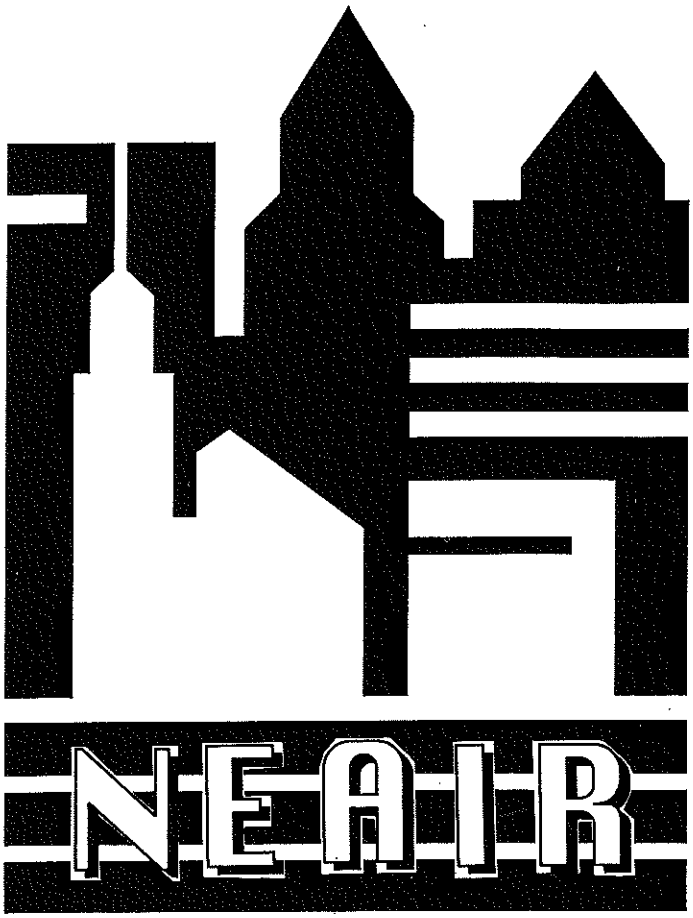
North East Association for Institutional Research

22nd Annual Conference

Proceedings

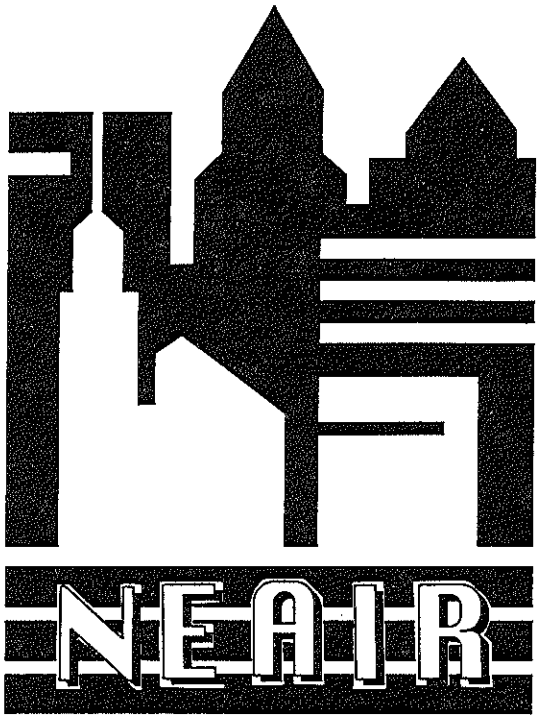


Comparative and Longitudinal Studies of Higher Education

Harvesting the Findings

Sheraton Burlington Hotel and Conference Center • Burlington, Vermont

October 28-31, 1995



COMPARATIVE AND LONGITUDINAL STUDIES OF HIGHER EDUCATION

President's Message

Dear Friends and Colleagues,

Thanks to all of you for contributing to a very successful 22nd Annual Conference of the Northeast Association for Institutional Research which was held in Burlington, Vermont. Although it is traditional to thank all of the folks who took on leadership roles in order to make the conference such a huge success (Dan, Becky, and Brenda), I always feel compelled to remind everyone that the success of the conference is directly related to the willingness of the membership to participate in a myriad of ways. The conference was a success because people taught workshops, presented a paper, talked to a vendor, taught the hand mimes to the unicorn song, engaged in an enrollment modeling discussion while watching the world series, or jumped in as a keynote speaker at the last minute. A good conference results when it is truly the sum of its strengths -- in the case of NEAIR the wonderful people and personalities that bring their quirks, laughter, and intelligence together once a year.

I offer you these proceedings which have been expertly edited and woven together into a seamless document (thanks Anne Marie!). I offer you good wishes until we convene again in Princeton.

Marian Pagano
President, NEAIR 1994-1995

Acknowledgment

A special note of gratitude is extended to Mr. Ce Shen, Research Associate for Program Research in the School of Education at Boston College. His professional contribution has been significant both in terms of his technical expertise and exceptional dedication to quality production standards. Special appreciation is extended also to Karen Hendrzak, a graduate student research assistant, for her proofreading and editing assistance in the preparation of the Proceedings.

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I. Papers and Selected Panel Presentations

* This paper was selected for the Best Paper Award.

The University Intellectual Environment: Do Perceptions Mirror Reality?

Audrey Adam
Research Analyst, Institutional Research
Tufts University

Introduction

Growing concern by the administration about student complaints concerning the intellectual and social activities on campus prompted the forming of a Task Force on Intellectual Life. The objective of the Task Force was to determine if there was a lack of intellectual and social activities on campus and the extent of the problem. The Office of Institutional Research also had received a request from a Trustee committee to survey the student population concerning social life on campus, particularly related to fraternities and sororities. It was decided that a survey of the intellectual and social environment be implemented in order to attempt to answer all the questions and concerns of the Trustee committee and administration. With feedback from the Task Force, the Dean of Students, the Trustee committee, and the input of students a survey was designed.

To assess the intellectual and social environment, as perceived by the student body, at a private research university, a survey was distributed to sophomores, juniors, and seniors during the fall of 1994. The intent of the questionnaire was to determine how students spent their time in course work, in contacts with faculty, in various social and cultural activities, using facilities, and opportunities that exist in the university setting. In addition, students were asked what perceptions they had about the intellectual and social environment, and how they rated aspects and priorities of the university.

Methodology

Data for this report were collected from questionnaires without an identifying variable. The survey was mailed to sophomores, juniors, and seniors during the fall of 1994. It was determined that first year students would not have been on campus for a sufficient amount of time to answer all the questions. Prior to the mailing of the survey The Office of Institutional Research contacted student leaders to enlist their help in prompting students to respond to the survey. An article in the student newspaper explained why the survey was designed and that students would be receiving the survey. After the survey was mailed, two follow-up reminders were placed in the student newspaper. The final response rate of 12% was less than hoped for.

This presentation will focus on the intellectual environment of the university community with an analysis of the perceptions and experiences of students. Three questions from the survey will be discussed: Given a list of statements students were asked to indicate their level of agreement concerning perceptions of the faculty; students were asked to rate their relationships with faculty in terms of approachability, understanding and encouragement; and finally, given a list of statements, students were asked to indicate how often they actually interacted with faculty. The responses to these questions were compared by college (Liberal Arts and Engineering), class standing, gender, and minority vs. non-minority status. Do perceptions change from one class year to the next? Do male and female students have different perceptions and experiences? How do experiences differ for the minority population versus the non-minority population? T-tests for significant differences were performed and all results are at the $p<.05$ level.

Profile of Respondents

Of the 364 respondents 64.4% were female and 35.6% were male. The response rate by class was 41.2% seniors, followed by 30.6% sophomores and 28.1% juniors. The majority of respondents lived in on-campus housing 70.2% followed by 23.5% living in off-campus housing, 4.1% living in a fraternity or sorority, and 1.1% living at home. U.S. citizens comprised 93.4% of the respondents and 6.6% were International students. White Americans made up 83.1% of the respondents, Asian Americans 10.3%, Biracial Americans 1.8%, African Americans and Hispanic Americans 1.2% and Other 2.4%.

Opinions About the University Intellectual Environment

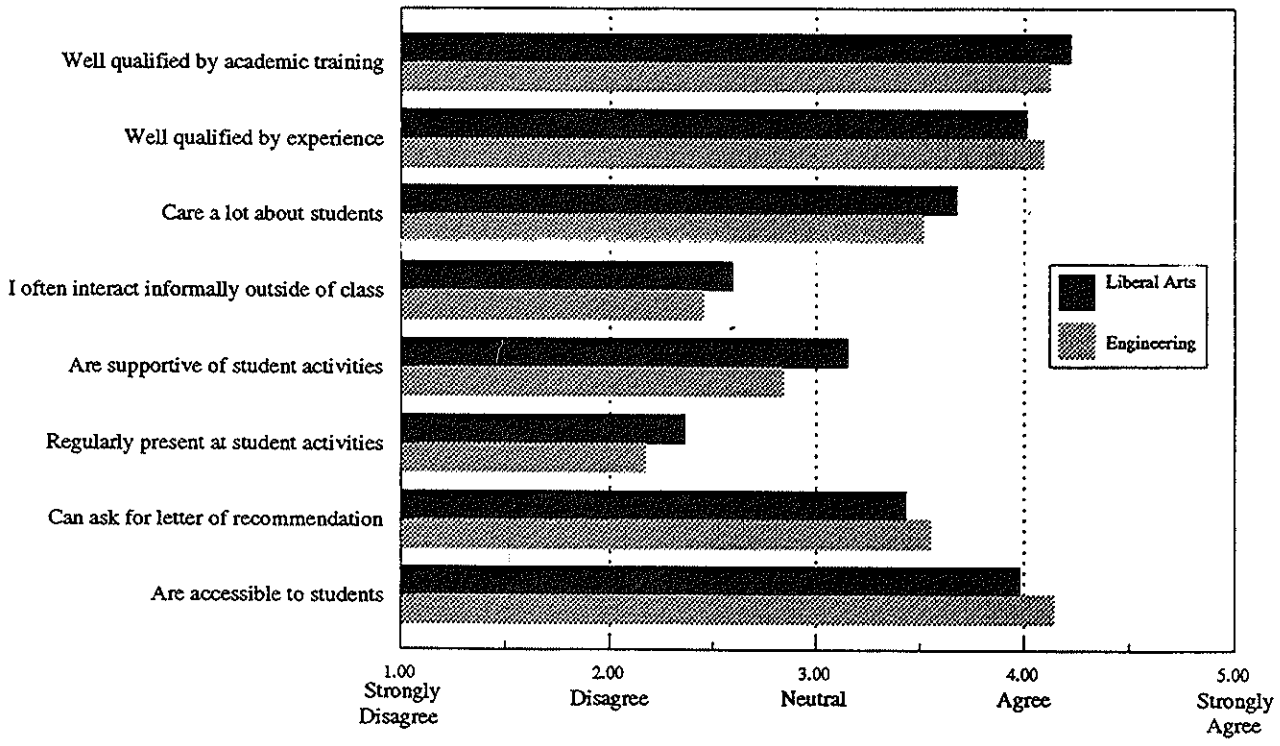
Students were asked to rate how the university emphasized the development of academic, scholarly, and intellectual qualities. Using a four-point scale with "4" as Very Strong Emphasis and "1" as Very Weak Emphasis, 36.5% of the respondents felt that the university placed a *very strong emphasis* on the development of academic, scholarly, and intellectual qualities; another 50.9% felt the university placed a *strong emphasis* on this aspect of the intellectual environment. A significant area of difference in response to this statement was seen between whites and minorities, with significant differences appearing again in the sophomore class between whites and minorities.

Perceptions of Faculty

One question of the survey asked students' level of agreement with statements concerning their perceptions of the faculty. The students were asked to indicate their level of agreement on a scale of 1 to 5 with "5" as Strongly Agree and "1" as Strongly Disagree. The mean responses by Liberal Arts majors and Engineering majors are shown in Graph 1. There was a significant area of difference in the responses of these two groups to the statement, *Faculty are supportive of student activities on campus.*

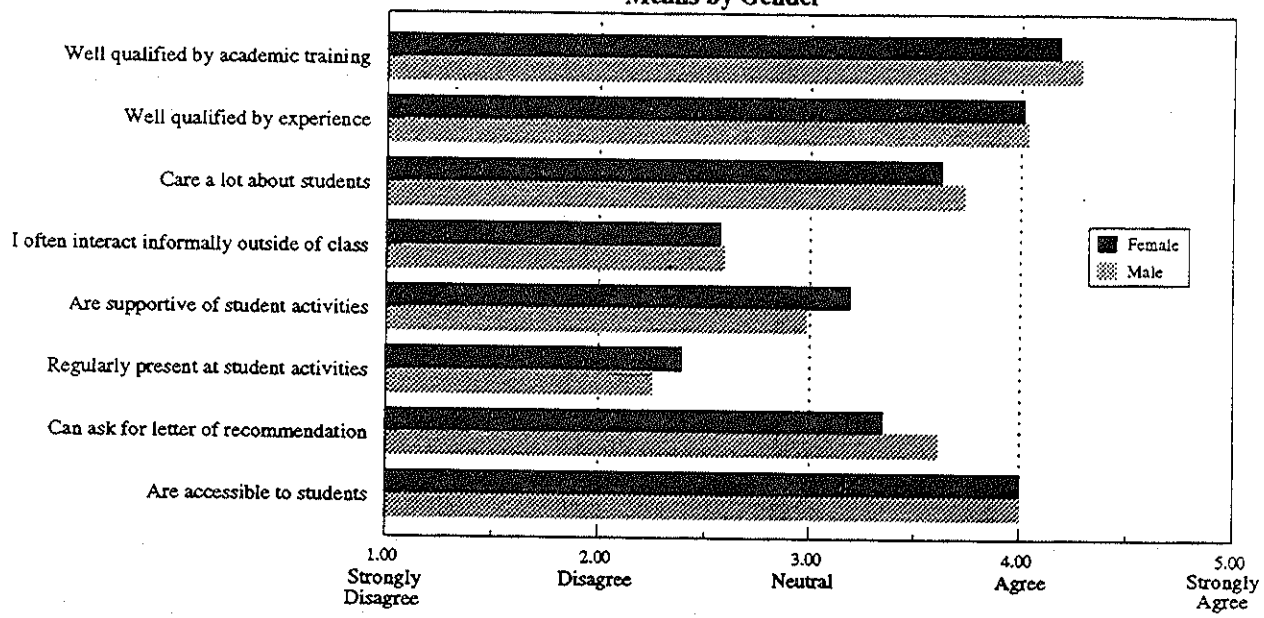
Graph 1

Perceptions of Faculty
Means by College



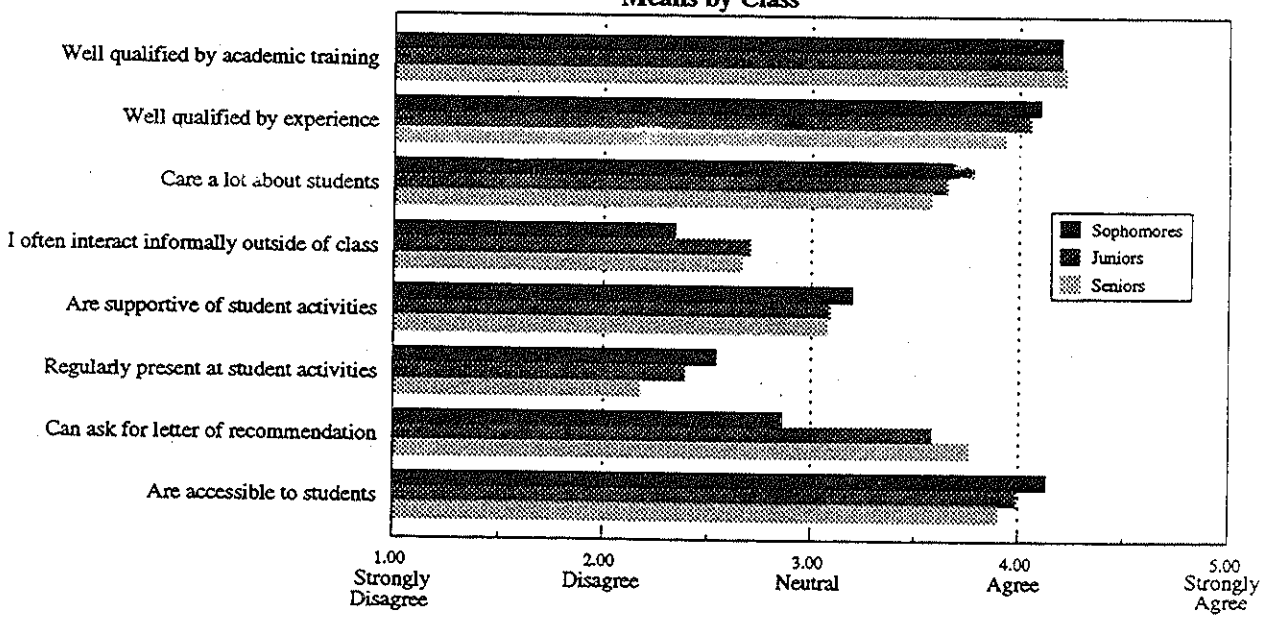
Perceptions of faculty by gender show a significant area of difference in the responses of these two groups to the statement, *I know faculty well enough to ask for a letter of recommendation*. Graph 2 shows the mean responses by gender.

Graph 2
Perceptions of Faculty
Means by Gender



Perceptions of faculty by class year show differences in the responses between sophomores and juniors and the responses between sophomores and seniors to the statement, *I know faculty well enough to ask for a letter of recommendation*. Graph 3 shows the mean responses by class year.

Graph 3
Perceptions of Faculty
Means by Class



Looking at each class individually revealed some differences by minority status and gender. Perceptions of the faculty by sophomores show differences between whites and minorities to two of the statements, *Faculty are well qualified by academic training* and *Faculty are well qualified by experience*. In the junior class, there were differences between men and women to the statement, *Faculty are supportive of student activities on campus*.

Relationships with Faculty

Another question on the survey asked students to rate their experiences with faculty. The students were asked to rate their relationships with faculty using a five-point scale with "5" as *very approachable, understanding, encouraging* and "1" as *very remote, unsympathetic, discouraging*. Table 1 shows the mean responses for each statement.

TABLE 1 **Relationships with Faculty**

	Mean
Faculty are approachable	4.24
Faculty are encouraging	4.08
Faculty are understanding	3.59

5 = very approachable/understanding/encouraging *1 = very remote/unsympathetic/discouraging*

More than 90.0% of Liberal Arts majors and more than 85.0% of Engineering majors rated faculty as moderately to very approachable. More than 82.0% of Liberal Arts majors and 62.0% of Engineering majors rated faculty as moderately to very understanding. And about 82.0% of Liberal Arts majors and 62.0% of Engineering majors rated faculty as moderately to very encouraging. Relationships with faculty by college show differences in the responses between Liberal Arts majors and Engineering majors to the statements, *Faculty are understanding* and *Faculty are encouraging*.

Relationships with faculty within class years show differences in the senior class by college and gender. Relationships with faculty by seniors show differences in the responses between Liberal Arts and Engineering majors for all three statements: *Faculty are approachable*; *Faculty are understanding*; and *Faculty are encouraging*. Senior male and female responses show differences in responses to the statement, *Faculty are understanding*.

Experiences with Faculty

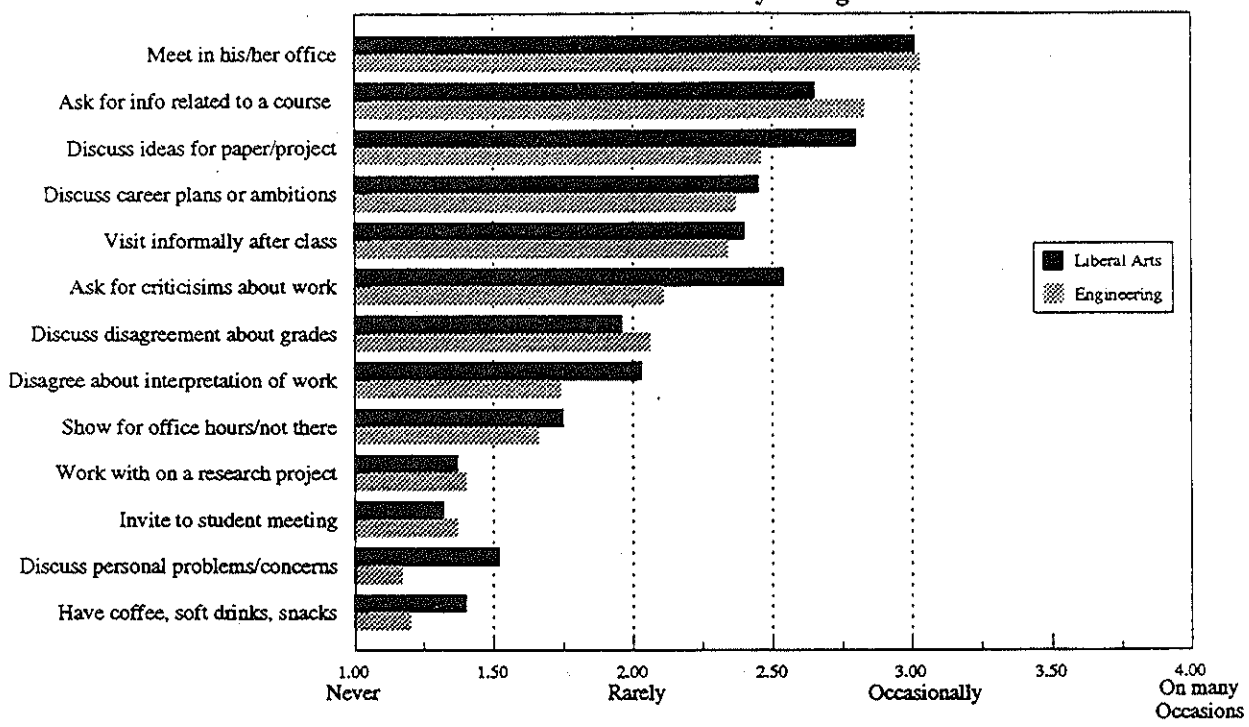
Students were asked how often they typically met with faculty members during a semester. based on a four-point scale with "4" as *on many occasions* and "1" as *never*.

Experiences with faculty by college show significant areas of difference in the responses by Liberal Arts and Engineering majors to three of the statements, *Discuss ideas for a term paper or other class project with a faculty member*; *Have coffee, soft drinks, or snacks with a faculty member*; and *Discuss personal problems or concerns with a faculty member*. Graph 4 shows the mean responses by college.

Responses by gender indicate differences between men and women for the statement, *Invite a faculty member to a meeting in which you are involved.* Experiences with faculty by ethnicity reveals differences in the responses of whites and minorities to the statement, *Discuss a disagreement about grades with a faculty member.* Graph 5 shows the mean responses by gender.

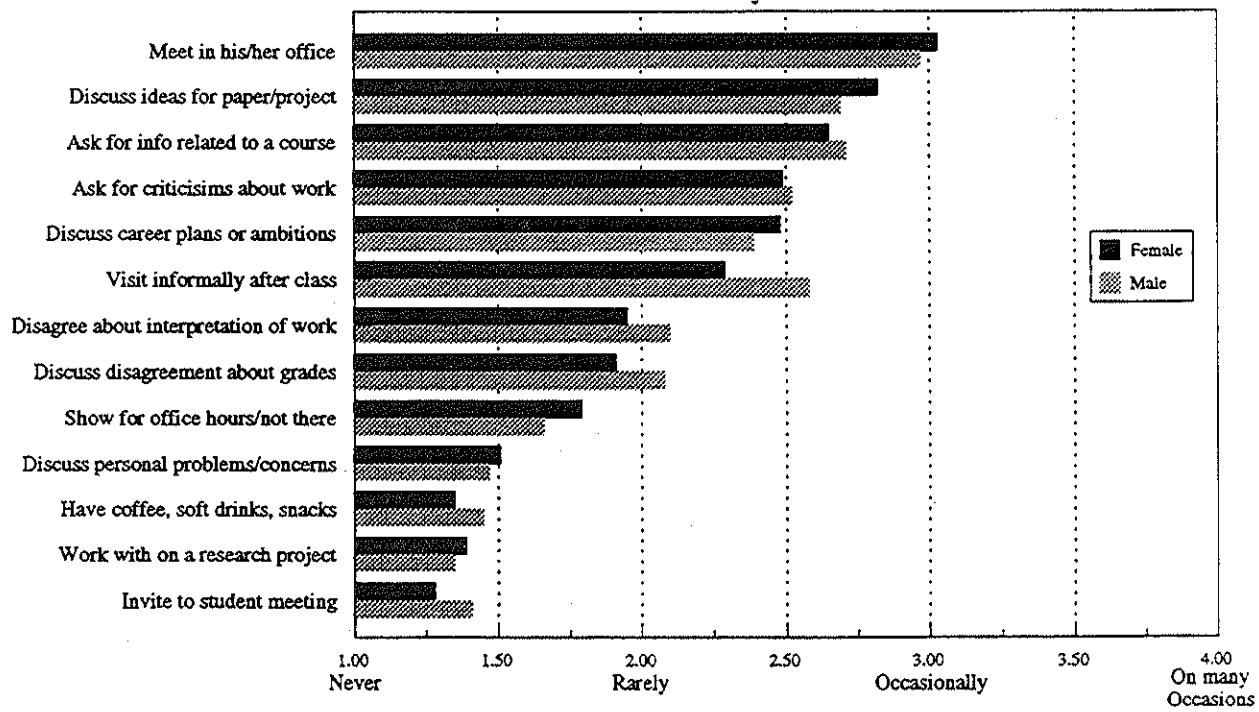
Graph 4

Experiences with Faculty
Means by College



Graph 5

Experiences with Faculty
Means by Gender



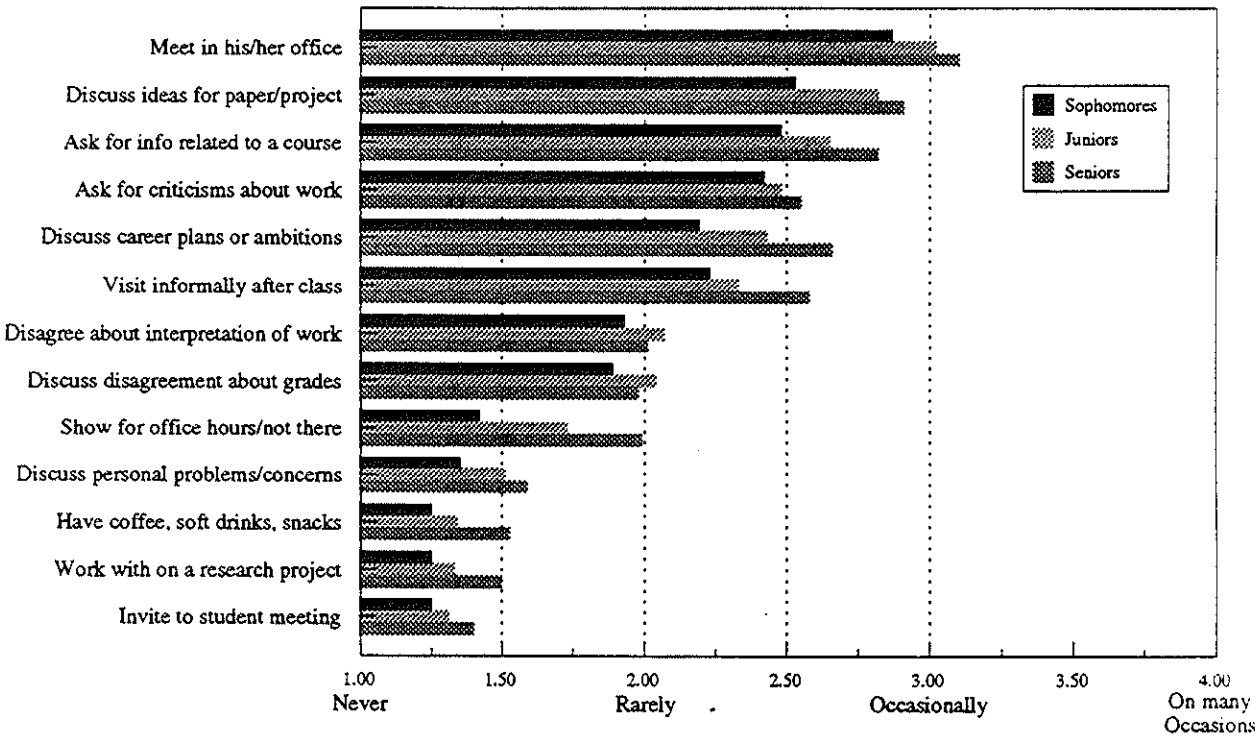
Looking at student experiences with faculty by class shows differences between sophomores and juniors, juniors and seniors, and sophomores and seniors. There were significant areas of difference in the responses between sophomores and juniors to the statements, *Discuss personal problems or concerns with a faculty member*, and *Show up during office hours to find a faculty member failed to keep his/her hours.*

Juniors and seniors responded differently to the statements, *Have coffee, soft drinks, or snacks with a faculty member*, and *Work with a faculty member on a research project.*

More differences appeared between sophomores and seniors in their interactions with faculty. There were significant areas of difference in the responses by sophomores and seniors to the statements, *Invite a faculty member to a meeting in which you are involved*; *Have coffee, soft drinks, or snacks with a faculty member*; *Work with a faculty member on a research project*; *Discuss personal problems or concerns with a faculty member*; and *Show up during office hours to find a faculty member failed to keep his/her hours*. Graph 6 shows the mean responses by class.

Graph 6

Experiences with Faculty
Means by Class



Experiences with faculty within class years show differences by college, gender, and ethnicity. Sophomore Liberal Arts and Engineering majors responded differently to the statement, *Discuss ideas for a term paper or other class project with a faculty member.* Looking at responses by gender reveals differences to the statements, *Invite a faculty member to a meeting in which you are involved*, and *Have coffee, soft drinks, or snacks with a faculty member.*

In the junior class differences by college were significant for the statement, *Discuss personal problems or concerns with a faculty member.* Gender differences appear for the statements, *Invite a faculty member to a meeting in which you are involved*, and *Meet with a*

faculty member in his/her office. Differences by ethnicity also appear in the junior class to the statements, *Invite a faculty member to a meeting in which you are involved*, and *Work on a research project with a faculty member.*

The senior class showed differences by college in their experiences with faculty. Liberal Arts and Engineering majors differed in their responses to the statements, *Discuss ideas for a term paper or other class project with a faculty member*; *Have coffee. soft drinks. or snacks with a faculty member*; and *Discuss personal problems or concerns with a faculty member*. Gender differences among seniors appeared for the statement, *Discuss your career plans and ambitions with a faculty member.*

Summary

Overall, students are meeting with faculty for routine matters related to course work more often than for social or personal matters. Students most often meet with faculty to discuss ideas for a term paper of project, to ask for information related to a course, and to ask instructors for comments and criticism of their work. On the other hand, students rarely discuss a disagreement about grades, discuss personal problems, have coffee, soft drinks, or snacks with faculty.

There were differences between Liberal Arts and Engineering majors with regard to faculty understanding and encouragement. Liberal Arts majors were more positive in their ratings of faculty on these attributes than were Engineering majors. Liberal Arts majors agreed more often than Engineering majors that faculty are supportive of student activities on campus. Discussing ideas for term papers or projects were more often done by Liberal Arts majors than by Engineering majors. Although both Liberal Arts and Engineering majors infrequently discussed personal problems with faculty or socialized (have coffee, soft drinks, snacks) with faculty, Liberal Arts majors tended to do these things more often than Engineering majors.

The perception students have of knowing a faculty member well enough to ask for a letter of recommendation differs for men and women, with men agreeing more often to the statement than women. As students progress through college they also tend to agree more often to this statement. Juniors agreed more often than sophomores and seniors agreed more often than juniors.

There were few significant differences between whites and minorities in their perceptions, relationships and experiences with faculty. Discussing a disagreement about grades was one experience where significant differences appeared. Minority students were slightly more prone to do this than were whites.

Actual experiences show that as students progress through college they tend to increase their interactions with faculty. Seniors more often than juniors socialize with faculty and more often work with a faculty member on a research project. As one would expect seniors' levels of interactions with faculty are greater than sophomores in areas such as inviting a faculty member to a student meeting, socializing, discussing personal problems, and working on a research project with a faculty member.

Within the sophomore class, there were significant differences between whites and minorities' perceptions of faculty qualifications by academic training and experience. Whites were more likely to give faculty higher ratings than were minorities. Sophomore men were more likely to invite a faculty member to a meeting and socialize with faculty than were sophomore women. Junior men also were more likely to invite a faculty member to a meeting than were junior women. Junior women perceived faculty to be supportive of student activities on campus more so than junior men.

Taking Values Seriously: Assessing the Mission of Church-Related Higher Education[1]

Bayard Baylis, Associate Dean
Messiah College

Introduction

In their seminal work, *How College Affects Students*, Pascarella and Terenzini [1991, p. 269] begin their chapter on Attitudes and Values by saying, "There can be little doubt that American colleges and universities are and have been deeply concerned with shaping the attitudes, values, and beliefs of their students." They continue by noting that "there probably is substantial agreement among faculty and administrators, as well as parents, legislators, alumni, and students themselves, that higher education institutions should be involved in the shaping of values." Beyond this, however, there is little or no agreement on anything else.

What values should be taught? How energetically should values be taught? Are changes in values and attitudes a result of the college experience or just a result of maturation? Part of the difficulty in answering these questions comes from the fact that the term *values* means different things to different people. Part of the difficulty comes from the problem of determining the degree of correspondence between belief and practice. (Do we practice what we preach?) Finally, part of the difficulty comes from the complications of a changing society. In any long term study, are the observed changes due to the college experience or changes in society? We know that culture and society change, and that individuals within the culture and society change. Our students change. Are those changes the result of our colleges or of the societal changes all around us? How can we determine the sources of the changes? What can a college do to determine how well it is doing in shaping the values of its students? How do we know if those promises made in the mission statement are being fulfilled? How do we answer constituents and accrediting agencies when they ask how well are our goals being met? How do we answer our students? How do we answer ourselves?

These questions have been researched and discussed for more than thirty years. The Coalition of Christian Colleges and Universities (CCCU), an association of 90 colleges and universities, all with comprehensive curriculums rooted in the arts and sciences, and supported by an expanding coalition of affiliated institutions and many organizations, foundations and individuals, has become very interested in these questions. For a number of years, individuals representing many institutions within the CCCU have been talking about assessment in general, and assessment of values in particular.

In 1984, a faculty member at one of the CCCU colleges surveyed the graduates of the class of 1979 at thirteen of the CCCU institutions. The purpose of this survey was an attempt to determine the extent to which alumni thought their undergraduate education influenced their affective development. The survey consisted of twenty-eight statements derived directly from the mission statements of the thirteen institutions. The instrument was designed to measure the perceived college-related influence on a set of affective outcomes such as values, attitudes and

[1] The Coalition for Christian Colleges and Universities wishes to gratefully acknowledge and thank the Fund for the Improvement of Postsecondary Education (FIPSE) for their support through the partial funding of Taking Values Seriously: Assessing the Mission of Church-Related Higher Education, grant number P11B40838-95.

beliefs. Respondents were asked to indicate on a four-point, anchored Likert scale (none, very little, somewhat, very much) the level of influence they thought their undergraduate experience had on the particular aspect of their affective development. In 1987, the survey was repeated with the graduates of 1982.

In 1987, three faculty members at three different CCCU schools initiated a longitudinal study of students at their colleges. The primary objective was to investigate the entry- and exit-level characteristics of students with respect to psychosocial development, values and moral reasoning. In the fall of 1987, 100 first year students were tested, using the *Survey of Major Social Issues* (Pace 1975), the *Defining Issues Test* (Rest 1979), and the *Rokeach Values Survey* (Rokeach 1975). In addition, a videotaped interview of each participating student, stressing identity development, moral reasoning and cognitive style, was conducted. In the spring of 1991, a follow up assessment was conducted of the 75 students still enrolled at the three colleges. The follow up study consisted of another videotaped interview and administration of the three quantitative surveys.

In the fall of 1990, fourteen CCCU colleges began to work toward a cooperative venture centering on the use of the Cooperative Institutional Research Project's freshman survey (CIRP). The fourteen colleges pooled their data to come up with a normative group of 3,632 Christian college freshmen. Several analyses of this data have been done. A follow up administration of the College Student Survey (CSS) was done in the spring of 1994 to graduating seniors at twelve of the original fourteen colleges. The data from this follow up is currently being analyzed.

In the spring of 1993, a working conference, entitled **Assessment in Christian Higher Education** was held at Calvin College, Grand Rapids, Michigan. This conference produced several results. The first was a book, entitled *Assessment in Christian Higher Education: Rhetoric and Reality* (edited by Lee and Stronks, 1993), of conference papers and other essays addressing the question: "How can we know if the education promised in our mission statements is actually taking place?" The essays attempt to address, in both practical and theological ways, the current shape of this area of scholarly concern, and also take some initial steps in charting the course of future research. The second outcome of the Calvin conference was the identification of individuals on more than 50 of the CCCU colleges and universities, who would serve as contact people for assessment endeavors. The CCCU formed three "working groups" to continue the cooperative assessment ideals. As an indirect outgrowth of one of the working groups, the CCCU and one college jointly began publication of a research journal, **Research on Christian Higher Education**. The inaugural issue was published in the summer of 1994 with a second issue coming out in the summer of 1995.

As a direct outgrowth on another of the working groups, the CCCU sponsored the first of a planned series of conferences on assessment issues for its members. The first conference was a national conference held in the fall of 1994. In the summer and fall of 1995, seven regional conferences were held to permit more campus representation at these meetings. In the fall of 1996, another national conference is planned.

Also, as a direct outgrowth of one of the working groups, a proposal was submitted to FIPSE to fund an extensive, values-oriented assessment project involving a number of institutions and a number of methodologies. After much discussion with FIPSE, the proposal was funded and **Taking Values Seriously: Assessing the Mission of Church-Related Higher Education** became a reality. Taking Values Seriously: Assessing the Mission of Church-Related Higher Education is a six-year project, involving 50 church-related institutions and more than 10,000 students and 1,500 faculty. The project looks at the values of students as they enter college, as they graduate and after they have been out of college two years. It also looks at faculty and their perspectives on values, both for themselves and their

students. The project includes both quantitative and qualitative assessment methods. It uses pencil and paper surveys and videotaped interviews. The project makes use of both longitudinal and cross-sectional databases. The project will use standardized, nationally normed instruments and instruments constructed specifically for this project. The research design is shown on the next page.

This paper will discuss the research design and the question of what values are to be studied. The results of this past year's survey of freshmen have been analyzed and will be introduced, but more fully discussed in a later paper. The analysis of the videotaped interviews of freshmen is not complete and it is too early to be able to discuss any preliminary results. The perspective of how several institutions have used or are planning to use the project in their assessment program will also be discussed in another paper.

Research Design

The project will use the CIRP (for freshmen), CSS (for seniors) and faculty survey instruments from the Higher Education Research Institute (HERI). The use of these standardized instruments will enable the participating institutions to compare themselves not only with the other project institutions, but with the general college population. Additional questions will be included with each of the standardized instruments to get at more of the religious oriented values. An alumni survey that is being developed will include some of the questions from the standardized instruments plus some other "less well-known" instruments.

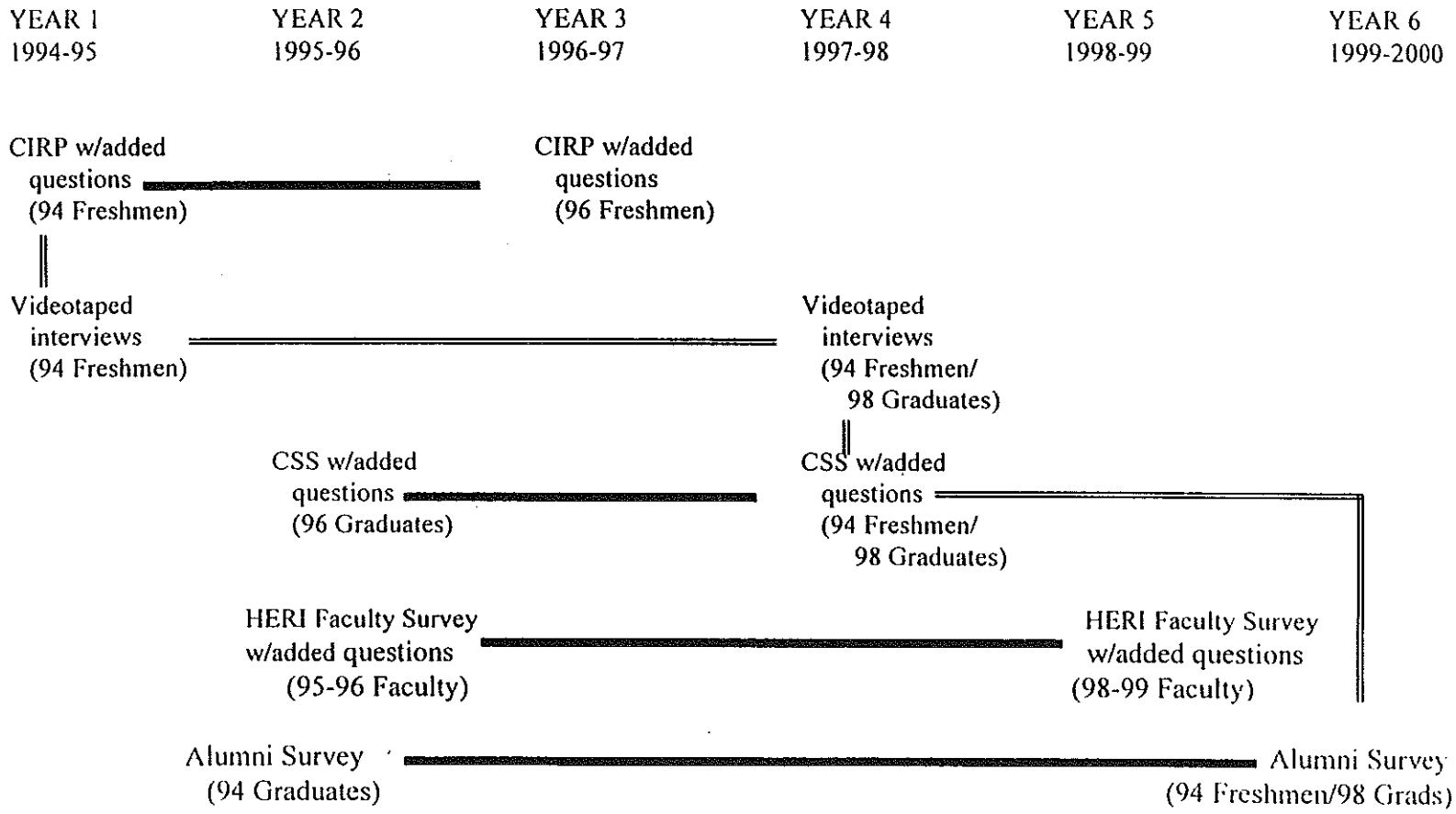
The research design calls for two administrations of each instrument. Taking "snapshots" of two different classes or groups of individuals using the same instrument helps "validate" the instruments and helps "define a norm" for the given group. If the two snapshots are "close," it gives us confidence in the instruments and in the assumption that the group can be described. If the two snapshots are radically different, additional research will be need to determine why.

An integral part of the project is videotaped interviews of a sample of entering freshmen and follow up videotaped interviews of the same students as seniors. The interviews will focus on identity questions with respect to political, social, occupational and religious values and gender roles. Using both quantitative and qualitative assessment methods will enable the participating institutions to validate their findings.

In order to achieve some commonality in the data being gathered, a core set of questions was developed that was used by all the participating colleges. Based on prior experience and the current research purposes, questions were developed that dealt with: reasons for selecting the college, preferences for classroom environment, issues of religious faith and doubt, political and social issues awareness, gender issues, and self-judgment of relative certainty of commitments.

Each college was expected to follow the same pattern with regard to data collection and processing. Directions were given for drawing the sample (e.g. minimum of 20 per college), selection of interviewers, videotaping, and time of administration (between October and December of the freshman year). The data analysis represents potentially the most difficult phase of the project. The problem is to coordinate up to 1000 videotaped interviews in such a way that insures some consistency in the data analysis. A decision was made to centralize most of the data analysis. Each school was requested to transcribe their interviews and forward copies of the transcripts (preferably both paper and electronic format) to the coordinators of the videotape component of the project. During the summer and early fall of 1995, the transcripts will be analyzed for Marcia's Ego Identity Statuses and certain other minimal content analysis.

RESEARCH DESIGN
COALITION FOR CHRISTIAN COLLEGES & UNIVERSITIES ASSESSMENT PROJECT
TAKING VALUES SERIOUSLY: ASSESSING THE MISSION OF CHURCH-RELATED HIGHER EDUCATION



KEY:

Cross-Sectional Data Base

Longitudinal Data Base

CIRP Student Information Form of the Cooperative Institutional Research Project of the Higher Education Research Institute (HERI) of UCLA.

CSS College Student Survey from HERI

HERI HERI Faculty Survey

Alumni Survey An alumni survey designed by cooperating CCCU institutions.

When completed, each school will receive a report on its individual interviews and some information on the pooled group of interviews for all reporting colleges.

The interviews were based upon the work of Erikson, Marcia and Parks. Erikson (1968) introduced the concept of **identity formation** during which young adults attempt to answer the question, "Who am I?" James Marcia (1980) proposed an **identity status** model to get at Erikson's concept of identity formation. Sharon Parks (1986) contended that the college years provide the best opportunity to reshape one's images and identity because the right combination of factors are all present.

Marcia's Identity Statuses Related to Crisis and Commitment		
	No Commitment	Commitment
No crisis	Identity diffusion	Identity foreclosure
Crisis	Identity moratorium	Identity achievement

The term *crisis* refers to the young adult's critical exploration of occupational, religious, and sociopolitical goals and beliefs. Commitment refers to one's selection of goals and beliefs from among alternatives. The four categories may be characterized as follows: **Identity diffusion**: *Precisis* and *precommitment*. A disinterested or detached young adult who is not critically exploring goals and beliefs and does not have commitments. **Identity foreclosure**: *Commitments* without *crisis* or borrowed commitments. A young adult with firm commitments that are not based on a process of personal, critical exploration; borrowed goals and beliefs from significant others, such as parents, teachers, pastors or peers. **Identity moratorium**: In *crisis* en route to *commitments*. A young person in the midst of critical exploration of alternatives. Like the identity diffused person, there are no commitments; however, the difference is that this individual is actively engaged in a search for commitments. **Identity achieved**: *Postcrisis* with personal *commitments*. A young adult with commitments to goals and beliefs based upon critical exploration.

Students typically enter college identity diffused or foreclosed. Several factors may interact to stimulate a process of moratorium or critical exploration. These factors include independence from home, having to make many decisions for oneself, and exposure to credible, alternative goals and beliefs in the form of teachers, peers, and curricular and extracurricular activities. It is hoped that four years of liberal arts education would bring students to a point of critical commitment, or at least to the point of engaging, personal examination of one's goals and beliefs. One can meaningfully apply these status designations to one's overall identity or to individual areas such as occupational, religious, political or gender role identity. For example, it is possible for a college senior to be occupationally achieved, religiously foreclosed, and politically diffused. Pascarella and Terenzini (1991, p 202) claim that *from two-fifths to two- thirds of entering freshmen may enter college and leave four years later with their identity status relatively unexamined* and therefore unchanged. Longitudinal research in Christian college settings have suggested that approximately 40% of college seniors are identity foreclosed. [Van Wicklin, Burwell & Butman, 1994].

What Values?

What are *values* or *attitudes*? The term *attitude* may be defined as the "mental position or feeling with regard to an object." The term *value* may be defined as "a principle or ideal of intrinsic worth or desirability." There is an important interplay going on here. Values and attitudes relate a property of an external object [intrinsic worth] with an internal process [feeling]. People impute worth or value onto objects, principles or ideals. Different studies have used slightly different definitions over the years.

Jacob [1957] defines values as "preferences, criteria, or choices of personal or group conduct." (pg xiii) Notice the emphasis on process. Preferences, choices and conduct are process words. Criteria may be a process word. The term criteria implies the existence of a rule for making a choice. The question is where did that rule come from? Did it come from the object? [intrinsic value] Did it come from the individual? [mental process]. Feldman and Newcomb [1969] begin their study of the effects of college by looking at values. They define values as "a cluster of attitudes organized around a conception of the desirable." (pg 7) They then look at the impact that a college makes on its students with respect to values.

Rokeach [1971] differentiated between values and attitudes by saying that "an attitude represents an organization of interrelated beliefs that are all focused on a specific object or situation, while...values are generalized standards of the means and ends of human existence that transcend attitudes toward specific objects and situations." (pg 453) In one sense Rokeach is saying that attitudes represent the particulars, while values are the universals. He developed an instrument, *The Value Survey*, which assesses goals in life (terminal values) and modes of conduct (instrumental values) in terms of their importance as guiding principles in life.

What are values? At least with these four authors, there is some consensus that values are general principles that guide an individual's decisions. These principles have an inherent organization to them, a rational basis and impute worth to objects and other individuals. Values speak to "what should be." This may be the closest that we can come to a working definition.

As noted above, the second problem in studying values concerns the degree of correspondence between the attitudes and values held and their consequential influence on individual actions. Do students, graduates, and alumni behave in a manner congruent with their stated beliefs? Do they (or we) practice what they preach? Should we be measuring the value structure of individuals (what they say they believe) or the behavior structure of individuals (what they do)? Should we be measuring what individuals say they do (activity surveys) or what they actually do (time logs, ethnographic observations)? Can we assume that professed values determine behavior? Can we assume that observed behavior was determined by a particular value structure? These questions are complicated by the fact that we can never know all the wide variety of general and situationally specific factors that can converge to determine individual actions.

The third problem in studying values arise from the complications of a changing society. Society and culture are not static. In the course of a decade there can be many changes in a society. From one year to the next those changes may not be noticeable. But over 10 or 20 years, the changes can be astounding. The question remains, "Are (or should) values be constant?"

Changes in societal values are usually gradual when viewed from a distance, but there can also be jumps brought about by certain events. Events like Woodstock, Watergate, the assassination of Martin Luther King, the Kent State incident, the Los Angeles/Rodney King riots, "Roe vs Wade," Sputnik, the "fall" of the television evangelists, and AIDS have had profound, immediate and drastic effects on our culture and societal values. Events like these are not predictable. We don't know if we will have more events like these during the six years of our project. We do know that these and other events have had and will continue to have significant influence on our culture and on the individual college students.

First, we indicated above that even though there is no standard definition of values, there is a general consensus about what values are. We have begun with that position. Second, the project deals with assessing the mission of church-related, higher education. Each institution has its own mission, and will have its own values. We believe that we have selected

a research design and instruments which will permit each institution to get at its own mission and values. Each institution will need to look at the important issues on the given campus for the given institution. But at the same time, the design and instruments will permit us to aggregate data from the CCCU institutions and make some generalizations concerning values. Finally, in any research project and especially in any FIPSE-funded project, new directions are possible, even expected. We are helping in the ongoing process of defining values.

In the preceding paragraphs, we presented three proposed definitions of the term *values*. The consensus of those definitions was that: *Values are general principles that guide an individual's decisions. These principles have an inherent organization to them, a rational basis and impute worth to objects and other individuals. Values speak to "what should be."*

Let us begin with this understanding of values. If we do, we can look at some of the work that has gone on before. For example, Jacob [*1957*] reported "more homogeneity and greater consistency of values" on the part of seniors than of freshmen. What does this mean? Jacob found this result somewhat disturbing. Instead of creating individuals with personalized values, he concluded that "the impact of the college experience" was strictly a "socialization" so that the individual could "fit comfortably into the ranks of American college alumni," i.e., an initiation so that the individual could join the club.

Jacob also concluded that the particular curriculum studied had little influence on students. The college experience was important. The particular college, program, major or curriculum were not. There were very little difference between the liberal arts and professional studies. Liberal arts education was not producing "a liberalization of student values." Feldman and Newcomb [1969] suggest that there are two processes at work. First, the prominence of an initial characteristic indicates a readiness on the part of the students to move in directions compatible with that characteristic. Secondly, this readiness is then reinforced by the fact that students discover many others which share this same interest. Social accentuation takes over.

The conclusions drawn by Feldman and Newcomb were stated as generalizations. However, their interpretations of the data and studies can be informative for us, and suggestive of ways to proceed. What does this mean for our colleges? These results represented the preponderance of evidence in 1969. They have been much quoted and much studied since then, with little contradiction. However, they do represent generalizations. They do not speak to the individual student or to individual colleges. If any college can make a difference in values, the church-related institution should be able to do so. That's what we are trying to determine. If we are making a difference, we need to find out why. If we aren't making a difference, we need to find out why not (or stop saying that we are).

We have already discovered many characteristics common to our students. As we look at the initial results from the CIRP, we need to look very carefully at those areas where we are different from the "typical" four-year college. Some of the preliminary results suggested areas where we were not that different from the general college population, and yet the public perception is that we should be different. [The best place for married women with children is in the home.] What is going to happen to CCCU students in such areas?

Accentuation has emerged in many different forms, whether under certain conditions, of individuals' initial prominent characteristics, or of initial differences among groups of students. What this is saying is that the processes of attracting and selecting students are interdependent with processes of impact. Colleges' impacts begin before the students arrive. But by the same token, the delayed selection process of attrition, impacts continuing students. The disappearance of certain kinds of dropouts not only sends a message to the continuing students, it also removes the "influence" of the dropouts on the continuing students.

Taking Values Seriously: Assessing the Mission of Church-Related Higher Education[1]

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Introduction

In their seminal work, *How College Affects Students*, Pascarella and Terenzini [1991, p. 269] begin their chapter on Attitudes and Values by saying, "There can be little doubt that American colleges and universities are and have been deeply concerned with shaping the attitudes, values, and beliefs of their students." They continue by noting that "there probably is substantial agreement among faculty and administrators, as well as parents, legislators, alumni, and students themselves, that higher education institutions should be involved in the shaping of values." Beyond this, however, there is little or no agreement on anything else.

What values should be taught? How energetically should values be taught? Are changes in values and attitudes a result of the college experience or just a result of maturation? Part of the difficulty in answering these questions comes from the fact that the term *values* means different things to different people. Part of the difficulty comes from the problem of determining the degree of correspondence between belief and practice. (Do we practice what we preach?) Finally, part of the difficulty comes from the complications of a changing society. In any long term study, are the observed changes due to the college experience or changes in society? We know that culture and society change, and that individuals within the culture and society change. Our students change. Are those changes the result of our colleges or of the societal changes all around us? How can we determine the sources of the changes? What can a college do to determine how well it is doing in shaping the values of its students? How do we know if those promises made in the mission statement are being fulfilled? How do we answer constituents and accrediting agencies when they ask how well are our goals being met? How do we answer our students? How do we answer ourselves?

These questions have been researched and discussed for more than thirty years. The Coalition of Christian Colleges and Universities (CCCU), an association of 90 colleges and universities, all with comprehensive curriculums rooted in the arts and sciences, and supported by an expanding coalition of affiliated institutions and many organizations, foundations and individuals, has become very interested in these questions. For a number of years, individuals representing many institutions within the CCCU have been talking about assessment in general, and assessment of values in particular.

In 1984, a faculty member at one of the CCCU colleges surveyed the graduates of the class of 1979 at thirteen of the CCCU institutions. The purpose of this survey was an attempt to determine the extent to which alumni thought their undergraduate education influenced their affective development. The survey consisted of twenty-eight statements derived directly from the mission statements of the thirteen institutions. The instrument was designed to measure the perceived college-related influence on a set of affective outcomes such as values, attitudes and

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But the Allport instrument can be instructive to us. It consists of two parts. In the first part, respondents are given 30 situational questions with two alternative answers and required to indicate the strength of their preference by distributing three points between the two alternatives. In the second part, respondents are asked 15 questions and required to rank order the four alternative answers. Respondents are thus given 20 opportunities to endorse each of the six value orientations. The instrument has been very useful in documenting value changes among college graduates for more than 40 years. Many studies during the past six decades have produced partial support for the Spranger conceptualization.

If we look at particular questions on the CIRP freshmen survey we will see some of the Spranger types or orientations. "Becoming successful in a business of my own" and "Being well off financially" help identify those students with an economic orientation. "Writing original works (poems, novels, short stories, etc.)" and "Creating artistic work (painting, sculpture, decorating, etc.)" help identify the aesthetic orientation. "Making a theoretical contribution to science" and "Developing a meaningful philosophy of life" help identify the theoretical orientation. The CCCU added questions of "I have a personally meaningful relationship with God" and "The way I do things from day to day is often affected by my relationship with God." to help identify the religious orientation.

If we look at the questions and even the format of the videotaped interviews, we can see the Spranger orientations evident. The questions "Are there any social or political issues that you would say you feel strongly about?" and "How certain are you of your current social/political views?" would help identify social or political orientations. The series of questions on doubting one's religious convictions would help identify a religious (or lack of) orientation. Questions on major and occupational choice would definitely help identity a person's theoretical or economic orientation. The Spranger model or construct has had a significant impact on values research since its introduction. Pascarella and Terenzini indicate that most of the research literature on values during the 70's and 80's could be classified into five general categories: (1) cultural, aesthetic and intellectual; (2) educational and occupational; (3) social and political; (4) religious; (5) gender. Within the first four Pascarella and Terenzini categories, we see the definite influence of Spranger. The fifth category is new. There have been cultural changes since 1928. [Would Spranger have had titled his book differently, if it were to be published today?] Gender roles are an important issue in today's world and we need to investigate it.

We still really haven't answered the questions "What are values?", "Why study values?" and "What values are we studying?". We are going to assume that: *Values are general principles that guide an individual's decisions. These principles have an inherent organization to them, a rational basis and impute worth to objects and other individuals.*

We are studying values because, based on the work of Jacob, Feldman and Newcomb, we believe that college can and should make a difference in students' values. We are proposing to use the Pascarella and Terenzini construct of five general categories of values: (1) cultural, aesthetic and intellectual; (2) educational and occupational; (3) social and political; (4) religious; and (5) gender roles. We have seen that this construct has a foundation in the work of Spranger, Allport and Marcia. We are going to look at values both at the individual and group level. Individuals have values. We will be looking at how an individual expresses those values, both in terms of stated beliefs and actions. We will also aggregate the values of individuals into group values, at the college and coalition level. As we aggregate, we may see subgroups emerge. We may be able to classify students using a typology analysis similar to that described by Astin [1993] or Baylis, Burwell and Dewey [1994].

There is great deal to do. We are expecting to do it.

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A Student Outcomes Typology for Community Colleges: Identifying Achievers with Longitudinal Cohort Analysis

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Governmental and accrediting agencies, college guidebook publishers, and others have focused on college graduation rates as a primary accountability measure. At open-admissions community colleges, with large proportions of students attending part-time, having goals other than degree completion, and needing remediation, such rates are often quite low. In addition, many students with goals of baccalaureate degrees transfer to senior institutions prior to completion of their community college programs. "Leaving early" for a senior institution does not represent a community college retention failure but often a rational advancement toward the student's ultimate goal. Community college assessment measures that focus exclusively on graduation rates are misleading, as is increasingly recognized. For example, transfer to "a higher level program for which the prior program provided substantial preparation" has been included as a "completion" in Student-Right-to-Know calculations.

Inclusion of transfer in summary outcomes measures is not sufficient, however. What is needed is an outcomes typology that (1) is comprehensible and accepted as legitimate by legislators, accrediting agencies, the public, and all others colleges are appropriately accountable to; (2) takes into account the full range of student goals in attending college; (3) acknowledges student enrollment behavior patterns, including part-time and stop-out attendance; and (4) provides a meaningful summary of student accomplishment that is useful to campus policymakers. The research office at Prince George's Community College developed the following student outcomes typology for both external accountability and internal decision support:

1. Award and transfer. The percentage of degree-seeking students in an entering cohort who have earned a degree or certificate from the community college *and* transferred to a four-year college or university within the study period. Depending on how the transfer information is obtained, transfer rates may be underestimated. This is likely for colleges relying on state reporting systems since student transfer to independent colleges or colleges outside the state are often not including in state-mandated reporting systems.

2. Transfer/no award. The percentage of degree-seeking students identified as transferring to a senior institution without having earned an award from the community college.

3. Award/no transfer. The percentage of degree-seeking students earning a degree or certificate from the community college for whom there is no evidence of transfer.

4. Sophomore status in good standing. The percentage of degree-seeking students who have not graduated from the community college but who have earned at least 30 credits with a cumulative grade point average of 2.0 or above, and for whom we have no evidence of transfer. Given the large proportions of entering students needing remediation and/or attending part-time, reaching sophomore status in good standing

represents a notable academic achievement. Probably included in this category are a number of students who have transferred to independent and out-of-state colleges or universities.

5. Achievers. A summary measure of the preceding four categories.

6. Persisters. The percentage of degree-seeking students still enrolled at the community college (as of the last term of the study period) who do not fall into any of the above "achiever" categories. They have not graduated or transferred, nor have they earned 30 credits with a 2.0 grade point average. Their outcomes are yet to be determined.

7. Other exiters. The percentage of degree-seeking students exiting the community college without graduating or earning 30 credits in good standing for which we have no evidence of transfer. Included in this group are the true "dropouts" who have not succeeded in reaching their goals within the study period. Some of these students may have transferred early (before accumulating 30 credits) to independent or out-of-state colleges, but most students in this group are appropriately considered as unsuccessful in achieving their academic goals at the college.

8. Special motive. Students who had indicated short-term, non-degree goals of personal enrichment or job skill upgrading *and* who attended only during the first two terms of the study period. Never intending to enter a curriculum or transfer, these students are properly excluded from attrition statistics.

The above classification becomes most meaningful when a substantial majority of the cohort has attained their ultimate community college outcome. While this argues for a fairly long study period, say six years or more, another consideration supports a shorter time span. Reporting on cohorts that entered many years ago runs the risk that student characteristics and institutional practices may have changed, so that the findings may not be useful guides for current policymaking. At PGCC, students are classified according to the typology at the end of three, four, five, and six years, with the four-year analysis included in reports to our Board of Trustees and our state higher education commission. Four-year outcomes for the fall 1990 cohort are reported in this paper.

A total of 2,643 first-time students entered the college in fall 1990. Of these, 256 indicated they had no intention of earning credits toward a degree, but instead were enrolled for short-term enrichment or specific skill upgrading reasons. Among the 2,387 degree-seeking students, 137 or less than 6 percent had earned an award from PGCC by the end of spring 1994. Another 214 (or 9 percent) had transferred to a four-year public college in Maryland. Thus 351 or nearly 15 percent had earned a degree or transferred within four years of entering the community college. An additional 314 students, or 13 percent, had earned at least 30 credits at PGCC with a cumulative grade point average of 2.0 or above. Including these sophomores in good standing with the graduates and transfers, the total proportion of fall 1990 entrants classified as achievers within four years was 28 percent.

Student Outcomes After Four Years Outcomes as of the End of Spring 1994 of Students Entering in Fall 1990		
Outcome	Number	Percent
Award and Transfer	54	2%
Transfer, No Award	214	9%
Award, No Transfer	83	4%
Sophomore w/2.0+ GPA	314	13%
Achievers	665	28%
Enrolled Spr 94 <30 Credits/ 2.0	175	7%
Dropouts	1,547	65%
Total Degree-Seeking Students	2,387	100%
Special Motive (excluded from above)	256	—

These outcome patterns varied by race/ethnicity, with Asian-Americans, White Americans, and international students achieving at higher rates than African-Americans and Hispanic-Americans. African-American and white students accounted for nearly nine in ten students in the cohort; their four-year outcomes are displayed below. White females had relatively high achievement levels. Forty-two percent of the white women had either graduated, transferred, or attained sophomore status in good standing within four years of entry to PGCC. This was slightly better than the white men, 38 percent of whom were classified as achievers according to the typology. In contrast, the achievement rates of African-American men and women were lower. Nineteen percent of the African-American women were classified as achievers. Only 13 percent of the African-American men had graduated, transferred, or attained sophomore status in good standing within four years.

Student Outcomes After Four Years, by Race/Ethnicity and Sex Outcomes as of the End of Spring 1994 of Students Entering in Fall 1990				
Outcome	African American Males	African American Females	White American Males	White American Females
Award and Transfer	1%	1%	4%	4%
Transfer, No Award	4%	4%	15%	15%
Award, No Transfer	2%	3%	3%	7%
Sophomore w/2.0+ GPA	6%	11%	16%	17%
Achievers	13%	19%	38%	42%
Enrolled Spr 94 <30 Credits/2.0	7%	10%	5%	5%
Dropouts	79%	71%	57%	53%
Total Degree-Seeking (100%)	463	718	400	496
Special Motive (excluded above)	30	88	40	73

The next step in the longitudinal cohort analysis involved an examination of student patterns of attendance, to see if they were associated with student outcomes four years after entry. As expected, students attending in fall 1990 and at most only one other term were unlikely to attain achiever status as defined in the OIRA typology. Only four percent of these short-term attenders were classified as achievers, almost all through early transfer to a senior institution in Maryland. Among those students attending at least three terms, however, a substantial difference was found. Students who attended the first three major terms (fall 1990, spring 1991, and fall 1991) were more than twice as likely to be achievers than students who were absent in either the spring or fall of 1991. A majority of those getting off to a "good start" had graduated, transferred, or attained sophomore status in good standing within four years of entry, compared to only 22 percent of those who attended three or more terms but did not enroll in all of the first three major terms. Students with the "good start" attendance pattern of enrolling in at least the first three terms without interruption had higher rates of graduation, transfer, and sophomore attainment:

Outcomes After Four Years, by Attendance Pattern
Degree-seeking Students Entering in Fall 1990

Outcome	"Good Start" (First 3 Terms)	3 or More Other Terms	1 or 2 Terms
Award and Transfer	5%	1%	0%
Transfer, No Award	16%	5%	4%
Award, No Transfer	7%	4%	0%
Sophomore w/2.0+ GPA	26%	13%	<1%
Achievers	54%	22%	4%
Enrolled Spr 94 <30 Credits/2.0	8%	23%	2%
Dropouts	38%	55%	94%
Total Degree-Seeking (100%)	1,030	309	1,048

The last component of this initial use of the longitudinal outcomes typology was to examine the impact of the need for remediation on four-year outcomes. Earlier OIRA studies had found that mathematics ability was a key predictor of success, a finding consistent with much national literature. Exploratory studies at PGCC had suggested that students needing remediation in mathematics and at least one other area — reading or English composition or both — were at greatest risk of not succeeding. This proved true for the fall 1990 cohort. Only 11 percent of the students identified as needing developmental courses in mathematics and at least one other area were classified as achievers after four years. In contrast, students with no developmental needs achieved at a rate of 44 percent. Adding in persisters — students enrolled at PGCC the last term of the study period — found half of the students not needing remediation successful, compared to only 20 percent of the "developmental math plus" group. Among full-time students, 56 percent of the non-developmental group — compared to 17 percent of the developmental math plus group — had graduated, transferred, or attained sophomore status in good standing within four years.

Student Outcomes After Four Years, by Developmental Need Outcomes as of the End of Spring 1994 of Students Entering in Fall 1990				
	No Developmental Needed		Developmental Math Plus	
Outcome	Total	Full-time	Total	Full-time
Award and Transfer	4%	7%	<1%	1%
Transfer, No Award	17%	24%	2%	4%
Award, No Transfer	5%	6%	1%	2%
Sophomore w/2.0+ GPA	18%	19%	7%	9%
Achievers	44%	56%	11%	17%
Enrolled Spr 94 <30 Credits/2.0	6%	4%	9%	7%
Dropouts	50%	40%	80%	76%
Total Degree-Seeking (100%)	949	536	628	281

Achievement rates were calculated for several academic variables, each of which appeared to be associated with student success. The more terms a student attended, and the more credits carried each term, the higher the achievement. Students who attended without interruption had higher achievement rates than students who interrupted their studies. And students who were always in good academic standing had higher achievement rates than those who attended one or more terms on academic probation or restriction.

The table below shows the achievement rates of various cohort sub-samples defined by single variables individually. But in reality, the factors inhibiting or facilitating academic success are cumulative and interactive. One way to see this is to create a new table that shows the achievement rates of successive sub-samples created by adding criteria one at a time, steadily decreasing the size of the sample by more narrowly defining it. Beginning with the total degree-seeking cohort of 2,387 students, that collectively generated a 28 percent achievement rate, the addition of each additional criterion raised the achievement rate substantially. The sub-sample of all full-time degree-seeking students, accounting for a third of the total cohort, had an achievement rate of 45 percent. Nearly three-fifths of the full-timers who were tested and did not need remediation had graduated, transferred, or achieved sophomore status in good standing.

Percent Achievers, by Academic Characteristics			
Student Characteristics	Number of Students	Percent of Cohort	Percent Achievers
Mean Credit Load 15+	104	4%	59%
12 - 14 Credit Hours	669	28%	43%
9 - 11 Credit Hours	558	23%	37%
6 - 8 Credit Hours	544	23%	19%
< 6 Credit Hours	512	21%	4%
No Remediation Needed	949	40%	44%
Remediation Required	1,249	52%	19%
Not Assessed	189	8%	10%
Attended 7 - 8 Major Terms	276	12%	72%
5 - 6 Terms	440	18%	55%
3 - 4 Terms	623	26%	31%
1 - 2 Terms	1,048	44%	4%
Continuous Enrollment	809	34%	58%
Interrupted Enrollment	1,578	66%	13%
Always in Good Standing	849	36%	58%
At Least One Term not G.S.	1,538	64%	12%

The achievement rates for each successive sub-sample, and the number and percent of students represented, were as follows:

Percent Achievers, by Cumulative Academic Characteristics			
Cumulative Criteria Sub-samples	Number of Students	Percent of Cohort	Percent Achievers
All degree-seeking students	2,387	100%	28%
• Mean term credit load 12+	773	32%	45%
• No remediation required	414	17%	59%
• Attended 3 + major terms	249	11%	83%
• Continuously enrolled	194	8%	90%
• Always in good standing	169	7%	96%

Ninety-six percent of the cohort degree-seekers who attended full-time, had college-level basic skills at entry, attended three or more terms without interruption, and were always in good academic standing, succeeded according to our definition. For those students who came to the college with an adequate academic background, were able to make a commitment to full-time, uninterrupted study, and who studied sufficiently to earn passing grades, success was almost certain. The explanation for the poor overall achievement rates at PGCC is that so few of the college's students fit this profile.

How did all of the correlates of academic outcomes just discussed work together to predict student achievement? To answer this question requires some form of multivariate

analysis which can identify and separate robust indicators from those whose predictive power is only a product of spurious correlation. The method chosen for our multivariate analysis of 1990 Cohort four year academic achievement was *logistical regression.* This technique was specifically developed to handle situations like ours where the analyst must model the collective impact of a set of category independent variables upon a dependent variable taking 0/1-indicator or flag form. In this case, standard linear regression is precluded because variable distributions are inherently non-normal.

The output of a logistical regression is a linear regression-like equation. The equation's b-coefficients, when multiplied by their respective variable category values and then summed, produce a natural log-based statistic (Z^2), the antilog of which is an estimate of the overall probability of a case falling into the indicator classification. These estimates of classification probability can be used to assign cases to their most likely dependent variable category. (For example, applying our data and the normal cut criterion of ≥.5, a student with a classification probability of .65 would be assigned to the achiever category, if .49 to the non-achiever category.) Comparison of predicted and actual dependent variable case classifications can then be made and predictive accuracy straight-forwardly expressed in terms of percent of cases correctly placed by the model.

As in standard regression analysis, selection of independent variables for the logistic regression equation can be carried out using forward inclusion procedures based on the statistically significant predictive weight each tested variable may contribute to the accumulating total. However, where forward standard regression proceeds according to *continuous* variable addition to total R^2, forward logistical regression selects *category* variables according to the amount each would improve (decrease) the preceding joint Chi^2. A statistical significance test of each variable inclusion step, as well as for the resulting full logistic equation, is possible, and various goodness-of-fit statistics, based on a probability measure known as the likelihood statistic (or *-2LL*), are available for estimating the overall power of the model. Finally, the typical logistical regression analysis generates an association coefficient called *R*, analogous to the Pearson part- correlation of linear regression, for gauging each equation variable's singular contribution to the model.

In preparing for the logistical regression analysis, we selected 58 independent variables for trial inclusion representing all of the forces we hypothesized might condition academic progress at PGCC for which we had indicators:

- *Social Background* (Age, Sex, Race/Ethnicity, Socio-Economic Status, etc.)
- *Entry Condition* (Immediate Entry from High School, Type of High School.)
- *Attendance Location/Schedule* (Main Campus or Extension Centers, Day, Evening or Weekend Classes, etc.)
- *Study Objectives* (Transfer, Degree, Job-Related, Self-Enrichment, etc.)
- *Study Curriculum* (Transfer or Occupational Program, Specific Major, etc.)
- *Remediation Status* (Placement Test, Number of Developmental Areas Required, Program Completion, etc.)
- *Course Effort* (Credit Hour Load, Summer Attendance, etc.)
- *Course Performance* (Cumulative GPA, Academic Standing, etc.)

The social background battery was particularly rich due to the inclusion of a set of 12 items relating student neighborhood of residence to U.S. Census data on annual household income, percent of college graduates, upper white collar employment, official poverty rate and the like. Variables having to do with credit accumulation (Number of Major Terms Attended, Four Year Cumulative Credit Hours Earned) were deliberately excluded from the equation since credit accumulation success is a dimension of the dependent variable (e.g., 30 or better credit hours earned). Indicators of the "good start" phenomenon and non-interrupted attendance

generally also were not tested here, in this case because of a problem in variable definition: to make any sense of the concept, assessing continuity of study requires a study interval of at least three major terms and therefore can only be carried out on a cohort subsample consisting exclusively of post-Term 2 students. The results of our logistical regression are summarized in the table below.

The overall model seemed to show good technical goodness-of-fit, which is measured in logistical regression by a comparison of the -2 Log Likelihood before variable inclusion with the *-2LL* after model building is complete. Perfect "fit" would be represented by a model with 0 *-2LL*. Our model represented a considerable -2LL drop of 1554 down from a pre-model figure of 2837, statistically significant at the p<.0000 level. Furthermore, the logistic model seems to possess a striking power of predictiveness, correctly classifying 87 percent of degree-seeking cohort students into their proper academic achievement categories – an improvement of 75 percent over coin flipping results and an increase of 55 percent over guessing the known mode in every case.

We attempted to corroborate the logistic model by running the same data through linear regression and discriminant analyses. Even though these methods were technically less appropriate given the level of measurement of our variables,we felt that their approach to model building and underlying mathematics were close enough so that similar results ought to be obtained if the logistic model was valid. This proved to be the case: the variable components of linear and discriminant models, and their relative proportional contributions, were nearly identical to those in the logistic model. The linear model's goodness-of-fit, as measured by Pearson's R^2, was 47 percent of the total variance explained, while the discriminant model (mathematically equivalent to the linear model when, as here, the dependent variable is a dichotomous indicator) correctly identified the achievement categories of 86 percent of the cohort's members.

More interesting, of course, is the structure of the model itself: Which variables made it into the equation (and which did not), and how much explanatory power did each included variable possess relative to the others? The first question is easily answered by comparing the lists of researcher-entered and model-included variables. The hard task in regression analysis, logistical regression not excepted, is always the assessment of relative variable contributive weights. Setting aside issues of collinearity (high variable inter-correlations) for the moment, this is true because contributive "weight" can mean several different things, each measured by a different variable-specific statistic.

In logistic regression, for example, the *b* coefficient gauges a variable's instrumental weight in producing model predictions of case values. The *R* partial correlation indicates an independent variable's *singular* power to determine the behavior of a dependent variable bounded by a set of other independent variables. And improved Chi^2 suggests how much each new variable contributes to the *joint* power of a growing multivariate model. Both are provided in the table (which also shows the simple bivariate *Eta* correlation for reference sake), but in the discussion to follow, we will focus on *R*, which holds the most theoretical interest.

According to the table, only 13 of the initial 58 independent variables were accepted for model inclusion, five of which seem to be prime contributing factors: *Four Year Cumulative Grade Point Average* turned out to be the top explanator of student achievement (*R*=+.25); Final GPA also registered one of the highest improved Chi^2 values (227). *Attendance during Any Summer Session* showed the second strongest partial correlation with student achievement (+.21) as well as adding a very robust improved Chi^2 value (333) to the model. The third highest R was scored by the *Any Change in Major* variable (+.16) which, however, registered only a mid-level improved Chi^2 value (90). Following change of major in *R* coefficient importance was *Four Year Always in Good Academic Standing* (+.125) with an improved Chi^2

Logistical Regression Model of Four Year Student Achievement

Data Source: Fall 1990 Cohort of PGCC First Time Entrants (N=2,387)

Statistics for Whole Model

Intercept Only -2 Log Likelihood	2836.95	
Full Model -2 Log Likelihood	1282.87	
Full Model Chi^2	1554.07 (df=13)	.0000 Significance
Step Improvement Chi^2	4.33 (df= 1)	.0374 Significance

Model Equation Statistics

Independent Variable	Entry Step	Improv. Chi^2	*b* Signif.	*R* Partial Corr	Raw *Eta* Corr
Cum. Grade Point Average (4 Yr)	3	226.8	.0000	.250	.560
Summer Session - Any (4 Yr)	2	333.3	.0000	.213	.443
Curriculum Change - Any (4 Yr)	5	89.6	.0000	.156	.281
Acad Good Standing - Always (4 Yr)	6	47.3	.0000	.125	.462
Avr Credit Load - Major Term (4 Yr)	4	253.3	.0000	.103	.361
Remediation Completed - All (4 Yr)	10	5.0	.0021	.051	.112
Avr Credit Load (T1-T2)	8	11.9	.0039	.047	.356
Dev. Course-Taking - Any (T1-T2)	11	7.2	.0052	-.045	.196
No Curriculum Choice (4 Yr)	9	8.3	.0092	-.041	.125
Acad Good Standing (T1)	1	529.1	.0174	.036	.466
Immediate Entry from H.S. (T1)	7	33.4	.0196	.035	.188
New Collar Programs (4 Yr)	12	4.7	.0220	.034	.115
Under 21 Yrs Old (T1)	13	4.3	.0372	.029	.191

Predicted vs. Actual Case Classification

	Model Predicted		
Actual Outcome	Non-Achiever	Achiever	% Correct
Non-Achiever	1,590	125	92.7
Achiever	175	497	74.0
Overall Percent Correct Classification			87.4
Proportional Improvement over .5 Chance			74.8
Proportional Improv over Marginal Guessing			55.3

NOTE: All multivariate analyses were run on a dataset which excluded special motive student and was updated through summer session 1994.

value of only 47. The last of the prime model components was *Four Year Mean Major Term Credit Hour Load* which partial correlated +.10 with Student Achievement and considerably improved the joint Chi^2 (253). All of the above had 0-order correlations of at least .28 with Student Achievement.

The eight remaining table variables all showed Student Achievement absolute partial correlations of under .06. In R correlation order, these were: Completed All Required Remediation by Year 4, Term1-Term2 Mean Credit Load, Any Term1-Term2 Developmental Course-Taking (-), No Major Chosen (-), Term1 Good Academic Standing, Immediate Entry from High School, Enrollment in Hi-Tech or Allied Health Programs, and Younger than 21 Years. First Term Good Standing, however, broke from the pack by registering the highest improved Chi^2 (529) of any model variable.

Unfortunately there is no room in this short paper for a thorough exposition of all the statistical patterns revealed in the table. We hope that the following brief observations and conjectures will suffice for the present:

• Perhaps the most striking finding was the remarkable absence of all but one (Younger than 21 Years) of the social background variables from the model. Neither racial group nor gender nor any of the socio-economic measures available to the logistical regression procedure survived analysis.

• Moreover, the explanatory weakness of social variables can not be traced to the possible controlling effect of the more achievement-proximate course performance and academic status variables. A separate regression of social background variables only upon student achievement failed to yield a model of reasonable goodness-of-fit and case predictiveness (*-2LL* improvement of only 238 beginning with 2837; cases correctly classified 75 percent, or only 10 percent better than margin-based guessing). However, in other experimental analyses we found that social variables *did* have significant power to explain variation in *particular* intervening variables, especially credit load and remediation need.

• By type, the single most important block of variables in the achievement model related to student effort and performance (Credit Load, Cumulative GPA and Good Academic Standing). This reflects back upon our earlier cross-tabular findings and subsequent remarks concerning the centrality of simple study and persistence for community college students wishing to progress academically.

• As already explained, we were precluded by measurement logic from testing the impact of attendance interruption upon student achievement in a regression using the whole cohort database. However, an additional post-first year student only regression allowing for the inclusion of two pattern of attendance variables found that both the Good Start Effect (R = +.12) and Consecutive Major Terms Only variables (R=+.03) made the cut.

• We were surprised to find that, outside the effort and performance block, two most powerful model elements turned out to be Any Summer Session Attendance and Any Change of Major, which we initially thought of as minor variables introduced for the sake of comprehensive coverage. These may have functioned as indirect measures of two important psychological factors related to academic success — motivation and flexibility. Summer enrollment may signal the willingness and sense to make up for past failures or to take every opportunity to surge ahead. Changing one's choice of curriculum, similarly, might indicate the capacity to recognize a mistaken path and the courage to set forth on a new, more appropriate road. A change in major may also signify goal clarification which can increase motivation.

• Remediation status was represented in our model by only two variables — Completed All Developmental Requirements by Year 4 (R=+.05) and Any Developmental Course-Taking Term1-Term2 (R=-.05). None of the many other remediation-related variables satisfied the statistical criteria of the model. Although marginal direct explanators of student achievement, further regression analyses using developmental independent variables only showed them having a fairly robust collective impact upon all three principle course effort and performance variables in the model. The implication is the need for causal modelling such as path analysis to more fully understand the interactions among explanatory variables.

• Five of the 13 model variables were time-keyed to the first two major terms in the cohort's career. While none of them (except perhaps Term1 Academic Standing) showed a strong degree of model effect, their presence along side parallel variables representing the cohort's complete four year career imply a special role for the "launch period" in conditioning final outcomes. This makes sense when we consider that fully 38 percent of all degree-seeking cohort members ceased attending PGCC before the start of the third major semester.

In conclusion, it must be emphasized that the logistical regression model just presented should be taken as provisional and constitutes only a first step in what will be an on-going cohort-based research effort to uncover the true correlates of student achievement at PGCC. Much work remains to be done in the refinement of both data and methodology. On the data side, we are currently hampered by inadequate information concerning the actual scope of four year school transference from PGCC, a major element of achievement indicator. Given present data sources, our dependent variable misclassifies a small but significant minority of "exiters without transfer, award or sophomore in good standing status" who have actually gone on to Maryland private or out-of-state colleges and universities.

More importantly, although we have ransacked the readily available data sources to put together as comprehensive a set of potential indicators of academic achievement as possible, we realize that many hypothesized areas of explanation have gone unexplored by our logistical regression work. The ideal data set would be able to measure the achievement impact effects of a much larger range of possible explanators, including: high school performance, pre-college study habits and subject knowledge (e.g., SAT scores); childhood family values (especially educational); student personality (e.g., Myers-Briggs type, emotional dynamics, etc.); personal values, life goals, motivation and drive; social values (ideology, alienation, religion, etc.); customer satisfaction (assessment of college, alternate educational possibilities); job, family, financial and health pressures; social integration with student and institutional life; school social and racial environment; personal capabilities (learning disorders, intelligence quotient, etc.). The linear regression version of our 1990 cohort achievement model explained around half of the dependent variable's total variance. That leaves quite a bit of variance unexplained. OIRA plans to integrate survey-based childhood environment and high school performance data into its achievement modelling of the 1992 cohort behavior.

On the methodological side, OIRA plans to pursue implications of our findings on social background, remedial status and launch period achievement effects by supplementing regression model development with causal path analysis in future research. Even if our current findings had not pointed in this direction, we would have moved to broaden our methodological approach to embrace path analysis. Regression analysis is a superb technique for gauging the impact of *truly* independent variables upon a dependent variable, but is very awkward in dealing with highly inter-correlating explanatory factors. Coincidental collinearity (e.g., as among the various sub-indicators of socio-economic status) can be fairly easily managed in regression analysis through pre-analysis data reduction and scaling. Unfortunately, many of the highly inter-correlating factors behind student achievement are not coincidentally but *structurally* related. Students progress towards their educational goals through an institutional system — the academic *process* — which is a complex of conditional paths by its

very nature. In this case, data reduction techniques further muddy already cloudy research waters rather than clarifying them.

Lifestyles of the Targeted and Enrolled: Using Geo-Demographics for Marketing and Analysis In a Community College Setting

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Introduction. Wouldn't it be wonderful if there existed a single, relatively simple and easy-to-use methodology which might give community colleges the means of planning efficient and effective targeted student recruitment campaigns based on thorough market analysis, and into the bargain also provided them a way to deepen their understanding of their existing student bodies by adding socio-economic analysis capabilities to their research and reporting efforts? At Prince George's Community College, we think that we have found just that. It is known as *geo-demographics* and works by extracting a neighborhood *lifestyle typology* from a systematic similarity analysis of raw census tract data and then sorting tracts into lifestyle *clusters* according to the typology.

Geo-demographic analysis underlies the successful targeting and analysis systems of national marketing firms like Claritas Corporation and the Donnelly Group. Modelling its work on these national systems, in 1991 the college's Office of Institutional Research and Analysis managed to set up *PG-TRAK*^{90}© -- PGCC's very own neighborhood lifestyle cluster system, custom designed for its county service area. In the remainder of this paper, we more fully describe geo-demographics and *PG-TRAK*^{90}, and then go on to discuss some of the ways the college has been able to employ its neighborhood lifestyle system in targeted marketing and enrollment management.

What is Geo-Demographic Analysis? The geo-demographic approach to marketing begins with the insight that "birds of a feather flock together." That is, people sharing similar demographic, socio-economic and life-cycle attributes, cultural and political attitudes, and patterns of social and consumer behavior -- in short, *lifestyle* -- tend to live near each other and to create roughly homogenous residential neighborhoods. Thus, one can indirectly but effectively market individuals by marketing whole neighborhoods, once a typology of neighborhoods has been worked out and the market analyzed by neighborhood type.

The Census Bureau equivalent of "neighborhood" is Census tract. In these computer-driven days, it is a relatively easy and inexpensive matter to append tract codes to the addresses in customer lists and to market analyze such lists by Census tract. If for a certain market territory (e.g., Prince George's County) tracts have been sorted into a geo-demographic "lifestyle" typology of neighborhoods, then tract analysis equals analysis by lifestyle *clusters* of neighborhoods. Cluster analysis sets up the marketer for *targeting* analysis (Which clusters have been the best past performers? Which ought to be performing better given the nature of the product/service?). This leads readily to *message development* (Which messages will be most motivating given the particular lifestyles of targeted clusters?). There remains only target *location* and *access*. Geo-demographics shines here too, because prospective customer addresses and phone lists *selected by tract* are easily extractable from one of the many relatively inexpensive mapping software applications now available.

PG-TRAK[90]: Development and Operation. *PG-TRAK*[90] is a full-featured geographic marketing system, similar to national systems but customized to maximize educational marketing objectives within a restricted geographic locale – the PGCC service area. To create it, we first obtained U.S. 1990 Census Bureau data files with over 200 demographic, housing and life-cycle variables for every one of the 172 tracts making up Prince George's County. These data were then reformulated into 93 marketing-style indicators and subjected to a statistical sorting technique known as cluster analysis. The procedure groups individual cases into a set of "clusters" according maximum similarity across all indicators within each cluster but also maximum indicator dissimilarity across all clusters.[1]

The result was the sorting of all County neighborhoods (tracts) into 15 lifestyle clusters, also interpretable as 15 standing markets, the basic needs, motivations and resources of which are implicit in the lifestyle data that define them. Households with potential new students can be efficiently reached by targeting only those cluster markets known to be rich in the sort of possible enrollees sought. This is mainly a matter of determining which clusters have been disproportionate contributors of past and current students by analyzing lists of past and current students by cluster.[2] Furthermore, the messages and scripts used in direct contact campaigns can be custom-tailored for maximum appeal to each targeted cluster since each incorporates a well-understood lifestyle.

Clusters-in-the-County and Clusters-in-the-Student Body. Table 1 provides capsule descriptions of the cluster results. The table also displays how the county's 258,011 households actually divide up by clusters: The single largest cluster proved to be Afro Blue Collar (15 percent), which together with Hispanic Mix and City Line, form a cluster group of downscale, mostly African American inner-suburban neighborhoods defining around 31 percent of all County households. Socio-economically balancing this group are three mid-to-upscale minority clusters (Black Enterprise, Black Middle America, Minority Comers) which together include about 20 percent of all households. In fact, one of them -- Black Enterprise -- led all *PG-TRAK*[90] clusters in terms of median household income and percent white collar workers. These prosperous black neighborhoods make Prince George's county practically unique among U.S. counties: majority non-white but also essentially middle class suburban in character.

The second largest cluster turned out to be the Upwardly Mobiles (13.4 percent), one of four mostly white central suburban/exurban segments (also including Exurban Elite, Beltway Havens and Rural Development -- 33 percent, collectively). The numerical strength of the Upwardly Mobiles reflects the County's participation in the national economic shift to hi-tech service jobs. But the strong presence of the other three shows that the traditional white collar/white race suburbs are still well represented here. Also, on the margins of this grouping is Fort George (4.2 percent), a cluster of military families centering on Andrews Air Force Base.

Lastly, our clusterization detected an interesting miscellany of inner-suburban neighborhood types. The mostly white inner-suburbs were represented by the culture-oriented, sophisticated renters of the Cosmopolitan cluster (3.3 percent), the mainly student

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[1] Technically, we used SPSS/PC+'s cluster analysis program with squared Euclidean distance measures and Ward's approach to agglomeration.

[2] With today's computer technology, this is easily accomplished."Geo-coder" applications, readily available from mapping software firms like Atlas GIS or ARCView, have little difficulty identifying census tract from raw address data, and census tract code converts directly into cluster code.

PG-TRAK[90] Zone	Table 1. Neighborhood Life Style Cluster Descriptions and % County Household Shares (Prince George's County = 258,051 HH 1990)		% HH
UPSCALE OUTER SUBURBS (15.6 %)	01 - Exurban Elite	Mostly white, very upscale exurbs/ Business executive HHs predominate/ Many "Empty Nesters"	11.3 %
	02 - Black Enterprise	Very upscale minority black suburbs/ New high value tracts/ Federal workers common/ Large families	4.3 %
MIDSCALE CENTRAL SUBURBS (18.6 %)	03 - Beltway Havens	Aging, mostly white families in nice but older tracts off I-95/ High incomes, elite blue collar jobs/ Few college graduates	4.7 %
	04 - Upwardly Mobiles	Singles, new families in apartments & condos/ Professionals, technicians with entry level incomes/ New high-tech firms nearby	13.9 %
LOWER MIDSCALE CENTRAL SUBURBS (9.8 %)	05 - Black Middle America	Mostly large black families in median value tract housing near I-95/ Average incomes, education, jobs/ Many mid-level government workers	9.8 %
LOWER MIDSCALE RURAL (9.0 %)	06 - Rural Development	Large white and minority families/ Modest tract housing in rapid growing rural areas/ Well paid lower white collar, upper blue collar jobs	8.1 %
	07 - Fort George	Active military living on base	0.9 %
UPSCALE INNER SUBURBS (4.3 %)	08 - Cosmopolitans	Inner-suburban upscale professionals/ Mix of luxury apartments and fine older housing stock/"Bohemian" areas/ Significant minority of blacks and new immigrants	3.4 %
	09 - Asians Plus	One-third Asian immigrant/ Below average incomes but highest % college graduates and current students/ Young apartment dwellers	0.3 %
	10 - Town & Gown	Mostly higher educational institutions and adjacent neighborhoods/ Large student dormitory population	0.6 %
LOWER MIDSCALE INNER SUBURBS (10.4 %)	11 - Minority Comers	Single renting African Americans and new families/ Lower white collar & upper blue collar entry level/ Many in college and job-training	6.0 %
	12 - Old County	Lower midscale mix of renting young singles and home-owning elderly whites/ Old inner-suburban housing stock	4.4 %
DOWN-SCALE QUASI-URBAN (32.4 %)	13 - Afro Blue Collar	Mostly young black renters/ Steady but lower paying blue collar jobs/ Many children and female-headed households	15.5 %
	14 - Hispanic Mix	Inner-suburban mix of growing young Hispanic and African American families/ Little income, education/ Some home-owning	7.1 %
	15 - City Line	Solidly black neighborhoods near the D.C. boundary/ Unmarried female-headed HHs with children modal family/ Significant unemployment, poverty	9.8 %

dormitory dwellers of Town & Gown (.6 percent) and the remnants of the yesteryear's white blue collar suburbs in Old County (4.3 percent). The inner-suburban remainder reflected the national demographic trend toward ethnic diversity. The cluster analysis revealed two strongly immigrant-impacted clusters -- Hispanic Mix and Asians Plus (7.4 percent, collectively).

These then are Prince George's Community College's standing educational sub-markets. How well has PGCC been doing drawing students from across this kaleidoscope of populations? Table 2 provides matched comparisons of the proportional weights of the clusters both in-the-County and in-the-student body. Student cluster percentages are derived from an analysis of a database including all 1984-1990 PGCC course-takers, both credit and non-credit. Clusters are shown rank-ordered high/low according to County cluster household percentage. The strong parallelism between the two sets of cluster percentages clearly illustrates how very demographically representative PGCC's student body has become. This is very welcome news from a college mission perspective. Community colleges historically were established to democratize access to higher education, and in this, PGCC seems to be succeeding admirably.

Table 2. Prince George's County and PGCC Student Body Lifestyle Cluster Distributions

Cluster Type	Students*	County HHs
13-Afro Blue Collars	15.5 %	10.2 %
04-Upwardly Mobiles	13.9 %	14.9 %
01-Exurban Elite	11.3 %	13.8 %
05-Black Middle America	9.8 %	11.6 %
15-City Line	9.8 %	9.0 %
06-Rural Development	8.1 %	10.2 %
14-Hispanic Mix	7.1 %	5.4 %
11-Minority Comers	6.0 %	5.3 %
03-Beltway Havens	4.7 %	4.8 %
12-Old County	4.4 %	4.0 %
02-Black Enterprise	4.3 %	5.2 %
08-Cosmopolitans	3.4 %	3.8 %
07-Fort George	0.9 %	1.2 %
10-Town & Gown	0.6 %	0.4 %
09-Asians Plus	0.3 %	0.2 %
TOTAL - PERCENT	100.0 %	100.0 %
TOTAL - NUMBER	(258,051)	(87,812)

* Unduplicated Credit & Non-Credit Headcount File 1985-1990

But for the educational marketer, the finding that PGCC has been doing at least O.K. everywhere is not very helpful. Good marketing lies in attention to detail and seemingly small individual segment differences in sales strength can add up to significant customer numbers across many market segments. The marketer needs information on the specific level of sales *penetration* in each market segment: the proportion of all *potential customers* in a market segment that have already been converted into *actual customers*. A very high penetration rate implies a nearly *saturated* market segment with little room for sales growth. A low rate signals poor past market exploitation but great opportunity for expanded sales.

Table 3 is a re-working of Table 2's data on county and student cluster distributions. using raw numbers instead of percentages. Assuming one student per household (safe in vast majority of cases), taking the ratio of the number of 1985-1990 PGCC students in a cluster to the number of households in the same cluster is equivalent to calculating PGCC's five year market penetration of that cluster.[3] Table 3 presents cluster penetration rates in county-indexed form (100 x cluster rate / whole county rate) for easy cross-cluster comparisons. It also gives a county indexed mean cluster score on our scale of socio-economic status so that any relationship between penetration levels and cluster social class attributes will be readily apparent.[4]

Table 3. PGCC Enrollment Cluster Penetration and County Cluster Socio-Economic Rank

Cluster Type	County Indexed Penetration	County Indexed SES Score
06-Rural Development	125	102
01-Exurban Elite	122	134
02-Black Enterprise	121	154
05-Black Middle America	118	95
08-Cosmopolitans	111	140
04-Upwardly Mobiles	108	125
03-Beltway Havens	104	116
15-City Line	92	62
12-Old County	90	85
11-Minority Comers	89	92
14-Hispanic Mix	76	73
13-Afro Blue Collars	66	77
COUNTY RAW VALUE	.340	*

*mean of 3 z-scores

PGCC's five year County-wide household penetration rate measured in numbers of credit/non-credit students per household was .34, or put another way, upwards of over a third of all County households sent PGCC a student of some description between 1984-1990. Individual cluster penetration rates varied widely around this mean, from a high of 43 percent in Rural Development (County Index 125) down to only 22 percent (Index 66) in Afro Blue Collar.

Such a broad variation is only to be expected, but what might be considered unexpected is how little the cluster rank-ordering of Table 3 resembles that of Table 2. (For example, the cluster we saw ranked among the highest in terms of student body proportional share we now find ranking at the bottom on PGCC cluster market penetration!). Not only that, Table 3 shows that penetration variation correlates directly with cluster social class position -- in general, the

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3 Three clusters have been dropped in this figure. Asian Plus and Town & Gown are too small to generate stable penetration estimates. And Fort George is a special marketing case: PGCC maintains an extension center on the air force base for training programs tailored to military career needs.

4 "Indexing" unit data to the absolute value of a total market is the typical way of reporting statistics in the marketing world since gauging relative tendencies among a set market segment is generally considered more important than fixing sub-market absolute values. The formula for indexed values is simple: I = 100 * (segment value / market value). This sets the index value as a percentage of the reference value.

more upscale the cluster the higher the penetration level (r^2 =.51). This makes good sociological sense; study after study has concluded that college orientation is strongly and positively linked to social status, but this seems to run directly counter to our earlier discovery that, cluster-wise, PGCC's student body closely resembles the general population of the County. The paradox, of course, is only apparent. PGCC's student enrollment *is* representative of the County's demography in the sense that all groups are recruited in rough measure to their presence in the general population; however, deviations from perfect proportionality are systematic, reflecting the greater educational orientation of the more affluent market segments.

The above findings, however, do lead to some interesting questions of marketing strategy: In the future, should the College strive mainly to expand its best and most proven existing markets, centered in middle to upper middle class neighborhoods, or take the more daring tack and attempt to develop its relatively underexploited market in less affluent areas of the County? Which course to take, of course, cannot be settled exclusively on technical marketing grounds but raises important issues of institutional mission and the balancing of the values of educational access and academic excellence. But whatever strategic conclusion is reached, geo-demographic analysis will be of great assistance by clarifying the marketing stakes involved and by guiding market planners to the most effective and efficient targeted recruitment possible under that decision.

Targeting for Credit Student Recruitment. Community colleges which have a geo-demographic system like *PG-TRAK*[90] in place may plan household-targeted credit student recruitment campaigns with the broadest or narrowest of focuses -- from stimulating credit enrollment generally (for example, picking the top six clusters in Table 2) down to searching for additional Engineering 101 sign-ons. Once a representative credit student sample has been cluster-encoded, the only limit in target identification is the level of comprehensiveness and detail characterizing the student archive data. Table 4 below illustrates the use of just a few of the possible credit target indicators available to PGCC's planners.[5] Those chosen for review here all relate in one way or another to a distinction of prime importance to community colleges -- "traditional" vs. "non-traditional" students.

[5] The target indicators for Table 4 were constructed as follows: "Mostly Full-Time" students were those who elected to pursue 12 credit hours or more during at least half of the school terms they attended; the overall 14 percent is lower than the typical PGCC fall semester 25 percent because student summer terms and terms spent largely on non-regular credit developmental course work were included. The "Transfer/Occupational Program Ratio" was calculated for each cluster: percent of credit students in any transfer curriculum divided by percent of students in any occupational curriculum. "Arts & Science Students" equals the percent of a cluster's students signed up for a transfer curriculum within the Arts and Science division. "Entrance Timing" is a three-part percentage variable based upon the number of years after high school graduation a student began attending PGCC: "HS Graduation" -- percent before (concurrent students), immediately after or within a year of high school graduation date; "2-9 YearsPost" -- with a period of between 2 to 9 years after graduation; "10+ Years Post" -- ten or more years following graduation.

Table 4. Selected Credit Student Target Indicators *(Statistics County Indexed)*

Cluster Type	Academic Load & Program			Post-H.S. Entrance Timing		
	Full-Time	Transfer/ Occup. Ratio	% Arts & Science Programs	Within One Year	Within 2-9 Years	10 Years or More
01-Exurban Elite	116	128	112	113	84	96
03-Beltway Havens	137	125	120	117	88	83
06-Rural Developmt	102	107	102	115	78	98
09-Asians Plus	228	187	90	117	57	117
08-Cosmopolitans	127	133	103	108	86	101
02-Black Enterprise	100	113	108	108	75	114
07-Fort George	55	123	110	27	147	182
10-Town & Gown	98	229	192	58	214	48
04-Upwardly Mobiles	93	107	92	88	120	99
12-Old County	102	111	133	88	119	101
05-Black Mid America	89	89	103	105	91	101
15-City Line	87	70	85	104	102	90
14-Hispanic Mix	107	92	92	96	114	92
13-Afro Blue Collars	95	82	82	89	117	101
11-Minority Comers	80	97	98	85	114	112
ALL (Raw Values)	14 %	1.07	6 %	46 %	28 %	25 %

The "traditional student" pattern features starting college immediately upon completing high school, attending with a Full-Time credit load, majoring in a transfer curriculum as opposed to a vocational, and usually although not necessarily, studying the humanities or sciences as opposed to a technical or business subject. On this basis, the prime source of such students in PGCC's recent past has been the conventional white suburbs – here represented by the top grouping of Exurban Elite, Beltway Havens and Rural Development. The second grouping of elite Black Enterprise and the sophisticated, inner-suburban Cosmopolitans and Asians Plus clusters also sent PGCC disproportions of "traditional students," but also proved to be a disproportionate source of adults returning to college for job-related skill upgrading and personal enrichment. The third grouping, too, favored transfer programs and in two out of three cases the Arts and Sciences as subject matter; but the disproportionately "delayed entry" students of Fort George, Town & Gown and New Collar Condos (three clusters made up mainly of young adults without children who either worked Full-Time or studied Full-Time but not at PGCC) typically attend PGCC on a part-time basis.

With one exception (Old County, with its own peculiar pattern), the remaining clusters shown in Table 3 were more likely to contribute "non-traditional" than "traditional" students to PGCC's student body. The large family minority clusters Black Middle America and City Line did tend to send more straight-from-high school students than delayed entry students but proved vocational program oriented. Finally, the poorest source of "traditional" students proved to be the Hispanic Mix/Afro Blue Collar/Minority Comers grouping of minority clusters featuring populations of young singles and starter families. Most PGCC students from this grouping were occupationally-oriented working persons out of high school for several years searching for ways to improve their job prospects.

Using Student Clusters in Academic Performance Tracking. Besides its power as a marketing tool, a neighborhood lifestyle typology can prove very useful in the analysis of student records for academic policy planning. *PG-TRAK*[90], for example, has given the Office

of Institutional Research and Analysis the ability to add the equivalent of student social class background to its arsenal of analytic variables.

Table 5 gives a glimpse of how recent PGCC credit student academic performance varied by lifestyle cluster. Its columns display aspects of the academic progress of first time college students in the Fall 1990 entering cohort as revealed by four indicators -- placing into at least one of three remediation programs in the entry term, maintaining a grade of C or better average (minimal passing cumulative GPA), achieving sophomore status (30 or more earned credit hours) by last term of attendance, and succeeding in either transferring to a four year college or university or earning an award (occupational certificate or associate degree) or both by last term of attendance. The order of the column is meant to suggest, in rough, very simplified terms, the flow of the cohort through the PGCC academic process. The figures shown are percentages of students in each cluster indexed against whole cohort percentages.[6]

The results, as can be clearly seen, were striking. The remediation need indicator split the 12 cohort clusters into two groups along the racial divide -- the top six clusters in terms of remediation needs turned out to be the six with non-white population majorities; the bottom six in developmental placement tendency were either racially balanced or predominately white clusters. But the impact of racial background was only part of the story of remediation need as revealed by cluster analysis. The other part had to do with the operation of social class. In both top and bottom groups of clusters, cluster ordering was largely a matter of cluster socio-economic rank.

Table 5. Academic Performance Tracking by Student Cluster: 1990 Fall Entering Cohort* ***(Statistics Whole Cohort Indexed)***

Cluster Type	Performance Indicators**			
	At Least 1 Remediation	Maintained C Average	Achieved Soph. Status	Transfer &/or Award
13-Afro Blue Collars	141	81	71	54
15-City Line	126	72	52	45
11-Minority Comers	116	97	80	77
05-Black Middle America	115	84	96	92
14-Hispanic Mix	107	104	89	71
02-Black Enterprise	102	99	108	101
06-Rural Development	94	106	106	107
04-Upwardly Mobiles	92	100	103	119
12-Old County	79	104	118	134
08-Cosmopolitans	79	110	132	135
03-Beltway Havens	69	137	180	165
01-Exurban Elite	60	115	140	176
ALL CLUSTERS (Raw Value)	58 %	57 %	28 %	16 %

* All first time any college 1990 Fall entering credit students in degree programs (N=2,387).

** Remediation column shows indexed % of students testing into at least one of 3 developmental programs in Fall 1990 (those not taking all 3 placement tests excluded; other 3 columns show student status as of end of eighth major term).

[6] Three cluster sub-samples of the cohort proved too small for indicator percentage calculations (Fort George, Asians Plus and Town & Gown) and were excluded from the table.

In the top group, the least likely to require remediation were students from affluent Black Enterprise neighborhoods. Somewhat more frequently needing remediation were those from two predominantly minority lower middle class areas. Most often required to take developmental courses were those from two of the poorest clusters – City Line and Afro Blue Collar. Only students from working class Hispanic Mix broke the pattern with a collective developmental placement tendency close to that for Black Enterprise students. Similarly, in the mostly white bottom group, upscale Exurban Elite students exhibited the lowest degree of remediation need and lower midscale Rural Development students registered the highest degree.

Table 5 shows that student cluster level of college preparedness at initial enrollment was a strong *reverse* predictor of cluster rank on the three academic progress indicators. For example, at the opposite end from Term 1 developmental placement testing is Term 8 final outcome success (earning a transfer to a four year school or a PGCC certificate or associate degree). Cluster order here was almost the mirror image of the remediation need order: most white student clusters outperformed mostly minority student clusters, but with racial groups of clusters, the higher the socio-economic ranking of a cluster the more progress was made by students from tracts making up that cluster.

Conclusions. As the above targeting exercises indicate, the public does tend to respond to a community college's educational services based upon lifestyle factors of social class, ethnicity, and lifecycle which can be estimated for individual households from data on neighborhood type. The capability of analyzing its service area and enrolled students geo-demographically should enable an institution to efficiently target the former for direct contact student recruiting and to track the latter with enhanced sociological insight.

Student Activities and Enhancement Ratings in the COFHE Class of '94 Senior Survey

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Background and Introduction

Twenty-seven private, selective colleges and universities participated in the COFHE Class of '94 Senior Survey. This is the fourth senior survey that COFHE has conducted; beginning in 1982 under the auspices of the COFHE Graduate Project and continuing in 1984 and 1989, members of the Consortium have surveyed their seniors regarding undergraduate financing patterns, attitudes towards students' loans, educational goals, career plans and values, overall satisfaction with and loyalty to their alma maters, and participation in student activities. Several follow-up alumni surveys have been conducted that focus on many of these same issues as well as on the realization of senior year plans. The Class of '94 surveys were distributed to 24,518 seniors; 15,262 completed surveys were scanned. The overall response rate was 62 percent; institutional response rates ranged from 17 to 94 percent.

Response rates were highest among the twelve schools that linked the completion of the survey to something related to graduation (graduation tickets, brunch tickets, cap and gown, etc.). Two additional schools with high response rates did not "require" the survey, but they distributed it at a required senior event, commencement rehearsal, where they had a captive audience. In this paper, we will use the 14 institutions with response rates greater than 75 percent. Our database for these 14 schools consists of 10,721 students. Seventy-one percent are from universities, 69 percent are white, and 56 percent are women.

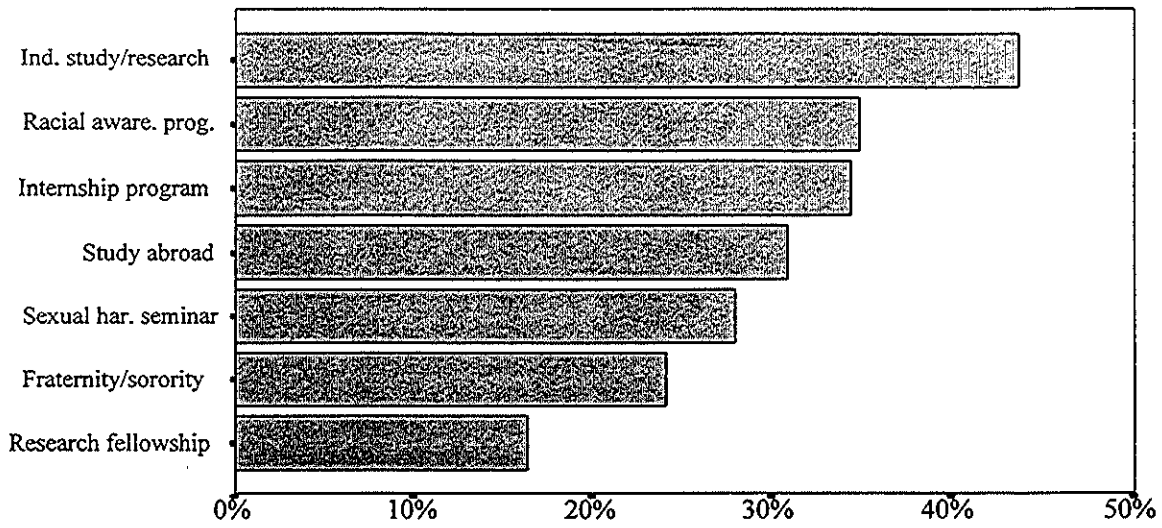
This paper examines the participation of seniors in a variety of programs and activities, as well as the time seniors spend on different parts of their college lives. Patterns of participation as well as the influences and interrelationships of participation in various activities and enhancement ratings will also be analyzed.

In which programs do students take part?

Seniors were asked to mark the programs in which they had participated; the seven programs in the list are shown in Figure 1.[1] More than 40 percent of seniors reported that they had taken part in an independent study or research for credit. Just over one-third of the respondents said they had participated in a racial/cultural awareness program or workshop; only 28 percent had taken part in a seminar or workshop on sexual harassment. Almost one-quarter of seniors reported belonging to a fraternity or sorority.

1 Contingency tables for the relationships described in the text and the methodological details were distributed at the meeting and can be obtained by writing to the author.

Figure 1. Percentage of Seniors Reporting Participation in Various Programs



The proportion of students that reported participation in each program in some cases varied significantly based on student or institutional characteristics. Some of these differences are easy to explain, but others are not. Highlights of these differences are outlined below:

- Students at both types of universities[2] were more likely than students at either type of college to belong to a fraternity or sorority.
- White students were more likely than almost all other students to belong to a fraternity or sorority.
- Seniors at Women's colleges were more likely than seniors at Coed colleges and Ivy League universities to report participation in an off-campus internship. Black students were more likely than Whites, Asians, and students of other racial backgrounds to participate in an internship or off-campus program.
- Not surprisingly, seniors majoring in the humanities were more likely than students majoring in all other areas to study abroad. This is probably due to the opportunity to study languages abroad. Students majoring in the applied, physical, and biological sciences were the least likely to study abroad. This is probably a result of the structured curriculum of these majors, which may not have the necessary courses available abroad.

2 The four types of institutions are: Coed colleges, Women's colleges, Ivy League universities, and Other universities.

- Seniors majoring in the physical or biological sciences were the most likely to report that they participated in a research fellowship; business and humanities majors are the least likely to report participation.

- More than two-fifths of women reported participation in a racial awareness program; only one-quarter of men reported participation in such a program. When coed institutions are analyzed separately, 38 percent of women reported participation in a racial awareness program.

- Almost one-third of women have attended a seminar on sexual harassment; less than one-quarter of men have attended such a program.

- Seniors at both types of colleges are more likely than seniors at either type of university to have attended a seminar about sexual harassment.

- Coed college seniors were more likely than all other seniors to have participated in an independent study; Women's college seniors were more likely than seniors at either type of university to have completed an independent study.

Some of the differences in participation may be a result of the availability of programs on different campuses. For some of the programs, there were many statistically significant differences across the 14 institutions.[3]

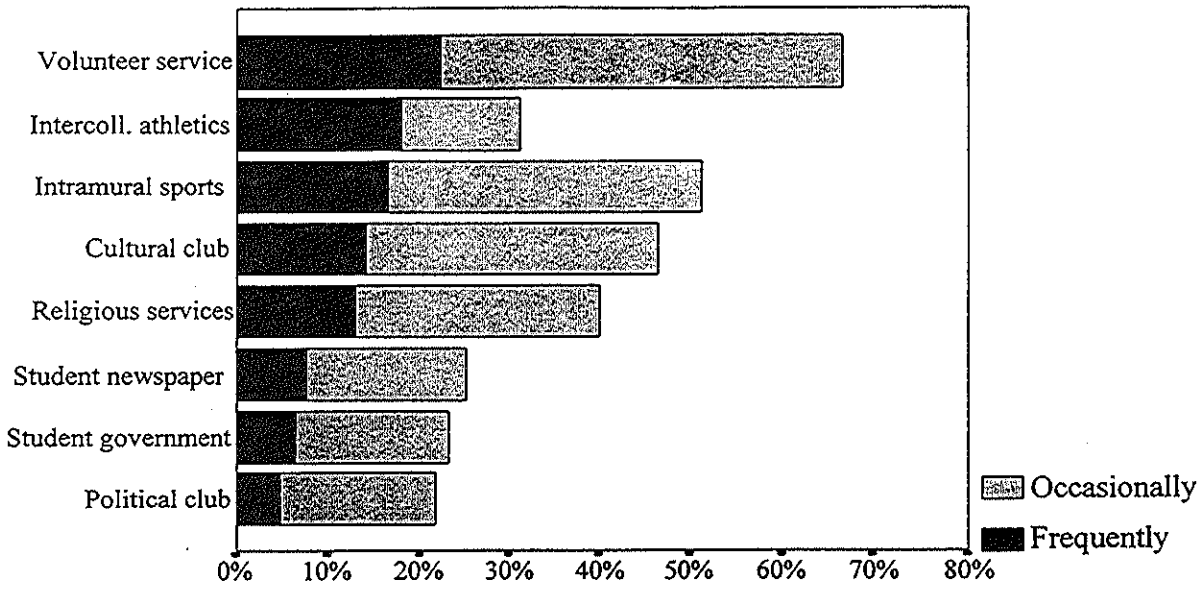
Only one of five seniors did not participate in any of the above programs; 22 percent participated in one program only. Another 23 percent reported they had participated in two programs, and more than one-third of the seniors reported participation in three or more programs.

In which extra-curricular activities do students participate?

Seniors were also asked to indicate whether they had participated in a list of eight extra-curricular activities. They were also asked their level of participation -- "not at all," "occasionally," or "frequently." Two-thirds of the seniors reported participation in a volunteer service, and just over one-half reported participating in intramural sports. Political clubs had the lowest level of participation. (See Figure 2).

3 We compared each institution with every other institution in the data set for a total of 91 comparisons.

Figure 2. Participation in Extra-Curricular Activities
(percentage reporting "occasionally" or "frequently")



Some of the above activities may be related to a student's major or long-term career interest, but others are not. The proportion of students that participated in each activity varied significantly in some cases based on student characteristics. Highlights are listed below.

- Seniors at Women's colleges were more likely than all other students to be involved in student government. Students at Ivy League universities were the least likely to participate in student government.

- Not surprisingly, seniors with career aspirations of government and law were more likely than those with all other career goals to belong to a political club.

- More than three-quarters of Blacks and Asians belonged to a cultural club. Whites were the least likely to participate in a cultural club; only 35 percent reported participation.

- Humanities majors were the most likely to work on a student newspaper or magazine. Seniors majoring in the applied sciences were the least likely to work on a student newspaper or literary magazine.

- Students at Coed colleges and Ivy League universities were more likely than seniors at Women's colleges and Other universities to report participation in intercollegiate athletics.

- Seventy percent of men reported participation in intramural sports; only 37 percent of women reported participation.

- Seniors majoring in the biological sciences and social sciences were the most likely to do volunteer work; students majoring in the applied sciences were the least likely to volunteer. However, 56 percent of applied science majors reported participation in a volunteer service.

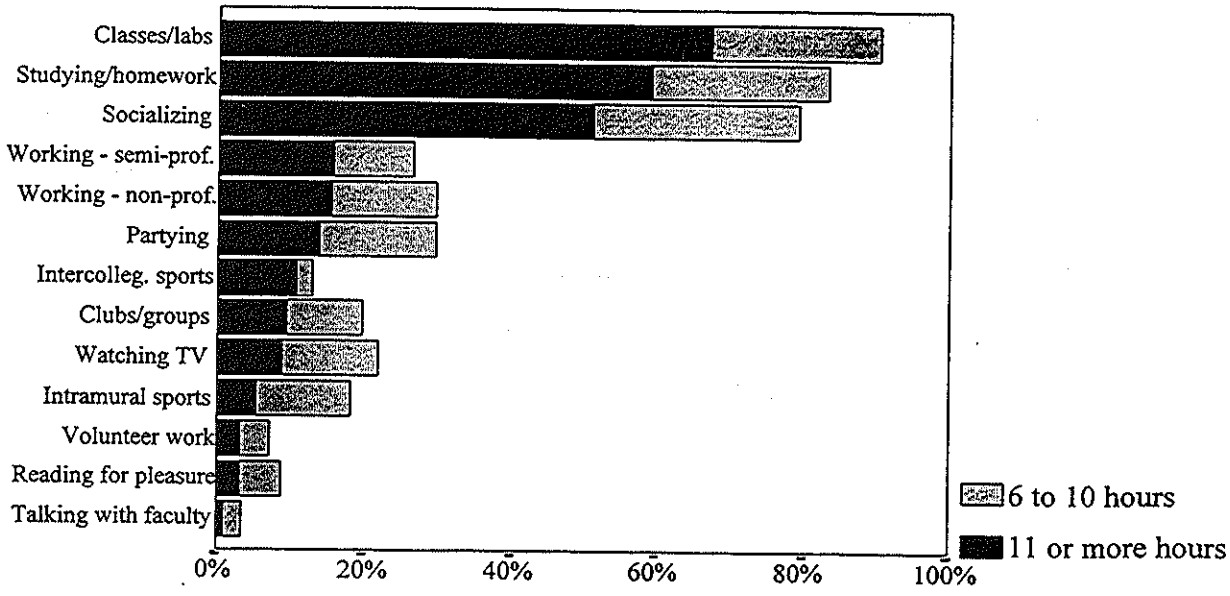
- Blacks were more likely than Asians, Whites, and students of other racial and ethnic backgrounds to participate in religious services.

The proportion of seniors that reported participation in each of the extra-curricular activities varied substantially across institutions for some activities, and very little for others. Almost nine of ten students reported participation in at least one of the extra-curricular activities listed above. Thirty percent of seniors reported participation in one or two activities; another 41 percent participated in three or four. Seventeen percent of the respondents said they had participated in five or more of the listed activities. Although we have an indication of the number of activities in which students participated, we do not know the extent of their commitment to each activity (beyond "occasionally" or "frequently") and the number in which they were involved simultaneously. They may have participated in different activities in different years, or they might have participated in multiple activities each year.

How did seniors spend their time in the fall semester of senior year?

We asked seniors to report how many hours they had spent on various activities during a typical week in the fall term of their senior year. Students reported spending the greatest number of hours attending classes and labs, studying and doing homework, and socializing. Just over one-fifth of the seniors reported studying 20 or more hours per week. As a group, they spent the least number of hours participating in intercollegiate athletics and volunteer work. However, the majority of those students who did participate in intercollegiate athletics dedicated 11 or more hours per week to their sport. Although nine of ten students reported they spent time talking with faculty outside of class, only four percent spent more than five hours per week conversing with faculty. Sixty-four percent of seniors reported working in a semi-professional, non-professional, or both types of positions during the fall semester. Twenty percent reported working six to 10 hours; thirty percent worked 11 or more hours. (See Figure 3).

Figure 3. Percentage of Students Spending 6 or More Hours Per Week on Each Activity



Which students were most likely to study the most? Party? Work for pay?

Building upon some analysis done at Georgetown University, we examined what factors might influence the amount of hours seniors study, "party," and work for pay. We chose to analyze the group of students who reported they attended class six or more hours per week.[4] We looked at the proportion of students who studied 16 or more hours per week, the proportion who "partied" more than 10 hours per week, and the proportion who worked for pay (semi-professional or non-professional) 16 or more hours per week. Highlights are listed below.

- Women were slightly more likely than men to report studying 16 or more hours per week.
- Physical and applied sciences majors reported the highest proportion of students studying 16 or more hours, seniors majoring in business reported the lowest -- less than one-fifth of the business majors reported studying 16 or more hours per week.
- Men were almost twice as likely as women to report that they "partied" 11 or more hours per week.
- Business majors were at least twice as likely as all but one other major to report "partying" 11 or more hours per week. Seniors majoring in the biological or physical sciences were the least likely to report high levels of "partying."
- Seniors at Other universities were twice as likely as students at Coed colleges to work for pay 16 or more hours per week.
- Students with estimated parental incomes of $60,000 or less were at least twice as likely as students with parental incomes of $140,000 or more to report working 16 or more hours per week. More than one-quarter of the seniors with parental incomes less than $40,000 reported high levels of work.

How much does participation in various programs and activities and how seniors spend their time influence overall enhancement ratings?

Colleges and universities put a great deal of resources into enhancing various skills, and it is important to know where their efforts are making a difference and in which areas their efforts need to be strengthened. The seniors in this study all had relatively high levels of skills and abilities when they arrived on COFHE campuses. However, they also had different levels of skills and abilities -- someone who reports a large gain in a particular area may have graduated with a lower level of that skill than someone who reported a smaller gain. The gains we measured are self-reported, and we have no absolute measures or levels of development at the beginning or end of college. Seniors were asked to indicate the extent to which each of 24 abilities or types of knowledge was enhanced by their undergraduate experiences.

A majority of seniors reported that four skills were enhanced "greatly" (the highest rating on a 4-point scale; listed below in descending order of their ratings): (See Figure 4)

- Understand myself: abilities, interests, limitations, personality
- Acquire new skills and knowledge on my own

4 We chose to look at only students attending class six or more hours per week to avoid including students with very low course loads -- those with very low course loads might have studying, "partying," and working habits that are different from the rest of the respondents.

- Think analytically and logically
- Function independently, without supervision.

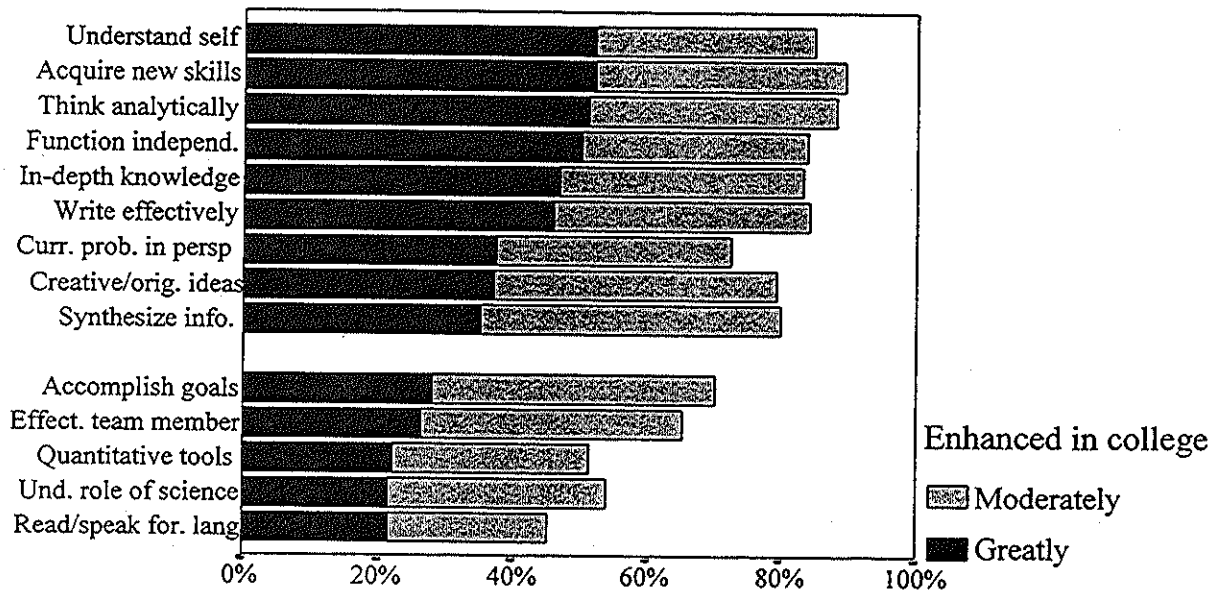
More than one-third of the seniors reported that five skills were "greatly" enhanced:

- Gain in-depth knowledge of a field (e.g., academic major, occupational field)
- Write effectively
- Place current problems in historical/cultural/philosophical perspective
- Formulate creative/original ideas and solutions
- Synthesize and integrate ideas and information.

The following five skills had the lowest ratings of gains; even for these, more than 20 percent of the seniors reported that the skill was enhanced "greatly":

- Establish a course of action to accomplish goals
- Function effectively as a member of a team
- Use quantitative tools (e.g., statistics, graphs)
- Understand the role of science and technology in society
- Read or speak a foreign language.

Figure 4. Gains During College of Abilities and Types of Knowledge
(Top nine and bottom five in enhancement)



A number of these skills and abilities are closely inter-related, indicating that they may reflect broader underlying dimensions. Through factor analysis, we identified four sets of skills that consisted of two or more specific skills and abilities. They are shown below in order of their average importance. In the remainder of this paper we will use italicized names to refer to the scales created from these clusters of skills and abilities.

Broad Outcome	Specific components
Intellectual Skills	Acquire new knowledge and skills on own Think analytically and logically Formulate creative/original ideas and solutions Synthesize and integrate ideas and information
Humanities Knowledge	Place current problems in historical/cultural/ philosophical perspective Identify moral and ethical issues Develop awareness of social problems Acquire broad knowledge in the arts and sciences Appreciate art, literature, music, drama
Leadership	Lead and supervise tasks and groups of people Function effectively as a member of a team
Quantitative Tools and Science	Understand role of science and technology in society Use quantitative tools (e.g., statistics, graphs)

We submitted the data on the four outcomes scales described above to multiple regression analysis in order to ascertain the relative importance that participation in various activities and how seniors spend their time may have as contributors to the enhancement of each of the outcomes. Very little of the overall variance in each of the outcomes scales is explained by these measures.[5]

Intellectual Skills

- High hours studying and talking with faculty outside of class, participation in an internship, sexual harassment seminar, or independent study/research, and participation in intercollegiate athletics and volunteering are positively and independently associated with self-reported intellectual skills development.

- High hours watching television and working in a non-professional job and participation in intramural sports are negatively associated with intellectual skills development.

Humanities Knowledge

- The strongest predictors of self-reported growth in humanities knowledge were study abroad and participation in a racial or cultural awareness program.

- Increased hours spent studying and socializing, participating in a political club, working on a student newspaper or literary magazine, participating in intercollegiate athletics, and volunteering all contribute to humanities knowledge.

- Increased hours spent watching television, belonging to a fraternity or sorority, and participating in intramural sports are all negatively associated with humanities knowledge.

5 Some program participation that students reported could have been as long as four years in the past (i.e., as first-year students).

Leadership

- The strongest predictors of self-reported growth for leadership skills were participation in a college internship, racial or cultural awareness program, sexual harassment seminar, and student government.

- Several other activities contribute to leadership skills, including: hours spent talking with faculty outside of class, "partying," participating in intercollegiate athletics, and participating in clubs, belonging to a fraternity or sorority, participation in student government, cultural clubs, intercollegiate athletics, volunteer service, and religious services.

- Hours spent reading for pleasure and participation in intramural sports are negatively associated with growth in leadership skills.

Quantitative Tools and Science

- Not surprisingly, the strongest predictor of self-reported growth in quantitative tools and science was participation in a special undergraduate research or mentoring program.

- Students who reported high hours attending classes or labs, studying, and talking with faculty outside of class, and participation in student government all report high levels of enhancement of their quantitative tools and science knowledge.

- Study abroad is strongly but negatively associated with high enhancement ratings for quantitative tools and science knowledge; other items that are negatively associated include hours spent socializing, working in a non-professional job, and working on a student newspaper or literary magazine.

What does all this mean?

Seniors who participated in particular activities are more likely than those who do not to report growth in certain kinds of skills and knowledge. Not surprisingly, one of the strongest predictors of self-reported growth in humanities knowledge was studying abroad. The strongest predictors of self-reported growth in leadership skills were participation in a college internship program, participation in a racial/cultural awareness program, and participation in a sexual harassment seminar (these students might have leadership roles in the seminars and workshops or campus leaders might be the most likely to participate in programs that they, or their friends, develop). Participation in a special undergraduate research or mentoring program was a very strong predictor of growth in quantitative tools and science. It is unlikely that an individual will participate in activities and programs that will lead to high growth in all areas -- and it is probably unrealistic for institutions to expect students to do so. Students most likely choose the activities and programs that are of interest to them.

Assessment of a Clustered Learning Program

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Abstract

The Clustered Learning Program at Shippensburg University groups culturally diverse students together in a core of courses to encourage support structures and academic performance. Clusters remain together throughout their freshman year. This study evaluated the success of the program in terms of both academic performance and persistence. Results show that course grade point averages were significantly higher for the clustered group than the control group. Contributors to these results were most likely increases in the academic and social support provided and facilitated in the clustered group. Retention rates were higher for the clustered group. As expected from related theory, increasing the students social and academic integration, yield increases in commitment and, in turn, retention.

Introduction

The Clustered Leaning Program (CLP) is a component of the overall Retention Plan at Shippensburg University of Pennsylvania. A specific goal of the CLP was to create a program that would encourage "true" learning in both students and teachers by fostering good study habits, nurturing the whole student, and providing creative, innovative teaching strategies for participating professors. The CLP was piloted throughout the 93-94 academic year. The formal clustering began in the 94-95 academic year. This study was designed to determine if there were significant differences between clustered and non-clustered groups in performance in specific courses as well as overall, academic performance. The program's impact on persistence behavior was investigated.

Description of the Clustering Program

The program consisted of clustering students into groups of 20-40 students. Scheduling allowed these groups to attend specified courses as a group throughout the freshman year, thus increasing their contact with each other and enhancing the social-academic environment. In these courses, faculty strove to create a cooperative learning environment. Not only were these students scheduled in common course sections throughout their freshman year, but they were encouraged to interact informally as well. Furthermore, faculty conducted strategy sessions on how to relate or overlap the content of these course sections. An early warning system was in place to identify problems during the semester that affect students' academic performance as well as to endorse successful student behavior. Additionally, students in the clusters participated in study groups, supplemental course instruction, tutoring, and study skills workshops.

Method

Subjects

The population was defined as the Fall, 1994, first-time freshman cohort. The treatment (experimental) group were those freshmen who participated in the Clustered Learning Program. The remaining freshmen constituted the control group. Depending on the level of analysis, this control group was further restricted to those subjects who enrolled in sections of courses comparable to the clustered courses.

Table 1. Demographics of the Sample

	Control	Treatment (CLP)
n	1129	125
% Male	45	50
% Female	55	50
%Minority	7	24
Mean SAT	947	872
Mean Decile Rank	3.6	4.1

Procedures

Several components of overall assessment existed. Initially treatment and control group cohorts were established and tracked utilizing the university student database. Academic progress of the groups was monitored over their Shippensburg experience. Exit interviews were also conducted designed to measure student and faculty perceptions, opinions, and levels of satisfaction. Treatment and control groups were statistically compared in terms of grade point average, persistence, retention, and in terms of perceptions, opinions, and levels of satisfaction. This research focuses on the measures of academic performance and persistence. SPSS for Windows was utilized for the statistical analysis.

Further analysis beyond the scope of this study will span at least a six year period to assess graduation rates of the groups although the duration of the additional treatment has not yet been determined. New cohorts will be added to the assessment each year that the program is in place.

Statistics

The basic design was an analysis of covariance (ANCOVA). Groups were compared based on the level of treatment: control group v. treatment group. ANCOVAs were accomplished with the grade as the dependent variable, group membership as the factor (independent variable), and SAT score and relative class rank as covariates. The ANCOVA procedure "is linked to the following two basic objectives in the experimental design: 1. elimination of systematic bias (and,) 2. reduction of within group or error variance" (Stevens, 1992, p. 326). The grade means were adjusted to what they would have been if both groups were equal on the covariate. The adjustment was based on the linear relationship that exists between the covariates and the cumulative and course grades; the ANCOVA is a combination of linear regression and analysis of variance.

Measures in This Study

The dependent variables, academic performance and persistence, were defined as follows:

Grade point average (GPA): Average of all freshmen course grades.
Course grade: Individual course grades will be compared for selected courses.
Persistence: The returning of a student in the original cohort for their second semester and sophomore year.

Results

The results show evidence for the success of the clustering in terms of academic performance and persistence and possibly increased social cohesion. However, a comparison of the fall and spring semesters and freshman year cumulative GPAs showed that the CLP group did not perform significantly better than the control group after accounting for differences in ability level. The CLP group did however have an overall GPA that was higher than the control group for the fall semester.

Secondary analyses compared the performance between CLP and control groups in a number of separate courses in both fall and spring semesters. Tables 3 and 4 provide the course numbers, unadjusted and adjusted GPAs of the two groups, and significance test results for the analyses. In all cases, the covariates show significant relationship to the grades. The multiple R^2 value for the covariates was moderate and positive.

Two courses showed statistically significant differences in grade point averages. In the fall semester, CLP students performed significantly better than control group students in History 105. The difference in GPA was nearly one-half of one point. In the spring semester, CLP students performed significantly better than control group students in Geography 101. The difference in GPA was nearly one full grade point.

CLP students were retained at a higher rate than were control group students (see Table 5, no adjustments were made based on ability level). A total of 122 of the 125 CLP students returned for the spring semester for a rate of 97.6 percent. The comparable rate for control group students was 92.3 percent. This showed an increase in semester to semester persistence of 5.3 percent. Results were similar for the one year persistence rate. A total of 98 of the 125 CLP students returned for the next academic year for a rate of 78.4 percent.

Table 2. Comparison of Groups in Academic Performance

	Fall Semester	Spring Semester	Freshman Year
Control			
Unadjusted Mean	2.38	2.43	2.47
Adjusted Mean	2.37	2.42	2.46
Treatment (CLP)			
Unadjusted Mean	2.35	2.28	2.34
Adjusted Mean	2.44	2.42	2.38
R^2covariates	0.252	0.223	0.298
p(covariates)	0.000	0.000	0.000
p(main effects)	0.186	0.780	0.717

Table 3. Comparison of Groups in Fall Academic Courses

	ENG 101	HIS 105	SPE 100
Control			
Unadjusted Mean	2.93	2.18	2.79
Adjusted Mean	2.92	2.17	2.78
Treatment (CLP)			
Unadjusted Mean	2.77	2.48	2.59
Adjusted Mean	2.84	2.60	2.72
R^2 covariates	0.158	0.163	0.205
p(covariates)	0.000	0.000	0.000
p(main effects)	0.522	0.000	0.624

The comparable rate for control group students was 74.8 percent. One year persistence was 3.6 percent higher for the CLP group.

Table 4. Comparison of Groups in Spring Academic Courses

	ART 101	ENG 101	ENG 105	GEO 101	HIS 106	MUS 121	SOC 101	SPE 100
Control								
Unadjusted Mean	2.27	2.89	2.65	2.05	2.23	2.23	2.53	2.76
Adjusted Mean	2.24	2.88	2.60	2.05	2.22	2.24	2.52	2.75
Treatment (CLP)								
Unadjusted Mean	2.44	2.54	2.63	2.83	2.21	2.50	2.55	2.55
Adjusted Mean	2.49	2.63	2.87	2.82	2.34	2.49	2.59	2.62
R^2 covariates	0.130	0.178	0.313	0.170	0.184	0.233	0.125	0.183
p(covariates)	0.008	0.000	0.000	0.037	0.000	0.000	0.000	0.000
p(main effects)	0.395	0.130	0.218	0.002	0.174	0.431	0.661	0.397

Table 5. Comparison of Groups in Academic Persistence

	Number in Cohort	Persisted Spring	Persisted Next Fall
Control	1129	1042 (92.3%)	844 (74.8%)
Treatment (CLP)	125	122 (97.6%)	98 (78.4%)

Discussion

The results show overall success of the Clustered Learning Program in terms of academic persistence and performance. Significant CLP impact was observed in History 105 and Geography 101 where clustered students performed significantly better than non-clustered students. It is important here to consider the Supplemental Instruction (SI). SI was implemented in the both of these courses and the increase in performance may be due to the SI or its combination with the clustering. In addition, both of these courses require a high volume of outside of class reading, more so that the other courses studied. Observing increased performance in these courses indicates that the Supplemental Instruction and the academic and social support provided and facilitated in the clustered group impacted on the students behavior to the point that the grades increased.

The results of the increase in persistence behavior leading to higher retention are also encouraging. Validated theoretical models have shown (Tinto, 1975; Pascarella & Terenzini, 1979, 1983; Stage, 1987, 1988, 1989) that increasing the students social and academic integration, yield increases in commitment and, in turn, retention. In addition, the more active roles of the faculty adds to the possibility of student integration into the academic and social systems of the university.

The Fall, 1994 semester was the first clustered cohort that was designed to be subject to detailed statistical analyses (it was piloted in Fall, 1993). The results are promising in terms of academic performance and persistence, but the program was designed to impact on more than GPA. It is hoped that measures of these other constructs be established to provide a more in-depth analysis of the impact of the CLP.

In addition, further research should consider additional variables, such as socio-economic status (SES), as covariates. As the demographics show, the groups may differ on this variable. After controlling for SES, the impact of the clustering may prove to be amplified.

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Creating and Utilizing Student Typologies

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College admissions officers make decisions on an almost daily basis that influence the character and quality of the incoming freshman class and ultimately, the nature of the student body for years to come. They pursue and encourage prospective students they have identified along a variety of dimensions, such as academic talent, athletic prowess, musical ability, and leadership potential, to name a few. On the basis of their own experience and intuition, counselors make judgments about the way that admissions candidates with a variety of these personal and background characteristics might fit into the campus milieu. Making that kind of determination about prospective students, of course, is one of the primary tasks that admissions counselors are hired to do.

Most of the information that admissions professionals obtain about prospective students is in the form of test results, responses to interest queries, and recommendations that high school teachers, counselors, and coaches provide. To get beyond these basic demographic and performance variables and to learn something more personal about the candidate, most colleges strongly encourage prospective students to have an interview with a staff member or at least with an alumni representative. In most cases, that encounter is the first and only opportunity for admissions counselors to learn about the personality of the individual candidate.

While there can be little doubt that the interview process is enormously useful and valuable, there are some limitations. Relatively few of any college's original prospects actually submit to an interview, and over time and among staff, interviews vary in the quality, amount and scope of information that is gathered. Thus, little is ever known about the personal qualities of the vast majority of prospective students that colleges include in their admissions databases each year.

The purpose of this paper is to describe an analyses that GDA staff did for one college in order to improve this situation. In the course of two surveys, substantial information about current and prospective students was obtained. The analyses of those data were intended to gain a better understanding of the personal makeup of the students in the market served by this college. Descriptions of the research and analyses follow, and to further demonstrate the utility of the approach, they are accompanied by some of our recommendations.

The methodology that follows draws on work by Brodigan and Ramsay (1991) at Carleton College, where concern about disparaging assessments of American college students by higher education critics led to a close examination of several years of freshman survey data obtained while participating in the Cooperative Institutional Research Program (CIRP). Their analysis identified distinct "college styles" within the student body and some variation in the relative proportions of those traits in entering classes over a twelve-year period. Fortunately, the patterns and the variations over time were less distressing than the dark assertions and predictions of the critics might have led some to expect.

Brodigan and Ramsay also looked at measures of the quality of effort put forth by students in relation to the personality variables they identified.[1] They found relationships between personality dimensions and the manner in which students utilize the college resources. In other words, the quality, scope and amount of experience in college varied across personality dimensions. While some kinds of students made excellent use of the many or all of the resources provided by the college, others used the college's offerings more selectively and more sparingly.

In a subsequent study, Brodigan and Litten (1992) extended this analysis by looking at the CIRP survey data for entering students at 18 colleges and universities belonging to the Consortium on Financing Higher Education (COFHE). The demographic characteristics of students with differing personal orientations were examined. They also provided an assessment of the variations across institutions in the goals and values of students and the differences in institutional characteristics that might be associated with those variations.

A research application for admissions marketing: In our latest example of the application of these ideas and findings which is the subject of this report, two surveys were conducted. First, students currently enrolled at a small, independent liberal arts college were surveyed on a variety of topics and issues, many of which were specific to that college. Included within the questionnaire were numerous background questions and a set of items reflecting personal goals related to college and to life beyond college. This set of goals was constructed from the survey items which yielded the personality types in the studies reviewed above. Students were asked to rate the items on a four point scale labeled *not important, somewhat important, very important,* and *essential.*

The second survey was conducted by telephone with 300 students selected randomly from among high school seniors who inquired about attending the college. That survey explored several areas of interest, but like the current student survey, included the set of items reflecting personal goals for college, career, and life.

What follows is a description of the findings we obtained concerning student typologies in the market served by one liberal arts college. In the interest of confidentiality, the name of the college has been omitted from the findings and recommendations that follow.

The important goals and outcomes: For easy comparison, Table 1 shows the frequencies with which respondents in both surveys rated the importance of the goals as *essential.* While the percentages among inquirers are greater consistently, the top three for both groups are **becoming an authority in your field, helping others who are in difficulty,** and **being well-off financially. Becoming successful in your own business** and **helping to promote racial understanding** are also important to substantial percentages of both groups.

[1] The measures of quality of effort came from campus surveys which used the College Student Experience Questionnaire developed by Robert Pace.

Table 1. College outcomes and personal goals essential to current and inquiring students

	Current	Inquiry
Becoming an authority in your field	37%	48%
Helping others who are in difficulty	37%	52%
Being very well-off financially	36%	52%
Becoming successful in your own business	30%	51%
Helping to promote racial understanding	30%	42%
Developing a meaningful philosophy of life	28%	31%
Obtaining recognition from your colleagues for contributions to your special field	28%	37%
Influencing social values	19%	27%
Having administrative responsibility for the work of others	17%	24%
Keeping up to date with political affairs	16%	24%
Participating in a community action program	14%	24%
Becoming involved in programs to clean-up the environment	13%	21%
Influencing the political structure	10%	12%
Writing original works (poems, novels, short stories, etc.)	10%	17%
Making a theoretical contribution to science	7%	11%
Creating artistic works (paintings, sculpture, decorating, etc.)	6%	11%
Becoming accomplished in one of the performing arts	4%	10%

Underlying themes: The next step in this effort was to conduct a principal components analysis for current students using the set of items in Table 1.[2] In general, the purpose of this kind of analysis is to uncover meaningful underlying dimensions which represent basic personality themes, orientations or traits. Among current students at the college in this example, five **personality** factors were identified. The names of these dimensions appear in Table 2 along with the items having high factor loadings in each case.

Table 2. Personality dimensions and relevant survey items

Socially concerned
- Influencing social values
- Helping others in difficulty
- Developing a meaningful philosophy of life
- Participating in community action programs
- Helping to promote racial understanding
- Becoming involved in programs to clean-up the environment

Politically oriented
- Influencing the political structure
- Keeping up to date with political affairs

Business oriented
- Being very well-off financially
- Becoming successful in your own business

Recognized authority
- Becoming an authority in your field
- Obtaining recognition from colleagues for contributions to your special field
- Having administrative responsibility for the work of others

Artistically inclined
- Writing original works (poems, novels, short stories, etc.)
- Creating artistic works (paintings, sculpture, decorating, etc.)
- Becoming accomplished in one of the performing arts (acting, dancing, etc.)

[2] A varimax rotation was used to obtain the final solution.

Personality typing: For the set of items listed with each personality dimension in Table 2, every respondent was given a score equal to the sum of his or her ratings across the items (4 = *essential*, 3 = *very important*, 2 = *somewhat important*, and 1 = *not important*). Subsequently, respondents were identified by a given personality characteristic whenever the appropriate sum divided by the number of items was equal to, or greater than "very important" (3). For a personality dimension with three items, a respondent qualified if the total score was 9 or higher. For a set of four items, the minimum qualifying score was 12.

Of course, some students meet the basic criteria for more than one dimension.[3] For purposes of further analysis, we limited membership to one group per student. When students qualified for more than one group, standard scores for the values on each dimension were compared. Each student was assigned to the personality dimension in which she or he had the highest standard score.

When this classification was complete, the same criteria were applied to the responses of individuals in the survey of students who made inquiries about admission to the college. Then, within the inquiry group, information about the character, background, preferences, values, and attitudes, of each of these different kinds of personality types was obtained through segmentation analysis.

The following sets of statements about the student personality typologies, for both the current and the inquiry surveys, are from extensive analyses in which variables representing these personality types were crosstabulated against a wide array of other survey response variables. The statements are based on crosstabulations in which a chi square statistic was significant at the .05 level or lower ($p < .05$). The survey variables represent queries about expectations for college, the importance of college characteristics, gains students believe they made during their most recent year of college, frequency of college activities, attitudes about college, background, interests, and demographics.

In order to show the marketing potential in the application of these findings, recruitment recommendations are listed for each personality type. Of course, our report to this college contained additional detail and more specificity concerning the implementation of the recommendations.

Socially concerned

- Among current students, 16 percent are in the socially concerned category, compared to 20 percent of the inquirers.

Current students

- Among the socially concerned current students, important college expectations more often include **developing your own values and ethical standards**[4] and **understanding other people and the ability to get along with different kinds of people.** Also more often important are **learning more about yourself, developing critical thinking and analytical skills** and **enhancing your ability to put ideas together.**
- Areas in which these students more often report that they gained very much include **developing personal values and ethical standards** and **understanding other people and the ability to get along with different kinds of people.** In addition, these students more often say they gained very much in **developing career and occupational skills** and in **writing clearly and concisely.**

[3] In fact, 26 percent qualified for just one dimension, 26 percent for two, 18 percent for three, and 16 percent qualified for none.

[4] Bold print is used here to represent items, or excerpts of items, as they were seen by survey participants.

- These students more often report that during the current year they very often **made friends with students whose background was very different from their own, sought out a friend for help with a personal problem, participated in class discussions, attended social events put on by the residence unit,** and **discussed major social problems.**
- These students more often strongly agree with the statement **I am proud to be a _____ College student.**
- Socially concerned students more often have a **part-time job on campus.**
- Socially concerned students less often have a major in **business or accounting.**
- These students less often come from a **high school with a graduating class of fewer than 100 students.**
- Both during high school and at _____ College, the activities of these students more often include **musical performance** and **religion.**
- Socially concerned students are more often **female** than male.

Inquirers

- Not unlike the socially concerned current students, the socially concerned inquirers' important college expectations more often include **developing your own values and ethical standards** and **understanding other people and the ability to get along with different kinds of people.**
- For these students extremely important college characteristics include **accessibility of professors, preparation to be a good citizen,** and **concern about the development of the whole person.**
- Essential opportunities and skills for career preparation that these students more often report are **getting individual career planning assistance, developing team work skills, having a college-sponsored internship, preparing for graduate or professional school** and **help in identifying your personal interests and strengths.**
- More often socially concerned inquirers and there families plan to **pay more than $8,000 per year for college,** and they are less likely to say that cost, financial aid, or a scholarship were among the **most important factors in specific application decisions.**
- Socially concerned inquirers more often plan to **major in the social sciences.**
- During high school, these students more often **participated in social action** activities.

Recommendations for recruiting socially concerned students

- Require community or volunteer service while in college.
- Place greater emphasis on personal growth activities in college.
- More intentionally link the residential and social life of the college to the academic program.
- Emphasize the multicultural opportunities.
- Place more emphasis on the career counseling component of ... (a unique employment program for graduates at this college).

Politically oriented

- The proportions of current students and inquirers who are politically oriented are nearly the same. Among current students, 15 percent fit this classification, and among inquirers, 17 percent do so.

Current students

- Among the politically oriented current students, important college expectations more often include **enhancing the ability to put ideas together, writing clearly and concisely, developing personal values and ethical standards** and **enhancing the ability to learn on your own, pursue ideas, and find**

information. Also more often important are **gaining knowledge of personal interest** and **gaining a liberal arts education.**

- Areas in which these students more often report that they gained very much include **acquiring self-confidence, developing critical thinking and analytical skills, acquiring knowledge which is of personal relevance, enhancing the ability to put ideas together,** and **writing clearly and concisely.**
- These students more often report that during the current year they very often **participated in class discussions, discussed major social problems,** and **attended a meeting of a club, organization, or student government group.** They also reported more frequently that they often or very often **did additional readings on topics introduced and discussed in class, took advantage of entertainment and cultural activities in the city,** and **discussed ideas for a term paper or other class project with a professor.**
- These students more often strongly agree with the statements: **my _____ College education is preparing me for graduate or professional school** and **I am satisfied with the academic advising in my major.**
- Politically oriented students less often have **considered transferring** from _____ College.
- These students more often **work at a job for pay more than 16 hours per week.**
- During high school, these students less often engaged in **musical performances religious activities,** and **honor society.** However, they were more likely to be involved in **newspaper activities.**
- While in college, these students more often are participants in **volunteer service** and in **student government.**
- Politically oriented students are more often **male** than female.
- **Family incomes** more often are greater than $70,000 among students with this orientation.

Inquirers

- Among politically oriented inquirers, important college expectations more often include **developing your academic, scholarly and intellectual qualities, developing critical thinking and analytical skills, writing clearly and concisely,** and **gaining a range of information relevant to a career.**
- Compared to others, these inquirers more often prefer a **liberal arts education to a general education.**
- These students more often say their desire to attend would be greatly increased if a **college emphasized opportunities for students to become independent learners.**
- Essential opportunities and skills for career preparation that these students report more often, compared to other students, are **developing strong communication skills, learning to work on your own, pursuing a specific career-related major field,** and **becoming a sophisticated user of personal computers.**
- Among these students, **parents are less often *very involved* in the determination of college choice.**
- Politically oriented inquirers more often say they would **prefer working on campus.**
- Politically oriented inquirers more often plan to **major in the social sciences.**
- The hometown of inquirers having this orientation, less often is **urban.**

Recommendations for recruiting politically oriented students

- Fund and promote an active debate team.
- Offer housing based on interest in discussion about politics and current affairs.
- Reward and recognize with scholarships those students who participate in student government.
- Make public policy a central theme of on-campus lectures.
- Prepare a publication on the advantages of _____ College for parents that focuses on the strength of the majors, personal development, and other advantages of the college.
- Promote the Washington semester.
- Stress independent study and internships for those interested in the social sciences.

Business oriented

- Among both current students and inquirers, about a quarter are business oriented (25 percent of current and 24 percent of inquirers).

Current students

- Among the business oriented current students, important college expectations less often include **developing your own values and ethical standards, learning more about yourself, understanding other people and the ability to get along with different kinds of people, enhancing the ability to put ideas together,** and **developing aesthetic appreciation and creative skills.**
- These students less often report that they gained very much in **developing values and ethical standards, enhancing the ability to learn on your own, enhancing the ability to put ideas together, gaining self-confidence, developing career and occupational skills,** and **gaining knowledge of personal relevance.**
- These students more often report that during the current year they very often **followed a regular schedule of exercise or practice in some sport** and **used facilities in the gym for playing sports requiring more than one person.** On the other hand, they less often **participated in class discussions, discussed major social problems, made friends with students whose background differed from their own, worked to improve a skill with computers or laboratory equipment,** and **used the library card catalog or computers to find materials.**
- These students less often strongly agree with the statements: **I am proud to be a _____ College student, my parents are pleased with my experience at college,** and **I am satisfied with the academic advising in my major.**
- Business oriented students are more likely to say they are **not doing as well as expected academically.**
- Relatively few say they **would definitely choose _____ College again.**
- The **greatest impact on the decision to attend** _____ College came more often from a _____ College coach, parents, or the college's proximity to home.
- Among the business oriented, slightly fewer **parents** completed a four-year college.
- Both in high school and at college, these students more often participated in **varsity athletics.** They less often were participants in theater, dance, and music while in high school, or in volunteer service or religious activities at college.
- The **hometown** of these students is more often **small or rural.**
- Business oriented students are more often **male** than female.
- Family incomes more often are greater than $70,000 among students with this orientation.
- Business oriented students more often are **Catholic** and **White.**

Inquirers

- The college characteristics that these students less often rate as extremely important are **accessibility of professors, concern about the development of the whole person, a supportive environment, emphasis on values and ethics, prestige,** and **preparation to be a good citizen.**
- Among the inquirers in this classification, important learning expectations concerning a college education less often include **developing critical thinking and analytical skills, writing clearly and concisely, understanding other people and the ability to get along with different kinds of people, enhancing the ability to put ideas together, developing academic, scholarly and intellectual qualities, enhancing the ability to learn on your own,** and **learning more about yourself.**
- Compared to others, these inquirers more often prefer a **general education to a liberal arts education.**
- Although a third or more say that **emphasis on preparing students to be leaders** and **on opportunities for students to become independent learners** would greatly increase the desire to attend a specific college, other students make these statements more often.
- While about half of these students consider the following to be essential opportunities and skills for career preparation, they do so substantially less often than other students: **learning to handle yourself in a professional manner, learning to work on your own, developing strong communication skills, pursuing a specific career-related major field,** and **having a college-sponsored internship.**
- For these students, the list of **most important factors in specific application decisions** more often includes **cost, financial aid and scholarship** considerations.
- Business oriented inquirers more often **plan to major in business** and less often in the social sciences.
- The **high school activities** of these students less often include participation in musical performances and newspapers or other publications. Although over half participate in volunteer service activities, that proportion is lower than it is for the remainder of the inquiry group.
- More often than for others, these students live **in-state.**

Recommendations for recruiting business oriented students

- Guarantee internships for all students who want them.
- Establish and promote an active business club using alumni as mentors and instructors in the ways of business.
- Provide more opportunities for students to actually help manage businesses on campus (snack bar, bookstore, etc.)
- Work closely with parents of students with an interest in business, in particular with the parents of athletes.

Recognized authority

- Proportionately more current students than inquirers are in the recognized authority category. One in five of the current students compared to just 14 percent of inquirers are of this type.

Current students

- For students in this category, important college expectations more often include **developing your academic, scholarly, and intellectual qualities, developing career and occupational skills, gaining a range of information that may be relevant to a career,** and **gaining self-confidence.**

- These students more often report that they gained **a range of information that may be relevant to a career.**
- These students more often report that during the current year they very often **discussed major social problems, such as peace, human rights, and justice.**
- These students more often strongly agree with the statement _____ College is **preparing me for the real world.**
- Students in this group less often **transferred into** _____ **College from another college.**
- For nearly a third of the students in the recognized authority category, **a major in business or accounting is planned**
- During high school, these students more often **participated in student government.**

Inquirers

- Somewhat more often than others, those in the recognized authority category **first learned of the college because of its proximity to home.**
- These students less often view the **ideal college or university enrollment as 3,000 students or fewer.**
- The presence of **fraternities and sororities is a preferred college characteristic** for these students.
- Inquirers in the recognized authority category less often view **writing clearly and concisely** and **understanding other people and the ability to get along with different kinds of people** as extremely important characteristics of a college education.
- Compared to others, these inquirers less often say that **gaining a general education is** essential.
- Compared to other types, the recognized authority is more likely to have heard of ... (a unique employment program for graduates at this college).
- **SAT or ACT scores** lie above the median substantially more often among members of the recognized authority group.
- Inquirers in this classification are less often members of **minority** ethnic or racial groups.

Recommendations for recruiting the recognized authority

- Provide more connection between the academic, social and residential sides of the college.
- Demonstrate a more proactive graduate and professional school advising program.
- Develop distinctive characteristics for all major fields, but especially for those in the sciences.
- Promote the advantages of learning science in a liberal arts environment and in general, the small college advantages with small classes and hands-on learning.
- Refer to _____ College as having "liberal arts and sciences."
- Prepare materials on each academic department, particularly in the sciences.

Artistically inclined

- While 20 percent of the inquirers are artistically inclined, only 8 percent of current students are.

Current students

- Among the artistically inclined current students, important expectations for a college education more often include **developing an understanding and enjoyment of art, music, and theater, gaining a broad general education about different fields of knowledge, gaining a liberal arts education, developing aesthetic appreciation and creative skills,** and **enhancing**

your ability to learn on your own, pursue ideas, and find information you need.

- These students more often report that they gained very much in **developing an understanding and enjoyment of art, music, and theater.**
- While at _____ College these students more often expect to **study abroad, collaborate on research with a professor,** and **take a graduate level course** (or they have already done so).
- These students more often reported that during the current year they very often **made friends with students whose background was very different from their own** and **discussed major social problems.**
- Also in contrast to other students during the current year, the artistically inclined *often or very often* **talked about art with other students, discussed ideas for a term paper or other class project with a professor, did additional readings on topics introduced and discussed in class, attended an art exhibit, music event, or theater performance at the college, attended an event at another college or university, changed an opinion as a result of the knowledge or arguments presented by others,** and **took advantage of entertainment and cultural activities in the city.**
- These students more often strongly agree with the statement **its location in _____ city is one of the great advantages of _____ College.**
- The artistically inclined more often reported that **_____ College is not as challenging as expected.**
- Transferring from _____ College has not been considered as often by artistically inclined students as by others.
- Among the current students who responded to the survey, the artistically inclined are more likely to be **first-year students** and less likely to be **seniors.**
- The artistically inclined more often **live in a college-owned residence hall.**
- **A planned major in the humanities** is more likely for these students than for others.
- The artistically inclined come more often from **parochial schools** and less often from public high schools.
- Activities in high school more often included **theater or dance, academic club, newspaper,** and **cheerleading or pep club.**
- Home for the artistically inclined is less likely to be within 50 miles of _____ College.

Inquirers

- For these students, extremely important college characteristics include **a supportive environment, graduate or professional school placement, an emphasis on a broad-based, liberal arts education, financial assistance,** and **an active social life.**
- **Out-of-class** activities expected, during college by artistically inclined inquirers, more often include **theater, dance,** and **music.**
- These students less often prefer to **attend college in a suburban area.**
- Like that of the artistically inclined current students, the artistically inclined inquirers' list of important characteristics of a college education more often includes **developing an understanding and enjoyment of art, music, and theater, gaining a broad general education about different fields of knowledge, gaining a liberal arts education, developing aesthetic appreciation and creative skills,** and **enhancing your ability to learn on your own, pursue ideas, and find information you need.**
- In addition among inquirers, the artistically inclined more often view **developing critical thinking and analytical skills, gaining knowledge having personal relevance, writing clearly and concisely, learning about**

yourself, developing your own values and ethical standards, understanding other people and the ability to get along with different kinds of people, and **gaining self-confidence,** as important features of a college education.

- For artistically inclined inquirers, the desire to attend a particular college more often would be greatly increased by **an emphasis on preparing students to be leaders, opportunities for students to become independent learners, a program where all first-year students explore a special topic, academic courses that include discussion sections in the residence halls,** and **career-oriented certificate programs for students regardless of major field.**
- Essential opportunities and skills for career preparation that these students more often report are **developing strong communication skills, developing an appreciation of other cultures and nations, learning to handle yourself in a professional manner, becoming a lifelong learner, having opportunities to meet and network with alumni of the college, learning to work on your own, getting individual career planning assistance, identifying personal interests and strengths,** and **taking a career planning course.**
- During high school, these students less often **participated in religious activities, academic club,** and **honor society.**
- The **hometown** of the artistically inclined is more often **urban.**
- **ACT or combined SAT scores** are above the inquirer median only about half as often among the artistically inclined (less than a quarter).
- The racial or ethnic background of theses students is more often **minority.**
- Fewer of the artistically inclined inquirers are from **in state.**

Recommendations for recruiting artistically inclined students

- Develop a residential theme community for artistic expression where these students can find friends and mutual support.
- Recruit a critical mass of students by offering fellowships in theater, music, and art.
- Make the humanities and fine and performing arts programs and majors distinctive with specially designed off-campus and overseas programs not found at other colleges.
- Demonstrate a more proactive graduate and professional school advising program.
- Become a center for creative writing.
- Offer an "affordable arts" package for artistic and cultural events in the nearest city. Include discounts on admission to area art museums, dance performances, theatrical productions, and concerts.

Are these personality types stable over time? To be sure, the college years bring change as students learn and as developmental processes unfold. Thus, personality change is to be expected. Still, if the information about these types is to be used in student recruitment, in predicting satisfaction, and as a basis for managing college programs and resources, the traits should have measurable levels of stability over time. In another line of research on personality types which was based on an analysis using sixty items from the CIRP questionnaire, Astin reported substantial construct validity and predictive validity over periods as long as nine years beyond college entry (Astin, 1993).

While the results from Astin are encouraging, there are several differences between the work that he reports and the somewhat less complicated effort that is the subject of this paper. Fortunately, among the clients of GDA are two colleges where students completed the CIRP entering student survey on two different occasions.

At these colleges, students were surveyed upon college entry. Subsequently, the same students were surveyed at the end of the first year, the end of the sophomore year, the end of the junior year, or upon completion of the senior year.

Table 3 contains correlation coefficients computed between the first and second scores on the personality measures for students at these two colleges. The replications which follow the original most closely in time have the highest correlation coefficients within each personality dimension. After one year, the correlation coefficients range from .5 to .7, indicating high levels of stability, and even after four years, the correlation coefficients are substantial. Of the five measured dimensions, the business orientation index shows the greatest stability.

Table 3. Correlation coefficients between first year personality scores and scores in subsequent years of college

End of :	First	Second	Third	Fourth
Socially concerned	.61	.44	.49	.42
Politically oriented	.52	.47	.41	.31
Business oriented	.67	.52	.58	.54
Recognized authority	.57	.42	.40	.30
Artistically inclined	.71	.64	.59	.48

Another way to look at change over time is shown in Table 4. In this case, students who met the basic criterion for membership in a category upon college entry were examined to see whether they qualified after completion of four years. Again the highest level of stability occurs along the business dimension where over half of those starting out hold onto a very specific set of goals.

Table 4. Percentages of students who qualified for each typology after four years of college

Socially concerned	31%
Politically oriented	38%
Business oriented	56%
Recognized authority	36%
Artistically inclined	17%

Some of these categories change simply because students learn more about their own talents and prospects as the college years go by. Among those who start out as artistically inclined, there are likely to be several who learn that their goal of writing original fiction, painting landscapes, or playing with a major symphony orchestra, is unrealistic. Among those who wish to attain the status of recognized authority, some may learn that they do not have the ability or drive to make it to the top of their chosen field. Among the socially concerned, some will be distracted from their well-meaning goals simply because something else catches their attention, and others may find that personally "making a difference" in matters of cleaning up the environment or improving race relations is a more formidable challenge than it first appeared.

Another reasonable hypothesis concerning these changes is that the college may do a better job of assisting students in moving toward some kinds of goals, but not toward others.

Conclusion: This research demonstrates that relatively uncomplicated survey techniques can yield personal information which, until now, has been difficult to collect for large numbers of students. Knowledge of these relatively stable student personality characteristics can serve several purposes, and principle among them is the assist that they offer to admissions marketing efforts. As has been indicated by the recommendations listed for each personality type, specific marketing strategies can be directed to each of these very different kinds of students. This research provides new ways of thinking about individual differences among prospective students, and suggests new customized and individualized recruiting strategies for different students. In those strategies, the special interests and particular benefits being sought in college, which differ by personality type, can receive more appropriate levels of emphasis.

However, the utility of these findings does not end with applications in admissions. Among the other useful applications to be considered regarding the individual differences uncovered by this research is the opportunity for colleges to adjust programs and facilities in order to improve the chances that some kinds of students will be comfortable and satisfied at college. While the exclusion of students with less likelihood of being satisfied may be an option for highly selective institutions, others may wish to respond to the particular needs and interests of different students with careful and deliberate institutional changes. The line of research described in this report can meet the need for basic information that this kind of institutional response requires.

Related to the satisfaction that students feel while at college and, to the quality of the educational process, is the extent to which they utilize the resources that the college offers for purposes of fostering learning and development (Pace, 1984). The line of research presented in this paper suggests a new line of assessment activities. That personality, as measured in this study, relates to the utilization of college resources, is clear in the work of Brodigan and Ramsay (1990). As a part of their self-assessment efforts, colleges and universities should consider the quality of the educational process as it differs across students having different goals and orientations toward college.

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Econometric Modeling of Enrollment Behavior

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Introduction

This paper describes the application of econometric modeling techniques to the analysis of enrollment behavior of admitted students at four-year colleges and universities. It is based on the author's work over the last four years with approximately two dozen institutions seeking to understand more about the behavior of their admitted students — especially those requesting financial aid. This approach to modeling enrollment behavior has been discussed frequently in the literature[1] and has been adopted or attempted at a number of institutions. The purpose of this paper is to discuss experiences in implementing such an approach across a relatively wide spectrum of institutions differing by size, selectivity, program focus, etc.

The models, and the analysis surrounding the creation of those models, provide institutions with information that is useful in three key areas: understanding the competitive marketplace within which the institution operates; helping to assess how financial aid influences enrollment decisions; and predicting student enrollment, financial aid cost and the composition of the entering class. However, it will come as no surprise to anyone familiar with the financing of higher education in the 1990s that the primary motivation for the use of these techniques has been financial: to understand more about the role financial aid plays in the enrollment process and, with that knowledge, to insure that financial aid policies effectively and optimally support institutional enrollment goals. Experiences with this approach include the following:

- A large, regional, university discovered that it had been hurting itself by providing less than optimal aid to its first-year students. By expanding its financial aid budget, it was able to increase the size and quality of its class while increasing net revenue.

- A small liberal arts college was able to consolidate a large and unwieldy financial-aid packaging matrix into a few targeted cells. By eliminating a wastefully complex awarding policy, packaging time was shortened and the effectiveness of their financial aid budget was increased.

- A college moved reluctantly from being ability-blind to a differential financial-aid packaging policy, using an econometric approach to focus their aid dollars more systematically in areas that helped support their enrollment goals.

- A college in a budget squeeze used these techniques to make the most aggressive use of their financial aid to achieve a specific net revenue goal. Econometric modeling helped to inform that process as well as identify the limits to which financial aid alone could be used to achieve net revenue goals.

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[1] Frequently cited references include: Manski, F.C. and Wise, D.A. (1983) *College Choice in America*, Cambridge, MA: Harvard University Press; Ehrenberg, R. and Sherman, D. (1984) Optimal financial aid policies for a selective university. *J. Hum. Resour.* XIX, 202-230; and Moore, R.L., Studenmund, A.H. and Slobko, T (1991) The Effect of the Financial Aid Package on the Choice of a Selective College, *Economics of Education Review*. Vol. 10, No. 4, (311-321).

Why model econometrically?

The principal alternative to econometric modeling (for either predicting enrollments or assessing the impact of financial aid) is to build a table of historical yields in which students are grouped by, for instance, their ability and the size of their institutional grant. The historical yields in the individual cells become the best indicators of the yields for the coming year. The impact of alternative financial aid rules are estimated by seeing what would happen to enrollments if admitted students were moved from one grant cell to another. Table 1 shows a very simple example of such a table.

Table 1. Historical Yields by Financial Aid Status and Ability (percent)

	No Aid Requested		Aid Requested (Grant amounts in dollars)		
Ability groups	No Grant	Merit Award	*0-5,000*	*5,001-10,000*	*10,001+*
SAT less than 900	20	na	27	43	65
SAT: 900-1100	18	40	42	62	57
SAT: 1100-1300	15	35	34	40	43
SAT: above 1300	10	29	24	28	31

This tabular approach, while useful, has some serious limitations. Without testing statistically to determine the importance of each of these categories, this approach remains a more or less arbitrary way of classifying the admitted students. There are countless ways to break up the class based on student characteristics or interests. Suppose that yields are different by sex, race, or major. One would need tables (similar to Table 1) for women and men, different ethnic groups, or different majors; each broken down by SAT and grant size. As one splits the class up into ever finer cells containing ever fewer students, confidence in the predictive accuracy of the yields in each cell falls fast.

In contrast, the econometric approach uses all of the information about each student and does not force one to break the admitted applicant pool into smaller and smaller slices to do it. It calculates the independent effect on yield of each student characteristic (college aid, SAT, GPA, rank, ethnicity, geographic origin, expected major, etc.). It allows one to test statistically whether or not a particular characteristic "matters" in determining yield. This method also produces a direct estimate of the probability of each student's matriculation and can estimate the effect on matriculation probabilities of changes in institutional aid awards.

The econometric approach consists of three distinct phases:

- data acquisition and verification
- model estimation and validation
- model simulation and prediction

Each of these phases will be discussed below.

Data Acquisition and Verification

It is impossible to overestimate the importance of getting the data right. The most frequent lament among researchers studying admission and financial aid is that "the data are difficult to work with." The author's experiences suggest that there is an inexhaustible supply of potential problems. A short list would include: changing computer systems resulting in historical files that are potentially inconsistent with current information; changing field definitions within an existing historical data base; changing definitions of underlying concepts (did we calculate "Family Contribution" and "Need" differently before reauthorization?);

changing procedures and approaches to entering original data; data entered at alternative points during the year (is this data as-of-June or as-of-October?); inconsistency in the way matriculant and nonmatriculant data are entered; insufficient care in the accuracy of the underlying information during data-entry.

Moreover, data concerns go beyond questions of accuracy and completeness. Suppose that all of the relevant data is accurate and complete somewhere within the institution. The financial aid and admissions offices maintain data bases to satisfy their own needs and purposes, which may or may not coincide with the needs and purposes of others, such as institutional researchers or faculty members. Different agendas imply different ways of looking at the data that may or may not be consistent with the way in which the data are currently maintained. The trick is to balance the competing needs of the different interest groups so that each has access to the most up-to-date, reliable and accurate information possible.

What to collect?

Although the information that is available and relevant will vary from institution to institution, the types of information to gather can be grouped into several rough categories:

Ability. Measures of ability include SAT or ACT scores, class rank, GPA, academic honors or awards, and academic ratings (either subjective or objective) determined by the admissions office.

Financial Aid. Important pieces of information in this category include (among others): whether or not the applicant requested aid; if so, whether or not the student completed the application; the size and components of the financial-aid package; detail on negotiation of the award between the student/family and the institution; and whether or not the student received a merit award.

Demographics. These factors include ethnicity, religion, sex, geographic origin, if the applicant is a "legacy," the type of high school the applicant attends, family income, need and family composition.

Interests. Measures of the applicant's interests include: major or program of study, extracurricular activities, clubs, career plans, etc.

Student Actions. Ideally, any action taken by the student in his or her interaction with the institution ought to be recorded and maintained. The list would include whether or not the student was an early decision candidate; where else the student applied; who initiated the first contact and in what manner; how the student learned about the institution; what decisions were made by the college and how the student responded; if the student had an interview (either campus-based or off-campus).

"Real" financial aid and income concepts

It is important to look not only at the aid package offered to the applicant, but the amount of aid relative to the cost of attending the institution. Annual inflation, in tuition as well as other price levels, tends to distort trends in financial aid information and makes year-to-year comparisons difficult unless the values are standardized in some way.

The preferred approach is to standardize on a single year's education cost, usually the most current academic year. This is done by dividing the actual values (whether they be aid,

income or need) by tuition and then multiplying the resulting ratio by the tuition in the chosen base year. For example, suppose a student received a grant of $8,000 in a year when tuition was $10,000; his or her award was thus 80 percent of that year's tuition. If today's tuition is $20,000, that original $8,000 award would be restated as $16,000 (80 percent of this year's tuition) so that it could be compared with this year's awards.

Other measures of inflation could be used to "deflate" the actual yearly values so that year-to-year comparisons could be made. The Consumer Price Index or other such nationally-derived economic statistics are obvious candidates. However, to analyze decisions regarding the purchase of a college education, deflation using the institution's own cost of education makes the most sense because that is the single product that the financial aid award is designed to help purchase.

Bias in matriculant and nonmatriculant data

A frequent and very significant data problem encountered is bias resulting from inconsistencies in the collection and reporting of information on matriculants and nonmatriculants. Generally institutions will have complete and detailed information on those who enroll. Data on the nonmatriculants are much more variable, particularly financial aid data. Many financial aid information systems require the deletion of information on awards that are not accepted. If the system does not have an ability to track the original offers, then all information on awards to students who choose to enroll elsewhere is lost. From a modeling standpoint, complete information on the nonmatriculants is every bit as important as information on the matriculants. Without it, there is no chance of capturing a complete and accurate profile of students who, for whatever reason, choose not to enroll. Finding out why they choose not to enroll is, of course, a major goal of any enrollment modeling exercise.

Occasionally some data will be available for both matriculants and nonmatriculants but the data are more accurate, derived differently or from a different point in time for matriculants. Outside grants from private sources are an example of a data source that is often quite different for matriculants and nonmatriculants. For matriculants the data is typically updated and accurate as of fall registration: any outside grant that they have earned or been awarded will be recorded accurately. But for nonmatriculants, some of whom have had no contact with the institution since early spring, the information is quite sparse. If any of those outside awards were received at high school graduation (after the last contact a nonmatriculant would have had with the institution) then they will not be recorded.

This is just one limited example of a very prevalent and potentially quite severe bias problem in a data set. Careful attention to the way in which information is received and recorded is critical in understanding the limitations of the research database.

Timing of the data set

In the best of worlds, a researcher would have copies of the admission and financial aid databases from several points during the admissions season: one when initial letters and awards are sent, another after the bulk of the negotiation has taken place (perhaps by the end of June) and another as of fall registration. Unfortunately, the reality usually falls short of the ideal. Typically the most accurate and complete data is as of fall registration.

Model Estimation and Validation

The models are constructed by testing the significance of all relevant variables from a data base of merged admissions and financial aid information. The purpose is to see which variables improve the accuracy of the enrollment prediction. The model estimates the separate influence of each of these relevant factors -- from SAT scores to geographic location to intended field of study. Special attention is, of course, focused on the role of financial aid offers.

Estimation techniques

The modeling described in this paper is performed with a combination of ordinary least squares (OLS) and probit regression techniques. Because it is a much faster estimating technique, OLS is used for preliminary analysis of the data set to get a notion of which variables are most important in determining enrollment at a particular institution. Once the basic structure of the model has been identified using OLS, the models are reestimated and tested using probit. Other researchers have used logit techniques to estimate enrollment models. There does not seem to be any clear winner in this estimation-technique horse race. However, it is clear that the nature of the matriculation data (1 or 0 indicating whether the student enrolled or not) requires the use of some limited dependent variable technique.

Principal factors in the regression

The models are built by testing the significance (the ability to improve prediction of enrollment) of variables indicating ability, financial aid, interests, student actions, student demographics, etc. Coefficients on measures of ability (test scores, class rank, grade point average, etc.) will always have negative signs (regardless of the selectivity of the institution). This universal negative relationship between ability and enrollment probability comes from the fact that the more able students will have more options and are, thus, less likely to enroll at any single institution. Moreover, in a world of competitive financial aid awards, these students will also have more generous competing financial aid offers from other institutions.

Experience has shown that the most significant variable describing financial aid is the amount of institutional grant awarded. As noted above, data on outside grants are typically plagued by bias. The same is true for information on student loans and workstudy. For matriculants, the data on loans and workstudy are generally what has been accepted as of fall registration; for nonmatriculants, the data are generally as of the initial offer in the spring. Ignoring this fact can often lead to unbelievable coefficient estimates suggesting that loans (or workstudy) have a more powerful positive impact on enrollment than institutional grants.

Missing data

The most significant econometric problem facing the researcher is the omission of data on competing financial aid offers from other institutions to which the applicant has also applied. Unfortunately there is no way around this fundamental problem. The coefficient estimates are thus likely to be less precise than they would be if the data on competing awards were available. This is a compromise that is inherent in the way the data are collected and maintained at all institutions. The models can often capture the impact of competing awards

indirectly through information (typically from the financial aid application) on where the student has sent his or her scores. Student ability (for instance, the SAT score) can also play a role in capturing the impact of competitors' awards. More able students will receive higher awards from competing institutions.

This data omission is common to any approach which is based primarily on a single institution's own data collected over an admissions cycle.

Defining sample sets

The analyst must make some initial decisions concerning the scope of the sample set. Should there be one model for all admitted applicants or several models depending upon a student's financial aid status? Should there be separate models for aid requesters and full payers? Should engineering students be grouped with humanities students? Should women have a different model from men? Should the data set include early admits, or athletes, or tuition remission students?

In addition to answering these questions about the scope of the sample set across individual groups of students, there are similar sets of questions to be asked about grouping data across time. Should the model be built on last year's data alone, the last two or three years, or longer? How much change has there been in the competitive marketplace that this institution faces over the last several years? Does the model that describes the enrollment process of two years ago "work" well to explain enrollment last year?

Unfortunately there is no simple answer to these questions without reference to a particular data set. The analyst must test the reasonableness of the exclusion or inclusion of different sets of students and different years of data using techniques that measure the validity of the assumption that their behaviors (across groups of students and across time) come from the same underlying model.

How to handle missing observations

Frequently the modeler encounters a variable that is only available for a portion of the sample but which is clearly important in determining overall enrollment. The most obvious example is high school class rank. Many secondary schools do not provide class rank to college admissions offices. Lacking this information (often on a sizable fraction of the admitted applicant pool) poses a dilemma: Should one restrict the sample to only those who have class rank (along with everything else) or use the full sample and drop class rank as a determining variable? If class rank is shown to be an important explanatory variable (by using it in a regression restricted to students with valid ranks) then a secondary model should be developed to estimate the ranks of those who do not provide them.

This procedure involves building a satellite model linking class rank to other variables that can be shown to play a role in determining class rank (SAT, grade point average, sex, type of secondary school, etc.). This model is then used to estimate a national class rank for those students who don't report rank but do report SAT and GPA). That variable is used to fill in the holes for those with missing class ranks.

A representative enrollment probability equation

Table 2 (below) displays the "ordinary least squares" coefficients from a very simple representative enrollment probability equation. The OLS coefficients are shown because they can provide a reasonably intuitive representation of the change in matriculation probability that results from a change in each of the variables. However, in actual prediction or simulation, the coefficients are reestimated using the probit technique.

Table 2. Enrollment Probability Equation
(t-statistics in parentheses below the coefficient)

Dep. Var.	*Matric*
Pds	*1994, 1995*
#Obs.	*1389*
Constant	-0.0377
	(-1.03)
Grants (000s) > $7,500	0.0220
	(7.57)
Grants (000s) between $5,000 and $7,500	0.0286
	(5.43)
Grants (000s) <= $5,000	0.0352
	(3.92)
SAT (00s)	-.0214
	(-5.42)
Appeal (denied)	0.1410
	(3.63)
Appeal (granted)	0.1796
	(4.28)
Asian	0.0670
	(2.55)
Early	0.4236
	(8.23)
Rank (actual)	0.5274
	(3.82)
Rank (estimated)	0.6839
	(4.38)
Resident of state 1	0.2223
	(5.92)
Resident of state 2	0.1779
	(5.83)
Rsq	0.154631
Std. Err.	0.44631

The model was estimated over academic years 1994-95 and 1995-96. It uses two measures of ability: SAT and class rank. Class rank enters twice using reported data "Rank (actual)" and estimated data "Rank (estimated)." The positive coefficient on rank implies a negative relationship between enrollment and ability (as measured by rank) since higher class rank is actually measured as a lower percentage amount.

The grant variable enters in three separate splines, each with its own coefficient. The results from this analysis suggest strongly that additional grants have a smaller impact on enrollment probability as the grant size gets larger. This institution collected information on

whether the student tried to negotiate for higher grants and whether the appeal was denied or granted. Both granted and denied appellants were more likely to enroll than all other students (everything else being the same), but those whose appeals were granted were even more likely to enroll. This impact (entered as a "dummy" boolean variable) measures the simple fact of their being granted or denied, independent of the actual dollars granted -- which are picked up directly in the grant variable.

In this equation, Asian students were more likely to enroll as were early decision accepts; residents of nearby states also had a higher enrollment probability.

The above equation is specific to a single institution. Its structure and coefficients could not be used in any way as predictors of enrollments at another institution.

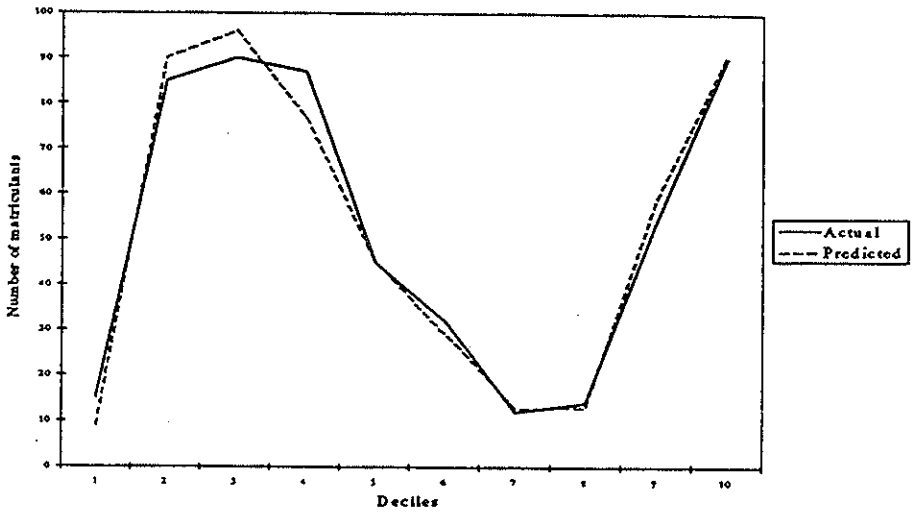
Model validation

Within-sample prediction accuracy. The primary method for model validation during estimating is the accuracy of the model over the estimation sample. The traditional way to test the accuracy of limited dependent variable models is to pick a critical value for the estimated dependent variable and then assign a "yes" (in this case enroll) to all those whose estimated values lie above that value and a "no" (do not enroll) to all those below. Comparing these enroll/don't-enroll estimates with the actual enrollment decisions provides an estimate of the forecast precision of the models. Unfortunately doing this will drastically lower the effectiveness and usefulness of the forecasts generated by the enrollment probability model. Suppose the critical value is the yield for that year's class (30 percent). Using the traditional approach, all those with estimated probabilities above 30 percent are forecasted to "enroll," and all those with probabilities below 30 percent are forecasted to not enroll. The model is actually predicting the enrollment probability of an admitted applicant, not whether he or she is going to actually enroll — an important distinction. A much more effective use of the model, in a forecasting mode, is to group students by probabilities and estimate what percentage of each group will enroll, based on an average probability assigned to each group.

Enrollment prediction. For example, suppose we take all of the students whose estimated enrollment probability lies between 40 and 50 percent. Rather than saying that all of those students will enroll (as the traditional approach would, because their probabilities lie above the critical value) the alternative approach would say that 45 percent of them would enroll. Likewise, suppose we take all students with probabilities between 10 and 20 percent. The traditional approach says none of them will enroll. The alternative approach says 15 percent of them will.

The preferred alternative approach leaves the modeler with the task of having to pick which 15 percent of the students with probabilities between 10 and 20 percent will enroll and which 45 percent of the students with probabilities between 40 and 50 percent will enroll. The procedure adopted by the author is to randomly select the calculated number of matriculants from each group some large number of times (typically 50 times) and use those 50 approximations of class composition to derive estimates of expected class characteristics (average SAT, percent minority, financial aid costs). This process has the additional advantage of providing a measure of variability by inspecting the distribution of the 50 separate outcomes. The figure below shows a comparison of the forecasted and actual enrollment by decile using this approach for one institution.

Figure 1. Actual and predicted enrollments by decile - (a representative institution)



The model predicts enrollment by decile and then adds up each of the ten decile predictions to get total enrollment. Actual enrollment for each of the deciles is simply the count of the matriculants whose estimated enrollment probability put them into that decile. The figure is laid out by decile so that one can see where the errors occurred. Note that the high counts of students in the higher probability band primarily represent the early decision admits whose probabilities are very high. The overall within-sample error in this case was 2 students, far less than if the traditional "critical-value" approach had been used.

An additional approach to model validation is to assess the stability of the coefficients estimated over sub-samples of the estimation interval. Significant variability in the coefficients suggests some potentially spurious correlation that may not hold up in the future. This, in-turn, raises the question of over parameterization.

"Over parameterization". There is a reasonably significant potential for over parameterization in the modeling of enrollment probability. Typically the researcher is provided with a very large data set, with sufficient degrees of freedom to allow using anything that might conceivably improve enrollment prediction. Many of these variables may "work" (in the sense of being statistically significant according to the usual criteria). In addition, there may be a strong temptation to model subgroups of the sample (by sex, major or race) when the data do not necessarily warrant it. Relentless efforts to find all the variables that "explain" this sample's enrollment behavior can easily lead one astray in the efforts to provide a useful tool for understanding financial aid and enrollment decisions. Ultimately we are looking for a model with general applicability which captures the underlying "truth" in the relationships among student characteristics, financial aid and enrollment. Such a model is useful in planning the general design of award packages whether or not it can predict activity with utter precision across all years or among a sub-group of students in any one year. By "over parameterizing" the model, one may end up with an equation that is only useful in analyzing a specific year (indeed one that has already passed and is thus of little more than historical interest).

Model Simulation and Financial Aid Optimization

The enrollment probability models can be simulated in many "what if" exercises to see the effect selected changes in financial aid awards will have on enrollment and net revenue for a particular institution. For example, one could test whether or not a group of high-yielding students would still have matriculated had their grant awards been slightly smaller, or whether a group of low-yielding students would have matriculated had their awards been slightly higher. One could determine whether either of these changes would have generated additional net revenue, or whether the resulting changes in class composition would have helped or hurt enrollment goals.

Optimizing financial aid consists of many of these "what-if" experiments, trying to find groups of students for whom higher grants would raise enrollment enough to increase net revenue despite the higher apparent financial aid costs. In addition, we look for groups of students for whom reductions in grants would not lower enrollment by enough to cut net revenue.

Table 3 shows a simple example of several of these "what-if" simulations at a small New England liberal arts college.

Table 3. Selected Simulation Results

Increase grants by $1,000 to:	*Yield*	*Matrics in Group*	*Matrics Change*	*Net Revenue Change*
All admitted financial aid requesters	35.3	251	13	-46,000
Admit/deny with family income above $50,000	21.2	26	3	20,000
SATs between 1300 and 1500	29.5	33	2	1,000

In the first simulation, all financial aid requesters are given an additional $1,000 in institutional grants. If this simulated increase in grants had resulted in higher enrollment and higher net revenue, then the institution had been too stingy with its actual financial-aid packaging. In this case, the model estimates that the change would have produced 13 more matriculants, but a net revenue loss of $46,000. This amount can be broken down in the following way: The 13 new students would have brought with them a total of $205,000 in net revenue (tuition, fees, room and board less their grants), but tallied against this is the $251,000 that would have been "wasted" by offering higher grants to those who had already enrolled. The difference ($251,000 minus $205,000) yields a net loss of $46,000.

The second shows a more targeted example in which $1,000 in institutional grants is offered to students reporting more than $50,000 in family income who had requested but were denied institutional aid. Twenty-six of these students had enrolled without the aid, so this action would have "wasted" $26,000. The additional aid would have boosted enrollment by 3 students who would have brought with them $46,000 in net revenue for a total gain of $20,000.

In the third example, students with SATs between 1300 and 1500 have their institutional grants increased by $1,000. There were 112 applicants in this group, 33 of whom enrolled. As a result of the grant increase, 2 additional students would have matriculated. This would have "wasted" $33,000, but the additional two students would have brought with them $34,000 in net revenue for an increase of $1,000. Thus this policy would have been virtually

"self-financing": slightly more financial aid would have generated slightly higher enrollment of a desirable group of students with no net financial aid cost.

A Final Note

Simulating to find groups of students where an institution may have under or overspent will optimize financial aid. However, since changes in aid will inevitably result in enrollment changes, the optimization process also requires balancing any proposed award changes with institutional enrollment goals. The knowledge provided by these modeling, estimation and simulation techniques can enable institutions to make informed decisions about their financial-aid budgets, including how to use those budgets to achieve their enrollment goals.

Student Satisfaction and Persistence: Some Early Findings at One Institution

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Abstract

New York University conducted a student satisfaction survey of its freshmen and juniors in Spring 1994, and is correlating the survey results with subsequent student enrollment behavior. This paper will present findings from the analysis of the survey and enrollment activities which suggest that some student attitudes are associated with student persistence.

Introduction

New York University, like most colleges and universities, is concerned with improving the retention rate of its students to graduation. After conducting focus groups to determine critical areas of concern for our undergraduate students, it was decided to conduct a student satisfaction survey, which would have two primary goals. First, to enable administrators to begin to gauge student satisfaction levels with the University, and second, to correlate the satisfaction findings with enrollment behavior to determine what areas might be associated with persistence to graduation.

It is NYU's intention to conduct the survey every two years to gauge changes in student attitudes: will the Spring 1994 freshmen look like the Spring 1994 juniors when they become juniors in Spring 1996, or will they continue to have attitudes which are distinctly theirs?

Background

In order to better understand student concerns, NYU's Office for Enrollment Services conducted a number of focus groups with undergraduate students. Some of the common themes which emerged from these sessions include:

- financial concerns, including financial aid and the cost of tuition, room, and board
- academic advisement
- teaching assistants, especially in cases where English is not the native language
- student life, including the lack of a common college experience
- feelings of isolation among students, especially those who commute
- an impersonal, bureaucratic feeling of the institution

In order to discover more about these findings, in a more objective and broader based manner, a survey was planned and executed in the Spring 1994 semester. The instrument itself was developed by a graduate assistant (GA) within the Office for Enrollment Services, working with an advisory committee and a few key liaisons. The GA conducted a review of the literature and assembled samples of satisfaction surveys from other institutions.

The survey was piloted twice early in the Spring 1994 semester to ensure that it was a student-friendly instrument, which could be filled out without requiring additional information or assistance. Based on these pilot runs, minor changes were made to improve the survey.

The survey was administered during March and April 1994. An announcement postcard was mailed in mid-March to all enrolled freshmen and juniors, advising them that they would be receiving an important survey shortly. At the end of March, the survey packet, including cover note, survey, and postage paid return envelope, were mailed to these same students. Two weeks later a reminder postcard was mailed, asking that students please return the survey form.

From the 7,028 students included in the survey, 2,313 surveys were returned, a 32.9% response rate. As the surveys were returned, they were reviewed and edited to improve the readability in the optical scanning process. Open ended responses were removed, and the first three pages were scanned, which provided a data file of survey results. The open ended question responses were read, and a categorization scheme developed. These responses were read again, and coded using the categorization scheme. In addition, the open ended responses were also coded so that they could be associated with the responses to the standard survey questions.

Once the survey data file was prepared, it was matched with demographic data from the Student Information System (SIS) by student ID number. This demographic data was retrieved from the SIS for all of the students surveyed. Since Spring 1994, we have continued to add enrollment and graduation data to the survey data file. At this point we have added Fall 1994 enrollment and graduation data, as well as Spring 1995 enrollment data, to the survey data file.

In analyzing the results of the survey, we categorize the results in two ways: demographic data analysis and survey data analysis, which includes correlating the survey results with enrollment behaviors. When we focus on the demographic data analysis, we are able to continue to report on the progress of the entire surveyed population. On the other hand, the survey data analysis, of necessity, focuses only on the survey respondents.

To date, we are defining *attrited students* as those students who were enrolled in Spring 1994 , were mailed a survey (i.e. were freshmen or juniors at that time), and have not registered in both Fall 1994 and Spring 1995, and who have not graduated. Therefore, the students who are categorized as *retained students* (or perhaps more accurately *persisters*) either enrolled in at least one semester (Fall 1994 or Spring 1995) or have graduated.

Demographic Data Analysis

Of the group originally surveyed, 89.4% of the students were retained at NYU while 10.6% were out of attendance. Attention must again be called to the fact that we are using a fairly restrictive definition of attrition, i.e. that an individual must have been out of attendance in *both* the Fall 1994 and Spring 1995 semesters to be considered an attriter. Why use such a restrictive definition? Currently, we want to look only at those individuals who are truly gone from the institution, as opposed to "stopping out." It is presumed that a two semester absence is better evidence of the action of leaving NYU than a one semester absence. (This does leave open the question of how future semesters attendance patterns will be classified. If someone is out for the last two out of three semesters, should they be considered to have attrited? Or will we look at only those people out all three semesters?)

When we sought information on those students who in reality had only "stopped out" during Fall 1994, and who returned in Spring 1995, we found that 138 (14.8%) or the 932 students who were missing in Fall 1994 returned the following Spring.

We have noted that the survey respondents are most likely not a representative sample of the entire population surveyed. If we compare persistence and attrition rates, we find that those who responded to the survey persist at a higher rate than those who do not (Table 1). However, given the caveat that the results are not necessarily generalizable to the entire population, the results are still important for the institution.

Interestingly, we found little difference in persistence rates by gender: females retained at a rate of 89.5% and males at a rate of 89.4%. However, when we look at students by their class level, we find a marked difference, with juniors more likely to retain than freshmen. This is not unexpected as juniors have much more invested. In the entire surveyed population, juniors returned 94.3% of the time, while freshmen persisted at a rate of 84.9%.

Table 1: Persistence Rates for All Students and by Survey Response Status

	All Students	Survey Responders	Survey Non-Responders
N	7,028	2,305	4,723
Persisted	89.4%	92.9%	87.7%
Attrited	10.6%	7.1%	12.3%

As might be anticipated, student persistence rates varied by racial/ethnic group as well. The best retention rate was demonstrated by those students who identified themselves as Asian or Pacific Islander, while the Black, Non-Hispanic and Hispanic students had the lower rates.

Finally, and perhaps most importantly for the rest of our analysis, we found (not unexpectedly) that each of our undergraduate schools has its own character and its own retention rate. Schools varied from a high of 94.5% retained for the undergraduate business school to a low of 81.8% for the school serving non-traditional students. These differences drove home the point that although an institution-wide analysis is interesting, the true value of the data comes from looking at the smaller populations which behave in differing manners.

Just based on this demographic data, a campus-wide committee is beginning to focus on which groups need to be targeted in our retention efforts. Clear starting points include freshmen and those of particular racial/ethnic categories. However, school-level results indicate that each unit may need to address different issues.

Survey Data Analysis

Perhaps most exciting for us was the validation of the survey instrument by finding statistically significant correlations between responses to items on the survey and persistence. Of the 88 items on the survey, numerous questions were found to correlate with retention. Of the correlations found between enrollment and survey responses, 10 were found to be correlated at the most stringent level ($p < .001$) of significance, when reviewed for all respondents. These results are shown in Table 2, where they are ranked in descending order by the strength of the correlation.

What the results seem to indicate is that one of the best indicators of whether or not a student will persist is whether or not the student feels that he or she made the right decision by coming to NYU. Questions 37 (happy about decision to attend NYU) and 40 (seriously

considered transferring) are relatively highly correlated with enrollment behavior, and question 39 (encourage others to attend NYU) is also positively correlated. Each of these questions is a part of the factor of having made the right decision by enrolling at NYU.

Table 2: Correlation Coefficient (r) of Persistence With Survey Questions

Question	r*
37. I am happy about my decision to attend NYU	.13
40. I have seriously considered transferring to another college or university	-.11
41. I have seriously considered taking time off from college	-.11
36. I have a group of friends with whom I usually spend a lot of time	.10
82. Number of student organizations participate in	.10
42. I am worried about finding a job when I graduate	.09
39. I would encourage others to attend NYU	.08
79. Status of major	.08
80. Status of career choice	.08
88. Number of hours per week employed	-.08
45. Importance of Office of Career Services	.07

*All correlations in this table are significant at $p<.001$

Other clear findings include that student intentions are clearly correlated with their enrollment behavior. Both considering transferring and considering taking time off are highly negatively correlated with persisting.

The literature also indicates that student integration into the college environment affects persistence. Our findings again support that: Having a group of friends and participating in student organizations, examples of such integration, are positively correlated with enrollment.

Student concern about finding a job after graduation has a positive impact on retention; those students who expressed concern were also the students who returned more often. Likewise, the more definite a career choice a student has made, and the more definite a student is about a major, the more likely he or she is to persist. This makes logical sense, as those students who don't know what they are doing have less reason to remain in school than those who are directed toward some goal. Tying in with these questions is also the fact that the more important students found the Office of Career Services, the more likely they were to continue at the university.

Not surprisingly, but disappointing nonetheless, is that student employment is negatively correlated with persistence, i.e. the more hours that an individual works, the more likely he or she is not to re-enroll. We would like, in the future, to try and isolate those individuals who may be working an excessive number of hours (greater than 20, for example), and see if the correlation still holds.

Future

New York University has just begun to scratch the surface of the information which has been gathered. The student satisfaction survey data file will become more valuable each semester as additional semesters of enrollment behavior are tracked. Additionally, more sophisticated analyses need to be undertaken. We have just begun "fooling around" with factor analysis, and preliminary results show that the questions do fall into some very definite factors, such as advising issues, student expectations, academics, interaction with the faculty, and

interaction with the administration. We look forward to refining those measures as a means of simplifying the amount of information to consider.

The primary goal for the future is to be able to identify those students who enroll at NYU and are at risk for attriting, based on their characteristics (both demographic and attitudinal), and to develop programming to mitigate that risk. In other words, we would like to develop a profile of an at-risk student (varied by college within the university) so that special attention can be paid to such individuals to increase the likelihood of their persisting to graduation.

Summary

New York University is in the midst of a longitudinal tracking study of two cohorts from the Spring 1994 semester. As time passes and we get more enrollment behavior history behind us, we will continue to correlate students' enrollment activities with their responses to the student satisfaction survey which was administered to them. Early results, however, show that a number of the questions are significantly correlated with persistence at NYU. It is now up to the institution to begin to take action on these findings.

(Appendix 1 includes a chart of the questions which were found to be significant at the .05 level or higher for the all-university results, as well as for four of the larger undergraduate colleges at NYU.)

(Appendix 2 contains the questions from the Spring 1994 student satisfaction survey.)

Appendix 1: Correlations Between Survey Responses and Persistence

All University and for Selected Colleges

	All University		College A		College B		College C		College D	
Q	r	p	r	p	r	p	r	p	r	p
Q1									0.12	0.05
Q4	0.05	0.05	0.08	0.05	0.11	0.05	0.14	0.05		
Q5									0.14	0.05
Q9			0.07	0.05						
Q10	0.05	0.05							0.22	0.01
Q12									0.22	0.05
Q18							0.20	0.05		
Q21									0.14	0.05
Q22									0.12	0.05
Q24			-0.08	0.05						
Q25									0.15	0.05
Q29	-0.06	0.01	-0.10	0.01						
Q30	0.05	0.05	0.07	0.05					0.13	0.05
Q32	0.07	0.01	0.09	0.05	0.12	0.05	0.14	0.05	**0.25**	**0.001**
Q33	0.05	0.05	0.09	0.05	0.16	0.01			0.15	0.05
Q34	0.04	0.05	0.07	0.05	0.14	0.01			0.13	0.05
Q36	**0.10**	**0.001**	0.08	0.05					0.12	0.05
Q37	**0.13**	**0.001**	**0.13**	**0.001**	**0.25**	**0.001**	0.16	0.01	**0.32**	**0.001**
Q39	**0.08**	**0.001**	0.07	0.05	**0.24**	**0.001**	0.12	0.05	**0.21**	**0.001**
Q40	**-0.11**	**0.001**	**-0.13**	**0.001**	-0.15	0.01	-0.17	0.01	**-0.20**	**0.001**
Q41	**-0.11**	**0.001**	**-0.12**	**0.001**			**-0.18**	**0.001**	-0.14	0.05
Q42	**0.09**	**0.001**							**0.20**	**0.001**
Q45	**0.07**	**0.001**	0.08	0.05						
Q46	0.05	0.05								
Q56					**-0.18**	**0.001**				
Q57	0.06	0.01								
Q58			0.08	0.05						
Q60									0.16	0.01
Q63							0.13	0.05		
Q64							0.11	0.05	0.13	0.05
Q66	0.04	0.05	0.08	0.05						
Q67									0.14	0.05
Q71	0.06	0.05								
Q73	0.06	0.01					0.14	0.01		
Q77	0.05	0.05								
Q79	**0.08**	**0.001**			0.13	0.05			**0.26**	**0.001**
Q80	**0.08**	**0.001**								
Q81			0.09	0.01						
Q82	**0.10**	**0.001**	0.08	0.05			0.11	0.05		
Q84									0.13	0.05
Q88	**-0.08**	**0.001**								

Notes:

p indicates probability that the correlation is not a chance occurrence.

r indicates the level of correlation between question and continuing enrollment.

Appendix 2-Survey Questions

I. Thinking of your academic experiences at NYU, please respond to the following questions:
How satisfied are you with the following:
[Very Satisfied/Satisfied/Dissatisfied/Very Dissatisfied]

1. Overall quality of instruction in all of your courses
2. Out-of-class availability of professors
3. The variety of instructional approaches used in classes
4. Overall quality of your college educational experience
5. Liberal arts or general education degree requirements in your school

The following questions are about Teaching Assistants (TAs). If you have not had a TA, please respond NA.
[Very Satisfied/Satisfied/Dissatisfied/Very Dissatisfied/NA]

6. Overall quality of academic instruction provided by TAs
7. The availability of TAs during office hours
8. The degree to which TAs are prepared to teach a course
9. The TAs' ability to communicate the course material

II. How satisfied are you with the following services? If you have never used the service, please respond NA.
[Very Satisfied/Satisfied/Dissatisfied/Very Dissatisfied/NA]

10. Academic Advising Center within your school
11. Bobst Library
12. Office of Career Services
13. Student Employment Office
14. Office of Financial Aid
15. University Health Services
16. Coles Recreation Center
17. University Computing Facilities
18. NYU Residence Halls
19. NYU Bookstore

III. Thinking of your experiences outside of the classroom, how satisfied are you with the following?
[Very Satisfied/Satisfied/Dissatisfied/Very Dissatisfied]

20. The attitude of NYU's administrative staff towards students
21. The quality of assistance you receive from NYU administrative offices when you need help
22. The quality of information that you get from University offices

IV. Thinking of your own experiences at NYU, to what extent do you agree or disagree with the following statements:
[Strongly Agree/Agree/Neutral/Disagree/Strongly Disagree]

23. The development of academic, scholarly, and intellectual qualities is encouraged by the NYU community.
24. NYU is a place where students go to class; not much else happens at NYU.
25. The University community is supportive of diverse student groups.
26. NYU students are friendly and supportive.
27. NYU students are open-minded and tolerant of difference.
28. Information about programs and events at NYU is easy to find.
29. I have thought seriously about dropping out because of financial difficulties.
30. I feel part of the NYU community.
31. A sense of university community is important to me.
32. Overall, I am satisfied with my NYU experience.
33. My academic experiences at NYU are meeting my expectations of what I thought college would be.
34. NYU is meeting my overall expectations of what I thought college would be.

V. Please respond yes or no to the following statements:
[Yes/No]

35. I have worked with a faculty member on a project.
36. I have a group of friends with whom I usually spend a lot of time.
37. I am happy about my decision to attend NYU.
38. I have attended an on-campus program or social event in the last five months.
39. I would encourage others to attend NYU.

40. I have seriously considered transferring to another college or university.
41. I have seriously considered taking time off from college.
42. I am worried about finding a job when I graduate.

VI. Please indicate the degree to which these services are important to you:
[Very Important/Important/Somewhat Important/Not Important]

43. Academic Advising Center within your school
44. Bobst Library
45. Office of Career Services
46. Student Employment Office
47. Office of Financial Aid
48. University Health Services
49. Coles Recreation Center
50. University Computing Facilities
51. NYU Residence Halls
52. NYU Bookstore

VII. Please respond always, often, sometimes, seldom, or never to the following questions.
How often have you:
[Always/Often/Sometimes/Seldom/Never]

53. Engaged in informal conversation with an instructor after class.
54. Asked your instructor for feedback about your class work.
55. Discussed ideas for a class assignment with an instructor.
56. Discussed personal problems with a faculty member.
57. Discussed career options with a faculty member.

VIII. How often have your instructors:
[Always/Often/Sometimes/Seldom/Never]

58. Scheduled office hours at times convenient for you.
59. Respected student points of view different from their own.
60. Really listened to student questions in class.
61. Clearly stated what they expect from students in their class.
62. Returned assignments with feedback that was helpful in preparing for additional class assignments.

IX. My current academic advisor:
[Always/Often/Sometimes/Seldom/Never]

63. Expresses interest in my academic progress.
64. Is available for advisement during registration periods.
65. Provides me with accurate academic information.
66. Provides adequate time to discuss my academic plans.
67. Helps me select courses that match my interests.
68. Discusses career options that match my interests.
69. Is helpful in the academic advising process.
70. Helps me plan an academic program that will prepare me for a career.
71. Refers me to Career Services for additional career counseling.
72. Is approachable and easy to talk to.
73. Is available outside of registration periods to answer my questions.

X. The following section contains some general information questions. Please answer each statement with the most appropriate response.

74. Who is your primary academic advisor?
    - Faculty member
    - The Department of my major
    - Advisement counselor in my school's Advising Center
    - Graduate student
    - Other

75. During the past semester, how many times did you meet with your advisor?
    Never
    1
    2
    3
    4 or more times

76. How much time do you usually spend in each meeting with your advisor?
    I have not met with my advisor
    Less than 5 minutes
    5 to 15 minutes
    16 to 30 minutes
    More than 30 minutes

77. Are you satisfied with the amount of time you spend with your advisor?
    Yes
    No

78. Are you satisfied with the quality of assistance provided by your advisor?
    Yes
    No

79. Which of the following describes your status regarding a major?
    I have officially declared a major.
    I have a general sense of what I want to major in.
    I am still undecided about a major.

80. Approximately how many hours do you study and prepare for your classes each week, including weekends?
    Less than 10 hours per week
    10-15 hours per week
    16-20 hours per week
    21-25 hours per week
    Over 26 hours per week

81. Which of the statements best describes your present career choice?
    I have made a definite career choice.
    I have made a fairly definite career choice.
    I am undecided about my career choice.

82. How many student organizations do you participate in at NYU?
    None
    1
    2
    3
    4 or more

83. Who is your primary source for information regarding academic degree requirements?
    Friends
    Department of my major
    Advisor
    Advisement counselor in my school
    Other

84. Do you have any concern about your ability to meet the cost of a college education?
    None - I am confident I will have sufficient funds
    Some concern - I will probably have enough funds
    Major concern - not sure I'll make it to graduation

85. If you have student loans, how concerned are you about your ability to repay them?
    No concern
    Some concern
    Major concern
    I have no loans

86. Have you been harassed or discriminated against by a member of the NYU community because of a personal difference.
    Yes
    No
    Not sure

87. If you are currently employed, indicate where you work:
    On-campus
    Off-campus
    Both on and off-campus
    I do not work

88. Indicate the number of hours per week that you are currently employed:
    0 hours
    1 to 10 hours
    11 to 20 hours
    21 to 30 hours
    Over 30 hours

Comparative Perspective on the Role of Institutional Research: Variation by Institutional Characteristics

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Introduction

The paper provides a profile and comparative institutional analysis on the current status, role, ideal plans, and expressed professional development needs for institutional research in different types of higher education institutions in New England. Components of the institutional research profile include organizational structure - the location, reporting relationships, staffing, computer resources and funding for institutional research offices; a functional analysis of typical research projects and constituencies served by the institutional research offices; and institutional perspectives documenting current emphases and projected plans regarding the future role of institutional research in different institutions.

Background

Higher education theorists and practitioners claim that institutional research is essential to effective decision making in colleges and universities. Further, recent developments - including growing competition, rising costs, the need for cost containment, public demand for accountability, federal reporting requirements, and declining enrollment and graduation rates among certain student segments - have expanded the need both for institutional research and for effective collaboration between researchers and administrators. In colleges and universities throughout the country, institutional research is being called upon increasingly to serve critical roles informing decision-making, planning and policy formulation. While many leaders and decision-makers in the higher education community recognize the need for institutional research to guide their planning, some have not yet developed the capacity within their institutions. The purpose of this paper is to offer a perspective on the current role of institutional research in different types of institutions; to project what this role might be in the future; and to discuss the educational and training requirements that must be fulfilled to meet the challenges confronting higher education now and in the 21st century.

The potential contribution and evolving nature of institutional research to college and university planning and policy development has been well documented in the literature. Saupe (1990) identified institutional research as an essential component of sound college and university governance which should occur whenever any planning initiatives, policy issues or institutional decisions are proposed. In 1985, Peterson observed that institutional research continued to evolve as a consequence of state and federal policy decisions, the changing student clientele, advances in computing and telecommunications, the shifting budgetary climate and the growing internationalization of higher education, the increasing complexity and sophistication of decision making and the growing number and volume of calls for increased institutional effectiveness. More recently, Matier, Sidle and Hurst (1994) advocate expanding the scope of institutional research to encompass the roles of information architect, change agent and consultant of choice within higher education institutions.

Preparation for these new roles and the continued growth of institutional research as a profession require information about the functioning of institutional research at different colleges and universities, the identification of existing needs for professional training and development, and the creation of structures and plans to meet the emerging needs and fulfill these new roles. Clyburn (1991) reports that the current models of institutional research and the emerging roles

and activities of the director of institutional research have received limited investigation; the need is particularly acute with respect to small, private colleges. Volkwein provides a rationale for documenting the diversity of institutional research across institutions. "The effectiveness and efficiency of the institutional research profession can only be improved by recognizing the wide diversity of structures and tasks that characterize campus practice and by designing the kind of collaborative support that is consistent with this diversity" (1990, p. 26). The present paper is intended to contribute to an understanding of the current and projected role of institutional research across diverse institutions and to discuss the implications of these roles for the education and training of future institutional researchers.

Data Source

This paper is based on a survey of 243 New England colleges and universities including 80 two year institutions and 163 four year colleges and universities. Responses were obtained from 127 of the 243 institutions yielding an overall response rate of 52 percent - 41 percent for the two year institutions and 58 percent for the four year colleges and universities.

The survey was designed to assess the current level of institutional research at New England colleges and universities; to elicit ideas regarding how the role of institutional research might be expanded to better inform institutional decision making and policy development; and to identify the resources and training required to achieve the maximum potential from institutional research in various higher education institutions.

Data from the survey document the configuration of institutional research offices and functions at each institution including the location and reporting relationship of institutional research offices and staff; the title, employment status, years of experience and academic qualifications of professionals doing institutional research; and the financial and technological resources committed to institutional research functions. The survey results identify the kinds of activities and studies institutional research staff are currently performing at various institutions including: planning, policy analysis and forecasting; financial studies; enrollment management studies; student surveys; faculty and academic studies. The survey data offer a perspective on the future of institutional research based on respondents' identification of the kinds of institutional research studies they would like to do and the financial support, computer resources and professional development opportunities estimated to accomplish the proposed institutional research projects at the respective institutions. Results indicate the extent to which those currently doing institutional research seek additional training in research design, statistical analysis, data management, computer applications and survey research.

The sample is comprised of diverse institutions including community colleges, liberal arts colleges and universities. The majority of responding institutions, 63.8 percent, are private and the vast majority, 74 percent, are four year colleges and universities. Most of the responding institutions are relatively small colleges and universities. Approximately 60 percent have enrollments of less than 2,000.

Results

Configuration of the Institutional Research Function at Responding Institutions

The scope and characteristics of the institutional function vary substantially at these institutions. As shown in Table 1, about 40 percent report they have an institutional research office; another 45 percent have a person or other office engaged in institutional research activities, but no office; and the remaining 15 percent have neither an institutional research office nor an institutional research function. Among the 80 institutions who identified the reporting relationship, the largest number, 27, reported that the institutional research office or function reports to the President and 16 and 14 respectively report to the Provost/Vice Chancellor and Vice President.

Table 1. Configuration of the Institutional Research Function at Different Institutions

Institutional Research Presence	Number	Percent
IR Office	51	40.2
IR Function	57	44.8
No IR Office or Function	19	15.0
Total	127	100%
IR Reporting Relationship		
President	27	21.3
Provost/Vice Chancellor	16	12.6
VP	14	11.0
Dean	9	7.1
Other Admin. Offices	14	11.0
Missing	47	37.0
Total	127	100%
IR Staff Titles*		
Vice Pres., Asst. V.P.	9	12.2%
Dean, Asst. Dean	14	18.9
IR Director	53	71.6
Other Director	9	12.2
Registrar	7	9.5
Associate/Analyst	25	33.8
Asst. Director	5	6.8
Other Professionals	16	21.6
		(N=74)
Years of Experience of IR Staff*		
11 or more years	26	38.2%
10 years	17	25.0
6 - 9 years	19	27.9
3 - 5 years	22	32.4
2 years or less	31	45.6
		(N=68)
Highest Degree of IR Staff*		
Doctorate	42	58.3%
Doctorate in progress	5	6.9
Advanced certificate	1	1.4
Masters	60	83.3
Bachelors	19	26.4
High School	2	2.8
		(N=72)

* The cumulative percent for this variable exceeds 100 since some institutions reported information for more than one staff person.

There is also considerable diversity in terms of the levels of positions held by those doing institutional research, their level of experience and academic background. The title of individuals doing institutional research ranges from Vice President to Research Assistant. The largest number, 53, institutions reported they have an Institutional Research Director and 25 institutions have an Associate or Analyst doing institutional research. It is interesting to note that

in nine institutions, individuals conducting institutional research hold the title of Vice President or Assistant Vice President and another 14 hold the title of Dean or Assistant Dean.

The level of experience for those doing institutional research reflects a substantial range with 31 individuals possessing two or fewer years and 26 possessing 11 or more years of experience. With respect to the academic background of those doing institutional research, the largest number, 60, hold a master's degree and 42 hold a doctorate. Most of the institutional researchers in these institutions earned their degrees primarily in the Social Sciences or in Education.

Role of Institutional Research

Typical Institutional Research Projects

In an effort to identify the role of institutional research at various institutions, respondents were asked to describe the typical research projects they conducted and who were the intended audiences. The descriptions of the research projects were then classified into the following eight categories:

Reports: Institutional statistics, internal and external administrative reports;

Research, Planning & Policy Analysis: Planning and policy analysis studies, forecasting/statistical projections, longitudinal research, and market and survey research;

Financial Studies: Cost analysis, budget planning, and financial projections;

Enrollment Management Studies: Admission, financial aid, and retention studies;

Student Surveys: Student and alumni/ae surveys;

Faculty Studies: Faculty evaluations, faculty workload studies and salary analyses;

Academic Studies: Academic program review, academic program evaluation, assessment of placement tests and outcomes assessment; and

Other Projects: Space utilization studies, transfer studies and other miscellaneous projects.

Table 2 displays the frequency and percent of responding institutions engaged in these various activities. Clearly, enrollment management studies are the most frequently reported activity. Approximately two-thirds of the institutions reported they were doing one or more studies in this area including admission, financial aid, enrollment and retention studies. Close to 50 percent report they typically are responsible for institutional reports which involve generating statistics for internal audiences and providing data to external audiences. Slightly more than one quarter report involvement in research, planning and policy studies.

Table 2. Typical Institutional Research Projects

Type of IR Projects	Number	Percent*
Enrollment management	85	66.9%
Institutional reports	62	48.8
Planning & policy analysis	35	27.6
Academic studies	23	18.1
Student surveys	20	15.7
Financial studies	11	8.7
Faculty studies	10	7.9
Other	59	46.5
		(N=127)

* The cumulative percentage exceeds 100 since some institutions conduct more than one type of IR project.

As illustrated in Table 2, relatively few institutions (N=11) reported they typically conduct financial studies such as cost analysis, budget planning, financial projections or resource allocation studies. Similarly, only a small number of institutions (N=10) report they typically conduct faculty studies such as faculty evaluations, faculty workload studies and faculty salary analyses.

Typical Audiences for Institutional Research Projects

Survey responses indicate that institutional researchers conduct studies for diverse audiences both within and outside the institution. Over 50 percent typically report the results of their studies to various administrative offices within the institution. Some 14 percent report that the President, Vice President and Trustees comprise a typical audience for their studies and another 14 percent identify deans, chairpersons and faculty as typical audiences for their reports.

Future Directions for Institutional Research

To provide a perspective on the future of institutional research at New England's colleges and universities, survey respondents were asked to identify the kinds of institutional research studies their institution would like to do that they currently are not doing and to specify the staff, financial and computer resources that would be needed in order to do these studies. In addition, respondents were asked to indicate the types of technical training and professional development experiences that would be most helpful in achieving the maximum potential from institutional research at their institution.

Using the previously defined categories, Table 3 displays the types of institutional research studies institutions would like to do. Similar to the report on typical projects currently being done, the largest number of institutions would like to do more enrollment management studies. However, in contrast to the distribution of current projects, a higher proportion of institutions, 38.6 percent, express interest in doing more academic studies including academic program reviews, academic program evaluations and outcomes assessment studies. Close to one-fifth also reported interest in conducting more student surveys.

Table 3. Desired Institutional Research Studies

Type of IR Studies	Number	Percent*
Enrollment management	67	52.8%
Academic studies	49	38.6
Student surveys	24	18.9
Planning & policy analysis	19	15.0
Financial studies	11	8.7
Institutional reports	7	5.5
Faculty studies	5	3.9
Other	46	36.2
		(N=127)

* The cumulative percentage exceeds 100 since some institutions desire to conduct more than one type of IR study.

Seventy-eight respondents reported they would need additional staff to complete the desired institutional research studies. Some respondents identified specific job titles while others provided only the type of position, professional or support staff. Results regarding additional staff needed are displayed in Table 4. As shown, four respondents projected that an institutional research office would be needed while most respondents recommended increasing the professional research staff to conduct the desired studies. In addition to projecting additional staff , some 30 respondents also indicated that more computer resources would be needed. Their recommendations ranged from upgrading current systems to establishing new computer networks.

Table 4. Staff Resources Required for Desired Institutional Research Studies

	Number	Percent*
IR Office	4	5.1%
Professional Staff		
IR Director	8	10.3
Research Associate	13	16.7
Research Assistant	11	14.1
Programmer/Statistician	4	5.1
Professional Position	18	23.1
Other Staff	29	37.2
Support Staff	17	21.8
		(N=78)

* The cumulative percentage exceeds 100 since some institutions reported more than one category.

Results from Bivariate Analysis: The Relationship of Institutional Characteristics to Institutional Research

Institutional Size and the Institutional Research Function

Bivariate analyses of the relationship between institutional characteristics and the institutional research function revealed the strongest relationship with the institution's size. As shown in Table 5, the scope of the institutional research function, the reporting relationship, size and qualifications of the institutional research staff vary significantly in relation to the institution's size. All of the institutions with enrollment of 5,000 or more, compared with only one-fifth of the institutions with enrollments less than 1,000, had an institutional research office. Reporting relationships also vary in relation to size; over 90 percent of the larger institution report at the vice presidential, provost or presidential level while the smaller institutions report at many different levels. As expected, larger institutions had larger institutional research staff and were much more likely to have an institutional research director with a doctorate; 54.5 percent of the largest institutions, compared with only 7.5 percent of the smallest institutions, had a research director with a doctorate.

Table 5. Variations in the Organizational Profile of Institutional Research Offices by Institutional Size

A. IR Presence

Institution Size	IR Office	IR Function	No IR Office or Function	Total
5,000 or More	100%	-	-	100% (N=11)
2,000 - 4,999	53.3	43.4	3.3	100% (N=30)
1,000 - 1,999	41.7	41.7	16.6	100% (N=24)
Less than 1,000	20.8	56.6	22.6	100% (N=53)
$X^2 = 29.22$ $p \leq .001$				*Total N=118*

B. Reporting Relationship

Institution Size	President	Provost/ V. Chancellor	V.P.	Dean	Other Adm. Office	Total
5,000 or More	9.1%	72.7%	9.1%	9.1%	-	100% (N=11)
2,000 - 4,999	28.0	24.0	8.0	16.0	24.0	100% (N=25)
1,000 - 1,999	25.0	16.7	33.3	8.3	16.7	100% (N=12)
Less than 1,000	48.1	-	22.3	11.1	18.5	100% (N=27)
$X^2 = 30.87$ $p \leq .01$						*Total N=75*

Table 5. Variations in the Organizational Profile of Institutional Research Offices by Institutional Size (Continued)

C. Size of IR Staff

Institution Size	2 or more Full-Time Staff	1 Full-Time Staff	No Full-Time Staff	Total
5,000 or More	81.8%	18.2%	-	100% (N=11)
2,000 - 4,999	13.0	78.3	8.7	100% (N=23)
1,000 - 1,999	22.2	77.8	-	100% (N=9)
Less than 1,000	-	54.5	45.5	100% (N=11)
$X^2 = 34.41$ $p \leq .001$				*Total N=54*

D. Presence of IR Director with Doctorate

Institution Size	IR Director with Doctorate	No IR Director with Doctorate	Total
5,000 or More	54.5%	45.5%	100% (N=11)
2,000 - 4,999	23.3	76.7	100% (N=30)
1,000 - 1,999	16.7	83.3	100% (N=24)
Less than 1,000	7.5	92.5	100% (N=53)
$X^2 = 14.61$ $p \leq .01$			*Total N=118*

Institutional Characteristics and the Role of Institutional Research

Results from bivariate analyses reveal several meaningful relationships between the role of institutional research and selected characteristics of the institution. Larger, four year and private institutions were more likely to engage in projects involving social science research methodology, such as planning, forecasting, and research on faculty and academic issues. Also, compared with public institutions, private institutions were more likely to engage in advanced research projects and in studies focused on academic issues. Several statistically significant relationships were also found. As shown in Table 6, Chi-Square analysis revealed a statistically significant relationship between institutional size and involvement in research and planning studies ($X^2 = 8.12$ $p \leq .05$). Compared with two year institutions, four year institutions also conducted more planning and policy studies ($X^2 = 4.35$ $p \leq .05$).

Table 6. Variation in the Role of Institutional Research by Institutional Characteristics

A. Variation by Institutional Size

Institution Size	Research & Planning	Non-Research & Planning Project	Total
5,000 or More	54.5%	45.5%	100% (N=11)
2,000 - 4,999	26.7	73.3	100% (N=30)
1,000 - 1,999	25.0	75.0	100% (N=24)
Less than 1,000	15.1	84.9	100% (N=53)
$X^2 = 8.12$ $p \leq .05$			*Total N=118*

B. Variation by Institutional Type

Institution Type	Research & Planning	Non-Research & Planning Project	Total
4 Yr. Coll. & Univ.	26.6%	73.4%	100% (N=94)
2 Yr. Coll.	9.1	90.9	100% (N=33)
$X^2 = 4.35$ $p \leq .05$			*Total N=127*

Qualifications and size of the institutional research staff bear implications for the types of research performed. The presence of an institutional research director with a doctorate was found to be significantly related to involvement in planning studies (X^2 =14.83 $p \leq .001$) and enrollment management studies (X^2 = 4.61 $p \leq .05$). Institutions with larger research staff were also more likely to engage in planning, policy analysis and forecasting (X^2 = 8.41 $p \leq .05$).

Institutional Characteristics and Perspective on Institutional Research Topics

Respondents were asked to estimate the importance of various institutional research topics in relation to the needs of their institution. The list of topics included: the Role of Institutional Research in Higher Education, Organizing an Institutional Research Office, Building Institutional Research Databases, Admission Research Issues, Financial Aid Research Issues, Retention Studies, Using Institutional Research to Enhance Academic Life, Using Institutional Research to Improve Student Life, Outcomes Assessment, Use of Quantitative Methods in Institutional Research, Use of Qualitative Methods in Institutional Research, and the Use of Survey Research in Institutional Research.

Table 7 displays the statistically significant relationships found between selected institutional characteristics and the perceived importance of these various institutional research topics.

Table 7. Variation in the Perceived Importance of Institutional Research Topics by Institutional Characteristics

A. Two-year College vs. Four-year college and University

Financial Aid	Unimportant/ Somewhat Important	Important/ Very Important	Total
4 Yr. Coll. & Univ.	30.3%	69.7%	100% (N=89)
2 Yr. Coll.	51.6	48.4	100% (N=31)
X^2 = 4.53 $p \leq .05$			*N=120*

Survey Research	Unimportant/ Somewhat Important	Important/ Very Important	Total
4 Yr. Coll. & Univ.	47.7%	52.3%	100% (N=88)
2 Yr. Coll.	25.8	74.2	100% (N=31)
X^2 = 4.52 $p \leq .05$			*N=119*

B. Public vs. Private College and University

Financial Aid	Unimportant/ Somewhat Important	Important/ Very Important	Total
Private	28.0%	72.0%	100% (N=75)
Public	48.9	51.1%	100% (N=45)
X^2 = 5.34 $p \leq .05$			*N=120*

Outcome Assessment	Unimportant/ Somewhat Important	Important/ Very Important	Total
Private	35.9%	64.1%	100% (N=78)
Public	17.4	82.6	100% (N=46)
X^2 = 4.81 $p \leq .05$			*N=124*

As shown, respondents at four year institutions attributed more importance to conducting financial aid studies ($X^2 = 4.53$ $p \leq .05$); approximately 70 percent of those at four year colleges and universities, compared with only 48 percent at two year colleges, perceived financial aid to be an important or very important topic. Conversely, those at two year institutions ascribed more importance to survey research ($X^2 = 4.52$ $p \leq .05$); approximately three-quarters of the respondents at two year colleges, compared with about one-half of those at four year colleges, perceived survey research to be an important or very important topic. Variations were also found between public and private institutions. Private institutions put more emphasis on financial aid studies ($X^2 = 5.34$ $p \leq .05$) while public institutions placed more importance on outcomes assessment ($X^2 = 4.81$ $p \leq .05$).

Results from Multivariate Analysis: Predicting Institutional Research Involvement in Planning and Policy

Discriminant analysis results, presented in Table 8, identified both research staff and institutional characteristics as predictors of the types of institutional research conducted in different colleges and universities. For example, four variables were found to predict successfully whether or not institutional research staff engaged in planning, policy analysis and forecasting. The structure coefficients were .75 for institutional research staff size; .61 for the presence of a person or office dedicated to institutional research; .49 for institutional research staff qualifications; and .18 for the type of institution - public or private. The canonical correlation of .52 indicates that the function explains 27 percent of the variance in the nature of institutional research projects.

Table 8. Predicting Institutional Research Involvement in Planning and Policy Development

Predictors	Structure Coefficients	Percent Correctly Classified
IR Staff Size	.75	71.7 %
Presence of a Person or Office Dedicated to IR	.61	
IR Staff Qualification	.49	
Type of Institution (Private vs. public)	.18	
Canonical Correlation	.52	$X^2 = 15.62$ df=4 $p \leq .01$

Summary and Conclusion

In summary, results from this research reveal substantial diversity in the nature of the institutional research function, the size and qualifications of the institutional research staff and the types and level of the tasks performed by institutional research offices. Statistical analysis confirmed statistically significant relationships between this diversity and various institutional characteristics. Several of the results confirm findings from previous research. For example, this study found that larger institutions tend to have larger institutional research offices with highly qualified staff who engage in substantial research and policy studies. Previously, Volkwein (1990) reported that larger research offices are generally found at larger institutions, tend to have more highly trained and experienced staffs, and carry out a more complex array of tasks. Also, similar to Volkwein (1990), findings from this study document the diversity of background, training and experience among institutional research staff and identify enrollment management studies as the most frequently performed institutional research tasks.

Of particular interest in these results is the fact that institutions express increased interest in conducting academic related studies. The study indicates a potential opportunity for institutional researchers. To the extent that institutional researchers understand the academic culture and collaborate with deans and faculty, they will potentially assume a more significant role in academic policy and ultimately effect significant changes in the academic life of the university.

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Institutional Strategy and the I.R. Role: A President's Perspective

John A. Dunn, Jr.

Abstract

A president's job resembles that of an architectural planner whose important contribution to a major building project takes place before the architects can begin design. Beginning with a general idea of what is wanted, the architectural planner looks at possible sites for the new facility, defines its appropriate massing and relationships to other structures, describes how it will function, and works out its budget with the client. Similarly, a president begins with his or her own sense of direction for the institution, identifies the major problems or opportunities, and selects the approaches that have the best chance of moving the institution forward. A president may appoint a constituency-based committee to recommend plans, but should do so only if that is the best strategy for achieving the desired result. The institutional researcher can understand and support both the initial conceptual work and any resulting planning process.(*)

The president as architectural planner

Some of you may have had the pleasure of working closely with a good architectural planner. He or she is a qualified architect who specializes in helping a client think through all of the major questions which need answers before architectural design of a major new facility can begin. These questions include the choice of site; how the building should relate to other buildings and spaces in the area; how massive it should appear; what the contents of the building are to be, and how people should be able to move into and through the building; what its character should be; and how all this can best be accommodated within the proposed budget. The central metaphor of this paper is that of the president as architectural planner for the future of the institution.

Preliminary conceptual work

The best way for you to understand the president's role is to imagine what you would do if you had just been appointed president of a college or university. Lots of people will be eager to give you advice on what to do and what not to do, but *you will want to make up your own mind how to move the institution in the directions you think are important.* The institution chose you as its leader just as a client chooses an architectural planner, because it believes that your professional skill and personal values are a good match with what the institution needs.

(*) This paper draws heavily on three papers by the author which are listed on the References page. Those who are interested in the topic and wish further information might find those papers useful.

Your job as president is to identify and make progress on the big problem(s). Even at the outset, you probably have a good sense of what they are. The board of trustees (and the state coordinating commission or system head, if any) may help define the issues, but the real job is the president's. Typically, the big issues are not complex or hard to see.

You have worked in higher education administration for some time and know that there are certain "people principles" which must be observed.

- A college or university is a collection of people -- smart people by and large, but with all the human virtues and failings.
- Changing an institution means changing the expectations and behavior of the people who constitute it.
- Individuals (and institutions) change behavior patterns only in response to lust or fear. Age usually weakens the former and strengthens the latter.
- People in colleges and universities see themselves as being rational. They need data on the basis of which they can perceive and articulate the need for change. All data will be used for political ends.
- Individuals are much more apt to change their expectations or behavior if they think the change was their idea in the first place. Then they have a stake in it. If the change is someone else's idea, then there has to be something in it for them if they are going to do it.
- Significant change in institutions almost always comes in response to outside pressures (sometimes articulated by new leaders) rather than from internally generated initiatives.
- There are limits to the extent to which a given institution can change. The history and culture of an institution shape its future. Significant change in the higher education enterprise in this country almost always comes about by invention of new kinds of institutions, not by major change in existing institutions.
- There is a tradeoff between time spent doing real work and time spent changing the process for that work. Moreover, people have only a limited tolerance for change. In practice, this means there is only so much change that an institution can accomplish in a given period of time, only so many projects it can work on at once.
- You can't ever say any of this out loud on your campus.

These principles and the fact that you are new may tempt you early on to bring together the relevant constituencies in a formal planning process to identify the problems and opportunities and to agree on the steps needed. *I would strenuously argue that this is premature.* Look at what happens to the institution that skips the architectural planning phase and immediately hires architects to begin design. The architects may be very talented, but if the preliminary architectural design questions are not thought through, the institution will wind up with an unsuitable or unaffordable facility. *You should never engage in a participatory constituency-based planning process until you have defined the problem you are trying to solve, and have convinced yourself that this is the approach best suited to obtain the results you want.*

You should start with your sense of direction for the institution, your general sense of what you would like it to be. If you insist on a fancy term, articulate <u>to yourself</u> your "strategic vision." Then identify the one or two most important problems to be solved or changes to be made. Usually they can be expressed in one sentence each. For instance, your institution may:

- have a clear and valid mission but need more resources to accomplish it better
- have a valid mission but need to weed out some programs and vitalize others
- have difficulty attracting enough good students in the local area and need to recruit more widely, becoming a residential institution
- be located in and draw from an area whose needs are changing rapidly

- have difficulty attracting enough good students because its mission has been taken over by others
- have a useful mission but demoralized personnel
- have a clear and valid mission but not be very effective in achieving it
- be financially out of control
- be about to receive a new mission assignment from the state system

Thus far the thinking process is your own, and does not represent a public commitment. If you are fortunate enough to have a good board chairman or a friend who is an experienced president at another institution, you may wish to share some of your thinking, asking the other person to be constructively critical. Don't go public yet.

The next step is to outline in broad strokes the conceivable ways of dealing with the key problem or opportunity. List all you can, as a way of being sure you have understood the problem. For instance, if the problem is that your institution has a valid mission but is not very effective, there could be a number of possible approaches:

- develop ways of measuring program effectiveness
- appoint new academic leadership in the school or department or program
- hire new key faculty
- change the reward system, including more love and attention
- change the standards for faculty appointment and promotion
- acquire better technology or other relevant resources
- revise the programs based on careful attention to their aims, process, and success
- drop some marginal programs to concentrate resources on central ones
- expose the faculty to sources of comparison, such as faculty from other institutions, faculty from graduate schools the students later attend, employers
- or any combination of the above.

As you evaluate each alternative or combination in terms of political costs, dollar costs, time involved, likelihood of success, etc., you can select the approaches you think will be feasible and effective.

Moving ahead with implementation

So far, all of this process has taken place in your head. Once you have gone through these conceptual steps -- articulating a strategic vision, articulating the key problems or opportunities, defining the possible approaches, and deciding on what you think will be most effective -- you are in a better position to proceed with implementation. You have completed the conceptual architectural planning work, and can now proceed to choose the architects to do the actual design.

You have many options for implementation, depending on the problem(s) you have defined and the approach(es) you have selected. Among these are the following:

- appointing people who share your views to key positions. After they have learned the lay of the land, you may want to ask them to participate in or lead planning efforts in their areas.
- changing the organizational structure to clarify responsibility for achieving the desired results, to give someone the organizational resources to deal with the situation, or to signal to the community a shift in priorities.
- changing people's job descriptions or titles.

- seeking better information on some programs or functions or people, using experts from inside or outside the institution to study the area and make recommendations.
- developing or strengthening certain procedures or policies.
- providing incentives or disincentives (promotions, salary increases, better offices, staff assistance, larger budgets, etc.) to help people move in the desired directions.
- allocating additional resources to the desired activities.
- and plain old-fashioned jaw-boning. (You should never underestimate the effect of your visible continued attention to an area.)

Or you may feel it is now time to organize a formal committee planning exercise. If so, you can now choose its members more astutely, and can specify the committee's charge more precisely. The community will be watching the committee process very closely for clues as to what your intentions are. You can use each of the aspects of its functioning to give the signals you want. This sounds Macchivellian. You can't outsmart faculty; they're smarter than you are and trained at critical analysis. Don't try to be over-subtle. Just be conscious of and thoughtful about the signals that each of your actions sends. Pay attention to:

- the charge
- the leadership
- membership. Board members? Faculty? Staff? Students? Administrators? Community members? Legislators? Alumni/ae? Donors? No committee is better than its members. Sometimes the most important outcome of a planning committee is the overview it gives the members of the operations of the institution as a whole and of its strategic position; this training can be invaluable for future institutional leaders.
- subcommittee structure
- support for the process. What information does the committee have access to? Who can it ask for help? What budget does it have?
- timetable
- relationship to the budget process and other institutional decision processes
- the desired outcome. A planning document? A proposed budget? A series of discussion documents?

While you as president clearly want the advice and counsel of the committee, you may also want to use the planning process to educate the community about the problems or opportunities you see, and to work toward a consensus on the steps needed.

A sense of direction

As president, you want to become involved in the details of the planning, or you may be concerned about developing too detailed a plan. You are eager to move ahead, but you know that conditions change over time. Remember that your job is like that of the architectural planner. You need to think about the character of the institution as it evolves over the long term, as the architectural planner thinks about the evolving appearance of the campus over decades.

If you want to move to a spot in the clear air of the mountainous West, which you'll recognize when you get there, a detailed road map of metropolitan Boston won't help you for long. Your sense of direction is critical; you must find your way as you move ahead. Norris and Poulton (1991) describe the reality of good planning as resembling a Lewis and Clark expedition more than a Cook's Tour. You will be wise to leave decisions as to pacing and specific routes until you see the ground before you -- unlike the planned tour which can tell you where you will be on Thursday afternoon eighteen months from now. Abraham Lincoln is said to have likened his style as president to that of the Mississippi riverboat pilots who just set

the course as far as they can see, from point to point, not trying to anticipate conditions too far down the river.

In another wise metaphor, Harvey Mintzberg (1987) talked about *crafting* strategy rather than intellectually planning it. Productive strategy emerges from the interaction over time between the leader's expertise and the changing events, people and conditions of the institution, much as the artistic pottery emerges from the interaction over time of the potter's skill and the character of the clay.

It has seemed to me over three decades of working in higher education planning that the most difficult part of the job is not that of identifying the major questions, or that of figuring out what the strategy is, but instead that of persisting over long periods of time and through multiple distractions to assure that what is important gets accomplished.

Tying planning to the institution's decision processes

Under most circumstances, you will want to assure that the planning process is integrated into the institution's on-going decision processes and basic operating policies. The point of planning is to change the way people think and the decisions they make, not just to create planning documents. To complete the basic metaphor of this paper, it is important that the architects designing the building be guided by the conceptual work of the architectural planner, and it is important that the construction crew be guided by the drawings.

Institutional decision processes to be tied to planning include:

- annual operating budget process
- capital budget process and capital project approvals
- campus physical planning
- admissions and financial aid decisions
- faculty and administrative appointments -- especially key personnel appointments.
- fund-raising objectives and campaigns

Key policy areas to be shaped by planning include:

- endowment investment and payout
- debt and capitalization
- personnel recruitment, compensation, development and promotion
- enrollment levels
- pricing and financial aid
- information technology
- outcomes assessment

There are two exceptions to this rule of tying plans to operating decisions. Sometimes a president wants a "blue-sky" dream about future possibilities, untrammeled by day-to-day difficulties. On other occasions a president may want the planning process to be a wheel-spinning exercise without influence. This can happen if a planning process is externally mandated at a time when the president does not want it, or if the president intentionally commissions a planning exercise to divert attention or to relieve other pressures.

Role of IR/planning person

Now that you've enjoyed the exhilarating life of a president for a while, let's switch back to your current role, that of institutional researcher. How can you be most helpful to your president and to the institution as a whole?

First, find out as much as you can about planning in general, and about planning at institutions like your own. Join the Society for College and University Planning. Read Don Norris and Nick Poulton's *Guide for New Planners.* Enroll in a planning workshop at NEAIR or at a regional or national SCUP conference. Read up on the relevant literature. Call a half dozen of your colleagues at similar institutions and talk carefully with them about how planning is done on their campuses.

Second, talk to the president, key administrators and "movers and shakers" at your institution and find out what they want to accomplish. Recognize that you are in a sensitive area here and that they may not be fully open with you; however even a partial understanding is better than none. Try to understand their "strategic vision," their architectural plan; in particular, try to identify the problem or opportunity with which they are trying to deal. The information you can make available about the institution's recent history, current situation and comparative status may be quite helpful to these leaders as they develop the "architectural plan." You can help them test and shape that vision.

Third, collect and make available information on the institution's current situation, recent past, and likely future. Assemble trend data and comparative data on the key variables in Fact Books, reports, or other easily accessible form. Join data-sharing groups if there are relevant ones, and take advantage of their resources. Examine your institution's history, looking for values, key incidents and anecdotes, and the history of other efforts at change. Search for useful ancestors. You don't have unlimited resources; search out and distribute the information you think will be most helpful given the nature of the problem the institution is trying to solve.

Data alone never make people change their values. However, data can prepare the ground for change by creating cognitive dissonance, showing people that what they thought was true is not. Data can also help people justify new positions, providing quotable evidence of the need for change. Remember, however, that you are dealing with human beings who aspire to rationality but respond to emotion and self-interest; one memorable anecdote (a useful historic precedent or insightful story about an individual) can be worth a thousand data points.

Fourth and finally, take on whatever role the president wants you to in the planning process. You may be asked to support the committee and its leadership with information gathering, data analyses, to develop "what-if" scenarios or models, and even to provide logistical support. If you are asked to provide minutes of the meetings and initial drafts of reports, be careful to be sure that they reflect the committee's deliberations and not your own preferences. You should not duck that role; it is an important opportunity for positive contributions and for your own growth. The person who writes the minutes is the one who determines what really happened at the meeting. The person who writes the first draft has more to do with the shape of the final report than does anyone else.

One especially important role is that of linking the planning process to other institutional decision processes, especially to the development of operating and capital budgets. If the opportunity presents itself, take on this responsibility or at least participate in it as much as you can. All too often institutional research is held at arm's length from the budget processes; this is your opportunity to be involved. Remember: if you do not understand where the money comes from and where the money goes, you do not understand the institution.

In summary, "the basic principles for planning in this environment, and possibly in others, seem clear: Get to know the values, history, and relevant dimensions of the institution. Get to know those [individuals] who really make a difference and find out what they want to accomplish. Then find ways to help them evaluate the feasibility of their dreams and ways to help them make the dreams come true." (Dunn 1990.)

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Two Tasks with One Stone: The Staff Newsletter as a Vehicle for Presenting Institutional Research Findings

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The Tasks

In a comprehensive review of Hudson County Community College during the 1992-1993 by a blue ribbon task force, the office of institutional research was challenged to "make the entire College aware of its work."[1] Further, the College was challenged to "devise an alternative to the current penetration measure [used at the time by the state] that would take into account the special mixture of demographic factors in Hudson County."[2]

Tackling the Tasks

During a period of intense development of many basic functions at the college following this task force report, a staff newsletter, *HCCC Networks*, was established, and the president asked the director of institutional research to contribute an article for each month's issue. The director decided to take the opportunity to tackle the two challenges presented in the blueprint report: to explore the demographic factors toward the goal of arriving at alternative penetration rates, and to publicize the work of institutional research.

For the past three years the institutional research office at HCCC has used its column in the employee newsletter to present and interpret local and state census, economic, and educational data. Comparisons are made between Hudson County and other counties in the state, and among the municipalities in the county.

During the first year, relevant 1990 census data and other economic and labor data were researched and presented. During the second year, the articles focused on the educational achievement of county residents by different demographic characteristics. During this past year, the articles have been used to examine the extent to which the college is serving the county; "service rates" have been calculated for each municipality, for those who have not attained college degrees, by gender, by race/ethnicity, and by age.

The Process/ Year One

The first step in the process was to decide how to use the space in the monthly column. The research office could present timely data of interest to the campus, selectively present the results of routine research reports, surveys, or responses to external questionnaires, or it could select a theme for a series of articles. Although timely data will be presented in a portion of the column in the future, the director opted to select a theme for periods of time that amounted to roughly a year. (Factsheets and relevant survey results were presented during some months.)

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[1] Marvin W. Greenberg and Bonnie J. Wagner-Westbrook, *Hudson County Community College Blueprint Project*, Jersey City, NJ, 1993, p. 85.

[2] Greenberg and Westbrook, p. 18.

In the busy routine of the office, these monthly deadlines served to provide a discipline to carry out research that might not otherwise have been done.

The second step was to select a relevant and interesting topic. The 1990 Census data was just becoming available at the time, and a review of that data for the state, the county, and the municipalities within the county seemed particularly timely since the college was embarking on a period of intense development and expansion. (It was also a valuable tool for the new institutional researcher to use to become acquainted with the demographic data.)

So for each of six months beginning in March of 1993 a section of the census data was analyzed and presented, beginning simply with a description of the county, its population, and its population density. Next the county was examined in context: how it had changed between 1980 and 1990, and how it compared with its neighboring counties; how the country had changed, and how the state had changed. Columns in subsequent issues dealt with the age, economic status and racial or ethnic make-up of the county population. In each case comparisons were made with other counties in the state and comparisons were made among the municipalities within the county. Finally profiles were prepared for each municipality based on these characteristics.

Some of the highlights revealed in these six articles included the following:

- Hudson County had by far the most persons per square mile of any county in New Jersey varying from a "low" of 2,389 persons per square mile in one municipality to a high of 45,834 in another.

- Four of the five northeastern counties of New Jersey had actually lost population between 1980 and 1990 while the state and the nation grew; however, Hudson Counties's population decline since 1930 appeared to have slowed substantially with the 1990 census.

- The average income (per capita) in the county was at least $4,000 less than for the state, and the percentage of families living below the poverty level was nearly double the state rate, with Hudson County having the highest percentage of families below the poverty level in the state.

- Four northeastern counties of New Jersey (Essex, Hudson, Passaic, and Union) were the most diverse in the state in terms of race or ethnicity.

Although resulting monthly articles were spare (one to two pages), the behind-the-scenes research was extensive. Many tables of data were developed in order to make appropriate comparisons. For example, as the population was studied in terms of numbers and density, a table was drawn up which displayed the population count, land size and population density of the counties in the state. Further tables were presented which ordered the counties by each of these features. Ordering the data by different characteristics made the data more interesting and revealing to the reader. While only one or two of the data tables were included in the column, these tables were drawn together and made available to any interested readers.

As more and more of the college personnel began to inquire about the data for different purposes, e.g. presentations or grant proposals, by September of 1993 it became obvious that there was a substantial body of information which could be made more useful if it were drawn together in one document. Therefore, the articles and related tables were bound together in a special 83 page data report titled, *1990 Census Data with Special Attention to the Counties of New Jersey and the Municipalities of Hudson County*, and were distributed to interested

college personnel, local agencies, and, because it included data for other counties, to the other county college institutional researchers in the state.

This particular document has served as a useful and handy reference for the research office. It was particularly helpful during the preparation of a grant proposal for the federal Title III program. But it, and the preceding newsletter articles, also served the intended purpose of exposing the institutional research function to the college community. Finally, they have brought good will to the college, from the selective community college audience across the country to whom the newsletter has been sent and to the county agencies for which the resulting document has been provided.

Year Two

The educational achievement of the county residents was of course included in the census data. But it seemed both too vast a topic and too relevant a topic to relegate to one issue of a newsletter. So, instead, it was selected as the theme for the entire second year of the project; columns in nine issues were dedicated to the examination of the educational status of the residents of Hudson County. Both census and state report cards provided the source data.

Topics examined for these nine articles included the following: educational attainment (e.g. what portion of the population had only a ninth grade education?), educational attainment and employment of youth, high school graduation rates, higher education aspiration of public high school seniors, mobility of students in the high schools, and the relationship between resources and graduation rates.

Some of the highlights of the findings presented in these nine articles included the following:

- 35% of the residents 18 or older had not achieved a high school diploma, ranging from a low of 28% in one municipality to a high of 48% in another.
- Nearly one-half of Hispanic residents had not attained a high school diploma as compared to nearly one-third of non-Hispanic residents.
- For youth 16 to 19 years old, only one of five high school graduates was unemployed, but this was true for two of five of those who had not graduated.
- The county public high school which placed with the median "graduation rate" for the Class of 1993 had a rate of 78%; this median placed the county next to lowest in New Jersey counties.
- During the 1992-93 school year, the mobility rates for the public high schools in the county ranged from a low of 2% turnover at one selective high school to a high of 75% at another. Mobility rates were among the highest in the state.

The data regarding the educational status were so striking that the following statement was included in the preface to the resulting report: "The data present dramatic information concerning a county in need of educational expansion; if one reads the report unmoved by the educational challenges, it is due to the presentation and not to the information presented."

Year Three

Finally in this most recent year, it was time to tackle the challenge of "devis[ing] an alternative to the current penetration measure [used at the time by the state] that would take into account the special mixture of demographic factors in Hudson County." By then the re-established institutional research office had collected and built up a body of data about the college student body, and the research of the two previous years provided the populations for comparison.

There was an underlying concern with the old market "penetration rate" which presented the data in a rather mystified technical manner. So, although taking advantage of the basic calculations used for deriving such a rate, a multiplier was used which made the results more accessible. The rate was called a "service rate," and was derived as follows: the number of students falling into a certain category who were enrolled were divided by the number of residents falling into the same categorization, and the result was multiplied by 10,000. The final figure indicated the number of persons enrolled for every 10,000 such persons in the population. In this way data could be standardized and compared for different groups.

These "service rates" could literally reveal how the college was serving different groups of residents within the population compared to other groups. Rates were calculated for each municipality, compared, and analyzed. Rates were calculated for subsequent articles for the following groupings: residents without a college degree (by municipality), by race/ethnicity, by age, and by a combination of these variables.

Some of the highlights of the findings presented in these seven articles included the following (for Fall 1994 unless otherwise noted):

- In the Fall of 1990, the college enrolled 62 of every 10,000 residents 18 years old or over; by 1994, this figure had increased to 87.
- When educational achievement is factored in, the "service rate" increased to 113.
- Thirty of every 10,000 White residents 18 or older were enrolled, the number was higher for other groups: 136 for Hispanic residents, 137 for African American residents, and 176 for Asian residents.
- The college enrolled women at more than 1 1/2 times the rate of men.
- Residents under 25 years old enrolled at 3 1/2 times the rate of those 25 or older.
- The college enrolled approximately 1 in every 10 young (18-19 year old) Asian men and women; 1 in every 20 to 25 young Hispanic and African American women; 1 in every 30 young Hispanic men; 1 in every 50 to 55 young African American men; 1 in every 70 young white men; and 1 in every 85 young white women in the county.

This final document of the trilogy surely helps us understand the way in which the college is differentially enrolling persons from different populations. It is not an end in itself, for the results require much teasing out and interpretation; but they do suggest questions that can be asked for college planning. Knowing the questions to ask is an important first step in deciding what direction to go.

Conclusion

The results of these past nearly three years of disciplined monthly research and presentation have yielded findings which have been useful in college planning, assessment, grant preparation, self-study, and public relations.

The public presentation of ongoing research has given the institutional research office exposure, and the research has yielded important demographic and community service data: two challenges have been met using "one stone."

The Study of Student Attrition as an Event in Time: The Application of Event History Analysis to a Cohort of First-Time Students

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Introduction

The study of student attrition in higher education has a long and varied history. Different conceptual models have been posited for the study of attrition in higher education[1] and the method of choice for its investigation has been the survey.[2] The benefits associated with the use of the survey include low cost, high reliability,[3] allowance for inquiry of attitudes and opinions, and linking of data obtained from the survey instrument to secondary sources of data. Yet notwithstanding the advantages of the survey method, the implementation of the survey design is not without problems. Potential problems that may arise include low response rate, selection bias among the respondents, and issues of validity. These problems can afflict any investigation employing survey methodology and are especially acute for the study of student attrition.

Moreover, the design of the survey is fraught with complexities when the phenomenon under study is essentially longitudinal such as student attrition. The longitudinal or panel design is perhaps the most useful of the various survey designs for the study of student attrition. As Terezini (1982, p. 61) has noted, the panel design "provides for extensive planned control of many variables thought to be potential influences on the attendance behavior of students." Consequently, studies employing this design are thought to be extremely powerful in understanding the phenomenon of student attrition.

However, the administration of the panel design also increases the cost to the researcher. Complex sampling designs, extension of the study period, and complex data management tasks are often associated with longitudinal research. If these complications can be overcome then the administration of surveys to students who drop out from school may be the most reasonable approach to take. However, these complications often cannot be

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1 Conceptual models that posit varying explanations of student attrition include the social and academic integration of students (Spady, 1970; Tinto, 1975, Pascarella, 1980); the interaction of students with their institution (Bean, 1983); and the intention of students to drop out (Fishbein and Ajzen, 1975). Bean (1982) has shown how these models can be synthesized into a single model of attrition.

2 Terenzini (1982) provides an overview of the three different ways in which survey methodology has been employed in the study of student attrition. These include the autopsy, cross-sectional and longitudinal designs.

3 A rich repository of questionnaires in the study of student attrition has emerged over the years which has contributed to the reliability of survey questions about student attrition. Some of the more widely used survey instruments in the study of attrition are the *Student Outcome Questionnaire* developed by the National Center for Higher Education, the American College Testing *Withdrawing/Nonreturning Student Survey*, and the *Student Turnover Questionnaire*. Chapman (1982) provides a listing of some of the popular survey instruments employed by institutional researchers.

overcome. Either because of a lack of resources, time constraints, or other various and sundry reasons, the institutional researcher seeking to understand the phenomenon of attrition at his or her institution cannot adopt a longitudinal or panel design.[4]

Fortunately, other and potentially more powerful methods for studying longitudinal issues such as student attrition have emerged over the years. One group of statistical techniques often referred to as event history or survival analysis is particularly suited for studying student attrition, and it is to this methodology that we now turn our attention.

Event History Analysis

Event History Analysis refers to a group of statistical methods that allow the researcher to study the occurrence and timing of events. An event in this context is a qualitative change that is situated in time and involves the transition from one state to another. Event history data consist of a longitudinal record of when certain events happen to an individual over time. Hence, in the study of student attrition by the method of event history analysis, an essential question that is asked is when does a student leave school.

The first use of event history methods was by demographers as far back as the eighteenth century in their work of constructing life tables. More recent traditions in the quantitative study of event history data are found in the work of biostatisticians in their studies of the causes of deaths, in the efforts of engineers to understand the processes of structural failures, and in the inquiries by social scientists of various social events.[5]

As Allison (1984, p.10) writes, the consequence of these various traditions is that "there is no single method of event history analysis but rather a collection of related methods that sometimes compete but more often complement one another." The researcher using event history analysis must select a method or group of methods along various dimensions that include distributional or regression techniques, parametric or nonparametric models, repeated or nonrepeated events, discrete or continuous time, and single or multiple types events.[6] In addition, the researcher must chose among a variety of statistical packages with which to undertake the analysis of event history data.

The sine qua non of these methods that comprise event history analysis is the ability to handle censored data and time varying explanatory variables. Censored data imply that the event under investigation does not occur within the time period observed. In the case of student attrition, if the period of time consists of six academic years and the student either graduates or continues in his or her studies, then we would say that the historical record for that student is censored.

One approach to this type of data is to distinguish between those experiencing an event and those that do not experience the event in question. With respect to student attrition data, such treatment of the data would imply the creation of a dichotomous variable that differentiates between students who drop out from school from those who do not. This created variable would then serve as the phenomenon to be explained through the application of logistic

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[4] Even if the institutional researcher had the wherewithal to administer a survey to a sample of drop outs from his or her institution, other methods should also be employed for its study. It's becoming more common to design studies that employ more than one method in the study of social and educational phenomena. This multi-method or triangulation approach is understood to impart a richness to the study of a particular subject matter that any single method is unlikely to achieve.

[5] Allison (1984, 1995) provides a concise introduction to the history and uses of event history analysis.

[6] Allison (1984, 1995), Collett (1994), and Yamaguchi (1991) provide a useful and accessible overview to these different dimensions of event history analysis.

regression or some similar analytical tool. However, in approaching the data in this way, information is necessarily lost because we are ignoring the point at which the student may have dropped out of school. In contrast to this approach, event history analysis would seek to take all the information that is available about the timing of the occurrence or nonoccurrence of attrition and then use this information as the phenomenon that is to be studied.

In addition, event history data often have another feature that conventional statistical analysis finds difficult to handle: the presence of time-dependent covariates (sometimes called time-varying variables). It may be desired or needed to include an independent variable that contains information for the points of time that comprise the longitudinal record of events. For example, when studying student attrition, the researcher could have information that tells whether a student attended school full-time or not for each semester comprising the historical record. One option that is available to the researcher would be to create dichotomous variables indicating if the student attended school full-time for each of the semesters and include these variables in the explanatory model being developed. Thus there would be as many binary variables as there are semesters. However, this approach not only is statistically inefficient but could also create other methodological difficulties. For example, such an indicator of full-time status would become a consequence of the event of attrition after it happens rather than coming logically prior to the occurrence of attrition. Many of the methods that comprise the event history approach to the study of events allow for the incorporation of time-varying data in a statistically efficient and methodologically sound manner. The following section describes the application of event history methods in an ongoing effort at Rutgers University to study the phenomenon of student attrition.

Modeling the Attrition Process

Following Willet and Singer (1991), we conceptualize student attrition as an event that occurs in discrete time. Each student in a cohort of first-time, full-time students has a historical record constructed from a series of academic years that are treated as discrete time intervals. Thus the act of attrition can potentially occur in any of the academic years that comprise a student's historical record.

The cohort used for the present analysis is the fall 1988 class of entering first-time full-time students to Rutgers University. The data elements selected from this cohort include an indicator that documents the occurrence or nonoccurrence of attrition, the duration of a student's academic career, and a group of explanatory variables. The cohort was tracked between fall 1988 and fall 1994 and includes information for each academic year. Table 1 lists these variables and their respective values. The event indicator variable (EVENT) informs us if the student dropped out of school (EVENT=1), graduated within the span of time considered (EVENT=2), or continued in his or her studies at Rutgers (EVENT=0).[7] In this effort to model attrition, all students who have a value of 0 or 1 on this variable are considered censored cases. The duration variable (SEMCOUN2) counts the number of semesters that a student attended Rutgers during the time period studied.[8]

[7] Students who have a value of 1 on the EVENT variable and thus considered to be drop outs have to have been out of school for three consecutive semesters. This criterion was used because we wanted to have some way of distinguishing students who drop out from those students who stop out and return to school.

[8] If a student was not in attendance for a semester or two but did not meet the criterion of a drop out as described above, then for purposes of the present analysis that student is considered to have continued in his or her studies and that semester is counted in the duration variable.

The goal of the present effort is to estimate a regression-type model that will yield the probability of a student dropping out during the six observed academic years. Another way of stating this is that we seek to predict what is the hazard rate of dropping out for a particular student. The explanatory variables included in this effort to explain the hazard rate are two sets of high school achievement variables: class rank (HSRANK) and the SAT scores (VSAT and MSAT); the college achievement variable: cumulative gpa (CUMGPA); and a set of personal background variables: minority/nonminority (MINORITY) and gender (GENDER). All of these variables except for the CUMGPA measure are constant over time. The CUMGPA variable has values for each of the years that a student was in attendance.

Table 1
Variables and Values for Event History Analysis of Attrition Data

Variable	Values
ETYPE (Event Type)	0 = Censored 1 = Attrited, Dropped Out 2 = Graduated
ATTRIT (Constructed Variable from ETYPE)	0 = Not Attrited (includes censored and graduated) 1 = Attrited
SEMHERE (Number of Academic Years Attended)	1 - 6
GENDER	0 = Male 1 = Female
MINORITY	0 = Nonminority 1 = Minority
VSAT (Verbal Score on SAT)	0 - 800
MSAT (Mathematics Score on SAT)	0 - 800
HSRANK (Rank in High School Class)	0 - 99.9
GPACUM (Cumulative GPA, calculated for each year)	0 - 4.0
TIME1 - TIME6	0 = Other Years of Nonevent 1 = Academic Year Event Happens

In order to estimate this model, further manipulation of the data is required. The data need to be massaged into a form that will allow us to create a set of students who are at risk of dropping out for each of the six academic years compromising our time intervals. This is accomplished by breaking each student's record into a set of distinct observations for each academic year until the event (i.e., attrition) or censoring (i.e., graduation or continued attendance beyond the observed interval of time) occurs. The resultant data set thus contains the number of student year records until the occurrence of the event or censoring, with the dependent variable that is to be modeled coded as 1 if the event occurred during that academic year or 0 if it did not occur. A copy of the SAS program that creates this data set and a few records of the resultant data set are found in Table 2.

The distribution for the risk of attrition for each academic year is produced from these data in Table 3. Of the 5,353 students in our cohort, 1,536 dropped out during the time span observed. More importantly, Table 3 reveals the hazard rate of attrition for each year in the fall 1988 cohort of first-time, full-time students. When time is conceptualized and analyzed in discrete intervals such as the present attrition model, the hazard rate for each of the six observed intervals of time is the probability of dropping out by a certain academic year for those students who are still at risk (i.e., they have not yet dropped out or been censored).

Table 2
SAS Program and Output to Create Student-Semester File

```
data sys8heve.logevent(keep=etype attrit gpacum  vsat msat hsrank
                                gender minority sem semcoun2);
set sys8heve.atteven2(rename=(gender=sex));
 if sex ='F' then gender=1;
  else if sex ='M' then gender=0;
 if ethnic ne . then do;
  if ethnic ne 6 then minority=1;
  else if ethnic=6 then minority=0;
end;
vsat=vsat*10;
msat=msat*10;
hsrank=round((hsrankp/10),1);
if etype=1 then semcoun2=semcount-2;
 else semcoun2=semcount;
semcoun2=round((semcoun2/2),1);
if semcoun2=7 then semcoun2=6 ;
array gpa(6) s1rcum s2rcum s3rcum s4rcum s5rcum s6rcum);
do sem=1 to semcoun2;
 if sem=semcoun2 and etype=1 then attrit=1; else attrit=0;
 gpacum=round(gpa(sem),1);
 output;
end;
```

OBS	ETYPE	ATTRIT	GRAD	GPACUM	VSAT	MSAT	HSRANK	GENDER	MINORITY	SEM	SEMCOUN2
1	2	0	0	2	600	560	88	1	0	1	5
2	2	0	0	3	600	560	88	1	0	2	5
3	2	0	0	3	600	560	88	1	0	3	5
4	2	0	0	3	600	560	88	1	0	4	5
5	2	0	1	3	600	560	88	1	0	5	5
6	2	0	0	3	420	370	64	1	1	1	4
7	2	0	0	3	420	370	64	1	1	2	4
8	2	0	0	3	420	370	64	1	1	3	4
9	2	0	1	3	420	370	64	1	1	4	4
10	1	1	0	3	550	600	77	0	0	1	1
11	2	0	0	3	400	500	97	1	1	1	5
12	2	0	0	2	400	500	97	1	1	2	5
13	2	0	0	2	400	500	97	1	1	3	5
14	2	0	0	2	400	500	97	1	1	4	5
15	2	0	1	3	400	500	97	1	1	5	5
16	2	0	0	4	610	580	91	0	1	1	4
17	2	0	0	4	610	580	91	0	1	2	4
18	2	0	0	4	610	580	91	0	1	3	4
19	2	0	1	4	610	580	91	0	1	4	4
20	2	0	0	3	540	650	88	0	0	1	4

Table 3
Distribution of Time to Attrition
Full-Time Students Entering Fall 1988

Year	Attrition Number	Graduation Number	Number at Risk*	Hazard Rating
1	529	0	5,353	0.10
2	386	1	4,824	0.08
3	216	10	4,437	0.05
4	212	2,403	4,211	0.05
5	193	1,056	1,596	0.12
6	0	171	347	0.00
Censored = 176 Total N = 5,353				

* Excludes those attrited and graduated in previous years.

Table 4
Estimates for Logit Models Predicting the Probability of Attrition
20,278 Years

Explanatory Variables	*Model 1*				*Model 2*			
	B	Beta	Wald Chi-Square	Risk Ratio	B	Beta	Wald Chi-Square	Risk Ratio
Intercept	1.3392		45.0566	3.816	1.3163		35.7296	3.729
Minority	-0.1313	-0.0340	3.9563	0.877	-0.1377	-0.0357	4.3405	0.871
Gender	-0.1099	-0.0303	3.3558	0.896	-0.1023	-0.0282	2.8911	0.903
VSAT	0.0001	0.0049	0.0576	1.000	0.0001	0.0063	0.0927	1.000
MSAT	-0.0008	-0.0487	5.5833	0.999	-0.0008	-0.0482	5.4722	0.999
HSRank	-0.0048	-0.0581	15.1499	0.995	-1.2740	-0.5330	1,037.8511	0.280
GPACum	-1.2560	-0.5255	1,150.2152	0.285	-0.0048	-0.0577	14.9157	0.995
Time					-0.0126	-0.0093	0.0189	0.987
Time2					0.0089	0.0393	0.3531	1.009

We see from Table 3 that the hazard rate appears to decline between the first and fifth years and then reverses in direction during the last observed academic year. Such a trend is not too surprising. Obviously, we would expect the hazard of dropping out to decline as a student becomes more invested in his or her education. What may not be as clear, however, is the reversal in the hazard rate for the last academic period. Perhaps this represents the process where students who are nearing completion of their studies begin to focus on other concerns in their life (e.g., work and family) and assume that the last few credits needed to graduate can be attained later in life.

But how does this hazard rate depend on the explanatory variables. To do this, we can perform a logistic regression on the hazard rate for each student. If we let P(t) represent the hazard for our discrete model, then by taking its logit transformation and placing it in a regression statement we arrive at the following equation:

$$\log (P_{it}/(1-P_{it}))=A+B_1X_{it1}+....+B_kX_{itk}$$

where t = 1, 2, 3, . . . when X is a time varying variable.[9] The results of this model are displayed in Table 4.

We have significant effects as reflected by the Wald Chi-Square statistic for minority status, SAT-math, high school rank, and cumulative GPA. The Risk Ratio is simply the antilog of the B coefficients.[10] When one is subtracted from the risk ratio and multiplied by 100 we obtain the percentage change in the hazard for each unit of change in the explanatory variable. For dichotomous variables, the risk ratio yields the percent of the hazard for one category compared to the other category. For example, the hazard of dropping out for minority students is 88% of that for nonminority students. If we allow for the fact that various programs geared to helping students succeed (e.g., the Educational Opportunity Fund [EOF] in New Jersey) are available especially to minority students, then a finding like this is not as surprising than it first may seem.

We can extend this model by estimating the effect of time on attrition. We saw in Table 3 that time appears to have a curvilinear effect on the hazard. To test for this we can enter the variable time and time-squared and then take twice the difference of the log-likelihood of the two models. If the result does not exceed its critical value then we can not reject the null hypothesis that the hazard is constant through time. In this example, twice the difference in the log-likelihoods is 3.8. At two degrees of freedom, this value is not significant. Thus we can not conclude that the hazard is curvilinear through time.

Conclusion

The preceding discussion provides only a small window into the many approaches that the researcher can take when applying event history analysis to the study of educational phenomena in general and student attrition in particular. Additional steps that can be taken include:

-- the testing of additional and possibly more powerful explanatory variables;
-- the estimation of competing risks such as graduation versus attrition;

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[9] When the hazard is constant over time then its value is the same for each student-year record.

[10] This is accomplished by raising e (2.718) to the power of B.

-- the construction of models for events that are repeated in time;
-- the testing of additional hypothesis of how the hazard may move through time;
-- the use of alternative techniques in the estimation of event processes; and
-- the testing of different assumptions with regard to how time is conceptualized.

It is our hope that this brief introduction to the application of event history analysis to the study of student attrition will generate interest among institutional researchers to use the varied methods of this approach when studying event processes in educational phenomena.

Humanizing the Admissions Process: Tracking the Academic Performance of Students Admitted without Required Grades

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Since we are from an area and a system that may not be entirely familiar to you, perhaps some background would be appropriate and would help you to understand why we chose to introduce the use of a Student Profile Form.

Guelph is a city of about 90,000 located approximately 60 miles or one hour's drive west of Toronto. The University of Guelph has a tradition that dates back well over 100 years and is considered to be one of Canada's leading research institutions. Our roots go back to the Ontario Agricultural College, the Ontario Veterinary College and Macdonald Institute. You may have heard of one of the illustrious alumni of OAC, Dr. John Kenneth Galbraith. The three colleges were the basis of the new university, established in 1964, and remain essential components of a much expanded and diversified institution that now includes physical and biological sciences, engineering, arts, social sciences and family and consumer studies. True to our roots, we still offer a degree in Agriculture and the Doctor of Veterinary Medicine program. Currently, the undergraduate programs with the largest enrollments are science and arts.

Our full-time and part-time undergraduate enrollment is approximately 12,000 with an additional 1,900 graduate students. Each year, we register approximately 2,300 new Semester One students from an applicant pool of about 15,000. There are a total of 17 degree granting institutions in Ontario and competition amongst the institutions for applicants is keen.

The application process in the province is rather unique in that all students applying to University submit their applications to a centralized processing center called the Ontario Universities' Application Center or OUAC. The Center, which is operated by the Council of Ontario Universities, processes and forwards applications and secondary school grades to the universities which the candidates have selected. In this system, applicants may submit only one form but are allowed to apply on this form to three universities or programs. Although students may receive up to three offers of admission, only one offer may be accepted. The universities select the students to be offered admission and the responses to these offers are returned to the Center. Of course, all application and response data is passed along to the universities via tape. It is a very satisfactory system which allows admissions personnel access to information on application and confirmation activity not only at their own university but also at other institutions within the system on an ongoing basis throughout the application cycle. Students pay a $75 application fee which is distributed amongst the Council of Ontario Universities and the universities themselves.

The minimum requirement for admission to an Ontario University is the completion of 6 Ontario Academic Course credits (after Grade 12) with at least a 60% overall average and completion of the Ontario Secondary School Diploma. This is essentially the minimum requirement for the Universities to receive government funding for the new students which they enroll. In fact, the actual averages required for admission to the universities and their particular programs are determined each year on the number of places available, the number of applicants and the academic standing of the applicants. The result is that the required averages can be much higher than 60%. The universities may also require students to present specific OAC credits within the six needed for admission. So, for example, students admitted to the

Bachelor of Science Program at the University of Guelph this past fall were expected to have completed at the OAC level, English, Calculus, 2 credits from Biology, Chemistry, Physics or Algebra and Geometry, plus 2 additional credits of their choice with a minimum average in these subjects of 84%. Needless to say, depending upon demand and the academic calibre of the applicants, these averages can fluctuate from year to year. Again, citing the Science program at Guelph as an example, in 1990 the admission average or cut-off was 68%.

This drastic increase is certainly the result of an increase in applications to the Bachelor of Science Program at Guelph. It also reflects the academic standing of those who have applied. However, over several years, we also began to see our cut-offs rising in other programs which, in fact, had not seen applications rise. We at the University of Guelph were not alone. Other major institutions were experiencing the same phenomenon to a greater or lesser extent. I should point out here, as you have probably already surmised, that we do not make use of provincial or federal standardized tests in considering applicants for admission. The grades on which admission is based are those reported by the classroom teacher. Yes, there is some degree of 'standardization' across the province as a result of the Ministry of Education and Training setting out curriculum guidelines and evaluation criteria and expectations for every course taught. However, the reality is that marking can vary drastically from school board to school board, from school to school and from teacher to teacher.

While we were pleased to see that the academic standing of our incoming students was markedly improving, we also were becoming concerned about the 'reliability' of the grades which were being reported. Until about 5 years ago, guidance counselors would provide information on whether or not an OAC course had been repeated. This would allow us to take into consideration the fact that a high grade might have been the result of a second or even third attempt at the course. When the Ministry declared that the official Ministry transcript of all secondary school marks was a record of achievement and would not include failures, the counselors refused to report to the universities that a course had been failed or repeated.

In discussions with secondary school teachers and guidance counselors it became apparent that the students' response to higher cut-offs (which resulted in the first instance from an increase in applications over a couple of years) was to repeat a course until a desired mark was achieved, not only for admission but also for scholarship consideration. Unfortunately, this phenomenon did not cease when applications leveled off across the province and when cut-offs should have at least stabilized if not decreased. It was almost like a self-fulfilling prophecy. Students expected that required admission averages would climb, yet by their actions they were driving them upwards. Teachers were being pressured to give higher grades and the cost to the secondary school system of students repeating courses for higher grades was becoming significant.

At the University of Guelph, the averages required for admission were amongst the highest, if not the highest for some programs, in the Province. At the same time, we began to see our applications decrease slightly, albeit inevitably, after several years of the largest increases in the province. We speculated that our high cut-offs were discouraging some students from applying. As stated earlier, competition for applications in Ontario is stiff and, to a great extent, the success of the overall liaison program is measured by the yearly increase or decrease in applications.

Because the Admissions and Liaison offices work very closely, the Assistant Registrar, Liaison Chuck Cunningham and Assistant Registrar, Admissions (second author) had an increasing number of discussions about these trends. Many of these discussions included the Associate Vice-President, Academic, to whom we reported and who was very supportive of our activities in Admissions and Liaison. We had touched on the notion of looking at supplementary information but we anticipated that there would be resistance, in some segments

of the university community, to admit on the basis of anything other than marks which were still proven to be the best predictor of academic success at university. Obtaining approval from the appropriate academic bodies, including Senate, to use supplementary information could prove difficult. It would be nice to be able to say that we fought long and hard through various committee levels to sell the notion of using a Student Profile Form as we had come to think of our proposed supplementary information form. This was not the case.

The following recent exchange of E-mail (slightly edited) between the Associate Vice-President, Academic (who since has gone on to become president of another university in Ontario), and the author, will describe very well the introduction of the use of the Student Profile Form in the admissions process at the University of Guelph and the reasons for its use.

Starr to the Associate Vice-President, Academic:

> Ann Hollings from the Student Environment Study Group and I are giving a paper at the NEAIR (North East Association for Institutional Research) conference in October in Vermont on .... The Student Profile Form! Ann will talk about data, analysis of the performance of the group etc., and I will have the task of talking about how we use the form and why etc. Unfortunately the 'why' is a little foggy other than that we had little faith in the reliability of OACs and we were concerned about decreasing applications. Chuck and I were trying to remember exactly how we got into the SPF game in the first place and our recollection is this:
> -we were lured to the Whippletree Restaurant for a free lunch with you, ostensibly just to have an informal chat about how things were going and what we had been doing.
> -we were lulled into complacency and near stupor by good food and easy conversation.
> -as we rose from the table you just happened to mention that you expected us to devise a Student Profile Form, formulate a policy for its use and, oh yes and by the way, do it with no additional budget or resources.
>
> As much as we thought and thought, that was the only way we could remember the birth of the SPF. I really would like to be able to cite some loftier goal such as leveling the playing field, looking at the total student etc. but I think we just did what we were asked to do and came up with some pretty good reasons after the fact if for no other reason than we were embarrassed that we had been 'had'. Boy you were good! No wonder you're a president. I was hoping that your recollection is different and that, in fact, there really were some sound and noble reasons for our decision to use the SPF. By the way, you might be interested to know that nearly 25% (23% to be exact) of our new students said that the fact that they could submit a SPF affected their decision to apply to Guelph. So, our recollection of the motivation may be a bit foggy but the outcome was good. If you can shed any light on this it would be much appreciated."

In fact, this inquiry was a bit of a 'set-up'. The Associate Vice-President, Academic is very eloquent and the hope was that he could help in the writing of an introduction to the Student Profile Form. He did not let us down. This was his response:

> "Dear Starr,
> My recollection of our excellent lunch is about the same as yours. I would add only that the Associate VP (I think that was the hat I was wearing at the time) had carefully considered (to his satisfaction) the pros and cons of SPF and had decided that we should do it. Why? Some political pressure that as admission

cut-offs were going up we were excluding some very good students who had the potential to succeed at Guelph, possibly greater potential than some students who offered higher grades but few other qualities. There was also a strong sense that the University is a COMMUNITY, and we wanted people who could offer something to the community as well as coming simply to RECEIVE something (i.e. an education). The goal was to create a more vibrant community by attracting people who could make a contribution. I just told you to get on with it."

To expand upon what the Associate Vice-President, Academic said, it should be explained that we also began to become concerned that we were not attracting and admitting what we had come to think of as a 'typical' Guelph student. Our university is highly residential, with 38% of the students living in residence, and prides itself on its reputation of being a friendly university where each student is important and is encouraged to become involved in student life and other community activities. For example, last year 6,000 of our students were involved in one or more of our intramural, recreational or intercollegiate athletics programs.

Were we admitting 'mark-chasers' who did little other than study rather than well-rounded individuals who could achieve marks that would ensure academic success at university as well as continue to be involved in activities which would enrich them and add to the texture of the university community? In the words of our Chancellor, the Honorable Lincoln Alexander: "One of the most important things to be gained at university is a sense of community. By learning to live and work with a wide variety of people from different cultural, ethnic and religious backgrounds, students have the opportunity to develop a strong sense of social, civic and global responsibility and discover the fulfillment to be gained from service to others."

Essentially what we wanted to be able to do was to look at the context in which grades were achieved and to be able to admit those students who could benefit from and contribute to those aspects of university life which we held to be important.

So, that was it! We had the opportunity to do what we wanted. We had been given permission, no, a directive, to break all the rules of university etiquette and approval and just forge ahead. It was empowering ! We felt like pioneers. I was reminded of something which I read somewhere which said that the greatest accomplishments in science and arts have been made by individuals acting alone; that no park has a statue dedicated to a committee.

In fact, to say we were overwhelmed would be an understatement. The infamous luncheon took place in January and offers of admission were to be released in mid-June. We had to act quickly. Again, it would be nice to be able to say that we spent endless hours consulting, researching, drafting and re-drafting the form itself; that we agonized over how the form would be used and that we lost hours of sleep in the process. That would come later. Basically what happened was that we picked up the lap-top on our way back from lunch (we had expected a considerably longer and, in the end, much more leisurely lunch and had cleared our appointment books for the entire afternoon) and retreated to my dining room table where we drafted the form and a procedure for its use in an afternoon.

In the end, we did seek the approval of the Academic Vice-President's Advisory Council before proceeding with the implementation of the Student Profile Form and received the support of all members except the Vice-President, Academic who, ironically, later became one of the strongest supporters of the SPF.

The draft of the 'dining room table version' of the form was circulated to staff and Admissions Committees for suggestions and revisions. The Chairs of the Admissions Committees were asked for suggestions on the percentage of places to be set aside for students

admitted on the basis of the profile and on the grade band below cut-off within which Committees would consider the Student Profile.

The result was that most programs admitted about 5% of their Semester One class on the basis of the SPF, with one going as high as 13%. Applicants whose averages fell 3% - 5% below cut-off were considered.

After the Student Profile Forms had been used in 1992 for the first time, ostensibly on a trial basis, the form and policy and procedures came under very close scrutiny. There was a diversity of opinion as to the usefulness of the form. While students and secondary school personnel welcomed the forms, some faculty thought them to be too labor-intensive, costly to the institution and a waste of time. One faculty member even suggested that, rather than use a SPF, we should select students by means of a lottery, from those applying with an average above which we would consider them to be likely to succeed at University.

At the other end of the spectrum, two Programs decided that they wanted to admit all students on the basis of a Student Profile Form raising the possibility of situations arising where students could be admitted with, for instance, a 75% average and strong SPF and refused with 90% and a weak SPF.

The current Student Profile Form differs in many ways from the one which was first used in 1992. Suggestions and recommendations from Admissions Committees, Deans and secondary school personnel have resulted in a more concise mission statement and clearer instructions. More general and open-ended questions have been added to the more specific ones asking for details on extra-curricular activities and awards. We have also developed a Supplementary Student Profile Form for Students with Disabilities.

These suggestions for change were presented, initially, to the University's Admission Sub-Committee of the Board of Undergraduate Studies. In March 1994, Senate approved the form and its use, allowing Programs to admit up to 20% of their new Semester One students on the basis of the Student Profile Form. The Program Committees would determine the grade band below cut-off in which the forms would be considered. Senate also stipulated that the form and its use should be reviewed annually and that review has continued.

While the use of this supplementary information has, for the most part, been accepted, there are still some concerns which relate mostly to how the forms are used. Each Committee tends to look at the forms in its own unique fashion, with some placing more emphasis on the response to some questions than others. For example, for some committees the students' reasons for wanting to attend the University of Guelph carry more weight than their involvement in extra-curricular activities. This has raised the question of equity and it has been suggested that criteria be set for evaluation of the responses and guidance given to Committees on how to use the forms. The belief is that this would make the Committees more accountable for their decisions and would enable us to better justify and explain the decisions to applicants. The form and its use have been criticized for eliminating certain groups of applicants from being able to complete the form and therefore adding to the systemic barriers which already exist. These concerns are being reviewed and will be addressed.

With more experience using the form over the past few years we have been able to streamline our procedures. All applicants are sent a letter explaining that the form exists and how it will be used in the admission decision process. They are invited to request that a form be sent to them. We decided on this course of action to help keep costs related to printing and mailing down. After the first year, we also asked applicants to submit 4 copies which would be needed by the Committees. Regardless of this 'streamlining' we still have one staff working full-time on processing the invitations and forms and preparing them for Committees

between mid-March and May. Obviously using Student Profile Forms and considering supplementary information is not without cost.

In addition to all the practical considerations however, was the question of whether students admitted on the basis of the SPF were capable of performing academically at an acceptable level. If they were not, then all the efforts in administration and all the arguments in favor of its use would be somewhat pointless. It is already well-documented, both at this institution and many others that persistence and success in higher education are highly dependent on incoming grades. If this were to hold strictly true, then the outcome would not be particularly favorable for our SPF admissions.

SPF students have been carefully tracked each year since 1992, not only their first year performance, but their continuing progress throughout their university careers. For each incoming class, students admitted on the basis of an SPF are identified, along with degree program, major and sex. A comparison group of students admitted "normally" is then identified using the framework established by the SPF group, specifically program and major. Since most program and major combinations have individual cutoff levels, it is important to match the SPF and comparison groups at this level. The comparison groups consist of students who have surpassed the admission requirements by no more than 2%, which establishes them at the lower band of normal admissions.

SPF and comparison groups are compared based on drop-out rates, re-registration rates and average marks, using standard statistical tests (Chi-square and t-tests). Graduation rates will also be included within the next year, once the 1992 incoming students begin to graduate. Differences within degree program and by gender are also examined.

In 1992, a total of 70 students were admitted on the basis of an SPF, about 3% of the incoming class. By Fall 1994 the number had jumped to over 250, or 11% of the incoming class; for Fall 1995 the figure is expected to be about the same, although it will represent a larger percentage of incoming students as the size of the incoming class has decreased. The results described here will focus on the 1992 group, since the time span allows for the longest view of their performance. It should be noted that the results of the analyses of subsequent admissions are consistent with those of the 1992 group with the added advantage of stronger statistical tests because of the larger numbers. It is often difficult to obtain statistically significant results with small sample sizes, although differences between groups can often be clearly detected on visual inspection.

Table 1 shows the distribution of the SPF and comparison groups, by degree program and gender, for the 1992 incoming class.

Table 1

Program	Females		Males	
	SPF	Comparison	SPF	Comparison
Engineering	5	5	4	13
Agriculture	0	0	1	1
Applied Science	1	5	9	17
Commerce	10	14	2	2
Arts	18	76	2	6
Science	5	26	0	0
Env.Science	3	7	0	0
Kinetics	2	6	3	9
Total	53	156	17	39

Clearly there are some programs much better represented than others. In the current year there is still a wide range between programs in the percentages of students admitted using the SPF, which partly reflects the Colleges' varying degrees of acceptance of the SPF. Table 2 illustrates the SPF admissions patterns for 1992 through 1994 (1995 admissions are currently under analysis).

Table 2

% admitted on SPF Program	1992	1993	1994
Engineering	13%	29%	17%
Agriculture	1%	4%	4%
Applied Science	6%	4%	14%
Commerce	5%	7%	12%
Arts	4%	17%	16%
Science	1%	11%	11%
Env.Science	2%	7%	5%
Kinetics	5%	NA	NA
Total	3%	11%	11%

The analysis of the 1992 groups includes comparisons across a large range of factors, up to and including their performance in the Winter 1995 term: incoming averages, Semester 1 averages, average mark drop between high school and Semester 1, semester to semester changes in averages, registration rates, withdrawal rates, and academic review decision rates.

SPF students had significantly lower admission averages, 75% versus 79%. Since the groups were defined on the basis of admission averages this was an expected result, and confirmed at the outset that despite the small number of students involved there was a statistically recognizable difference between the groups.

By the end of Semester 1, SPF students were performing at a level just 1% below their normally admitted counterparts, and experienced a significantly smaller mark drop from their high school averages. We have found that first year students generally experience a drop of 12% to 15% in their first semester at university; and this was the case for the 1992 comparison group. For the SPF group however, this drop was just 10%.

Withdrawals in the first year (two semesters) and registrations in the second year were the same for both groups. (It should be pointed out however, that in 1993 and 1994 the SPF students have had significantly higher retention and re-registration rates than their comparison groups.) By the end of Fall 1994, halfway through their 3rd year, the 1992 SPF students had improved on their first semester averages by almost 5%, compared to the 2% improvement in the comparison group. By the end of the third year, Winter 1995, the SPF group was virtually indistinguishable from the comparison group, with the exception that SPF students had significantly higher averages in two degree programs.

As indicated earlier, as we track subsequent cohorts we are seeing the same general trends; SPF students tend to persist better in their studies and despite lower grades early in their academic careers, they are likely in time to pull their marks to a level comparable to that of their peers.

But what of their extracurricular activities, the basis upon which many of these students were admitted? Unfortunately, we have no means by which to objectively measure the activities of students or to compare them with others who may have been admitted with higher marks and less potential to contribute to the university community. We do have the anecdotal evidence from a program counselor who routinely interviews all of the first year students in his program.

The information gathered from the student interviews indicates very clearly that SPF students do indeed continue to contribute to the community in many ways. Their pursuits may be athletic, political, academic or social, and while SPF students are by no means the only students involved in such activities, they are involved in much higher proportions than the rest of the student population. That they are able to participate to the extent they do while still managing to maintain reasonable academic performance is a testament to their organizational and time management skills. As well, it justifies the original decision to use the profile forms as a basis for admission.

This coming year, as both federal funding and university applications decrease, the competition for students will be heating up. At the University of Guelph, the Student Profile Form will be part of the application package for all incoming students, with an invitation that they complete it if they desire. This will make the SPF more readily available than it has been previously, when students were invited to request a form, and is intended to allow Admissions Committees to increase intake without compromising admission standards. Undoubtedly, higher proportions of students will be admitted on the SPF, and we will continue to carefully track their progress to ensure that they continue to perform both as good students and as valuable members of the community.

Evaluating the Impact of a Freshman Seminar Program on Student Development and Retention

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Freshman seminar programs are a frequent element in strategies used by colleges to assist students in adjusting to the demands and culture of college life. Proponents of freshman programs stress their effectiveness in improving student retention. The research presented in this paper was designed to assess the impact of a freshman seminar on student development and retention, through the course's development and implementation at a comprehensive community college. Through participation in the development of the course, with surveys to assess student needs and faculty expectations, the institutional research office was able to design assessment instruments and procedures that were integrated in the course structure, and achieved broad cooperation from faculty. In this paper, the results of four years of successive evaluations are presented, which follow the program through piloting, revision, and final implementation phases.

In evaluating the effectiveness of freshman seminar programs, researchers have focused on variables in four categories: student retention, academic performance, knowledge and use of campus resources, and personality development. Fidler and Hunter (1989) reviewed a large number of studies on the impact of freshman programs. They report that the most widely studied variable is student retention, usually defined as reenrollment in the sophomore year, and that positive relationships with freshman seminar participation have been shown. As most colleges allow students to enroll in freshman seminar courses as an elective, some researchers have used matched control groups to reduce the impact of selection bias; some of these studies have also shown positive effects on retention and academic performance. A number of studies report results that are characterized as "compensatory" effects for freshman seminars; students enrolled in the course achieved retention rates and academic performance equal to comparison groups, in spite of the fact that they had weaker academic skills or were shown to be "at risk" for other reasons, such as uncertain career goals. More limited evidence exists that the positive impacts of freshman programs persist over time, and result in higher graduation rates (Starke, 1994).

University 101, the freshman seminar course at the University of South Carolina, has been studied extensively since 1972 (Fidler, 1993). Characteristics of course participants have been compared with students not enrolling in the course; they are more often female, younger, black, have weaker academic skills measured by high school GPA and SAT scores, and come from less affluent families. In spite of these risk factors for attrition, sophomore return rates for freshman seminar students have been equal to or higher than those of non-participants in almost all of the twenty years the program was evaluated, from 1973 to 1993. Return rates for participants ranged from 77.2% - 84.9%, compared with 73.2% - 80.5% for non-participants. Participants were more likely to be aware of and to utilize university resources, and to feel comfortable seeking guidance from a faculty or staff member.

The freshman seminar that is the subject of this paper is a one-credit, eight week course offered to incoming freshman students. It was developed by a committee of faculty and staff who were concerned about student retention, and was implemented over a four-year period with funding from a federal Title III grant. The course includes units that introduce new students to campus offices and support services; help them to assess their academic strengths and weaknesses and develop successful study skills; explore occupational aptitudes and interests; develop self-assessment and decision-making skills; and practice career planning strategies for achieving short and long-term goals. As of September of 1995, the program has been fully institutionalized and is supported with college funds, having proved highly effective in assisting students to successfully adjust to college, and in significantly increasing retention from first to second semester for freshmen.

Methods

The Title III funding that supported the seminar imposed requirements for formative and summative evaluations throughout implementation, which provided an ideal context for effective institutional research. Program guidelines required that activity objectives clearly state expected outcomes in terms of product, rather than process, and include a statement of quantifiable change in specific performance measures. The objectives stated desired improvements in performance measures in terms of a specific margin of gain, rather than as differences that achieved specific levels of statistical significance. A typical annual objective for the freshman seminar program might be "By September 1992, 50 liberal arts students who complete the freshman seminar will demonstrate 10% greater use of academic support services, when compared to a control group of non-participating students." Such specificity in the objectives of the project helped to clarify the parameters of the evaluation design, and kept both institutional research and freshman seminar staff focused as they assessed the impact of the program. An external evaluation consultant assisted participants in using internal evaluation results to revise annual objectives and improve program impact.

The freshman seminar was implemented over a four year period beginning in the spring 1992 semester. Curriculum was revised and enrollment was expanded each year. Evaluations were conducted annually, with results reported to the funding agency. The basic evaluation design specified comparison of freshman seminar participants to a control group of non-participating new students. Multiple measures of impact were utilized:

1. Knowledge of college resources and services.
2. Utilization of academic support services.
3. Increases in self-assessed learning skills.
4. Increases in students' "career maturity" (the extent to which they were aware of and practiced effective career planning strategies).
5. Retention of students from the first to second semester of freshman year.

Pre and post seminar testing with a locally developed instrument, designed to assess behaviors and attitudes associated with college success, was the primary means of data collection.

The instrument included questions addressing each of the performance measures specified in the project objectives. It asked students to rate themselves on specific academic skills and study habits, and tested their knowledge of the locations of various campus resources. It included several questions related to career planning strategies and the extent to which students felt they had clear career goals. The end of course assessment repeated most questions, and asked how many times students had used various support services. The questionnaire was administered to freshman seminar sections and to a sample of introductory level general education courses during the first week of classes, and again at the end of the eight-week seminar. In the analysis of pre and post test variables, only the responses from first-time

freshmen and new transfers in control group sections were utilized. Reenrollment and academic performance of seminar participants and the comparison group were tracked through the student information system.

The concept of "career maturity," which was specified in the project proposal as a performance measure, had not been operationally defined. Together, institutional research staff and advisement and counseling personnel developed an eleven item index to assess this aspect of student development; items focus on students' attitudes and behaviors related to choosing and planning a career. The index demonstrated high reliability in pretests of the instrument the semester before the seminar began. The following items were included in the index, with responses on a four-point Likert-type scale.

I have thought a lot about what career is right for me.
I have looked for information on how to meet my career goals.
I've thought about my goals, but making decisions is difficult for me.
I have spoken with individuals who work in the career(s) in which I am interested.
I have a definite career in mind.
I have discussed my career options with a counselor or teacher.
I feel I can achieve my career goals.
I know what special training or education I need to meet my career goals.
I'm not sure what I want to do with my life.
I know a lot about what people do in the occupations in which I am interested.
I don't have a clear career goal yet, because I need more information.

In the third year of the evaluation, background characteristics and first semester retention of seminar participants and control group students were also compared to those of all entering freshman, to determine whether they were typical of new students, and because of concerns about the size of the control sample that year. In the final year of evaluation, the comparison of characteristics, but not of retention, was repeated.

Findings

Characteristics of Seminar Participants

A comparison of freshman seminar participants and control group students with all entering freshman placed the analysis of seminar outcomes in a larger context. Background characteristics, educational goals, and academic skills of the three groups were examined using data collected at new student orientations in 1993 and 1994. Table 1 compares characteristics of the three groups. Freshman seminar students were not atypical, although they are somewhat more likely to be female and to have been weaker students in high school. Their mean scores on placement tests in reading, writing, and mathematics were lower than both the control group and all freshmen, placing more of them in developmental courses. (See Table 1 below.)

Since each term 25-30% of the students enrolled in the seminar did not complete the course, a similar set of comparisons was made between completers and non-completers. Non-completers were more often male, white, and younger, were enrolled in a service career program, and reported a physical or learning disability. They were less likely to cite job skills as their primary goal, and their placement test scores were slightly lower than those of completers. In the examination of program outcomes that follows, non-completers are *not* included in the analysis of variables from the pre and post-test, as there were no post-test scores available for them. They *are* included in the analysis of retention and academic performance; it was felt that dropping weaker students from the seminar group, but not from the control group, could bias results and magnify positive impacts of the seminar.

Table 1

	Seminar Group 1993	Seminar Group 1994	Control Group 1993	Control Group 1994	All Freshmen 1993	All Freshmen 1994
STATUS						
First -time freshmen	90.4	89.9	73.8	88.8	100.0	100.0
Readmit	4.3	0.6	0.0	0.9		
New Transfer	5.3	9.6	26.2	10.3		
PROGRAM TYPE						
Transfer	82.7	62.9	41.0	69.8	50.7	67.2
Business	10.1	14.0	56.4	14.4	18.4	14.8
Health	6.1	5.1	2.6	0.9	5.5	0.6
Technical	0.0	1.7	0.0	0.0	7.5	0.9
Service	1.1	15.7	0.0	11.2	11.1	14.2
Latch	0.0		0.0		6.8	
Non-Degree		0.6		3.7		2.3
MEAN AGE	22.0	20.0	22.0	19.4	22.0	20.7
GENDER						
Female	54.4	54.7	42.9	43.3	47.3	48.1
Male	45.5	45.3	57.1	56.7	52.7	51.9
Ethnicity						
White	92.3	85.7	97.4	88.8	75.0	84.7
Black	2.2	3.0	2.6	3.2	2.3	4.3
Other Min.	1.6	8.3	0.0	3.2	4.7	6.8
Not reported	3.9	3.0	0.0	4.8	18.0	4.2
MARRIED	3.3	4.8	9.8	3.2	5.8	6.2
ESL	0.6	6.0	5.1	1.1	4.2	6.2
PHYS/LRN DISABL	7.5	15.4	5.2	10.7	8.5	15.1
HIGH SCHOOL GPA						
Above B	8.1	7.4	12.5	7.3	7.7	7.7
C to B	44.3	43.7	45.0	44.4	53.1	48.1
D to C	28.4	29.5	30.0	21.8	24.0	25.9
Below D	2.1	1.1	0.0	0.4	1.0	0.5
Missing	17.1	18.4	12.5	26.1	14.2	17.8
PRIOR EDUCATION						
High School	74.3	68.4	55.0	62.0	71.9	68.4
Some Courses	7.5	8.9	37.5	10.3	11.4	11.0
Certificate	1.1	2.1	0.0	1.7	2.4	1.9
Associate Degree	0.5	0.5	0.0	0.4	0.7	0.9
Bachelor Degree	0.5	0.5	0.0	0.0	0.7	0.6
Missing	16.1	19.5	7.5	25.6	12.9	17.1

Table 1, cont.	Seminar Group 1993	1994	Control Group 1993	1994	All Freshmen 1993	1994
REASON FOR ATTENDING						
Learn Job Skills	29.9	31.1	32.5	20.1	38.8	34.7
Earn Transfer Credits	48.7	44.2	55.0	50.4	41.5	40.8
Personal Interest	3.2	0.0	2.5	1.3	2.9	2.6
Improve Basic Skills	3.2	3.7	0.0	2.1	3.0	3.5
Complete Gen. Ed. Credits	1.6	1.6	2.5	2.6	2.2	2.6
Other	7.0	6.8	5.0	3.4	6.4	6.3
No definite reason	2.7	2.6	0.0	0.9	2.7	2.8
Missing	3.7	10.0	2.5	19.2	2.5	6.7
CAREER PLAN						
Have clear goals	35.3	27.9	42.5	28.6	42.1	37.0
Undecided-need information	28.9	27.9	22.5	24.8	24.7	24.6
Indecisive	23.5	26.3	20.0	20.9	23.2	24.7
Haven't considered goals	6.4	5.8	7.5	6.4	6.1	5.0
Missing	5.9	12.1	7.5	19.2	3.9	8.6
MEAN PLACEMENT TEST SCORES						
Reading Test	28.6	27.1	31.9	30.3	28.3	28.2
Writing Test	3.0	2.9	3.4	3.0	2.9	2.9
Arithmetic Test	25.7	24.6	27.6	26.3	25.3	25.3
Algebra Test	13.2	12.9	18.4	14.7	13.4	13.5

Confidence in College Learning Skills

Students were asked to rate their college learning skills in a number of areas on the pre and post seminar questionnaire. Ratings on individual items were combined in an index with a maximum score of sixteen. Freshman seminar students had consistently lower scores on the pre-test, but showed greater gains during the eight weeks of the course, so that their post-test scores equaled or exceeded those of students in control group classes in all but one semester.

Table 2. Mean Scores, Confidence in College Learning Skills

	Seminar Group			Control Group		
	Pre-Test	Post-Test	Mean Gain (Loss)	Pre-Test	Post-Test	Mean Gain (Loss)
Spring '92	9.73*	12.30**	2.57	10.80*	11.30**	0.50
Fall '92	9.98	11.38	1.40	10.41	11.27	0.87
Fall '93	9.88	11.32	1.44	10.71	12.00	1.29
Fall '94	9.59	10.62	1.03	10.30	11.25	0.95

*p < .003 ** p<.05

Familiarity with College Policies and Procedures

The questionnaire contained five items for rating familiarity with college policies and procedures and ability to access information on campus; these ratings were also combined in an index. The pattern of gain over the period of the seminar was similar to that for learning skills. Seminar students showed significantly lower scores at the beginning of the semester, and made gains that raised their scores above those of the control group by the end of the course, for all four semesters.

Table 3. Mean Scores, Familiarity with College Policies and Procedures

	Seminar Group			Control Group		
	Pre-Test	Post-Test	Mean Gain (Loss)	Pre-Test	Post-Test	Mean Gain (Loss)
Spring '92	11.16*	15.75**	4.59	14.37*	14.09**	(0.28)
Fall '92	12.01	15.28	3.27	13.39	14.30	0.91
Fall '93	11.63	15.31***	3.68	13.68	14.83***	1.15
Fall '94	11.70	14.90	3.20	13.46	14.00	0.54

* p<.000 ** p<.007 ***p<.063

Career Maturity

Mean scores on the career maturity index, described in the methods section, repeated the pattern shown for learning skills and knowledge of policies and procedures: freshman seminar students began the semester with lower scores, showed significantly greater gains, and after eight weeks surpassed the scores of students in the control group in all four years.

Table 4. Mean Scores, Career Maturity

	Seminar Group			Control Group		
	Pre-Test	Post-Test	Mean Gain (Loss)	Pre-Test	Post-Test	Mean Gain (Loss)
Spring '92	28.48*	34.79**	6.31	31.52*	30.77**	(.75)
Fall '92	29.88	33.65	3.77	32.18	33.35	1.17
Fall '93	30.62	34.08	3.46	32.15	33.47	1.32
Fall '94	32.41	34.33	1.92	31.99	31.57	(0.42)

* p<.006 ** p<.025

Knowledge and Utilization of Key Campus Resources

Students were asked to identify the location of key campus resources at the beginning and the end of the freshman seminar, and a total score for correct identifications was computed. By the end of the eight week course, seminar students showed significantly greater knowledge of locations. In addition to being familiar with the locations of campus resources, seminar participants demonstrated greater utilization of a variety of support services, as shown below.

Table 5. Mean Scores, Location of Campus Resources

	Seminar Group			Control Group		
	Pre-Test	Post-Test	Mean Gain (Loss)	Pre-Test	Post-Test	Mean Gain (Loss)
Spring '92	7.20*	13.25	6.05	10.30*	12.30	2.00
Fall '92	6.90	13.14**	6.20	8.99	12.00**	3.10
Fall '93	6.83	13.51***	6.68	10.72	11.76***	1.04
Fall '94	7.75	12.98*	5.53	8.86	11.08*	2.22

* p<.000 ** p<.010 *** p<.05

In addition to being familiar with the location of campus resources, seminar participants demonstrated greater utilization of support services. Table 6 displays patterns of service use for Fall 1994; results were similar in other semesters.

Table 6. Utilization of Specific Resources by Groups, Fall 1994

	GROUP PERCENTAGES									
# OF TIMES USED:	None		One		Two		Three or more		1, 2, 3, +	
	fs%	c%	fs%	c%	fs%	c%	fs%	c%	fs%	c%
ARC	28	73	23	13	23	3	26	11	72	27
Health Services	89	81	9	10	2	8	0	1	11	19
Faculty Advising	65	81	24	14	9	4	2	1	35	19
Computer/Typing Labs	50	58	20	17	15	9	15	17	50	43
Athletic facilities	76	69	10	6	2	4	11	21	24	31
Registrar's Office	33	49	40	31	17	14	10	6	67	51
Library	22	27	14	14	21	15	43	44	78	73
Advisement/Counseling	55	81	30	15	11	3	4	1	45	19
Placement Office	83	90	13	5	3	5	1	0	17	10
Financial Aid	49	62	12	9	15	9	24	20	51	38
Student Activities	72	78	9	4	9	8	10	10	28	22

One of the most striking differences in the patterns of service use by the seminar and control groups was in utilization of the Academic Resource Center (ARC), the principal means by which students access tutoring and other academic support services. The orientation questionnaire administered before the start of the semester asks respondents to indicate in which of eleven areas they expect to seek help while enrolled; the list of choices includes writing, reading, math, and study skills. Intentions to seek assistance from this questionnaire were compared to patterns of service use on the post-seminar assessment instrument. In both groups, students who before the semester expected to seek help were generally more likely to actually do so. But students in the seminar group were far more likely to utilize support services in these critical academic areas, regardless of their prior perceived needs, than were students in the control group. Table 7 shows the percentage of students who used ARC at least once during the first half of their first semester, broken down by their intentions to seek help with reading, writing, math, or study skills. Because many students will pay a single visit to the ARC as part of a class, the number who used ARC services three or more times is also displayed.

Table 7. ARC Utilization by Prior Intentions to Seek Help

	Used ARC at least Once		Used ARC Three Times or more	
Planned to Seek Help With:	Seminar	Control	Seminar	Control
Writing Skills p<.001				
Yes	74%	38%	28%	-
No	66%	23%	25%	11%
Reading Skills p<.01				
Yes	80%	57%	37%	7%
No	66%	18%	23%	9%
Math Skills p<.001				
Yes	74%	33%	35%	15%
No	66%	23%	19%	6%
Study Skills p<.001				
Yes	74%	43%	22%	9%
No	66%	18%	31%	9%

Student Retention and Academic Performance

All of the positive relationships between seminar participation and the various measures of student development and integration into the campus community clearly documented the impact of the seminar on the quality of students' experiences. But retention of students into a second semester remained a critical factor in assessing the value of the freshman seminar to the college. Program staff had from the beginning expressed uneasiness about the likelihood that an eight week class could achieve the improvements in retention rate which were specified in the grant objectives: rates which were 5% higher than the control group in the second year of the project, and 10% higher by the final year. Differences in retention rate were found between the seminar and control groups in most of the semesters studied, as shown below. Table 8 displays credits attempted and earned by seminar and control group students, grade point averages, and reenrollment rates for the semester following seminar participation.

Table 8. Student Retention and Academic Performance

	Seminar Group				Control Group				
	Spring 92	Fall 92	Fall 93	Fall 94	Spring 92	Fall 92	Fall 93	Fall 94	Norm.
Credits-Current									
Attempted	9.80	12.50	12.31	12.13	12.54	11.31	12.45	12.10	11.66
Earned	7.65	10.79	10.88	10.86	11.54	10.75	11.54	10.72	10.52
Credits-Following Semester.									
Attempted	11.64	11.46	11.70	11.08	12.33	11.81	10.07	11.15	10.75
Earned	11.20	9.91	10.23	9.89	10.70	10.31	8.75	9.98	9.90
% Re-enrolled	61	77	83*	74	54	67	67*	69	77
% Completed	61	68	78**	65	52	62	57**	62	68
Current GPA	2.27	2.18	2.45	2.41	2.53	2.48	2.83	2.40	2.51
GPA Following Semester	2.68	2.20	2.14	2.40	2.48	2.39	2.35	2.35	2.40

* $p<.014$ ** $p<.005$

Discussion and Conclusions

The findings presented in this paper are consistent with those of other studies on the impact of freshman seminar programs. Over a four-year period, the evaluation suggested positive effects of seminar participation on all of the measures specified in the project objectives: awareness of college policies and procedures, knowledge and use of campus resources, confidence in learning skills, development of career planning strategies, and retention to the second semester of the freshman year. On measures of student development and integration into the campus culture, there were consistent patterns of difference between students in the seminar and control group. The incremental improvements that were achieved in retention and academic performance fell somewhat short of the project's goals, possibly demonstrating the operation of "compensatory" effects for weaker students, which have been suggested by other authors.

The Title III objectives did not specify that the project would demonstrate statistically significant differences on performance measures; the magnitude of the achieved improvements by seminar students satisfied the stated evaluation goals for the activity. Nonetheless, it was disappointing to institutional researchers that most tests for significance did not meet a standard that could more clearly limit the possibility of chance effects. This disappointment was somewhat mitigated by the consistent pattern of improvements in multiple measures, over several semesters, which favored seminar participation. As a whole, the data assembled in the evaluation provided ample evidence of the success of the project to the funding agency, and of the potential value of the seminar to the college as a strategy for addressing the problem of student retention.

In a recent paper, Vincent Tinto warns of "retention-related products" which promise colleges a quick-fix to the problem of student retention. "Successful education," he states, "not retention, is the secret of successful retention programs...the success of institutional retention efforts ultimately resides in the institution's capacity to engage faculty and administrators across the campus in a collaborative effort to construct educational settings, classrooms and otherwise, that actively engage students, all students not just some, in learning." It is in this

context that the freshman seminar program achieved its greatest success. Over a period of several years, it served as a catalyst for consideration of the factors that contribute to student success, and involved a significant portion of the campus community in thinking and talking about strategies to improve the quality of students' early experiences at the college. Dozens of faculty team-taught the course with professional staff and administrators, including the president, various deans, the director of institutional research, and student services staff. Instructors received training in the student development issues which were the focus of the course, and met regularly to discuss problems and experiences with the curriculum. The evaluation design requiring assessment of student progress in relation to specific objectives helped faculty to think in terms of encouraging change in students' attitudes and behaviors, in addition to imparting knowledge or developing skills. Extensive evaluation provided the evidence needed to make a strong case for the value of the seminar to both the general faculty and to budget administrators, when the time came to institutionalize the project with college funds. The freshman seminar made a start towards fulfilling Tinto's (1994) recommendation for implementing successful retention programs:

> "The practical question remains as to where and in what form should institutions invest scarce resources to enhance student retention? Here the evidence of effective programs is clear, namely that the practical route to successful retention lies in those programs that ensure from the very outset of student contact with the institution that entering students are integrated into the social and academic communities of the college and acquire the skills and knowledge needed to become successful learners in those communities."

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Defining and Exceeding Campus Expectations for Institutional Research

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If information can improve policy choices, the institutional research professional is potentially the best person to provide it. Possessing knowledge of information sources, technical data analysis skills, awareness of the external policy environment, and sensitivity to campus culture and personalities, the institutional researcher can be an invaluable member of the senior policy making staff. At many institutions, this represents a higher expectation than currently held for the research function. This paper identifies what an institution should expect from its research office. In addition, the question of what a research office should expect from its institution is addressed. The paper concludes with the presentation of a performance monitoring system for the assessment and continuous improvement of institutional research.

What expectations should a campus or other user of institutional research have of an institutional research office? What expectations should institutional research have of its campus? This paper addresses these *What should we expect?* questions based on experiences from two different viewpoints. First, from the perspective of a research director at a statewide association of independent colleges, a *consumer* of institutional research for influencing public policy in the state capital. Second, from the perspective of a director of a college research office, a *provider* of institutional research for both internal and external audiences. The authors draw on over 20 years of personal experience studying and attempting to improve the practice of institutional research. The paper also benefited from a lively dialogue on these issues conducted during January and February 1995 over the MdAIR-list, the electronic discussion list of the Maryland Association for Institutional Research. The contributions of our Maryland colleagues--especially Ron Maggiore, Dan McConochie, Javier Miyares, and Merrill Pritchett--are gratefully acknowledged.

The Effective Institutional Research Office Defined

"Institutional research at the campus level has traditionally provided two levels of support: (1) collection and reporting of institutional data, and (2) policy analysis for management and decision making" (Chan, 1993, p. 537). However, as is increasingly recognized, institutional research may fulfill a third function. We believe that institutional research's primary contribution has evolved through three stages: (1) description (using simple quantitative methods); (2) understanding (using multivariate and qualitative techniques); and (3) advocacy (requiring political savvy and other contextual awareness). In his history of the functions of institutional research, Peterson (1985) concurred, arguing that the common function of institutional research offices in the 1950s and 1960s was to collect data; in the 1970s, the primary function was the analysis of evolving management issues; and in the 1980s

management, advocacy, and policy research were the primary functions. In the 1990s, Terenzini (1993) asserted that truly effective institutional research offices must have (1) technical/analytical intelligence; (2) issues intelligence; and (3) contextual intelligence.

Terenzini's conception of institutional research as institutional intelligence in three mutually dependent but distinct forms implies that institutional research has evolved from traditionally quantitative analysis to a more qualitatively oriented framework, a point made by Chan (1993). While Terenzini identified the knowledge and skills needed to have a truly effective institutional research office, the effectiveness of institutional research is properly measured by its *impact on policy and institutional effectiveness*.

This policy-influencing role is not new, but it is becoming a primary function of institutional research as technological and managerial trends displace the data-providing role of the past. Distributed processing and decentralized decision making suggest that many in the organization may need and have access to data. In such environments, institutional research may take on decision support system design, data administration, and end-user training functions. But we argue that the research professional, combining a penchant for the details involved in data analysis with a broad campus wide perspective, can be an invaluable member of the top policy making group. If the right information can improve policy choices, the institutional researcher is potentially the best person to provide it.

Participation in institutional effectiveness efforts is an increasingly important role for the institutional research office to assume. Demands for accountability and outcomes assessment have become increasingly common on campuses and the institutional research office with its institutional intelligence is the logical place for these activities. However, in a study of structures and tasks at 122 NEAIR campuses, Volkwein (1990) was "disappointed to find so little respondent participation in outcomes research; but given the paucity of staff in most offices, [he was] not surprised. Most institutional research operations are simply unprepared to undertake the effort" (p. 22). Another study conducted by Rogers and Gentemann (1989) suggested that "the mere presence of IR activities on campus does not increase the likelihood that institutions will come closer to meeting the demands to assess effectiveness. Offices given responsibility for institutional effectiveness are engaged in many activities which support assessment, but institutional research offices involved in routine institutional research activities may find that they are not leading their institutions' assessment efforts" (Rogers & Gentemann, p. 355). It is our position that institutional research should be a major participant in institutional effectiveness efforts, and that its absence in such efforts constitutes an ominous sign for the future of the office.

To fulfill this policy-influencing and institutional effectiveness role, the institutional research professional needs to be considered a part of the top policy making team and should exhibit behaviors that are indicative of effective institutional researchers including (1) being a member of, or regular participant in meetings of, the president's staff or college planning council, (2) making significant contributions to college wide budgeting and resource allocation decisions, (3) publishing information that raise issues onto the agenda of top policy makers, (4) completing analyses that influence major institutional policy decisions, and (5) periodically making presentations to the institution's governing board (although this is more likely at a community college or liberal arts college than at a large university). At many institutions, this would mean raising existing expectations about the contribution institutional research should be making. Concomitant with these higher expectations, however, may be the need for increased institutional support in staffing and other resources. We suspect that much of the suboptimal performance we see reflects the inadequate support associated with low expectations.

Breaking out of this low expectations-inadequate support-suboptimal performance cycle may take changes in attitudes by both the consumers and providers of institutional research.

The next two sections provide discussions of the expectations we feel are reasonable from both points of view; that is, what consumers should expect from institutional research, and what institutional research should expect from its institution.

Institutional Research: What Should Its Consumers Expect?

Sponsors and consumers of institutional research should expect the following from its practitioners:

Technical competence. Researchers are presumed to know what they're doing in terms of research design, database structures, data analysis, computer applications, and similar number-crunching skills. Such technical competencies should be prerequisite to securing a position in institutional research.

Professional integrity and ethics. Commitment to, and practice of, proper professional behavior as embodied in the AIR *Code of Ethics* for institutional research is assumed. The temptations for transgressions are plentiful, given the discretionary nature of decisions regarding research design and methodology, and the political pressures to produce findings supportive of those in power. A common adage in the profession is that "if you torture data long enough it will confess to anything." Institutional research must resist becoming a legitimation function for preordained decisions.

Policy relevance. In our view, the key value of effective institutional research is its contribution to informed policy making. This requires that the researcher possess both issues intelligence and contextual intelligence (Terenzini, 1991). Awareness of the institution and the environment in which it operates is necessary to maximize the policy impact of institutional research. According to Ewell (1989, p. 2):

> the successful application of knowledge requires the simultaneous presence of two conditions. First, the information must have a visible bearing on a perceived problem. Second, there must be a constant and consistent dialogue between those who gather and provide information and those who must use it.

This dialogue is needed for several reasons. Regular interaction with top management ensures that the researcher knows what top policy makers want--and need. If the researcher knows the context and focus of the impending policy decision, he or she may be able to provide useful information beyond that which policy makers have requested. Policy makers do not want to be overwhelmed with data, but rather benefit most from information that is targeted. ("Data, data, everywhere but not a thought to think" is the situation to be avoided. Data without context is misinformation.) The dialogue is further enhanced and facilitated if the research professional understands the history and culture of his or her institution. Knowledge of individual personalities and campus politics should shape research agenda and dissemination decisions, ensuring the "organizational validity" that promotes acceptance of research findings (Heacock, 1993).

In addition to knowing your campus and the needs and personalities of its key decision makers, researchers benefit from knowledge of trends in the institution's external environment. Regular environmental scanning, including a close eye on the corporate world, can help the researcher anticipate upcoming issues affecting the campus so that current research design and database decisions position the office for future policy-relevant contributions. Intelligence-gathering is a prime institutional research function, and key to ensuring its policy relevance.

Effective communication. Researchers must present their findings in formats accessible to top policy makers. Transforming data into useful information is both an art and a science. Researchers are expected to possess tabular, graphic, written, and oral communication skills.

High productivity. Given the demands typically made on them, research offices must operate at high efficiency in order to free up the time for the context-rich, issue-focused projects we advocate as institutional research's major contribution to its campus. And, in these tight fiscal times of doing more with less, institutions have a right to expect high productivity from each campus office.

Initiative. An efficient research office, attuned to the policy environment facing campus decision makers, should be in a position to raise new issues, contribute new, unsolicited insights, and bring new data to bear on hot issues. An example of an effective institutional research initiative at Prince George's Community College is illustrative (Clagett, 1992). The college was under attack by students and local legislators for its high tuition, despite its record of low per-student expenditures and modest budget. The institutional research director, on his own initiative, acquired expenditure data for Prince George's and four neighboring counties from the state department of fiscal services and developed a comparative analysis of community college funding. The analysis found that, by several different measures, Prince George's had provided about half the level of community college funding support that the other counties provided. Dissemination of the comparative funding analysis succeeded in defusing the high tuition charge, by deflecting most criticism away from the college and to the historically low level of county support. Legislators and students came to understand that differences in student charges reflected differences in county aid. County budget staff acknowledged privately that a planned cut in the county's contribution to the college was averted because of the persuasive case made by the college that the county had consistently underfunded it in the past.

Impact. This is the ultimate measure of success. Institutional research success stories provide new understandings of important issues, lead to changes in campus policies, contribute to improving student success, save money or raise revenue, or otherwise have a major impact on an institution. Mired down in mandated reporting or responding to the latest ad hoc data request, researchers enjoy too few of these successes. But such impact is what institutional research should strive for. Regularly making a positive impact typically depends upon all of the above listed attributes--competence, integrity, relevance, communication skills, high productivity, initiative--plus savvy and often a dose of luck. Knowing the organizational and personal objectives of key decision makers is crucial, but sometimes serendipity plays a role.

Self-evaluation and continuous improvement. Research, like all other campus functions, should be expected to routinely monitor its performance and strive for improvement. This can be done through adoption of Total Quality Management techniques (Heverly, 1993; McLaughlin and Snyder, 1993) or less formal practices, such as those described in the final section of this paper. Zeglen (1994, p.2) has suggested that, by "adopting tactical applications of TQM techniques rather than the more long-term strategic deployment of TQM planning, some gains in productivity and quality may be achieved by offices with less investment of scarce time and staff resources." Two tools mentioned by Zeglen are especially useful in institutional research. First, maintenance of an *error log* listing errors by stage of occurrence and detection (project definition, design, production, presentation, or evaluation), the person discovering the error, insights into why the error occurred, and suggestions for preventing such errors in the future. (In her study, most errors occurred during the production stage. Three-fourths were discovered by research office staff, but nearly half were discovered after the project results had left the office.) One tool for helping minimize errors is a *quality action questions (QAQ) checklist* (Zeglen, p. 12) that prompts evaluation at each stage of a project.

Humility. At the 29th annual forum of the Association for Institutional Research in Baltimore, James Dator suggested that institutional researchers occupy a "very precious space between spineless administrators and mindless academicians." Talented researchers can develop a professional arrogance after years on the job, but are well advised to keep in mind the limitations of the information services they provide. Not everything that counts can be counted, and not everything that can be counted, counts. The following disclaimer has made its way around the Internet:

> We fully realize that we have not succeeded in answering all of your questions. Indeed, we feel that we have not answered any of them completely. The answers we have found only serve to raise a whole new set of questions, which only lead to more problems, some of which we weren't even aware were problems. To sum it all up, in some ways we feel we are as confused as ever, but we believe we are confused on a higher level, and about more important things.

A sense of humor. Institutional research can be very stressful, especially if it is involved in the top policy issues we argue it should be. But we all must keep a proper perspective on life, and sharing or raising a smile is always important.

What Should Institutional Research Expect from Its Institution?

In order to deliver on the expectations of its users, institutional research should expect the following from its institution:

Regular interaction with policy makers. As noted above, to ensure that the work institutional research does will be useful to policy makers requires ongoing dialogue with them. Establishing personal rapport with people at the top increases the likelihood that research will influence policy. As one respondent to the electronic discussion list put it, "a one-person office with no budget but having access and trust from the president can have more impact than a well-funded office four layers down." There is evidence to suggest that many researchers are frustrated by the lack of this kind of access. A survey of all community college research officers in the South found insufficient access to top level administrators and a lack of appreciation by direct line supervisors of the potential contributions of institutional research to be major complaints (Rowh, 1992). Similarly, a national survey of AIR members found presidents who weren't data people, lack of access to top decision makers, and perceptions that research wasn't part of the campus leadership team prevalent complaints (Huntington and Clagett, 1991). Sample comments from the latter survey:

> The biggest obstacle to our effectiveness is the lack of communication from senior administrators regarding current and upcoming policy issues.
>
> Reporting line is not close enough to top level decision makers.
>
> Key leaders do not understand IR and the function it should perform. We constantly have to coach and explain information to several key leaders.
>
> The biggest problem is not having people at the top who really want the data and information institutional research can provide.
>
> None of our top level administrators are data people.

passion that creative research professionals revel in and encouraging innovation and initiative in the research office.

Access to campus databases. Research offices must have direct access to campus electronic databases. Many institutions are moving to decentralized processing, and encouraging offices campus wide to access and analyze data on their own. At such places, the role of institutional research is changing from being the primary provider of information to one of data administration, system design, and interpretation (Matross, 1988). Whatever the office's role, ready access to--and understanding of--all major college databases is essential.

Appropriate technology, including access to the Internet. Every member of the research team needs computer hardware with adequate capabilities to handle the files and run the software appropriate to their tasks. In addition, an Internet account is becoming increasingly indispensable for communicating with colleagues, participating in professional organizations, and accessing information.

Adequate staff. Observation, conversations with colleagues, and survey research all suggest that many offices are understaffed, precluding them from reaching the full potential of institutional research. Even if dedicated and hardworking, a one- or two-person office probably cannot meet the expectations identified here. An institutional research office, irrespective of the size of its institution, needs at least two research professionals *in addition to* the director if it is to *regularly* contribute to college wide policy making. This support frees up the director's time for the intelligence gathering, committee service, informal networking, and dissemination functions that are essential if research is to have maximal impact. The demands of state and federal reporting, external surveys, and routine, recurring institutional data reporting can easily consume the time of one full-time analyst. The second analyst is needed for the in-depth, policy-focused studies that constitute the core contribution of the best institutional research.

Professional development opportunities. To keep up with new technologies, educational policy trends, changes in the environment affecting higher education, and the latest in research methodologies, institutional researchers need access to professional journals, workshops, and conferences. As the chief information officer in the top policy circle, the institutional researcher must have exposure to these kinds of resources, even when campus cost containment efforts are reducing periodical and travel budgets. Having the researcher serve this intelligence-gathering function for the campus can be a cost-effective investment.

Recognition by senior management. Acknowledgement that institutional research is a primary player in policy formation facilitates its successful achievement of that role. Knowledge that information is being sought and used in decision making, and that the institutional researcher has direct input, promotes both formal and informal communications, enhancing the intelligence-gathering role.

A Performance Monitoring Indicator System for Institutional Research

To promote efficient and effective office performance, a system incorporating explicit goals, assessment tools, and staff recognition is beneficial. In this section, a performance monitoring indicator system developed by the Office of Institutional Research and Analysis (OIRA) at Prince George's Community College (PGCC) is described.

Office Goals

As part of the college's overall planning process, the OIRA prepares goals and objectives for each fiscal year. These reflect current campus strategic priorities as well as on-going functional responsibilities. The performance monitoring indicators described here are different. These emphasize office productivity and include measures applicable to individual staff performance. The nine performance goals measure total office output, campus wide service, timeliness of task completion, dissemination, and quality. Output is measured by the total number of projects completed and the percent of requested projects this represents. Campus wide service is measured by the number of projects completed for each of the college's five divisions. Timeliness is measured by the percent of priority projects completed by their target completion date. Dissemination is measured by the number of reports distributed and the number of formal presentations made. Quality is measured by the number of ERIC publications submitted, scale means on a customer satisfaction survey, and the number of awards made for superior office efforts recognized on- and off-campus for their impact. These indicators and the systems put in place to generate and track them are explained in detail below. The office's performance goals for fiscal year 1995 were as follows:

Office of Institutional Research and Analysis Performance Goals for 1994-95	
Total projects completed	100
Minimum projects per division	5
Completions/requests ratio	90%
Project completion by target date	100%
Total reports (excluding tech memos)	40
Formal presentations	6
ERIC publications	10
RUSS scale means	>4.00
EMI awards	2

Assessment and Monitoring Tools

The OIRA uses four tools for generating and tracking performance indicators: a project management database system, publication typologies, a mid-year office review, and a customer satisfaction survey.

Project Management System. An indispensable tool for assessing and monitoring the performance of the research office is the Institutional Research Project Management System (IRPMS). This system is maintained on the office's standard database software package--specific project management software is not needed. (See Chambers, 1994, for a discussion of similar project tracking systems at several campuses.) The data elements included in IRPMS are an assigned project number, name of person requesting the service, request date, a target completion date, project title, project leader, priority (1 to 4), project status, date begun, date completed, and a notepad for brief commentary. At the beginning of the fiscal year, the office prepares an annual research plan incorporating all federal- and state-mandated reports, selected external surveys, recurring institutional data analyses and reports, and priority research projects extracted from the office's annual goals and objectives. All projects in this annual research plan or calendar are loaded into IRPMS July 1. During the course of the year, additional ad-hoc project requests are added to the system as received. Note that IRPMS is a *project* monitoring system, not a log of all data requests received by the office. Simple data extractions and other requests that can met within a day or two are not entered in the system.

The IRPMS is used for monitoring current operations and for biannual, in-depth reviews of office performance. Prior to scheduled staff meetings, each research team member is provided a project leader turnaround sheet listing all assigned projects and providing space for updating their status. These turnarounds are returned to the director who updates the system and then generates a project status summary for all projects with target completion dates during the next 6 weeks. This summary is used during staff meetings to review and plan staff work. IRPMS also produces a summary of project activity for use in preparing the office's monthly report to the vice president. The software permits other quick reports to be extracted from the database as needed. For the in-depth assessments of office accomplishments, a standard set of performance measures is generated from IRPMS. Trends in these indicators are tracked over time in a set of data displays prominently displayed on the office's central bulletin board. These indicators are used for goal setting, assessing office accomplishments, and evaluating the performance of individual staff members.

Publications. Publications are a primary means of disseminating office findings. But tracking patterns in report generation also provides a good way of assessing office productivity and service to the campus community. To facilitate this, research office publications at PGCC are classified according to two schemes.

First, reports are issued according to a fiscal-year and report-type classification scheme (e.g., BT95-2). The publications typology includes nine categories: reports to the Board of Trustees, briefs for the Planning Council, enrollment analyses, market research, program evaluations, needs assessments, research briefs, fact books, and technical memoranda. Reports are also classified by topic or subject area. For example, budget-related publications might be issued as reports to the Board, planning briefs, and tech memos, depending on the audience and purpose of the report. Examining trends in publications by topic provides an indication of what subjects have demanded information support at different points in time. Thirteen topic areas are identified in this classification scheme: academic programs, affirmative action/campus climate, budget and finance, developmental education, enrollment forecasts, enrollment profiles, environmental scanning, facilities/space use, fact books, market research, methods/documentation, staffing/employees, and student outcomes.

IRMA. While use of the project management system in routine staff meetings throughout the year ensures operational monitoring, it is useful to stop for a more in-depth assessment of office accomplishments periodically. At PGCC, we do this twice a year. At the end of the fiscal year, the office prepares an annual report for incorporation in the college's overall "evidences of achievement" accountability report and to aid in developing goals and objectives for the following year. But we also do an "Institutional Research Mid-year Assessment" affectionately known as Irma.

RUSS. Asking your customers directly how well you have served them can provide useful feedback. PGCC's research office periodically includes a Research User Satisfaction Survey (RUSS) in its report distribution. This one-page instrument asks research users to rate (on a 1 to 5 scale) the relevance, timeliness, clarity, usefulness, and professionalism of the office's performance, and concludes with an open-ended question asking how the office could improve its service. However, as Zeglen (1994, p. 1) points out, customer satisfaction surveys are not sufficient by themselves:

> For example, a survey which met the general expectations held by the administrator who commissioned it could have methodological limitations in its sampling technique which would be viewed as a flaw in the larger milieu of institutional research professionals. So, customer satisfaction alone is *not* adequate as a monitor of the quality of institutional research work.

Staff Recognition and Incentives

To recognize research office staff accomplishments, and provide light-hearted incentives, PGCC's research office established four in-house award categories. Staff members are recognized for these achievements at a summer retreat, and on the bulletin board in the main office.

Team 90. To qualify for membership in Team 90, research staff must complete a minimum of 90 percent of the projects assigned to them during the year **and** complete at least 90 percent of their priority 1 and 2 projects by their target dates. Team 90 status is conferred at the end of the fiscal year based on project management system summary reports.

ERIC Publication. The Educational Resources Information Center (ERIC) sponsored by the U.S. Department of Education solicits institutional research publications for national dissemination through its on-line databases, its monthly abstract journal *Resources in Education*, the ERIC Document Reproduction Service, and its own publications such as the *ERIC Digest* series. The PGCC research office supports ERIC by submitting selected publications to the Clearinghouse each year. The decision to submit, made by the office director, is considered an honor for the report author(s). While nationally ERIC rejects half of the materials submitted to it each year, the PGCC research office has to date a 100 percent acceptance rate. Thus the office's decision, rather than ERIC's acceptance, is the locus of the honor. The director bases the decision to submit a report to ERIC on two criteria. First, will other institutions or researchers benefit from reading it? Second, does the report reflect well on the college and on OIRA in particular? To be useful to others outside PGCC, the report must include an adequate description of the context of the research and a clear explication of the methodology used. Thus many research and planning briefs do not qualify for consideration. Similarly, many projects are so county and college specific as to be of limited value to others. Beyond these considerations, however, is an assessment of report quality. The decision to submit to ERIC recognizes particularly thorough and well-written works by OIRA staff.

Century Club. The typical distribution of an OIRA report at PGCC is 25 to 30 copies. The president's staff and other members of the college wide Planning Council receive copies of all OIRA publications. Selected administrators, faculty, and staff with specific association with the report's content also receive copies. For cost containment reasons, other copies are printed and distributed by request only. Thus distribution above 25 or 30 copies is a measure of interest, and demand for, an office publication. To give formal recognition to this acknowledgment of a report's usefulness, the office has established *The Century Club*. An OIRA report that has circulation of 100 or more copies qualifies the author(s) for inclusion in the club. A listing of all reports meeting this standard is proudly displayed on the bulletin board in the main office.

EMI Awards. The ultimate measure of the effectiveness of institutional research is its contribution to institutional effectiveness, and the ultimate research team award is an EMI Award for achievements of Extraordinary Merit and Impact. The awards, polished stones on a black wooden base emblazoned "EMI," are crafted by the director and proudly displayed on staff members' desks. EMIs are reserved for the few projects that truly make an impact, as acknowledged by the college president, board members, outside organizations, or peer institutions. Typically, only one EMI is awarded each year, and in some years none is awarded. The director of institutional research determines if an award is deserved based on informal discussions with members of the president's cabinet and feedback from researchers and others external to the college. Projects earning EMIs are commonly the subject of conference presentations and often serve as models for studies at other colleges. While endorsement and replication by other institutions is important, the crucial factor is the impact on PGCC. Studies that successfully defuse sensitive political issues, resolve campus

controversies, and contribute to a better understanding of student performance are typical candidates. Because they are reserved for those special projects that have great impact, their award is usually an obvious choice. Office recognition as an EMI commonly follows multiple, unsolicited testimonials from policy makers who have found the work most useful.

Summary

Possessing knowledge of trustworthy information sources, technical data analysis skills, awareness of the external policy environment, and sensitivity to campus culture and personalities, the institutional researcher can be an invaluable member of the senior policy making staff. At many institutions, this represents a higher expectation than currently held for the research function. We have enumerated the high expectations an institution should hold for institutional research, and the kinds of support institutional research has a right to expect from its institution. An example of a performance monitoring system to promote productivity and effectiveness in institutional research was described. To realize the maximum contribution from an investment in institutional research, both the institution and the practitioner need to define high expectations and commit to their accomplishment.

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Development of a Computerized Student Tracking System At Harrisburg Area Community College

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Introduction

Successful educational outcomes and the measurement of these outcomes are vital to the effectiveness of Harrisburg Area Community College (HACC) in meeting its commitment to students. Since 1992, when the college focused its priorities around a student-centered learning environment, helping students to achieve their goals has been a standard of the college. The student tracking system (STS) which the college recently implemented builds upon HACC's prior assessment efforts and furthers the college's understanding of student goals, achievement, retention, and other outcomes that have not previously been available to college faculty and administrators. This will strengthen the college's ability to determine the degree of congruence between what it claims it does and what actually occurs in programs, classes, and instruction.

The establishment of a tracking system at the college was primarily the result of two factors. The first was institutionally based - HACC has long sought to obtain more information regarding student enrollment patterns and outcomes. The college has never completed systematic, longitudinal studies of students. While several studies that assessed student achievement have been completed, no tracking procedure over time was employed. Earlier works have generally provided only a "snapshot" of the student population at a specific time. The STS will provide on-going data of all students throughout their HACC career.

The second, and perhaps more compelling reason for instituting such a system, was the need to comply with pending governmental regulations. Specifically, a provision of the Student-Right-To-Know and Campus Security Act proposes that "all institutions that participate in the student financial assistance programs authorized by Title IV of the Higher Education Act of 1965" provide information on the completion and graduation rates of their students. The tracking regulation is tentatively scheduled to apply to all students entering between July 1, 1996 and June 30, 1997. Proposed regulations would require institutions to limit tracking to 150% of the normal completion time for graduation rates.

Given these two major factors for establishing a student tracking system, HACC expanded the tracking to include a comprehensive list of institutional outcomes in addition to graduation rates and indicators of students' activities after leaving HACC. Information gained from these studies will provide the basis for not only regulatory compliance but also serve as benchmarks when assessing programs and services at the college.

History

Student outcome information has existed in some form since the establishment of HACC. For the most part, when studies were completed they: 1) generally examined part of the student population; 2) obtained data on a limited number of factors, e.g. matriculation date, total credits carried, cumulative GPA, etc.; 3) were frequently conducted to meet requirements of external agencies; and 4) generally had little if any impact or long-term influence in the formulation and/or enactment of college policies, programs, or services.

However, while early studies of student enrollment patterns, outcomes, and post-HACC activities were limited in scope and generally did not result in any significant college-wide changes, they were not totally bereft of value. In gathering and analyzing admissions records, grade distributions, graduation rates, and other related matriculation, assessment and outcome data, HACC built a strong informational foundation.

Perhaps the most comprehensive efforts related to tracking students were associated with HACC's regional reaccreditation activities and on a smaller scale, faculty assessment of academic programs. During the two reaccrediting self-study periods in 1975 and 1985, an extensive amount of information was collected and analyzed. Some of the major areas examined were student enrollment progression, the degree of congruence between the institutional mission and actual outcomes, and post-graduation activities and satisfaction. Again, a myriad of variables, which are incorporated in the present tracking system, were examined but only as they applied to specific self-study charges and for a specific time. The college is currently completing another self-study in preparation for a 1996 Middle States Association visit.

The college's policy for assessment of academic programs calls for a review of each academic major every five years. Therefore, in any given year, approximately one-fifth of all programs may be under review. Extensive work is required in all reviews and the policy prescribes a number of "areas of inquiry" which mirror many factors contained in the tracking system. A sample would include a review of student academic success (e.g., course grades, GPA), enrollment and retention statistics, job placement and college transfer rates, graduation demographics, and completion rates.

Although the college has long recognized the value of a student tracking system, the lack of resources, both in terms of personnel and related support (e.g., computers) limited the start of a comprehensive tracking system. In the 1980s, HACC sought to enhance its institutional research function by supporting a full-time professional position to address this and other issues related to assessment and evaluation. A half-time assistant was also assigned to the Research Office. However, given the work demands made on the Research Office from both external and internal constituencies, no personnel were available to set up a tracking effort. Computer limitations also played a role.

The proposed mandates of the Student-Right-To-Know Act required HACC to move forcefully to implement a tracking system by 1990. The difficulties associated with promulgating final regulation gave HACC and other institutions additional time to consider how best to address the data requirements. In 1993 a college-wide reorganization placed the Research Office in the new Office of Planning, Assessment, and Faculty Development under the leadership of a newly created vice president position. Along with the reorganization, HACC adopted four college-wide priorities which resulted in the funding of 24 separate action plans. One was the funding of a research data specialist position who would be given the primary responsibility of implementing and administering a tracking system to meet not only regulatory requirements but also the needs of the college. It is from this history that this STS has evolved.

Purpose

The main purpose of the student tracking system is to assess the educational development of students and evaluate their patterns of progress. In contrast to traditional assessment measures used by the college, which provide a "snapshot" of student activity, the tracking system allows a longitudinal portrait of student outcomes. This perspective over time is especially important to community colleges because of the sporadic enrollment patterns of their students.

The impact of using a cross-sectional versus a longitudinal analysis of the student population can best be illustrated through an example. Suppose two students matriculated at the college in the fall 1990 semester. The first student attended part-time during the first two years, enrolling for six credits during the fall and spring semesters and three credits each summer, completing 30 credits by the Fall 1992 semester. The other student attended full-time during the fall and spring semesters but failed or withdrew from several classes during this time, completing only 30 credits by Fall 1992. Although each student had the same outcome in terms of the number of credits completed, the pattern of enrollment and the educational experience of each differed greatly. Prior to the creation of the student tracking system at HACC, the college could not determine how many students fell into these two types of patterns and how to best serve them.

One major difference between the STS and typical cross-sectional analyses is that the college can follow the course of individual students over time rather than simply for an isolated period. Although most of the information included in the STS was already available in the student data system housed on the mainframe computer, the data and resulting analysis from the tracking system are much richer because of the reorganization of the student database. Student history, rather than cohort history, will become the unit of analysis. For example, standard reports available from the college's Division of Computer Services show that 595 students enrolled as first-time, full-time degree students in fall 1987. As of fall 1993, 230 of these students had graduated, 27 were still enrolled, and 338 were no longer at HACC. About 40 percent of these students eventually graduated, but the paths they followed in graduating from HACC, transferring to other schools, or simply stopping their education are unknown. Establishing the tracking system now and enhancing the data collection allows the college to examine these student paths.

Other secondary functions rendered by the STS include such activities as reporting to meet federal and state mandates and responding to accountability issues from the college's local constituents. With the aid of the STS, the College can answer the following questions routinely:

- How does the retention rate for minority students compare to the retention for other students?
- Do students change their educational goals once they enter HACC? If they do, how often and when? Do they achieve their educational goals?
- In what manner does enrollment in remedial English/math courses affect student success in advanced courses?
- Does delayed entry into an academic program affect students' ultimate success in completing their degree?
- Do certain types of students enroll on an intermittent basis, and if so, what factors lie behind their sporadic enrollment?

Incorporating the answers to these and other similar questions into the routine reporting capacity throughout the college will promote a regular examination of the progress of students at HACC and identification of barriers to their success.

Besides the valuable assessment function the STS fills, another separate charge for the STS emanates from the federal government. Each year, the college must provide a limited form of tracking data to meet requirements for the Perkins Grant. In addition, proposed revisions to the Student-Right-To-Know law require all higher education institutions to follow the progress of new students to determine their graduation rate. Proposed regulations, as of September 1995, mandate that community colleges report the three-year graduation rates of firsttime students to potential and current students. With the tracking system in place, HACC will be able to easily and accurately generate the data needed to fulfill this mandate.

Description

A student tracking system is primarily a method to follow students as they enter, move through, and leave the college. The STS consists of a series of databases containing student demographic, educational, and outcome data by semester for different cohorts of students. Demographic and college data such as age, gender, ethnicity/race, academic program, previous education, etc., is downloaded from the mainframe into a PC-based database for new matriculants. After students complete their first semester at HACC, other educational indicators such as the number of credits attempted, the number of credits completed, financial aid received, etc., are entered into the database. This type of data is added to the database for each semester that students attend HACC.

Data Elements In The STS

Prior to the implementation of the tracking system, the Office of Institutional Research, working with administrators and faculty members, developed a final set of variables to be included in the system and created a data dictionary to define the variables and their values. The data dictionary ensures that the values of the variables remain constant over time, regardless of changes to application or registration forms, financial aid program revisions, etc.

Data included in the STS are organized around three separate stages of the student experience: entry, enrollment, and exit. Sample data elements are outlined in Table 1. The data for the entry stage are the easiest to collect and maintain because once the data are entered into the student tracking system, they are fixed and will not be changed. In contrast, during the enrollment stage, the same variables are collected for each semester in which a student is enrolled. However, the student information system on the mainframe is a dynamic system, in which information stored in the system is changed continuously (e.g., when students' addresses are changed, the initial address is not maintained). Therefore, it is important to capture the information on a continuous basis for the time period in which students are enrolled.

TABLE 1
STUDENT TRACKING FLOWCHART

ENTRY	ENROLLMENT	POST-HACC STAGE
- Inquire/learn about HACC. Develop interest - What do students hope to accomplish? - What background do students bring?	- Academic achievement - Persistence patterns - Graduation	- Did students meet educational goals? - Benefits of HACC education - Level of satisfaction with HACC
SAMPLE DATA ELEMENTS		
Social Security Number Gender Date of Birth Ethnicity/Race Employment (FT/PT, Unemployed, Other) Educational Goal High School Grad/GED Previous Education Standardized Test Scores Special Needs Veteran Status Zip Code Initial academic major Campus applied to Transfer credits	Academic Major Degree/Certificate/Diploma earned HACC credits attempted HACC credits earned Developmental Classes HACC Semester GPA HACC Total GPA Placement Test Scores Financial Aid/Scholarships Educational Goal Probation/Suspension Reinstated from Suspension Withdrawal Length of time out of school	Transfer status Employment status Achieved HACC goal Quality of HACC experience /Level of satisfaction Relationship of educational goal to current status Changes student would like /HACC strengths and weaknesses Reason for not returning? Other HACC classes Completion of BA/BS Transcripts requested

Most of the data necessary for the entry and enrollment stages are maintained in the student records system on the mainframe computer and are relatively easy to incorporate into the STS. However, some of the items are either not collected from students at the time of application and registration or are not routinely input into the mainframe system. For example, the registration form used by the college asks students about their educational goals but the responses are not entered into the student records on the mainframe. In addition, student disability status is not recorded on the mainframe system. These types of data are now entered manually into the tracking system from a review of individual student registration forms and college record keeping. A planned upgrade to the student information system on the college mainframe will allow for the automatic input of these and other variables.

Many data elements for the post-HACC stage are developed from surveys of graduates which occur 6 months and 24 months after students graduate. The responses are maintained by the college Office of Institutional Research (which is also responsible for managing the STS) and the responses are easily merged with the other data from the entry and enrollment stages through the student identification number.

Before fall 1995, students who withdrew from the college without graduating were not contacted. Since only about one of every nine students graduate, the college lacked vital information about student reasons for leaving HACC, whether students achieved their educational goal, and nonreturning students' transfer or employment status. Previous attempts to survey non-graduates were not effective in contacting all students and were expensive. In 1987, the college surveyed 1000 nonreturning students, but only a third responded to the survey. The group of 1000 students in 1987 represented only about one-fourth of the total number of non-returning students. The cost of mailing surveys to all nonreturning students is expensive but in order to determine the entire student experience at HACC, it is important to monitor these students and their activities for a short period after they leave HACC.

Another reason to survey nonreturning students occurred as a result of a statewide effort to identify patterns of community college enrollment. Working with the Pennsylvania Commission of Community Colleges and the network of 14 community colleges located throughout the state, all new matriculants who attend a community college for one fall semester, but do not return for the following spring and fall semesters will be contacted. In contrast to many four-year colleges and universities, community colleges face an overwhelming dilemma in retaining students and the purpose of the statewide survey is to determine how students apply their community college credits after leaving the colleges.

Structure of Tracking System

In establishing a student tracking system, it is important to remember that the databases involved are constructed based on the experiences of individual students. Therefore each record in the database will contain information on only one student and data entered into the tracking system must be linked by a unique student identification indicator. At HACC, the unique identifier is the student social security number.

Although all students could be included in the STS, the size of such a database would be immense. Tracking only fifteen data elements for an average of 10,000 students each year would result in a data base with almost *one million* data points within two years. In order to simplify the initial stages of student tracking and to meet the requirements of the Student-Right-To-Know Law, the college decided to include first-time students enrolled during the fall 1995, fall 1996, and fall 1997 semesters. (New matriculants in the fall semester represent about two-thirds of first-time students during the entire academic year.) Both full-time and part-time and degree and non-degree students are included and depending on the success of the tracking system for fall cohorts, spring cohorts of new students may also be added to the system. After some initial work with the tracking system, the Office of Institutional Research also decided to include the fall 1994 new matriculants as a separate cohort in order to provide more comparative data and to pilot this system..

As mentioned earlier most of the data needed for the tracking system exists on the college's mainframe student records system in a VSAM file structure. To create the tracking database, the college's Division of Computer Services wrote COBOL programming to identify all first-time students for the fall semesters and generated a EPCDC file containing the necessary demographic and educational data. The resulting file was stored on the mainframe and then downloaded by the Office of Institutional Research as an ASCII file. This file was then developed into a datafile using the SPSS for Windows, Release 6.1 statistical software.

Data for each cohort of new students will be maintained in a separate database to minimize the bulk of the final tracking. While this adjustment should decrease the processing time and complexity of the databases, the size of the database will still be large. As of September 1995, the combined database for the fall 1994 cohort contained 385 variables for 3,058 cases.

Each semester, the Division of Computer Services generates a data set which contains the data necessary to create each of the variables. In each semester these variables must be uniquely identified to permit a fixed "portrait" of the student during that semester without alteration based on future semesters. Data cells for students who do not enroll in a semester are blank.

The tracking system in place at the college as of September 1995 contained data for two cohorts of students: fall 1994 matriculants and fall 1995 matriculants. The college plans to include fall 1996 and fall 1997 matriculants in the tracking system. Information from the separate databases for each cohort will be used to determine patterns and outcomes both within and between cohorts. For example, student success in remedial courses can be examined for various cohorts, but can also be looked at along lines of race, age and educational ability within cohorts.

Over the course of 5-10 years, as new students enter and continue their enrollment at HACC, the majority of students will be included in the tracking database. By this time, the tracking system should be well established and the large size of the resulting database will be less of an impediment. Although including only first-time students at the onset of the tracking effort does not provide comparative data for all students, comparisons will be made after the second and third year of tracking. Until all students are included in the database, information from the tracking system will have to be supplemented with data from standard student information reports.

During the implementation of the tracking system, the Office of Institutional Research decided to make the STS as flexible as possible. However, although keeping the initial system small would ensure ease of use, it was also important to meet the information needs of college staff and faculty. Thus indicators other than those initially identified were added to the system. For instance, the coordinator of the Tech Prep program at the college requested that credits articulated from secondary vocational-technical schools be tracked. The resulting data will be used by the coordinator to compare the success of students who articulated prerequisite credits to the success of students who completed prerequisites at the college. In the future, gaps in the information on the system can be filled in as necessary as the tracking system evolves to address the College's requirements.

Based on a thorough review of the experience of other colleges and universities in initiating tracking systems, the college originally thought that 3-5 years would be an adequate time period to follow students. However at HACC, less than two-thirds of graduates complete their degree or certificate within 4 years while the average graduate requires over 5 years and a large number spend over 10 years to complete their degrees. A period of 4 years would provide coverage for about two-thirds of all students who will graduate, but a longer period of 8 or 10 years would be necessary given the enrollment patterns of many community college students. After consideration of these trends, the college decided to track new students for a continuous period of 5 years, and every other year thereafter for an additional 6 years. This 11 year period would provide enough time to allow many of the students to have graduated from HACC and/or transferred to other institutions. Of course, tracking for many students will require much less time since they will either graduate in less than five years or leave the college before this time.

Resources

Throughout the college, various offices and services collect data about students. Registration data and course grades are maintained by the Records Office, scholarship and financial aid information are kept by the Financial Aid Office, application information is collected by the Admissions Office, and transfer and employment status of recent graduates is collected by the Office of Institutional Research. Much of this data, but not all, is housed in the college's student information system on the mainframe. The tracking system itself is the responsibility of the Office of Institutional Research. The Office coordinates the collection of the data elements and maintains the databases. Other responsibilities include preparing and distributing periodic written reports on various topics.

To ensure the use of data from the tracking system, all segments of the college have been involved in the development of the system and have access to reports and recommendations resulting from the data. In addition, after the tracking system has been in use for a while, reports which link student outcomes to specific program areas will be provided to administrators, faculty, and counselors for their use in decision-making, assessment activities, and counseling. The usefulness of these reports will be assessed on a regular basis and if necessary, changes made to either the reports or the tracking system to improve the effective use of the data.

Most of the cost of implementing and maintaining the student tracking system involves the salaries of the persons developing and maintaining the system. Some computer programming time was necessary at the start of the project, but much less time is required since the initial programming was written. In addition, in order to quicken the computing and processing time, the personal computer used to maintain the tracking system was upgraded to an IBM-PC 330 - 466DX2 and it was necessary to purchase the SPSS for Windows, Release 6.1 statistical software package.

Conclusions

In order to effectively evaluate and monitor student academic outcomes, enrollment patterns, and post-college activities, the Harrisburg Area Community College developed a student tracking system. The system allows HACC administrators, faculty and staff to place student success at the forefront of their assessment efforts. The system will provide a wealth of information to be used at three different levels: 1) identifying success strategies for individual students; 2) assessing program outcomes; and 3) promoting HACC on a college-wide basis.

Seeking Academic Support Services On Two Campuses of Rutgers University

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Once American colleges and universities admit students with serious academic deficiencies (as they frequently do in the name of diversity or representativeness), they feel obligated to provide academic support services to help such students survive. First Year Student seminars, supplementary instruction classes, individual and group tutorials, study skill workshops, writing centers, learning centers, offices for advising and personal counseling, and "bridge" courses[1] are all widely available. Despite their diversity and ubiquity, little is known about how institutional support services are organized and utilized. This paper describes the operation of support services on two campuses of Rutgers University -- the very large main campus located in New Brunswick and the smaller campus in Camden.

Objectives

Assessments of academic support needs on both campuses were conducted to provide administrators with answers to certain basic questions: What kinds of help are needed and received? Where do students look for help? What students are most likely to seek help and receive it? Why don't students make greater use of institutional support services? These questions were first addressed on the main campus and then, a year later, on the Camden campus. The comparative perspective achieved by replicating the original study not only allows us to discern how the support systems are similar and distinctive but also helps us understand the impact of institutional size upon utilization of academic support systems.

Data and Methods

The data upon which this report is based come from three sources: student surveys, institutional records included on the Rutgers University Student Record Data Base, and semi-structured interviews with both students and support service providers on both campuses. Unfortunately, only brief reference to the interview findings can be included here. The survey instrument used for these studies was a self-administered questionnaire composed almost entirely of closed-ended questions. The questionnaire was mailed to a random sample of 1,100 students via the campus mail system on the main campus and through the US mail at Camden. There were four mailings in all. The response rates were: New Brunswick campus -- 64.1 percent; Camden campus -- 65.8%. On both campuses the samples accurately reflect the population as a whole except in that there is a slight over representation of females.

[1] Although bridge courses are of various types, they all attempt to ease the transition from high school to college for ill-prepared entering students.

The student bodies on both campuses are quite similar with regard to gender, citizenship, residence within New Jersey and EOF status. However, at Camden there are fewer Asian students (6 vs. 19 percent) and more white students (73 vs. 61 percent) than in New Brunswick. There are also many more older students at Camden (46% vs. 13%). Finally, the Scholastic Aptitude Test (SAT) scores of students on the Camden campus are lower than those of students in New Brunswick (Verbal: 500 vs. 450, Math: 580 vs. 510).

Research Sites

The two campuses are much more different than the two student bodies. The main campus, located in New Brunswick, is actually comprised of five campuses spread out on both sides of the Raritan River and connected by an extensive university bus system. There are four liberal arts colleges and 10 professional schools that provide undergraduate courses. The total undergraduate enrollment is 24,876 students, eighty-five percent of whom are full-time students, and approximately half of whom reside on campus. There are also more than eight thousand graduate students in New Brunswick. The administrative structure of the New Brunswick campus is multilayered and complex.

The Camden campus is a compact and attractive enclave of about fifteen square blocks located at the foot of the Benjamin Franklin bridge. The 3,599 undergraduates are enrolled in either the single liberal arts college or one of the two professional schools with undergraduate programs. One of three undergraduates studies part-time and less than 300 reside on campus. Camden students enjoy relatively small classes and relatively simple administrative arrangements.

The academic support systems on both campuses are similar in some respects. Both have state-funded Educational Opportunity Fund (EOF) programs and internally-supported Learning Resource Centers (LRC). The EOF programs provide comprehensive support services for low-income students. The LRCs offer tutoring and help in developing study skills to all undergraduates. Students on both campuses can also get help from academic advisors, counselors, librarians, computer center personnel and, of course, professors and teaching assistants. However, the New Brunswick campus has many more academic support programs than does the Camden campus. These include Writing Centers, bridge courses, and a variety of special programs for women and minorities in the math/science areas. At recent count there were 49 distinct such programs on this single campus.[2] The existence of so many distinct programs in New Brunswick creates a significant amount of confusion and duplication of effort.[3]

Findings

What kinds of help are needed and received? Students were asked to indicate with regard to each potential problem whether they (1) would have liked assistance, (2) received assistance or (3) required no assistance during the academic year. Column A of Table 1 shows that on both campuses there were many students who failed to get the help they would have liked. On the New Brunswick campus unmet need ranged from a high of 43 percent regarding "Making career choices" and "Mastering the material in one or more specific courses" to a low of 22 percent regarding "Understanding readings." In general smaller percentages of students

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[2] Richard A. Nurse, et. al., draft report, *Guide to Undergraduate Retention and Advancement Programs* (New Brunswick, N.J.: Rutgers, The State University of New Jersey, 1994).

[3] Robert J. Parelius, "Academic Support Needs at Rutgers University", (New Brunswick, N.J.: Rutgers, The State University of New Jersey, 1995).

on the Camden campus indicated that they wanted help but did not get it. Still unmet need did exist, and it ranged from a high of 42 percent regarding "Using computers" to a low of twelve percent regarding "Writing a paper." Other students on both campuses did find help as indicated in Column B. In almost all cases, however, the percentages of students with unmet needs for assistance exceeded percentages of those who did find it. Finally, Column C shows that substantial proportions of students, varying by specific academic problem from a low of 33.8 percent to a high of 78 percent, reported that they did not need help. Somewhat surprisingly, given their relatively low SAT scores, fewer students on the Camden campus indicated that they needed help. As measured by Cramer's V, there were statistically significant differences between campuses on all problems except library use.

TABLE 1

Kinds of Help Needed and Received by Campus
(In percent)

	New Brunswick				Camden				
	A	B	C		A	B	C		
Problem	Would have liked Assistance	Received Assistance	No Assistance was Required	(N)	Would have liked Assistance	Received Assistance	No Assistance was Required	(N)	Cramer's V
Making career choices	42.9	23.2	33.8	693	33.7	17.9	48.4	475	.146*
Mastering the material in one or more specific courses	42.9	17.0	40.1	693	33.8	14.8	51.4	476	.114*
Coping with stress	39.1	6.6	54.2	685	32.6	5.5	61.9	476	.076*
Using computers	31.2	33.7	35.1	693	42.8	23.7	33.5	481	.132*
Studying for tests	31.0	13.7	55.3	693	20.6	6.8	72.6	477	.180*
Using the library	23.5	33.5	43.0	691	25.6	36.8	37.7	479	.053
Solving mathematical problems	23.1	22.3	54.6	693	24.6	14.1	61.3	476	.104*
Writing a paper	22.9	17.1	60.0	687	19.6	11.6	68.8	478	.096*
Understanding readings	21.5	9.7	68.8	684	13.7	8.0	78.3	480	.109*

* P < .05

Where do students look for help? Help sources can be grouped into three distinct categories: (1) primary groups -- friends, informal study groups, and relatives; (2) Professors and Teaching Assistants who teach specific courses; and (3) institutional academic support services. Table 2 shows the frequency with which various sources of support were actually used by students. Large majorities on both campuses indicated that they turned to friends and members of informal study groups "Sometimes" or "Very Often." Professors were also major help sources on both campuses. Although relatively few students turn to professors frequently, most do seek help from professors occasionally. It is worth noting that in Camden, where class sizes are relatively small and Teaching Assistants relatively scarce, students more often look to professors for help. Undergraduate instruction is more often left to Teaching Assistants in New Brunswick, so it is not surprising that students on that campus rely on TAs more frequently. Librarians and relatives (both New Brunswick and Camden) and Computer Centers (Camden only) were the only other sources of assistance used by approximately half or more of the students. Students sought help from institutional support services relatively rarely. The data clearly indicated that on both campuses primary groups are the preferred sources of academic support; professors and TAs are secondary sources; while institutional supports services are sources of last resort.

TABLE 2

Frequency of Use of Support Sources by Campus
(In percent)

Support Source	New Brunswick				Camden				Cramer's V
	Very Often	Sometimes	Never	N	Very Often	Sometimes	Never	N	
Primary Group									
Friend	48.5	46.8	4.6	691	38.4	52.1	9.5	479	.125*
Informal study group	18.0	50.0	32.1	690	20.2	46.5	33.4	475	.037
Relative	10.9	37.1	52.0	691	6.5	33.0	60.5	478	.097*
Professor & Teaching Asst.									
Professor	9.9	67.9	22.2	691	19.3	70.5	10.2	479	.189*
Teaching Assistant	7.1	69.0	24.0	689	3.7	34.0	62.3	472	.385*
Institutional Academic Support									
A&S Dept. Advisor	2.1	24.0	73.9	690	2.7	19.9	77.1	477	.052
All other sources	9.5	6.9	81.6	171	11.3	6.6	82.1	141	.098
Computer Center	3.9	28.6	67.4	688	12.6	43.3	44.2	471	.248*
EOF program	3.5	5.9	90.6	687	5.0	5.6	89.4	472	.037
Formally organized peer study group	3.7	21.2	75.1	690	3.8	16.4	79.8	475	.060
Learning Resource Center	5.1	31.9	63.1	690	4.9	28.7	66.4	476	.035
Librarian	4.8	49.3	45.9	688	6.3	57.7	35.9	479	.101*
Math/Science Tutor	6.5	24.2	69.3	688	3.0	11.0	86.0	474	.192*
Student Life Dean/Counselor	2.5	28.8	68.7	691	0.7	20.8	78.6	478	.119*
Tutor that I paid myself	0.4	4.6	95.1	689	1.1	4.4	94.6	472	.044

* $P < .05$

What kinds of students need and receive help? To answer this question, two summated measures of need were constructed from responses to the nine academic problem areas listed in Table 1. The first summated measure, which measures the overall level of need.[4] The more assistance a student requires, the higher the student's value on this summated measure. The second summated measure was constructed to reflect the level of assistance received for students who indicated that they needed assistance in any of the nine academic areas.[5]

[4] For each of the nine academic problems listed in Table 1, a response of "no assistance was required" was coded as zero. A response of either "would have liked assistance" or "received assistance" received a value of one. Thus the summated measure varies from zero to nine.

[5] Students who indicated that they "would have liked assistance" are coded to have a value of zero for each of the nine academic problems considered. Students who selected "received assistance" are coded to have the value of one. The "no assistance was required" response is not included in this summated measure. Hence, this constructed measure also consists of values between zero and nine.

Table 3

Table of Means and Standard Deviations for Amount of Assistance

Factor/Category	*Assistance Required*			*Assistance Received*		
	Mean	Standard Deviation	N*	Mean	Standard Deviation	N*
Campus - Overall	**4.0**	**2.1**	**1,174**	**1.6**	**1.6**	**1,121**
Camden	3.8	2.2	484	1.5	1.5	454
New Brunswick	4.2	2.1	691	1.7	1.6	667
College GPA - Overall	**4.0**	**2.1**	**1,113**	**1.6**	**1.5**	**1,064**
< 2.0	5.1	2.0	106	1.7	1.7	104
2.0 - < 2.5	4.6	1.9	190	1.7	1.6	188
2.5 - < 3.0	4.4	1.9	282	1.7	1.6	279
3.0 - < 3.5	3.7	2.2	304	1.6	1.4	283
3.5 - 4.0	3.1	1.9	232	1.5	1.5	210
SAT - Verbal - Overall	**4.1**	**2.1**	**798**	**1.7**	**1.6**	**769**
< 39	4.7	2.3	102	2.0	1.9	100
40 - < 49	4.5	2.1	327	1.6	1.5	320
50 - < 59	3.8	2.0	276	1.6	1.5	263
60 - < 69	3.4	1.8	86	1.5	1.4	83
70 - 80	2.4	2.5	6	0.3	0.6	4
SAT - Math - Overall	**4.2**	**2.1**	**814**	**1.7**	**1.6**	**785**
< 39	5.7	2.1	43	1.9	1.9	41
40 - < 49	4.4	2.0	163	1.7	1.6	161
50 - < 59	4.3	2.1	311	1.8	1.5	301
60 - < 69	3.7	2.1	239	1.4	1.5	226
70 - 80	3.7	1.7	58	1.5	1.3	56
Race/Ethnicity - Overall	**4.0**	**2.1**	**1,148**	**1.6**	**1.6**	**1,095**
African American	4.7	2.1	121	2.0	1.8	119
Asian	4.8	2.0	158	1.6	1.6	158
Latino	4.8	2.2	76	1.8	1.7	76
White	3.7	2.1	758	1.6	1.5	710
Other	4.3	2.2	34	1.1	1.5	32
Family Income - Overall	**4.1**	**2.1**	**1,071**	**1.6**	**1.6**	**1,027**
< 20,000	4.8	2.2	184	1.9	1.7	179
20,000 < 40,000	4.3	2.2	222	1.6	1.6	216
40,000 < 60,000	3.9	2.0	246	1.5	1.5	239
60,000 < 70,000	4.1	2.0	167	1.6	1.5	160
70,000 < 100,000	3.6	1.9	121	1.6	1.6	115
> 100,000	3.6	2.1	132	1.6	1.5	190
EOF Recipient - Overall	**4.0**	**2.1**	**1,174**	**1.6**	**1.6**	**1,121**
Yes	5.2	2.1	94	2.0	1.8	93
No	3.9	2.1	1,080	1.6	1.5	1,029
Gender - Overall	**4.0**	**2.1**	**1,174**	**1.6**	**1.6**	**1,121**
Female	4.3	2.1	687	1.7	1.6	664
Male	3.7	2.1	487	1.5	1.5	458
College Class - Overall	**4.0**	**2.1**	**1,149**	**1.6**	**1.6**	**1,097**
First-Year	4.3	2.2	419	1.7	1.6	400
Sophomore	3.9	2.0	393	1.5	1.5	374
Junior	4.0	2.0	231	1.6	1.6	223
Senior	3.9	2.1	106	1.8	1.6	101
Mother's Education - Overall	**4.1**	**2.1**	**1,160**	**1.6**	**1.6**	**1,109**
Elementary or Middle School	4.5	2.1	81	1.8	1.7	79
High School	3.9	2.2	432	1.6	1.5	407
Some College	4.4	2.0	235	1.8	1.8	227
College Graduate	4.1	2.1	277	1.6	1.5	267
Graduate or Professional School	3.8	2.0	136	1.5	1.5	128
Father's Education - Overall	**4.0**	**2.1**	**1,155**	**1.6**	**1.6**	**1,102**
Elementary or Middle School	4.5	2.8	92	1.7	1.7	86
High School	4.0	2.2	326	1.5	1.6	307
Some College	4.1	1.1	182	1.6	1.6	178
College Graduate	3.9	2.2	295	1.5	1.4	280
Graduate or Professional School	4.0	2.0	261	1.8	1.6	250
Traditional/Non-Traditional Students - Overall	**4.0**	**2.1**	**1,174**	**1.6**	**1.6**	**1,121**
< 25	4.2	2.0	863	1.6	1.6	834
>= 25	3.7	2.2	311	1.5	1.6	287

* Individual level Ns may not add to overall N due to weighting.

Table 3 shows the means and standard deviations of both summated measures of assistance for various academic and background variables. These variables include high school achievement indicators: SAT-Verbal and SAT-Math; college factors: College GPA, EOF Recipient, College Class, and Traditional College Age; and selected background characteristics: Race/Ethnicity, Family Income, Gender, and Mother's and Father's Education. Table 3 also contains the means for the Camden and New Brunswick campuses.

The means for these two summated variables (i.e., the level of assistance required and received) are 4.0 and 1.6, respectively. Distinguishing between the campuses, we see that the Camden campus has lower means on both assistance variables (3.8 and 1.5, respectively) than the New Brunswick campus (4.2 and 1.7, respectively). Differences in the means of these summated measures for the various categories of the variables listed in Table 3 are in the expected direction.

Two-way factorial analyses were computed on both summated measures of assistance for the campus variable and all academic and background variables listed in Table 3. No interaction effects are found to exist between campus and the various academic and background characteristics. However, main effects on the assistance required measure are significant for all variables except Father's Educational Level. Main effects on the assistance measure received are similarly significant for the following factors: SAT-Verbal, SAT-Math, Race/Ethnicity, and EOF Recipient.[6] Main effects for campus also exist when it is entered with many of the academic and social characteristics on both assistance measures.[7]

But what are the unique effects of these various factors on the level of assistance required and received? To address this concern, the various academic and background factors, along with the campus variable, were entered into simultaneous regression models for both assistance measures. These results are listed in Table 4. We see that Campus no longer has a significant effect on either the level of assistance required or received. College GPA and SAT-Verbal are negatively related to the amount of assistance required. In addition, students who are white, come from higher income backgrounds, and are of traditional college age have less need for academic assistance.

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[6] Effects are significant at the .05 level.

[7] Main effects on assistance required for campus were not significant when entered with SAT-M and Race/Ethnicity; main effects on assistance received were not significant for campus when entered with College GPA, Race/Ethnicity, College Class, and Traditional College Age.

TABLE 4

Regression Estimates for Models Predicting Level of Assistance Required or Received

Explanatory Variables	Level of Assistance Required B	Beta	t	Level of Assistance Received B	Beta	t
Campus	-0.30	-0.07	-1.54	-0.29	-0.08	-1.74
College GPA	-6.78	-0.22	-5.68 *	-6.74	-0.03	-0.68
SAT-Verbal	-0.03	-0.14	-3.20 *	-0.01	-0.06	-1.32
SAT-Math	-0.01	-0.05	-1.04	-0.01	-0.06	-1.16
Asian	-0.24	-0.04	-0.54	0.46	0.11	1.25
African American	-0.65	-0.09	-1.39	0.87	0.17	2.3 *
Latino	-0.69	-0.10	-1.46	0.53	0.10	1.36
White	-0.83	-0.20	-2.01 *	0.61	0.19	1.81
College Class	-0.04	-0.02	-0.42	0.03	0.02	0.36
EOF	0.18	0.03	0.62	0.17	0.03	0.70
Family Income	-0.15	-0.12	-2.65 *	-0.02	-0.02	-0.43
Mother's Education	0.09	0.05	1.11	-0.13	-0.10	-2.04 *
Father's Education	0.06	0.04	0.89	0.18	0.15	3.15 *
Traditional College Age	0.43	0.06	1.49	0.49	0.08	2.04 *
Gender	0.59	0.14	3.96 *	0.12	0.04	0.96

* P < .05

On the other hand, the introduction of these variables in a model predicting the assistance received measure results in significant effects for Mother's and Father's Educational Level, Traditional College Age, and African American Background. Moreover, coefficients for Mother's and Father's Educational Level reveal that there is a positive relationship between the level of assistance received and Father's Educational Level but a negative relationship when the unique effect of Mother's Educational Level is considered. Thus a conclusion to be drawn from this analysis is that the need for assistance is less among white, economically advantaged, traditionally aged students; and that it is African American; educationally advantaged, as determined by Father's Educational Level; and Traditionally Aged students who are more likely to receive assistance when needed.

Why don't students make greater use of institutional academic support services? Virtually all students on both campuses asserted that sometimes, "I decided to deal with the problem on my own" (see Table 5). Clearly the old-fashioned virtue of self-reliance remains strong at Rutgers University. However, this response tells us nothing about possible shortcomings in the academic support network. Strong majorities on both campuses indicated that other factors sometimes influenced their decision not to utilize institutional support services. Inconvenience in time was frequently cited as an obstacle on both campuses. Inconvenience of location was a major problem on the sprawling New Brunswick campus, but much less of a problem on the compact Camden campus. Approximately three of four students on both campuses reported that they sometimes did not seek institutional help because they did not know where to find it. Many students on both campuses had doubts at times about the effectiveness of institutional services (less so at Camden than New Brunswick) and about the willingness of support providers to help individuals like themselves. It seems that there is plenty of room for improvement in the academic support networks on both campuses.

TABLE 5

Reasons for Not Using Institutional Support Services by Campus
(in percent)

Problem	New Brunswick A All or Most of the Time	New Brunswick B Some of the Time	New Brunswick C Never	New Brunswick (N)	Camden A All or Most of the Time	Camden B Some of the Time	Camden C Never	Camden (N)	Cramer's V
Decided to deal with the problem on my own.	79.8	18.4	1.8	688	77.7	19.0	3.3	481	.066
Services were not at a convenient time.	27.8	51.2	21.0	682	29.8	43.4	26.8	474	.084*
Did not know where to get the help needed.	20.0	58.0	22.0	687	17.0	53.7	29.3	481	.087*
Reluctant to seek help.	24.2	48.3	27.5	687	18.5	42.3	39.2	470	.126*
Did not feel academic support services would be helpful.	24.2	46.6	29.1	685	16.6	40.1	43.2	477	.159*
The services were not conveniently located.	15.8	47.6	36.6	678	6.3	27.0	66.7	472	.298*
Some "helpers" have bad attitudes toward students like myself.	9.2	34.7	56.1	666	10.8	26.2	63.0	460	.101*

* P < .05

Insights from Student Interviews

Few students, even very weak ones, see their undergraduate experience as their last best chance to remediate academic deficiencies. Rather they think in terms of surmounting institutional obstacles en route to jobs.

Entering students, especially those from inner-city schools, often suffer from reality shock. Because grade inflation is a serious problem in schools serving our poorest neighborhoods, good high school students frequently find themselves assigned to remedial and developmental courses. The degradation engenders denial with the result that deficient students often delay seeking help and resist institutional efforts on their behalf. One student put it well, "As a first year student, especially if you were at the top of your class, you don't want to admit that you can't do this by yourself. I knew it was okay to get help, but you just don't want to." In addition many entering students find the scale and complexity of the New Brunswick campus overwhelming. They are told about the various academic support services, but they are frequently confused about their eligibility for certain programs as well as about the kind and quality of services available.

Soon weak students begin to focus on academic survival. Usually their aspirations for professional careers are rather quickly dashed. Rather than doing everything to strengthen their academic weaknesses, they reluctantly abandon their career goals. Rejecting the idea that tough courses are good for you, students who are weak in writing look for courses that do not require papers, and students with weak math skills avoid quantitative courses. One student remarked, "I don't want to take the required courses, because I know they will hurt my grade

point average." They adopted what Becker[8] called a "GPA perspective" in which the search for satisfactory grades (variously defined) took precedence over strengthening basic academic skills, or more broadly, intellectual development.

With the significant exception of students planning to enter graduate or professional schools after graduation, the students' grade point average perspective was strictly related to satisfying institutional academic requirements for graduation, rather than on enhancing employment opportunities. Students on both campuses believed that future employers are not at all interested in grade point averages. Thus, most undergraduates did not see future employment as tied to remediation of academic weaknesses.

Conclusions

There are more similarities than differences between campuses on the issues explored here. On both campuses more students failed to get help than received it. In both cases students turned first to informal primary groups, then to professors and Teaching Assistants, and, finally, to institutional support services. When overall academic need is considered, we find that campus differences are statistically insignificant when we control for various academic and social characteristics. However, we do find that need is greatest among nonwhite, economically disadvantaged, and nontraditional aged students. Among those students who require such aid, students who are of traditional college age, have fathers that achieved academically and are African American are more likely to receive assistance. Finally, the reasons students cite for not making greater use of institutional support services are quite similar in Camden and New Brunswick.

[8] Howard S. Becker, Blanche Geer and Everett C. Hughes, *Making the Grade: The Academic Side of College Life* (New York: John Wiley and Sons, 1968).

Correlates of Students' Ratings of Their Own Abilities and Characteristics

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Each year thousands of students entering colleges and universities across the nation perform the ritual of reporting on their families and their personal activities, goals, values, and self-assessments to the Cooperative Institutional Research Program (CIRP). We analyzed the responses of over 15,000 students at more than forty private/independent institutions which participated in this enterprise in the Fall of 1994. We will call these institutions "the group".[1]

In the present exercise we shall examine five of the nineteen self-ratings that these students provided—their ratings[2] of their

- academic ability
- intellectual self-confidence
- social self-confidence
- popularity
- emotional health.

We shall first consider how students at these institutions rate themselves compared to students in general and then look at how different types of students may differ in their perceptions of themselves. In concluding the paper, we will examine the most powerful predictors of students' self-ratings in each of these areas.

According to William Korn of the Higher Education Research Institute,[3] these relationships have not been examined previously. Our hope in presenting this paper is that we can shed some light on the phenomena which influence students' self-perceptions and that this will be helpful in assessment, retention, and student personnel efforts to assist students in succeeding in college.

These students generally regard themselves as above average, although they assess their academic abilities and emotional health more highly than the other three areas (Table 1). Entering students in this group of institutions are generally very similar to those in the general population of four-year institutions (Table 2).

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[1] The "group" consisted of three two-year colleges (n=451), fourteen four-year colleges (n=3163), twenty-one comprehensive universities (n=6634) and six doctoral/research universities (n=5163). All were included as "norm" institutions in *The American Freshman: National Norms for Fall 1994* (Los Angeles: Higher Education Research Institute, University of California, 1994).

[2] See the methodological appendix for the scales used for these self-ratings.

[3] Personal communication.

Table 1: **Selected Self-Ratings of Students Entering "Group" Institutions (1994)**

	Academic Ability	Intellectual Self-confidence	Social Self-confidence	Popularity	Emotional Health
Highest 10%	19%	16%	12%	6%	19%
Above Average	50	41	35	32	37
Average	30	37	42	56	38
Below Average	1	6	12	6	6
Total	*100%*	*100%*	*101%*	*100%*	*100%*
Average rating	3.86	3.67	3.45	3.38	3.80

Table 2: **"Group" Ratings Versus All Four-Year Institutions**[4]
Percentages with ratings of "Above Average" or "Top 10 Percent"

	Academic Ability	Intellectual Self-confidence	Social Self-confidence	Popularity	Emotional Health
"Group"	69%	57%	47%	38%	56%
All 4-year Inst.	68%	58%	49%	40%	58%

Men versus women.

Men rated themselves higher than women did in all five areas (Table 3). The differences were most pronounced in the intellectual areas, where, indeed, men had higher combined SAT scores (by some 43 points), while the women had significantly higher grades in high school.

Table 3: **Percentages with High Self-ratings**[5] **and High Performance Levels by Sex**

Self-rating of:	Men	Women
Academic ability	24%	15%
Intellectual self-confidence	23	11
Social self-confidence*	54	41
Popularity*	49	31
Emotional health	25	15
SAT scores 1100 plus	39	31
High school g.p.a. A+/A/A-	39	44
*Percentage with self-ratings of "In top 10 percent" unless marked with an asterisk; asterisk indicates "above average" rating.		

4 The unweighted average of CIRP norm reports for "all four-year colleges" and "all universities."

5 All differences noted are at the .001 level of statistical significance unless noted otherwise.

Race/ethnic group differences.

Academic Ability: Whites rated themselves higher than Blacks and Hispanics on academic ability and also had higher high school grades and SATs. Asians rated themselves higher than Blacks and also had higher high school grades. Asians' SATs were higher than Blacks' or Hispanics'. All groups had higher high school grades than Blacks.

Intellectual Self-confidence: Blacks had higher intellectual self-confidence than either Whites or Asians. Whites and Hispanics had higher scores than Asians.

Social Self-confidence and Popularity: Blacks rated themselves higher on both popularity and social self-confidence than each of the other three groups. Hispanics were also higher on the latter than either Asians or Whites.

Emotional Health: Hispanics have the highest scores on emotional health and were signifcantly higher than Asians.

Type of institution.

Students in the research/doctoral universities rated themselves higher on academic ability, intellectual self-confidence and emotional health than did their peers in the three other types of institutions. Doctoral university students also had higher high school grades and SATs than the students in the other types of institutions. Students in the comprehensive and four-year institutions rated their academic abilities higher than students in the two-year institutions and their high school grades and SATs parallel that difference, as well. Students in the comprehensive institutions also rated themselves higher than four-year and two-year institutions on intellectual self-confidence and emotional health. Two-year and four-year students did not differ on social self-confidence, popularity, or emotional health.

Further exploration of the intellectual dimension.

Self-ratings of academic ability and intellectual self-confidence are moderately correlated: $r=.48$. SATs and high school grades have identical correlations with students' assessments of their academic abilities.

The correlation between SAT scores and self-ratings of academic ability is considerably higher than the correlation that the College Board reports[6] between SAT scores and freshman grades (Table 4). Intellectual self-confidence is much less strongly correlated with SAT scores and high school grades than are self-ratings of academic ability. Self-confidence seems to be grounded in something other than traditionally-measured ability and academic performance.

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[6] College Entrance Examination Board, *Admission Officer's Handbook for the SAT Program* (New York: College Entrance Examination Board, 1995). The coefficients reported here are the medians from the 685 institutional studies that were reported for the SAT test.

Table 4: **Correlations between Measures of Academic Ability/Confidence and Performance** (Pearson's product-moment coefficients)

	SAT Scores	H.S. GPA
Self-rating: Academic ability	.58	.58
Self-rating: Intellectual self-confidence	.34	.26
Freshman g.p.a. (C.B. data)	.42	.48

More than half of the variance in self-ratings of **academic ability** can be accounted for by fifteen variables (Table 5).[7] Especially noteworthy are the positive effects of traditional academic/intellectual characteristics—high school grades, SAT scores, and math and writing abilities. Most other self-ratings which are positively correlated with self-ratings of academic ability present few surprises, with the notable exception of the **negative** effect of hours spent in exercising/sports[8] and the **positive** effect of having divorced parents[9]. All else being equal, men have higher opinions of themselves than do women.

We do somewhat less well in explaining **intellectual self-confidence**. Thirteen variables explain only forty-one percent of the variance in this rating. After the introduction of ratings of public speaking ability, emotional health, math and writing abilities, high school grades and SAT scores have less than half the effect that they have in the prediction of students' ratings of their academic ability. Conversely, a student's sense of his or her physical appearance has twice the impact on intellectual self-confidence that it does on the self-assessment of academic ability. The difference in beta weights for sex suggests that the intellectual self-confidence of men is inflated beyond what objective measures would justify even more than was the case with their reports of their academic abilities. While their influence is small, but significant, it is of note that Catholic students have lower intellectual self-confidence than students of other religions and that parents' income is negatively related to the self-rating of intellectual self-confidence.

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[7] All multi-variate analysis of these data is performed via stepwise, forward inclusion, OLS regressions. The level of statistical significance for inclusion in all models was set at .001.

[8] It is conceivable, although not verifiable that there were sufficient recruited athletes in the database to cause this effect. They may devalue their scholastic abilities because of the attention to their physical abilities.

[9] This relationship is no doubt due to collinearity of the "divorced parents" variable with some other factor which we were unable to isolate. The largest correlations we found were with income (-.26), attendance at religious services (-.16), race=Black (.15), Catholic (-.13), father's education (-.12), and combined SATs and high school g.p.a. (both about -.10).

Table 5: **Significant Predictors of Intellectual Self-ratings**
(standardized beta weights)

	Academic Ability	Intellectual Self-confidence
High school GPA	.306	.094
SAT scores (V+M)	.241	.093
Self-rating: Mathematical ability	.239	.147
Self-rating: Writing ability	.153	.134
Male	.058	.122
Self-rating: Physical appearance	.058	.129
Self-rating: Leadership ability	.054	.104
Hours exercising/sports in h.s.	-.051	-.043
Self-rating: Physical health	.042	
Self-rating: Artistic ability	.039	
Self-rating: Public speaking	.038	.232
Tutoring another student	.032	
Hours reading for pleasure in h.s.	.031	.069
Hours studying in h.s.	.030	
Parents divorced	.028	
Self-rating: Emotional health		.156
Parents' income		-.052
Catholic		-.033
Adjusted R^2	.561	.407

Note: see Methodological Appendix at end of paper for complete listing of independent variables included in the step-wise regression equations.

Non-intellectual areas.

Social self-confidence.

While intellectual and social self-confidence are moderately inter-related (r = .53), non-intellectual phenomena appear to have the most influence on a student's social self-confidence (Table 6). Indeed, SAT scores are negatively associated with such self-confidence once other variables are taken into account. Public speaking ability is the most important contributor to social self-confidence, followed closely by emotional health and physical appearance, which have nearly equal weights.[10]

[10] The causal relationship between social self-confidence and public speaking ability is not likely to be uni-directional. Intellectual self-confidence was not included in this regression because we viewed it as part of a generalized "self-confidence" factor (albeit a weak one). When it is included it becomes the strongest predictor (with a beta-weight of .324), decreases the weight of physical appearance to .188, and

Table 6: **Best Predictors of Non-intellectual Self-ratings**
(standardized beta weights)

	Social Self-confidence	Popularity
Self-rating: Public speaking ability	.241	.148
Self-rating: Emotional health	.224	.077
Self-rating: Physical appearance	.221	.295
Self-rating: Leadership ability	.178	.188
Hours partying in h.s.	.097	.131
SAT Scores (V+M)	-.088	
Hours socializing in high school	.055	.088
Self-rating: Physical health	.044	.113
Hours watching TV in h.s.	-.055	
Hispanic	.031	
Hours reading for pleasure in h.s.		-.056
Male		.036
Adjusted R^2	.426	.402

Popularity

Popularity and social self-confidence are moderately inter-related; the correlation is .53. It is undoubtedly a reciprocal relationship—the popular are self-confident socially and the self-confident (if not the cocky) are liked by others.[11]

Nine variables account for forty percent of the variance in these students' ratings of their own popularity. Students' assessments of their physical appearance are the most powerful predictors of self-rated popularity, followed by their ratings of their leadership abilities (again, there is probably a reciprocity at work between leadership and popularity). Public speaking ability and social activity (socializing, partying) also contribute strongly. Reading for pleasure weighs against popularity, once other factors are taken into account.[12] Men seem to consider themselves more popular than women. The word from these students appears to be: if you want to be popular, spiff yourself up, sharpen your rhetoric, and get out and boogie.

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pushes public speaking ability to fourth place at .155.

[11] Or, since these are self-ratings, the deluded are likely to have their delusions carry into related domains of their lives.

[12] It is unlikely that reading for pleasure *per se* produces this effect; it is more likely that the less-popular retreat into reading.

Emotional Health

Emotional health may be the most important of these characteristics for ensuring a happy and productive future, although we do least well in explaining it. Students who rate their emotional health relatively low are somewhat more likely to report depression (r = -.38). Physical health and social self-confidence contribute most to emotional health, but intellectual self-confidence also has a salutary effect (see Table 7). The children of divorced parents, especially women, seem to be somewhat less emotionally upbeat than their peers, as are those who have lost one or both parents.

Table 7: **Best Predictors of Emotional Health**
(standardized beta weights)

	Total	Women	Men
Self-rating: Physical health	.282	.301	.243
Self-rating: Social self-confidence	.228	.231	.231
Self-rating: Intellectual self-confidence	.106	.086	.109
Self-rating: Leadership ability	.097	.091	.102
Divorced parents	-.063	-.067	
Self-rating: Math ability	.048	.051	
One/both parents deceased	-.037		
High school g.p.a.			.078
Parents' income			.065
Adjusted R^2	.299	.289	.280

The effects of self-assessments on aspirations and expectations.

Without follow-up data, we can't learn very much about what the effects of differential self-assessments are on the later behavior of these students. These self-ratings do not go very far toward explaining aspirations for advanced degrees, or expectations of failing a course or of requiring additional time to complete a degree—less than ten percent of the variance in each of these outcomes was explained by regression models that included four to ten statistically significant variables. A regression model attempting to explain students' expectations of receiving at least a "B" average in college explained seventeen percent of the variance with six variables.[13] A model which explored predictors of students' expectations of graduating from college with honors explained twenty-eight percent of the variance with fourteen variables. One-third of this was explained by self-rated academic ability and intellectual self-confidence; one-fifth by SATs and high school grades. The remainder was explained primarily by other

[13] Self-ratings of academic ability and high school grades together accounted for more than a third of this total. Self-ratings of public speaking, writing ability, and intellectual self-confidence together account for most of the rest.

"intellectual" variables such as their assessments of their math and writing abilities and the amount of studying and reading these students did in high school.

Discussion of the findings.

Among a set of students which is in many ways representative of the general population of entering college students, self-assessments of various intellectual abilities and reports of intellectual self-confidence are strongly related to students' ratings of their specific abilities (math, writing), to test scores, and to secondary school grades. Math abilities count substantially toward students' general appraisals of their academic abilities, while writing skills are as important as math skills in producing intellectual self-confidence. SAT scores and high school grades have approximately equal effects on both of these intellectual self appraisals. Women tend to downgrade their abilities and have relatively lower self-confidence than their assessments of their specific abilities and objective indicators of ability would warrant. Our models were better at explaining self assessments of academic ability than they were in explaining intellectual self-confidence, which is undoubtedly a more complicated matter.

Intellectual and social self-confidence are moderately inter-related. Among this group, however, physical appearance is the single most powerful predictor of a person's assessment of his or her own popularity. Non-academic well-being is largely a function of non-intellectual phenomena. Indeed, after the introduction of other variables, SAT scores are negatively associated with social self-confidence. Not surprisingly, socializing contributes significantly to development and accomplishment in these areas. Emotional health, arguably the most important quality for effective long-term functioning, is largely a function of social accomplishment. Intellectual qualities also have positive effects, albeit more modest. No racial/ethnic or gender effects were observed for self-rated emotional health. The effects of divorce are particularly noteworthy and possibly most amenable to institutional initiatives. Faculty should be as aware of these complex foundations for well-being as student personnel tend to be.

Perhaps the most definitive conclusion one might draw from these explorations is that students' assessments of their academic/intellectual abilities are far more consistent with their self-ratings of other intellectual and academic factors and with objective measures of intellect than are their assessments of their self-confidence or self-image. Their self-confidence is considerably less consistent and coherent than their recognition of their academic ability.

Descriptive Appendix

Sex	
Men	40%
Women	60%
Race/ethnic group	
Asian	6%
Black	3%
Hispanic	8%
White	80%
Other	3%

Average High School g.p.a.	B+
Average Test Scores	
Verbal SAT	504
Math SAT	552
ACT	25
Average parental income	$50,000 - 59,999

Methodological Appendix

The following variables were entered into the regression equations, first as a complete set and then in a stepwise forward entry. The latter used a .0001 criterion for entry due to the enormous size of the data set. Unless noted otherwise, the variables listed here were included in all regression models.

Self-ratings of:
Academic ability
Artistic ability
Mathematical ability
Leadership ability
Popularity*
Intellectual self-confidence*
Social self-confidence*
Physical appearance
Public speaking
Physical health
Writing ability

The scale for the self ratings was:
"as compared with the average person of your age":
5=Highest 10%
4=Above Average
3=Average
2=Below Average
1=Lowest 10%

Activities in high school:
Religious service attendance
Tutoring another student

Hours per week in high school:
Studying or doing homework
Socializing with friends
Talking with teachers outside of class
Exercising or sports
Partying
Student clubs and groups
Watching TV
Reading for pleasure

Race (dummy variables)
Asian, Black, American Indian, Hispanic (Mexican American/Chicano, Puerto Rican, other Latino), Other; White was omitted category

Parents' birthplace
Mother foreign
Both foreign

Student's birthplace
Foreign

Total SAT scores We converted ACT scores to SAT equivalents when SATs were not available.

H.S. Grade Point Average

Parents divorced

One or both parents deceased

Religion
Catholic, Jewish, Protestant, Other religion; "no religious affiliation" omitted

Born again Christian?

Parents' income

Father's education
Mother's education

Dummy variables for Carnegie classifications of institutions

* Not included in Tables 5 or 6.

The Use of Placement Test Scores and Other Enrollment Data in Identifying Early Leavers from Community College

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For the past two decades, a number of different types of research studies have attempted to identify predictors of persistence and retention in college. Some of these studies, such as the application of Tinto's (1975) model, have employed causal modeling by incorporating a host of different exogenous and endogenous variables to explain the persistence of college students. Tinto (1975) synthesized the research on dropping out from higher education. He discussed academic and social integration as Durkheimian constructs that influence whether or not a student remains in college after they have committed to achieving the goal of completion. A number of studies since Tinto's (1975) work have shown academic performance to be the best predictor of persistence in college. While a student's decision to remain in college may also be affected by the student's social integration into the college's social system, social integration may play less of a role in community colleges since students commute to school and do not expect as much social activity on campus. As discussed by Mallette and Cabrera (1990), Tinto (1987) found that when analyses were performed separately by transfers and dropouts, estimates of withdrawal decisions changed.

More recently, while more comprehensive models of student retention have been proposed (see, for example, Cabrera, Nora and Castenada, 1993), other researchers such as Feldman (1993) and Revelt (1994) have attempted to identify predictors of persistence and dropping out of school. Feldman (1993) studied factors associated with one year retention at Niagara County Community College. She found that students with low high school grade-point averages are more likely to dropout. Revelt (1994) also used pre-enrollment variables to predict persistence. Scholastic Aptitude Test (SAT) scores were found not to be statistically significant.

In the absence of many pre-enrollment variables collected at Rockland Community College, it was the purpose of the present investigation to use placement test scores (in Reading, Writing, Arithmetic, and Algebra), GPA (grade-point average), number of credits completed, transcript request status, and enrollment status (graduated from high school or early admission student, General Equivalency Diploma (G.E.D.) student, or did not graduate from high school) as predictors of college persistence or early withdrawal among freshmen at Rockland Community College after one semester and then after two semesters.

Both cognitive and noncognitive factors have been identified as predictors of persistence in college. The factors used in the present study could be related to both cognitive and noncognitive forces. For this reason, a brief review of noncognitive predictors of persistence is presented.

House (1993) found that the most significant predictor of school withdrawal was a student's self-concept of their overall academic ability. Along the same line of research, Pickering et al. (1992) studied the usefulness of 16 noncognitive factors as predictors of academic difficulty and success after the first year and attrition or retention into the second year. In quite a similar study to the one proposed herein, Boese et al. (1990) examined the relationship between academic success and basic skills, educational background and demographic characteristics at Sacramento Community College. While ethnic background was

not examined in the present study, Boese et al. (1990) found that English and Reading scores varied significantly between ethnic group as did cumulative GPA and persistence.

Method

One thousand four hundred and thirty-nine first-time students who enrolled at Rockland Community College in the Fall 1994 semester were tracked for three semesters. The majority of students were required to take placement tests in Reading, Writing, Arithmetic and Algebra. Placement test scores substituted for pre-enrollment test scores such as the SAT. Other information collected about the student were number of credits completed and GPA for the Fall 1994 semester, number of cumulative credits completed and GPA for the Spring 1995 semester, part-time/full-time status and enrollment status. Also collected was whether or not the student sent a transcript to another educational institution. Retained or not retained for a second or third semester, respectively, was used as the dichotomous dependent variable in separate multiple and logistic regression analyses with placement test scores, credits completed after one and two semesters, GPA after one and two semesters, transcript request status, enrollment status, and retention status for the second semester used as independent variables. Analyses were performed to predict retention for the second and third semester separately for full-time students and the total group. Regression equations were first derived using a stepwise procedure and then rederived on .75 random samples to determine the adequacy of the stepwise procedure. Regression equations were then cross validated on approximate random halves of the total group. Finally, crosstabulations of recoded predicted scores and criterion scores are presented. Kappa, the coefficient of agreement, is computed. This was done to assess the effectiveness of using the regression equation to make predictions on actual students.

Results

The number and percentage of students enrolled for the Fall 1994, Spring 1995 and Fall 1995 semesters were as follows:

	Enrolled	Not Enrolled	Total
Fall 1994	1433 (99.6%)	6 (0.4%)	1439
Spring 1995	1069 (74.3%)	370 (25.7%)	1439
Fall 1995	838 (58.2%)	601 (41.8%)	1439

Because of a number of factors including that:

(1) many students do not take the placement test because they are able to place out of them;
(2) cases were not selected because they had 0 scores on the placement test and these 0 scores could either be interpreted as a 0 or not taking the test; and
(3) students in the Developmental Skills program with a full load of Developmental Skills courses had GPA's of 0 and thus were removed from the database so that their successful completion of Developmental Skills courses would not count as a GPA of 0,

the total group of 1,439 students was reduced to a total of 834 students of which 703 were full-time students. It should be noted that the students lost to this analysis would appear to consist of both the more able and the less able students. It should also be noted that the percentage of the Fall 1994 total group cohort of 834 students who enrolled in the Spring 1995 semester was

88.1% as compared to the 11.9% who did not enroll. Therefore, there was a greater proportion of returning students after one semester who were not Developental Skills students or students who had placed out of one of the placement tests.

Given these constraints, the following Tables 1-4 present the numbers of cases, means, and standard deviations for the full-time and total groups for predicting early withdrawal and retention in the second and third semesters.

Table 1. Number of Cases, Means and Standard Deviations for Full-Time Group Variables Predicting Retention for the Second Semester

Variable	n	Mean	Standard Deviation
Arithmetic	703	30.09	6.57
Writing	703	7.13	1.22
Reading	703	115.46	4.68
Algebra	703	18.99	6.24
GPA Fall 1994	703	2.57	.90
Enrollment Status	703	1.10	.41
Credits Fall 1994	703	11.86	3.69
Transcript File 1	703	.02	.15
Transcript File 2	703	.25	.43

Table 2. Number of Cases, Means and Standard Deviations for the Full-Time Group Variables Predicting Retention for Third Semester (Not Previously Listed in Table 1)

Variable	n	Mean	Standard Deviation
Attended Spring 1995	703	.90	.29
Credits Spring 1995	703	21.60	8.42
GPA Spring 1995	703	2.52	.85

Table 3. Number of Cases, Means and Standard Deviations for the Total Group Variables Predicting Retention for the Second Semester

Variable	n	Mean	Standard Deviation
Arithmetic	834	29.70	6.77
Writing	834	7.14	1.23
Reading	834	115.42	4.69
Algebra	834	18.38	6.54
GPA Fall 1994	834	2.65	.91
Enrollment Status	834	1.13	.46
Credits Fall 1994	834	10.91	4.15
Transcript File 1	834	.02	.15
Transcript File 2	834	.25	.43

Table 4 . Number of Cases, Means and Standard Deviations for the Total Group Predicting Retention in the Third Semester (Not Previously Listed in Table 3)

Variable	n	Mean	Standard Deviation
Attended Spring 1995	834	.88	.32
GPA Spring 1995	834	2.60	.86
Credits Spring 1995	834	19.87	8.96

Predicting Second Semester Retention or Withdrawal for Full-Timers

For predicting retention for a second semester, the regression equations for full-time and total groups were similar. In both cases, a stepwise procedure included one independent variable into the equation for predicting retention for the Spring 1995 semester. For the full-time group, the equation was

$$Y' = .024*CREDSFALL + .619$$

This produced an adjusted R Square of .09 and a multiple R of .30. The n = 703 cases were then sampled down to a .75 random sample and the regression equation was recomputed resulting in R = .31, R^2 = .09. The 703 cases were then systematically divided into two groups by last digit of the social security number and cross validated to produce multiple R's of .30 for the screening and .31 for the calibration samples, respectively. Based on these multiple R's, the original regression equation was used for the full-time group in predicting Spring 1995 semester retention.

A crosstabulation of predicted and observed scores resulted in there being no cases identified as early leavers when the predicted scores were recoded as 0 (withdrawal) and 1 (retained). (Predicted scores below .5 were recoded as 0 and predicted scores .5 or greater were recoded as 1). This problem is apparently due to there being an extreme split in the actual number of students retained for the Spring 1995 semester for the group on which the analysis was based (90.5% were retained as opposed to 9.5% for those who withdrew). The problem also stems from the small percent of variation in the dependent variable that could be explained. It should be noted that credits completed in the fall of 1994 was correlated r = .68 with GPA for the Fall 1994 semester. Yet, GPA for the Fall 1994 did not enter the equation, however. Logistic regression did not offer any better results.

Predicting Third Semester Withdrawal or Retention for the Full-Time Group

Variables that entered into the regression equation for predicting retention into the third semester using the Fall 1995 semester as the criterion are presented in Table 5 for the first-time full-time group.

Table 5. Regression Results for Predicting Third Semester Withdrawal or Retention for Full-Time Group

Variable	b	SE b	Beta	T	Sig T
Credits Spring 1995	.024	.003	.435	7.078	.000
Transcript File 2	-.421	.035	-.397	-12.175	.000
Attended Spring 1995	.274	.058	.174	4.723	.000
Transcript File 1	-.400	.098	-.130	-4.097	.000
Credits Fall 1994	-.023	.007	-.184	-3.342	.001
Reading	.011	.003	.109	3.289	.001
Enrollment Status	-.083	.035	-.075	-2.357	.019
(Constant)	-.823	.372		-2.212	.027

A multiple R of .58 was obtained ($R^2 = .336$). This compares to an R of .59 ($R^2 = .348$) for a .75 random sample with the variables entered in the same order as they were obtained using the stepwise procedure. Cross validation subgroups were obtained. For the screening sample, R = .63. This equation applied to the calibration sample reduced the R to .51. Despite the difference in R, the more stable original full-time regression coefficients were used.

The crosstabulation of recoded predicted scores and observed criterion scores for the Fall 1995 semester was as follows:

		Fall 1995 0	Fall 1995 1	
Recoded Predicted Score	0	96 13.7%	42 6.0%	138 19.6%
	1	119 16.9%	446 63.4%	565 80.4%
		215 30.6%	488 69.4%	703 100.0%

The value of kappa, the coefficient of agreement was .401.

Predicting Second Semester Withdrawal or Retention for the Total Group

The regression equation derived for the total group for predicting Spring 1995 withdrawal or retention was:

$$Y' = .024*CREDSFALL + .620 \quad .$$

A .75 random sample produced slightly higher values of R and R^2. R rounded to .31 in both groups. R^2 was .10 in the .75 random sample and .09 for the total group. The total group of 834 cases was then subdivided using the last digit of the social security number and cross validation was performed. Since the R^2's were fairly close, the original regression weight for the total group was used. R = .30 in the screening sample and when the weight was applied to the calibration sample, R increased to .314. A crosstabulation of recoded predicted scores, predicted no cases predicted as withdrawing after one semester. 11.9% (or 99 students) of the

actual Fall 1994 group withdrew for the Spring 1995 semester. 88.1% (or 735 students) were retained. The results of the crosstabulation reflect the extreme proportions of withdrawal and retention as well as the fact that only a small proportion of the variance could be explained in the two semester case with only one independent variable. A logistic regression was then performed and produced similar results.

Predicting Third Semester Withdrawal or Retention for the Total Group

The variables that entered into the equation for predicting third semester withdrawal or retention are presented for the total group in Table 6 below.

Table 6. Variables Entering Regression Equation for Predicting Withdrawal or Retention for Third Semester (Fall 1995) for Total Group

Variable	b	SE b	Beta	T	Sig
Attended Spring 1995	.323	.049	.224	6.536	.000
Transcript File 2	-.406	.032	-.376	-12.631	.000
Credits Spring 95	.024	.003	.452	7.309	.000
Credits Fall 1994	-.027	.006	-.236	-4.233	.000
Transcript File 1	-.354	.089	-.116	-3.992	.000
Reading	.011	.003	.114	3.810	.000
(Constant)	-.983	.338		-2.906	.004

As before, a .75 random sample was drawn and a regression equation was derived using the same order of entry as was obtained in the stepwise procedure. The multiple R and R^2 for the stepwise procedure was .58 and .34, respectively. The multiple R and R^2 for the .75 random sample were .59 and .34, respectively. Given the stability of the regression with drawing a .75 sample, the original regression weights for the total group were subject to cross validation. Cross validation yielded similar R's and therefore the total group multiple regression equation was used. The multiple R for the screening sample was R = .611. The reduced multiple R on the calibration sample was R = .539. As can be seen from the R's, there was greater shrinkage for the first-time full-time group than for the first time total group.

Finally, the following crosstabulation of recoded predicted scores and criterion scores was produced.

		Fall 1995 0	Fall 1995 1	
Recoded Predicted Scores	0	153	67	220
		18.3%	8.0%	26.4%
	1	115	499	614
		13.8%	59.8%	73.6%
		268	566	834
		32.1%	67.9%	100.0%

The value of kappa for the crosstabulation for the total group was .475.

An additional regression analysis was performed on first-time part-time students only for predicting withdrawal or retention for the third semester. This equation was:

Y' = .563*(Attended Spr 1995)-.415*(Transcript File 2) + .265.

The multiple R and R^2 for this regression are .591 and .349, respectively.

Discussion

As can be seen from the results, predicting withdrawal or retention for the second semester is a difficult task. First, only one independent variable entered the regression equation and explained only 10% of the variation in the dependent variable, Spring 1995 enrollment. In addition, the linear regression procedure may not be as appropriate as say probit analysis for dichotomous dependent variables with extreme proportions. Ordinary least squares regression does not seem to be functioning well with a 90-10 split. The distribution is very skewed. For both full-time and total groups, no leavers are predicted because of these two artifacts: (1) limited model, one variable, in a multiple variable problem with only a small proportion of variance explained, and (2) in 90% of the cases, a returner is observed. However, the model is still doing better than chance since 90% of the cases result in 1.

For predicting third semester withdrawal or retention, the regression procedure works better. For both the full-time and total groups, note the negative beta weights for the two transcript request files as compared to the prediction of retention for the second semester. This is indicative of perhaps the fact that students have to wait two semesters until they transfer at the majority of colleges. The negative weight means that these variables contribute negatively to the retention of students after the second semester.

Another variable that entered into the third semester equation was whether or not the student attended the second semester. This variable positively contributed to predicting third semester retention.

Besides transcript request and second semester retention variables, another variable was Reading Placement Test score. The reading test was the new Descriptive Test of Language Skills (DTLS). This variable positively contributed to the prediction of retention for the third semester.

For both full-time and total groups, credits completed during the Spring 1995 semester positively contributed to the prediction of retention for the third semester. Enrollment status, however, contributed negatively for the full-time group.

Enrollment status was coded a 1 for having a high school diploma or as an early admission student, a 2 for a G.E.D. student, and a 3 for no high school diploma. Higher values of this variable meant lower educational background upon admission. This explains the negative beta weight for enrollment status.

The other variable that entered into the equation for both full-time and total groups for predicting third semester retention was credits earned for the Fall 1994 semester. This variable had a suppressor effect in predicting third semester retention. The intercorrelations of variables left this variable with a negative contribution to retention for the third semester; yet the simple r between credits earned for Fall 1994 and attended Fall 1995 was positive in both full-time and total groups (r = .173 and r = .175, respectively). Perhaps students who sought to transfer after the second semester had earned more credits during the Fall 1994 semester. In fact, the

simple correlations for the full-time group between credits earned in Fall 1994 and Transcript Request Files 1 and 2 were r = .096 and r = .206, respectively.

Crosstabulations for full-time and total groups resulted in moderately sized kappas (.40 and .47). The percents leaving after two semesters as compared to after one semester increased for these groups to 19.6% for full-time students and 26.4% for the total group.

From predicting the second semester retention in terms of credits completed for the Fall 1994 semester and from predicting third semester retention in terms of credits completed for Fall 1994 and Spring 1995, attended Spring 1995 semester, and transcript request files 1 and 2, most of the variance in predicitng third semester retention is accounted for by variables that have to do with the student's academic experience and academic goals (e.g. desire to transfer prior to graduation) than to entering abilities. However, some of the variance is accounted for by enrollment status and Reading Placement Test score.

GPA was not significant in its own right, but credits completed was. Since these variables were correlated above .6, there is partial support for the contention that a student's decision to withdraw is to some extent influenced by his or her academic performance. For GPA, high GPA students are likely to transfer, while low GPA students may tend to not re-enroll for a third semester. The combination of these experiences may have resulted in a cancelling out effect for GPA.

The study has examined mostly cognitive reasons for remaining in community college. Noncognitive and/or social and psychological (motivational) variables likely underlie the cognitive reasons examined in this study.

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Parents as a Valuable Resource: A Survey of Parents Highlights Methods of Financing a College Education over Four Years

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Introduction

An on-going concern at Tufts University has been "How do parents really finance their children's education?" In pursuit of an answer, the Dean of Admissions and Financial Aid, the Director of Administration and Finance, and the Director of Financial Aid commissioned the Office of Institutional Research to create a comprehensive survey for the parents of its undergraduate population. The survey was designed to uncover background information about Tufts' families, their methods for financing a Tufts' education, their experiences in communicating with Tufts' administrative and academic departments, and important elements that they believe their child should receive from a Tufts' degree. The questionnaire, asking for anonymous replies, was mailed in the fall of 1994 to the parents of sophomore and senior undergraduate students.

Methodology

The survey questionnaire was designed with a variety of items, utilizing both quantitative and qualitative techniques.[1] Quantitative items ranged from simple checklists to determine household income, to level of satisfaction scales about various campus services. Qualitative items served to complement and clarify the responses to quantitative items and to provide space for open-ended comments.

The survey was mailed to all parents of sophomore and senior students (N = 2,350). It was designed as a self-contained, self-mailer. To increase the response rate of the survey, reminder postcards were mailed several weeks later. The final response rate was relatively high for a mailed survey, with 29.9% of sophomore parents responding and 24.2% of senior parents, providing a representative sample for data analysis.

Profile of Respondents

Of the 636 parents who responded to the survey, approximately 53 percent were mothers, 46 percent were fathers and less than 1 percent identified themselves as grandparents or "other guardian." The majority of the respondents were married to the Tufts student's other parent (79%) with 11.6 percent divorced or separated and 2 percent widowed. The vast

[1] Questionnaires and follow-up postcards are available upon request.

majority of respondents and their spouses were employed full-time (73.5% of respondents and 69.7% of spouses).

The median number of dependents per family was 2 children with an overwhelming majority of parents indicating that their children were currently or would be attending both college and professional or graduate school.

Communication with Tufts

One of the survey's primary objectives was to assess the parents' satisfaction with their Tufts communications. When parents were asked for their primary source of information about Tufts other than their child, the majority responded (77.9%) that they received their information from mailings, with local alumni (6.8%) and friends/colleagues (4.4%) as distant second responses. Overwhelmingly, parents believed that their information from Tufts was sufficient (81.5%).

When asked how they felt that their communication with Tufts could be improved, many replied that the mailings should be more directed to the concerns of parents, not alumni or other constituencies, and sent with more regularity. States the parent of a sophomore: "[What is needed is. . . a newsletter for parents with events and practical information for guiding your son or daughter." Another sophomore parent asks for "occasional SHORT mailings about specific departments and on-campus resources would be nice. No one around here really has time to read long, involved articles or magazines."

A second frequent request from parents was to receive more specific information about their son or daughter. A parent of a sophomore states: "I think the student's teachers, teaching assistants and advisors should send home to the parents (and possibly the student as well) specific information about the progress of the student, and upcoming milestones such as how to specify choice of major, how to concentrate for 5-year Masters, any major exams, etc. At least on a timely basis."

Several respondents suggested that communications might be improved by organizing groups of parents, either on-campus or off-campus. A parent of a sophomore student asks for more "frequent get-togethers (cocktail parties, teas) on the local (regional) level (i.e., NYC chapter of Tufts committee) where parents would meet, discuss issues, socialize and develop interests for the benefit of the university."

Services at Tufts

A second objective of the survey was to assess parents' level of satisfaction with different services in various offices at Tufts. The parents were asked to rate the services on a scale of 1 to 5, with "5" as "Very Satisfied" and "1" as "Very Dissatisfied." Few differences existed between the overall department scores. All of the departments showed average ratings which were above the "neutral" category, indicating that the parents were generally satisfied with the services. For those parents who did respond negatively, specific information about their specific complaints was gathered through the accompanying qualitative data. Those who were less satisfied were asked for an explanation, and specific data was collected for individual campus departments.

Financial Planning

A large portion of the questionnaire was designed to discover how Tufts' families finance a college education. Parents were asked questions concerning their perspectives on responsibilities towards repayment of college financing, responsibilities toward financing

undergraduate education, questions about their methods of financial planning for college, and questions about Tufts communication and service in the financial process.

Attitudes toward college financing

The vast majority of respondents (83.5%) believed that parents should be primarily responsible for financing their child's undergraduate education, while 16.5% did not believe parents bore the primary responsibility. When asked if they had concern about repayment of educational loans, however, 78.7 percent indicated that they had concern, with 26.8 percent indicating that they had a "major concern" and "were not sure if sufficient funds will be available." Almost one fourth (24.7 percent) of respondents stated that both they and their child would share the responsibility for repayment of loans, while 30 percent stated that they bore most of the burden, and 20 percent indicated that their child would bear the primary burden of repayment. Approximately 46 percent planned to help their child finance graduate or professional studies, although 25.5 percent indicated that they did not plan to assist their child with 29 percent unsure. More than half (55.9 percent) stated that educational debt will have accumulated by the time their child completed undergraduate education.

Financial planning

The questionnaire also asked parents for information on their process of financial planning for a college education. Approximately 64 percent of the parents stated that they had planned in advance for a college education, and the majority of parents (also 64 percent) began planning when their child was 0 to 6 years old. The average amount of income saved was $52,152 with many parents saving more than $100,000 for their son or daughter's education.

Sources of financing

Parents were asked to name their primary choice for financing their son or daughter's college education by each year of college, and to rank the sources by amount. For example, if savings were the primary source during the freshman year of college, parents would indicate a "1" in that column. Unfortunately, due to the complicated nature of grid used for this question, and the complex instructions, many parents did not rank their sources for financing and simply checked the source used. Despite the lack of ranking in the data, however, the results showed significant differences in the way Tufts' parents financed their child's education from year to year.

The following table illustrates the various sources used by parents for financing college, in rank order by college class. In this case, sophomore parents relied most heavily on savings and current income to finance their children's first two years of college. In contrast, senior parents -- towards the end of the college financing process for Tufts, relied more heavily on loan-based methods of payment than sophomore parents.

Sophomore Parents
Methods of Financing College
(in rank order)

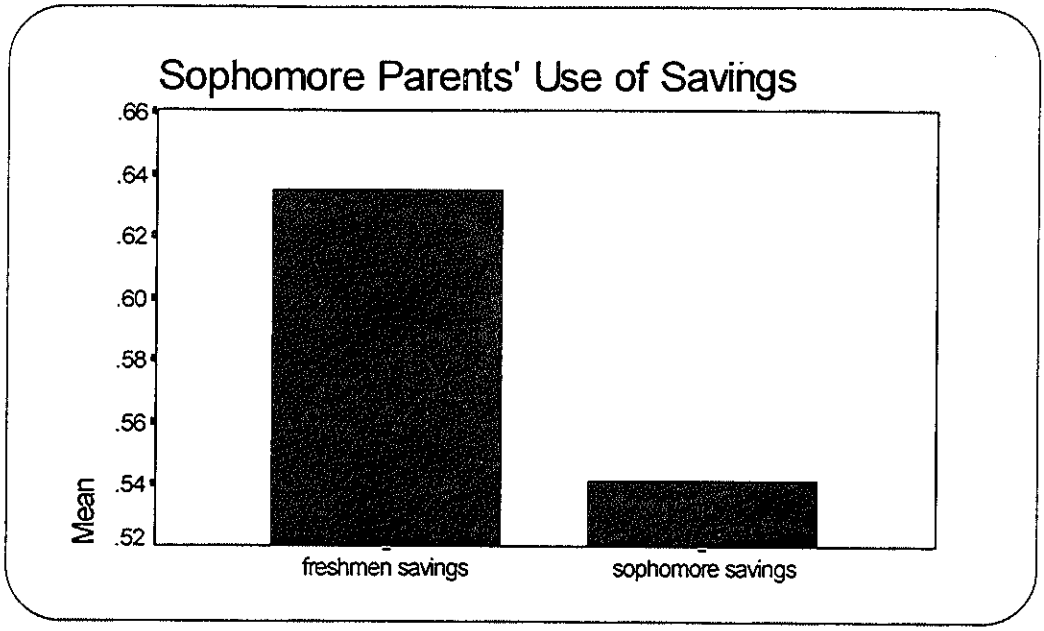
1. Savings
2. Current Income
3. Home Equity Loan
4. Monthly Payment Plan (AMS)
5. MASSPLAN-Family Education Loan
6. Grants and Scholarships
7. Federal Parents Loan (PLUS)
8. Relatives
9. Gifts
10. Subsidized Federal Student Loans (Perkins and Stafford)
11. Unsubsidized Federal Stafford Loans
12. Work Study
13. Tufts Short-term Family Loan

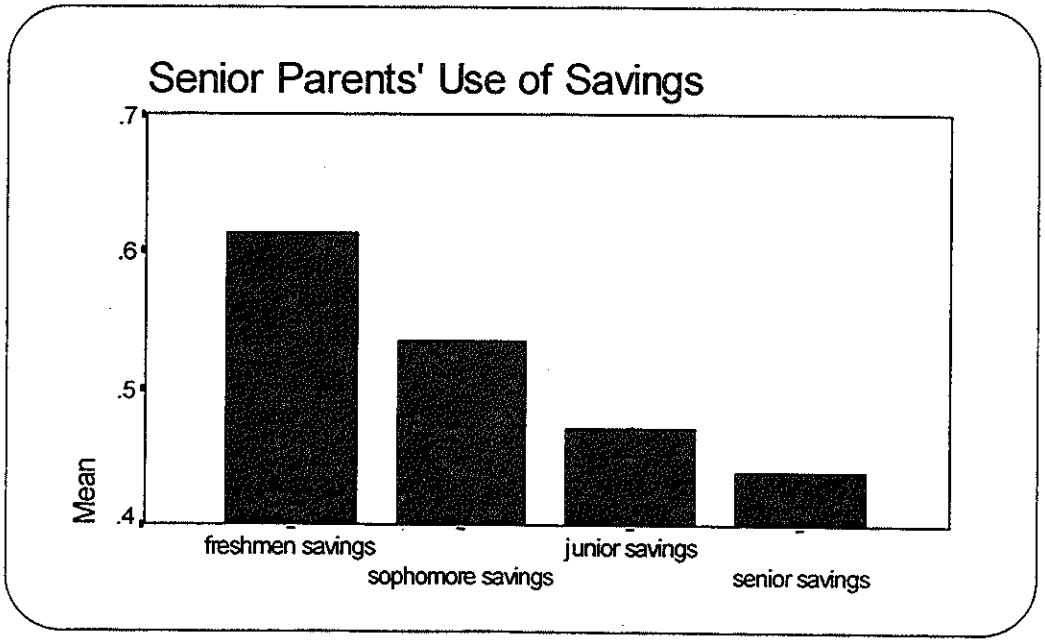
Senior Parents
Methods of Financing College
(in rank order)

1. MASSPLAN - Family Education Loan
2. Savings
3. Monthly Payment Plan (AMS)
4. Current Income
5. MASSPLAN-Family Education Loan with Home Mortgage
6. Grants and Scholarships
7. Home Equity Loan
8. Gifts
9. Relatives
10. Federal Parent Loan (PLUS)
11. Federal Subsidized Student Loans (Perkins and Stafford)
12. Federal Unsubsidized Student Loans
13. Education Resource Institute (TERI)
14. Tufts Short-term Family Loan
15. Work-study

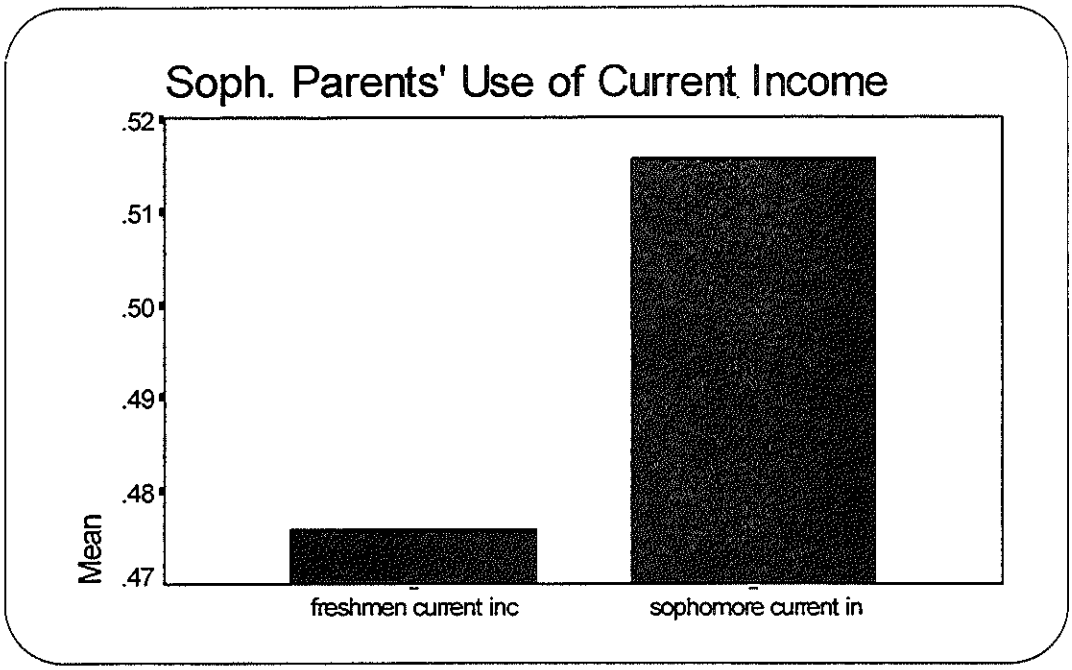
The following graphs highlight the pattern of financing for sophomore and senior parents during the time their son or daughter has been enrolled at Tufts:

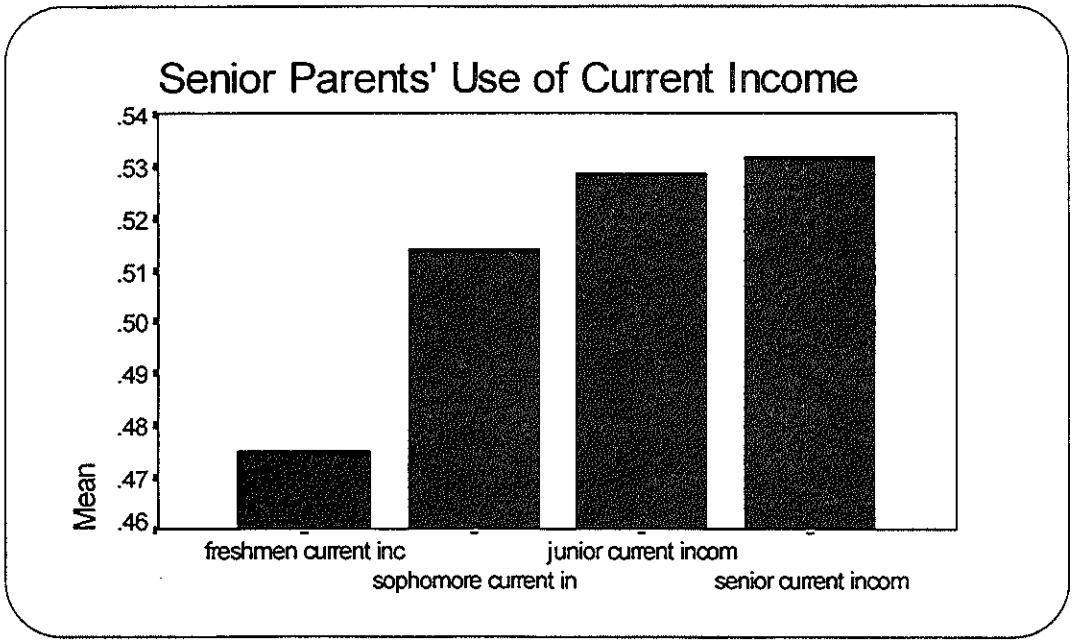
SAVINGS


Sophomore Parents' Use of Savings
.66
.64
.62
.60
.58
.56
.54
.52
Mean
freshmen savings
sophomore savings

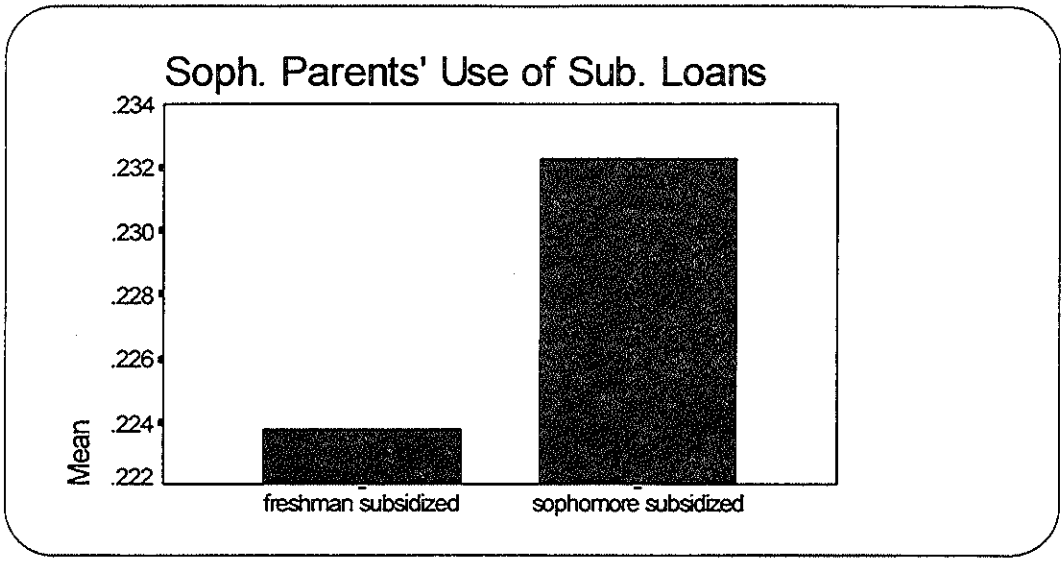

Senior Parents' Use of Savings
.7
.6
.5
.4
Mean
freshmen savings
sophomore savings
junior savings
senior savings

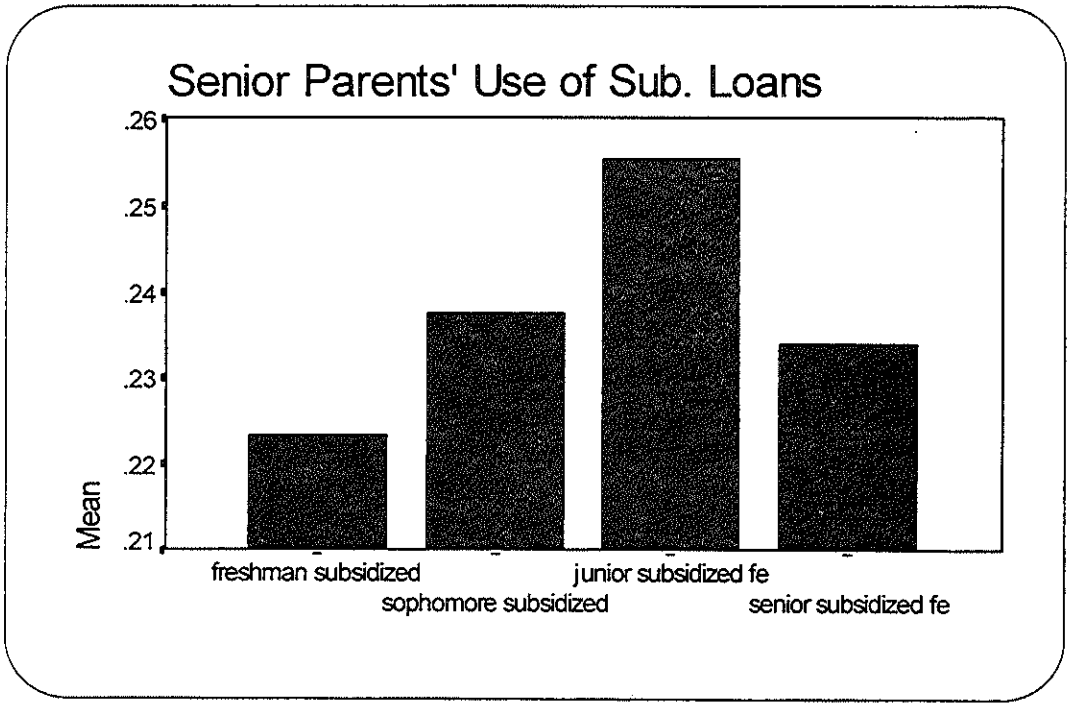
CURRENT INCOME





FEDERAL SUBSIDIZED LOANS (STAFFORD AND PERKINS)





The graphs indicate that many parents of both sophomores and seniors relied heavily on accumulated savings to pay for the freshman year of college. As the years increased, reliance on loans, particularly home equity loans and Stafford/Perkins loans, increased. Reliance on current income and monthly payment plans versus the use of savings also increased over the four years. At the same time, cited amounts for grants and scholarships decreased, particularly for the period between freshmen and sophomore years. The questionnaire also allowed space for parents to provide feedback on the various options available to them, and suggestions regarding ways of improving the process.

Overall Impression of Tufts

Parents were asked if they felt that Tufts had met their expectations for their child's academic development. The vast majority (92.3%) responded affirmatively, with only 7.7 percent choosing a negative response. One of the open-ended questionnaire items asked parents to name the aspects of Tufts which were most pleasing and least pleasing. By far the most common positive response related to the quality of academics at Tufts, whereas more negative responses related to cost of tuition and specific facilities on campus.

Lastly, Tufts parents were asked what they believed constituted a good college. The vast majority of parents provided responses which mirrored a liberal arts college philosophy, including strong academics, good faculty with personal attention to the student, small class size and excellent quality of fellow students.

Differences Between Sophomore and Senior Parents

To examine differences between the two groups of parents based on college class of their child, t-tests were performed.[2] Although there were few significant differences between the responses, the mean household income for sophomore parents was higher than that of senior parents. Sophomore parents were also more satisfied with several administrative offices on campus than senior parents.

Sophomore parents, however, showed greater concern about the repayment of loans than did senior parents, and were less likely to indicate that they would assist their child with the financing of graduate or professional school.

Although there were few differences between sophomore and senior parents on most of the open-ended responses, more senior parents emphasized the development of practical career skills in their definition of a good college.

Differences Between Levels of Household Income

Aside from the actual differences in financial aid packages expected from various levels of household income, there were a few significant areas of difference in the responses of the various groups. When the sample group was divided into two subgroups: those whose family income was less than $100,000 and those whose family income was above $100,000 a few significant differences emerged when t-tests were performed. Those respondents with household incomes less than $100,000 were less likely to be in traditional families (with both parents of the student married and living together). This group also responded more negatively than the higher income group in items related to Tufts services on campus, and had more concerns about the repayment of loans.

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[2] Significance level = $p < .05$ for all t-tests reported.

Summary and Implications

The survey of Tufts parents proved to be an invaluable resource for new information about Tufts students and their methods for financing a private college education. Through the feedback provided by the parents, new approaches to assisting parents in financing a Tufts education could be explored. The data also provided policy-makers with a better understanding of how parents of non-aid recipients were financing a private college education. In addition, the parents' external perception of Tufts and its on-campus services was very useful in determining areas for process improvements. With the sampling of two classes of parents (sophomores and seniors), trends emerged in perceptions of Tufts over time along with trends in the backgrounds of a changing student population, providing useful data for planning.

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Potential Effects Of Proposed Reductions In Federal Support For Research

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The relationship between American universities and the federal government, in terms of science and engineering research and development (R&D) funding, appears to be on the brink of a new era. Issues such as pressures to balance the federal budget, current public disaffection with higher education, and a perceived imbalance between teaching and research in many of the nation's universities are all factors which potentially contribute to pending decreases in the federal R&D budget. Such cuts could significantly impede overall university research efforts, as an analysis of National Science Foundation (NSF) science and engineering expenditure data reveals that colleges and universities depend on federal obligations to fund about sixty-percent of their separately budgeted research and development expenditures.

The question that most concerns many, however, is how will individual universities be impacted by the looming federal cuts. Our research attempts to consider this question through an analysis of both federal obligations for research and university research expenditures for the years 1984 through 1993. Time series analysis and a funding opportunities matrix serve as the core of the research effort. In addition, the report includes an examination of qualitative factors affecting the research funding issue. Our conclusions address both the potential impact of federal funding cuts on research and development and the inevitable hurdles to predicting such an impact based on the highly political quality of the funding issue.

Background

The relationship between the federal government and American universities in terms of federal funding of research activities took shape in the late 1950's when civilian-related agencies first began funding academic research. Each subsequent decade seemed to bring something new to this research funding relationship. The relationship grew with a burst of unparalleled spending in the 1960's following Sputnik, only to dwindle in the 1970's. This decrease in research funding was largely influenced by the unmaintainable growth rate of the 1960's. The 1980's saw increased growth from the lows of the 1970's, but funding did not skyrocket in this decade with the speed that it had in the 1960's.[1] A downward trend in federal outlays for research and development is anticipated by the end of the 1990's.

The current political climate alone is enough to strike fear in the hearts of administrators and researchers at universities that are heavily dependent on federal moneys. The growing federal deficit, changes in the way the federal budget is produced, and the recent change in congressional leadership all contribute to the looming decrease in R&D funds for academic research. Universities would be hit hard by cuts in federal R&D funding, as universities received 38% of all civilian research money obligated by the federal government in 1991.[2]

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[1] Robert L. Geiger. "Historical Patterns of Change: The Lessons of the 1980s," presented at AAAS Annual Meeting, 18-23 Feb. 1994, p. 3

[2] U.S. House of Representatives Committee on Science, Space, and Technology (1994). "Report on the Task Force on the Health of Research," as printed in the *AAAS Science and Technology Policy Yearbook, 1993*, p. 127.

Some blame science itself for the predicted federal cutbacks. Claims that science is too self-regulating and that poor ethics, such as the indirect cost controversy at Stanford and data falsification issues elsewhere, are feeding the argument that scientists are destroying the public image of their own field. Examples such as these are being used by some members of Congress to justify the decreased growth of R&D funding.

The academic response to the proposed cuts is to limit the number of students various departments are willing to train in scientific research fields. Scientists are also limiting their research proposals to "sure things," where they know that their research will provide fruitful results. One potential impact of the decreasing number of students being trained in research, paired with the decreasing risk that the conductors of research are taking, is that the United States will lose ground in the economic competitiveness arena.

A discussion of the current trends in research funding would be incomplete without accounting for the actions of Congress in the federal budget process. Our research aims to address both the qualitative and quantitative sides of the research funding issue in the context of the FY1996 budget discussion. Identification of general trends in research funding, a model to determine which institutions may find themselves at greatest risk as a result of federal R&D cutbacks, and a summation of the qualitative issues impacting research funding are the objectives of this paper.

Methodology

The Higher Education Data Sharing Consortium (HEDS), a membership organization of private institutions that engage in data sharing activities through an annual and supplemental report series, performs a biennial report on the status of research and development funding. The extension of our normal biennial report into additional realms was prompted by Congress' current debate over the FY1996 federal budget. The analyses contained herein are based on data obtained in compiling this biennial report, encompassing data from the most recent ten years of data publicly available (i.e., 1984 through 1993), as well as qualitative information related to issues underlying the research funding debate.

Our data were extracted from the Computer Aided Science Policy Analysis & Research Database System (CASPAR), maintained by the Quantum Research Corporation in Bethesda, Maryland. Specifically, the NSF Survey of Scientific and Engineering Expenditures at Universities and Colleges and the NSF Survey of Federal Obligations to Universities, Colleges, and Selected Nonprofit Institutions, both from the NSF Division of Science Resources Studies, were used in the analyses. Data from the American Association for the Advancement of Science are also included for the purpose of analyzing the potential impact of the Concurrent Budget Resolution research funding. Additional qualitative information was also gathered to help put the research funding situation into perspective .

The institutions examined in this report include the top one hundred recipients of federal obligations in FY1993 as reported by federal agencies, HEDS universities not included in the top one hundred recipients, and institutions commonly used as comparison institutions for HEDS' members. In total data from 122 institutions are included in the analyses. Due to changes in institutional reporting, there is no disaggregated obligation or expenditure data for the University of Massachusetts prior to 1992. The University of Massachusetts-Amherst, therefore, has no data reported prior to 1992. Similarly, the University of Tennessee-Knoxville has no disaggregated obligation data reported prior to 1992 and has been excluded completely from the expenditure data because the University of Tennessee reported expenditures only for all institutions combined. Trends of all institutions completing the Obligation and Expenditure surveys are also reported.

Limitations to our research include a discrepancy between the reporting of Expenditure and Obligation dollars. The difference in amounts reported in these areas is attributed to the fact that obligation dollars are reported by the agencies in full at the time of approval, but institutions do not report moneys obligated to them on the NSF expenditure survey until they are actually spent, which often is not fully in the year of the obligation. Institutional dependency on federal obligations is also somewhat difficult to project, as institutions are not required to report the source of their expenditures by agency on the NSF survey.

Findings

Although the total amount of federal obligations has remained fairly constant over the years, the increased number of institutions receiving federal funding for science and engineering research is causing obligations to be smaller for individual institutions than many universities have become accustomed to receiving. The relatively small average percent increase in obligations for institutions from 1989 to 1993 (9% growth, compared to 38% growth from 1984 to 1989), compared to the slightly upward trend of the time series data, suggests that the federal obligations are being spread among a growing number of institutions (See Chart 1). Literature on the increasing dispersion of federal obligations is complimentary to this finding.[13]

The compilation of an opportunity funding matrix (See Table 1) led to some conclusions on how universities would be impacted by the growing dispersion. Of 130 funding opportunities from 1984 through 1993 (13 agencies times 10 years) only one institution, Penn State, received funds from all 13 agencies in each of the ten years. Those with the least funding opportunities seized tended to be the medical schools, often relying almost exclusively on the NIH.

Carrying the matrix a bit further, we developed a matrix based solely on obligations from "troubled" agencies (See Table 2). These agencies included the Department of Commerce, the Department of Education, the Department of Energy, the Environmental Protection Agency, the Department of Interior, and the Nuclear Regulatory Commission. "Troubled" agencies were selected based on their funding trends, reports on the fiscal 1996 budget process by the American Association for the Advancement of Science, and other articles related to the fiscal well-being of federal agencies.[14] Results of this matrix showed that an institution's matrix score (highest score = 60 -- 6 agencies times 10 years) did not fully determine its degree of danger when the universities' dependence on the 6 agencies was also considered. Determining an institution's dependency on the various agencies was also important. The proportion of federal obligations from each of the six "troubled" agencies in 1993 was used as a proxy for dependency.

Taking the dependency factor into account, the University of Rochester, that scored only a 24 on the matrix, was the most reliant on "troubled" agencies. In fact, 34% of the University of Rochester's 1993 federal obligations were from "troubled" agencies; all from the Department of Energy. Most universities with a 20-percent or higher dependency on "troubled" agencies found the Department of Energy to be the determinant of their ranking.

Forecasts for the future appear bleak, as a result of the Republican Congress' Concurrent Budget Resolution proposing to balance the budget by 2002. A decrease in total

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13 Erich Bloch (1991). "Optimists, Skeptics, and Realists: Other Views of the Research Crisis," as printed in the *AAAS Science and Technology Policy Yearbook, 1991*, p. 151.

14 American Association for the Advancement of Science (1995). "Interim Report on Congressional Appropriations for R&D in FY 1996, p. 9-21.

Chart 1. Trend in Federal Research and Development Obligations in Science and Engineering to All Academic Institutions 1984 through 1993 Constant 1993 Dollars

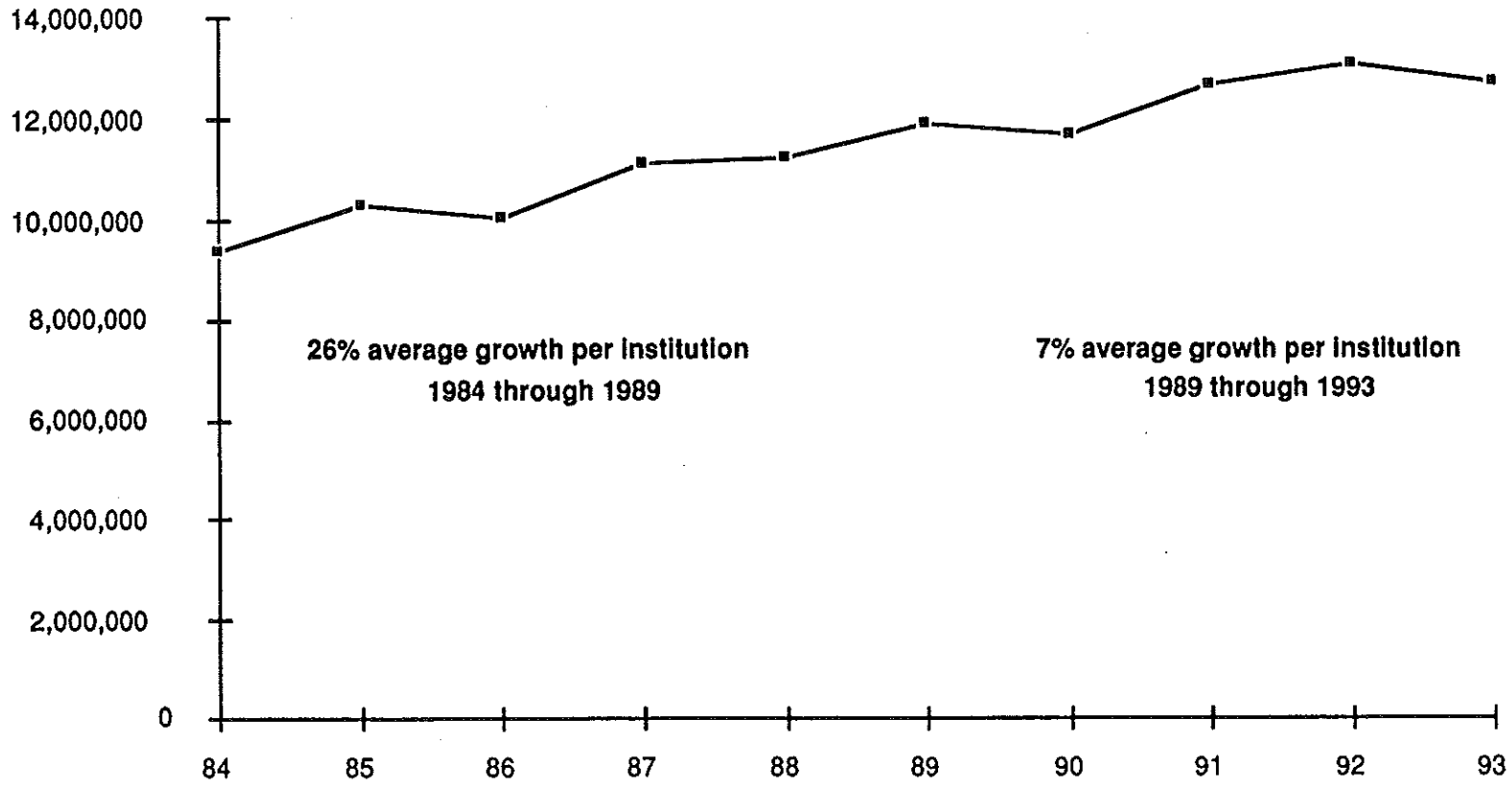

Table 1. Sample of Funding Opportunity Matrix
1984-1993

Institution Name	Total	USDA	Com.	DoD	Educ.	DoE	EPA	DoI	NASA	NIH	NRC	NSF	HHS	DoT
U. of AK Fairbanks - All	90	10	8	9	7	10	7	10	10	7	0	10	2	0
U. of Texas MD Anderson Cancer Ctr	35	1	0	2	0	4	5	0	1	10	0	8	4	0
Wayne State	81	1	1	10	4	10	5	3	10	10	0	10	10	7
Wake Forest	61	4	4	8	3	7	1	1	10	10	0	10	3	0
U. of Tennessee - Knoxville	19	2	0	2	1	2	2	2	2	2	0	2	1	1

Table 2. Institutions whose Federal Obligations had a High Reliance on Troubled Agencies in 1993

Institution Name	Score out of 60	S&E Obligations	% Reliance on Troubled Federal Agencies in 1993 Com.	Educ.	DoE	EPA	DoI	NRC	Obligations from Troubled Agencies
U. of Rochester	24	131,252	0%	0%	34%	0%	0%	0%	34%
U. of Connecticut - All	50	61,392	9%	3%	17%	3%	0%	0%	32%
Clark	18	2,081	4%	0%	11%	13%	0%	0%	28%
U. of Georgia	47	68,180	2%	3%	21%	2%	0%	0%	28%
U. of Notre Dame	31	15,140	0%	0%	25%	1%	0%	0%	27%
Florida State	42	41,966	2%	2%	23%	0%	0%	0%	27%

*NOTE: Some numbers in the Obligations from Troubled Agencies column do not total due to rounding

federal research obligations of 33% is projected between 1995 and 2002 (See Table 3 for impact on selected agencies). Many institutions will face major cutbacks in their federal funding. Those hardest hit will be those who rely most heavily on agencies whose funding is already troublesome, including the six "troubled" agencies included in our matrix.

Projected Change in Non-Defense R&D Budgets By Agency 1995 - 2002, Constant 1995 Dollars ($000,000)

Agency	1995	2002	% Change '95-'02
Agriculture	1,540	995	-35.4%
Commerce	1,284	642	-50.0%
Education	175	4	-97.7%
Energy	3,969	2,086	-47.4%
EPA	619	446	-27.9%
Interior	686	381	-44.5%
Labor	62	21	-66.1%
NASA	9,875	6,331	-35.9%
NIH	10,840	8,467	-21.9%
NSF	2,544	2,084	-18.1%
Other HHS	749	491	-34.4%
Transp.	687	400	-41.8%

Source of Data: House Budget Committee Policy Assumptions: Fiscal Year 1996 Budget Resolution prepared by the House Budget Committee May 10, 1995 and Conference Report for Concurrent Resolution on the Budget for Fiscal Year 1996 June 26, 1995. Reported on the American Association for the Advancement of Science Web Page.

Qualitative Issues

One of the most important conclusions made in the course of our study is that the qualitative political issues related to the federal funding of academic research are of equal importance to the dollar trends. Two major categories of qualitative factors come into play: 1) Intra-university politics and 2) The federal budget process.

Universities are faced with a number of decisions regarding the role of research in their mission to educate students. Much current debate revolves around the choices universities are making between teaching and research. Based on a fifteen year time period, from 1975 to 1990, Erich Bloch, former director of the NSF, reports a 27-percent decline in teaching as a primary function for new professors who have obtained their Ph.D. , and a 30-percent increase in research for the same.[5] Many feel that this is an imbalance considering that universities' missions are to provide a well-rounded education for their students.

Universities' troubles do not end with the federal funding decreases for science and engineering. The humanities and arts are taking an even harder hit, with the National Endowment for the Humanities scheduled to cease operations in three years and the National

5 Bloch, p. 151.

Endowment for the Arts in two. University administrators are hearing numerous complaints from those in the arts and humanities that their disciplines are being sacrificed while universities invest all of their time in trying to save their science-related funding. These complaints may not be unfounded either, as the sciences bring far more resources into the institutions than the arts and humanities. In addition, the humanities sometimes controversial undertakings may be harder to justify than money spent for national defense and the saving of human lives.

Government politics are also doing their share to cloud the federal funding picture. The Budget Enforcement Act of 1990 (BEA) is one factor that severely dampens any hope universities may have of receiving increased funding for the research sciences. The BEA divides all spending into three categories: defense, international and domestic. Within these three categories there are further divisions, which determine specific groups within which individual agencies and projects are funded. The objective of this act is not to decrease the overall deficit, but rather not to increase it in any given year. Unfortunately, however, reductions in any one group cannot be shared with any other group. Therefore, in order for research funding to increase, another part of its funding group must face cutbacks.[6] Research funding growth is limited by the BEA because many of the research appropriations are grouped with programs and projects that fall under the "sacred cow" classification or research organizations are lumped together, making overall research funding a zero-sum game. For example, the NSF, the Veterans' Administration, the Department of Housing and Urban Development, NASA, and other science-funding agencies are all grouped together. In addition, The National Oceanic and Atmospheric Administration (NOAA) is funded in the Commerce-Justice appropriations bill, which provides funding for popular programs such as crime bills and immigration control.[7]

Because of the difficulty in increasing funds for research, at least one proposal has been made to decrease the regulation of research so that the funds awarded to the universities have a higher value in regard to the research that can be conducted using those funds. This decrease is being proposed by Rep. John E. Porter (R., IL). Porter cites the regulations on waste disposal and guidelines for the humane treatment of animals as areas that are over-regulated in terms of conducting research.[8] Many researchers agree with Porter, claiming they often have to hire additional team members just to handle all of the paperwork resulting from the research-related regulations.

One part of the federal budget process that does favor academe is the earmarking process. Earmarks allow members of Congress to award research and other educational-related funds to institutions in their district on a non-competitive basis. Although earmarks for academic projects are decreasing, in 1995 they still accounted for $600 million down from a record high of $763 million in 1993. Many institutions rely heavily on these earmarked funds, especially some smaller institutions trying to find their niche in the research community. Larger institutions, such as Rutgers University and the University of Connecticut, were found to rely on earmarks for as much as 16-percent and 24-percent, respectively, of their total federal obligations in 1993.

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6 Stanley E. Collender (1991). "The New Budget Process: How Will It Work (Or Not Work)," as printed in the *AAAS Science and Technology Policy Yearbook, 1991)*, p. 180.

7 American Association for the Advancement of Science, p. 17.

8 "Stephen Burd. "Could Reducing Regulations Leave More Funds for Research?," *The Chronicle of Higher Education*, 11 August 1995, p. A25.

Conclusion

Federal funding for science and engineering R&D will face many cuts in the coming years. The impact on individual institutions, however, is unclear. Those institutions relying heavily on agencies whose existence and funding are unstable will likely face the hardest hits, especially those relying on the Department of Energy. Decreases in earmarks, however, place even some of the more securely funded institutions on shaky ground. Smaller institutions just breaking into scientific research may face the deepest funding cuts as earmarks are slashed.

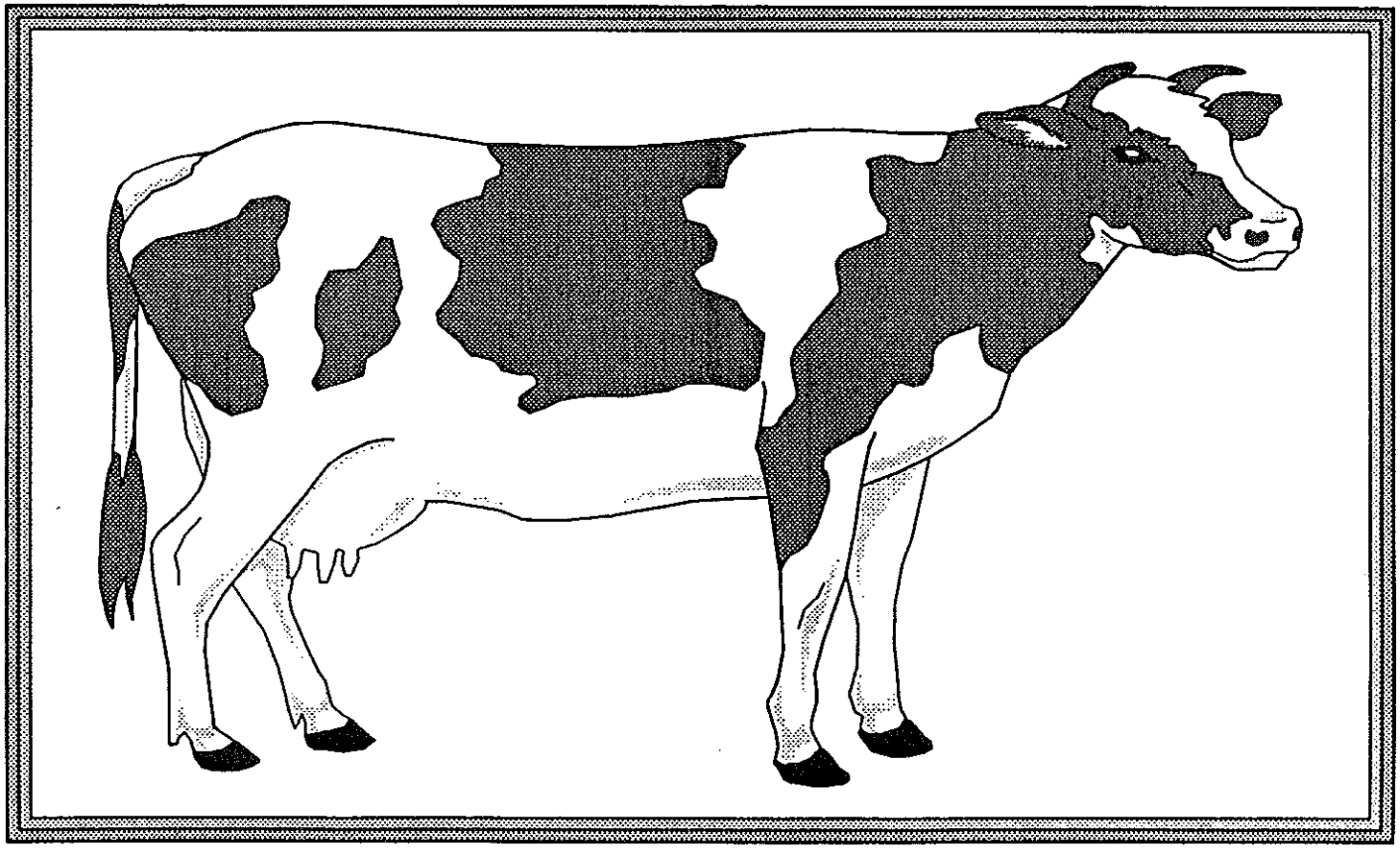
Although attempts to balance the federal budget by 2002 will serve as the biggest setback to academic R&D funding, the most pressing current issue is that of increased dispersion. As Congress attempts to move away from earmarks, the importance of being able to compete for funds at a merit-based level will increase. In consideration of the overall growing number of graduates with doctoral degrees, many of whom are from top-notch research universities, one can only conclude that the quality of newly hired researchers will increase at institutions that have not typically excelled in the federal, merit-based award process. Federal funds will be attracted to these institutions that were not previously in the federal funding-mix, thus making dispersion a likely ongoing problem.

Both the qualitative and quantitative views of the science and engineering research funding issue leave much room for political change. At times it appears that nothing regarding this issue is set in stone, most notably the objective of balancing the budget in seven years. Researchers and administrators at the various research institutions will have to face a number of decisions over the next few years; some in fact may face the decision of which departments and research specialties they can afford to maintain. In the event that institutions cannot decide for themselves, federal obligations may make the decision for them.

North East Association for Institutional Research

22nd Annual Conference

Comparative and Longitudinal Studies of Higher Education
Harvesting the Findings



Sheraton Burlington Hotel and Conference Center
Burlington, Vermont

October 28-31, 1995

North East Association for Institutional Research - 22nd Conference Program

SATURDAY, OCTOBER 28, 1995		
1:30 - 3:30 PM	**Registration**	
2:00 - 5:00 PM Univ of Vermont Waterman 113Q	Mary Ann Coughlin Associate Prof. of Research & Stats Springfield College	**Advanced Statistics for Institutional Research (Part 1)** *Workshop* This workshop will deal with advanced issues in inferential statistics. Topics such as Analysis of Variance, Factor Analysis, Multivariate Regression, and Logit/Probit models will be covered and contrasted with other statistical tools and techniques. A case study approach will be used illustrating applications of these statistical techniques in institutional research. SPSS running on a PC will be used for this workshop.
2:00 - 5:00 PM Diamond Ballroom	J. FrederickVolkwein Director, IR SUNY-Albany	**Managing a Program of Outcomes Assessment (Part 1)** *Workshop* This workshop acquaints institutional researchers with the tools and processes for assessing campus educational outcomes. Participants will review the multiple purposes and uses of assessment, and will learn about various methodologies and instruments that are available and appropriate. Participants should bring copies of assessment plans and reports from their own institutions where possible.
6:00 - 7:00 PM Room 422 Presidential Suite	**President's Reception**	
SUNDAY, OCTOBER 29, 1995		
8:00 - 9:00 AM Promenade	**Breakfast**	

North East Association for Institutional Research - 22nd Conference Program

SUNDAY, OCTOBER 29, 1995		
8:00 AM - 5:00 PM	**Registration**	
9:00- 12:00 noon Univ of Vermont Waterman 113Q	Mary Ann Coughlin Associate Prof. of Research & Stats Springfield College	**Advanced Statistics for Institutional Research (Part 2)** *Workshop* This is a continuation of part 1 and may only be taken by those taking part 1.
9:00 - 12:00 noon Willsboro	J. Frederick Volkwein Director, IR SUNY-Albany	**Managing a Program of Outcomes Assessment (Part 2)** *Workshop* This is a continuation of part 1 and may only be taken by those taking part 1.
9:00 - 12:00 noon Valcour	Karen W. Bauer Assistant Director, IR & Plng University of Delaware	**Newcomers to Institutional Research: Strategies for the Practice of Effective Institutional Research** (Part 1) *Workshop* This workshop is designed for new practitioners who engage in IR activities. Using the AIR monograph, Strategies for the Practice of Institutional Research, the workshop addressses key components of IR including defining critical issues for institutional research, identifying sources of data, developing factbooks and other reports, and conducting effective survey research for assessment and evaluation. The main focus is a presentation of general concepts and practical strategies for the implementation or continued development of effective IR at many schools, regardless of size or type.

October 29 9:00 - 12 noon Kingsland	Peter Balcziunas Executive Assistant to the President Dickinson College	**For the Planner with Many Hats: Strategic Planning for those New to the Field** *Workshop* Draws upon planning theory and the practical experiences of workshop participants to construct an "ideal" planning process. Participants will discuss what works and what doesn't and develop "best bet" strategies for achieving success in their particular institutional settings. Among topics discussed will be the role of the planner as change agent, the importance of the IR function in the planning process, and the effective use of external consultants.
9:00 - 12 noon Shelburne	Rosalinda Graham Senior Institutional Research Analyst University of Delaware	**Conducting a Salary Equity Study** *Workshop* A critical component of good and effective salary administration is the capacity to ensure that salary differentials can be explained by both quantitative and qualitative measures. The workshop will provide a practical guide on how to conduct a salary equity study and how to develop proposals for salary adjustment within fixed budget constraints. Emphasis is given on the methodology and guidelines rather than the technical aspects of the statistical analysis.
1:00-2:30 PM Emerald I and II	**William G. Bowen** **President** **Andrew W. Mellon Foundation** *Keynote Session*	

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October 29 2:30- 5:30 PM Willsboro	Linda E. Winkler Director, Plng & IR Mount Saint Mary's College John Casey Director, IR Georgian Court College	**Catholic Colleges/Universities** *Special Interest Group* Representatives of Catholic colleges and universities are invited to share experiences and common concerns and to plan activities of mutual benefit.
2:30 - 4:00 PM Valcour	Karen W. Bauer Assistant Director, IR & Plng University of Delaware	**Newcomers to Institutional Research (Part 2)** *Workshop* This is a continuation of part 1 and may only be taken by those taking part 1.
2:30 - 5:30 PM Kingsland	William H. Freund Director, Technology Programs NCES Roslyn A. Korb Director, Postsecondary Coop. Systems NCES	**Use of NCES National Databases for Institutional Policy Analysis** *Workshop* The workshop will help participants understand how to use national databases that have rich information for institutional research. The workshop will map major research issues, discuss sampling weights and variance computation in analyzing sample survey data, illustrate using PC's how to create files for statistical analyses, and demonstrate peer selection techniques.
6:00 - 7:00 PM Promenade	**Reception**	
7:00 - 9:00 PM Emerald Ballroom	**Dinner** "Ghouls & Goblins Vermont Theme Party" Menu includes lobster, oysters, clams, Vermont Maple Cured Ham, pastas, covered bridges, spiders and other guests!	

North East Association for Institutional Research - 22nd Conference Program

MONDAY, OCTOBER 30, 1995		
7:30 - 9:00 AM Emerald I and II	**Breakfast** **Sponsored by "Scanning Products"**	
7:30 - 8:45 AM Willsboro	Michael Middaugh Director, IR & Plng University of Delaware	**National Study of Institutional Costs and Productivity** *Special Interest Group* Michael has just received a federal grant to continue his work examining instruction costs and productivity by academic discipline. This SIG is for those who have participated in the national study in previous years and for those who are interested in learning more about the study.
7:50 - 8:45 AM Valcour	Kathy Kern Bowman Research Associate COFHE Larry Litten Director of Research COFHE	**COFHE Senior Surveys** *Special Interest Group* A chance for COFHE schools interested in the Senior Survey to share ideas and concerns.

October 30 8:50 - 9:50 AM Emerald III	**Emily Lloyd** **Executive Vice President for Administration** **Columbia University** **Susan Shaman** **Assistant Vice President for Planning and Analysis** **University of Pennsylvania** *Plenary Session* Vice President Lloyd will speak on current challenges facing the administration of higher education. One focus will be the changes brought about in strategic planning by recent economic and political developments. Susan Shaman will comment based on her long involvement with strategic planning issues at the University of Pennsylvania.	
10:00 - 10:55 AM Diamond I	Patrick Sullivan Research Analyst University of Connecticut	**Continuity of Alumni Survey Data** *Table Topic* An alumni survey can be an important tool is assessing students' attitudes toward the institution. However, the resources to survey attitudes annually may be unavailable and these attitudes may not change much from year to year. The current study measures differences in alumni data to estimate minimum survey frequency.
10:00 - 10:55 AM Diamond II	Eleanor Fujita, Ed.D. Director, IR Hudson County Community College	**Two Tasks with One Stone:** **The Staff Newsletter as a Vehicle for Presenting Institutional Research Findings** *Workshare* Articles in the college staff newsletter were used for carrying out and presenting an analysis of service area demographics and the degree to which the community college was serving that area.

October 30 10:00 - 10:55 AM Emerald II	Fred Cohen Director Enrollment Research & Analysis New York University	**Student Satisfaction and Persistence: Some Early Findings at One Institution** *Paper* New York University conducted a student satisfaction survey of its freshmen and juniors in Spring 1994. The results of this survey have been correlated with student enrollment behavior. This paper will present findings from the analysis of the survey and enrollment activities which suggest that some student attitudes are associated with student persistence.
10:00 - 10:55 AM Emerald I	Charles Secolsky Research Associate, IR Rockland Community College	**The Use of Placement Test Scores and Other Enrollment Data in Identifying Potential Early Leavers from Community College** *Workshare* Many colleges use SAT scores for admission and as part of a set of variables for predicting retention. At many community colleges placement test scores are used instead. This study used placement test scores, grade-point average, number of credits completed and enrollment status as predictors of retention with the goal of identifying potential early leavers.
10:00 - 10:55 AM Amphitheater	Steve Brooks President S.H. Brooks, Inc.	**Econometric Modeling of Enrollment Behavior and Optimization of Financial Aid Budgets** *Paper* The process of using an institution's admissions and financial aid data to build customized econometric models of enrollment probabilities will be described. Uses of data acquisition and verification, model estimation, validation and simulation and alternative approaches to enrollment prediction will be discussed.

October 30 11:00 - 11:25 AM Promenade	**Break**	
11:30 AM - 12:25 PM Diamond I	David A.Hemenway Director, Plng & IR Eastern Connecticut State University William S. Stuart Research Analyst, Eastern Connecticut State University	**Planning and Institutional Research Information Systems: Theory and Practice** *Paper* This paper comprises two sections. The first will discuss the issues and decisions which need to be addressed when developing an information system to support decision making. The second part of the presentation will be a demonstration of Eastern's University Information System at its current state of development. The presenters will distribute an abbreviated form of the demonstrated system to program atttendees.

October 30 11:30 AM - 12:25 PM Diamond II	Robert J. Heffernan, Ph.D. Associate Director, IR Rutgers University Tina Grycenkov Information Manager Rutgers University Marie Paulette Matis IR Staff Rutgers University Joan Spivak IR Staff Rutgers University	**Event History Analysis in the Study of Student Attrition** *Workshare* A current study of attrition at Rutgers University is building models of student careers that will allow: the identification of students that are most at risk of leaving college and the timing of withdrawal from school; the detection of differences among these risk profiles for various categories of students; and the evaluation of particular intervention strategies presently at use at Rutgers to ascertain their impact on preventing students from dropping out.
11:30 AM - 12:25 PM Amphitheater	Dr. Anne Marie Delaney Director of Program Research Boston College	**Comparative Perspectives on the Role of Institutional Research: Variation by Institutional Characteristics** *Paper* Based on a survey of 243 New England colleges and universities, this paper presents results from bivariate and multivariate analyses showing the relationships among the following: institutional characteristics, the nature of the institutional research function and the kind of research performed, the contribution of institutional research to decision making, the vision for the role of institutional research and the estimated resources required fulfill this vision.

October 30 11:30 AM - 12:25 PM Emerald I	Amy W. Johnson Senior Research Analyst Institute for Research on Higher Education University of Pennsylvania	**Sponsor-a-Scholar: First Findings** *Paper* *Sponsor-a-Scholar* is a program for high-risk secondary school students being piloted in the Philadelphia public school system. The program matches mentors with individual students with the goal of increased college attendance rates. This paper presents the first findings of an analysis of a matched-sample to evaluate the efficacy of the program.
12:30 - 1:25 PM Emerald III	**Business Meeting and Luncheon**	
1:30 - 2:25 PM Diamond I	Robert J. Parelius, Ph.D. Assc. Professor of Sociology Rutgers University Robert J. Heffernan Associate Director, IR Rutgers University	**Academic Support Services at a Large Public Research University** *Paper* A comparison of the utilization and perceptions of academic support services on two campuses of a large northeastern public research university is the focus of this study. The data for this analysis come from student and administrator interviews, a self-administered survey distributed to a probability sample of undergraduates, and institutional student records.
1:30 - 2:25 PM Diamond II	Ann Hollings System and Analysis Coordinator University of Guelph Starr Ellis Asst Registrar, Admissions University of Guelph	**Humanizing the Admissions Process: Tracking the Academic Performance of Students Admitted Without Required Grades** *Paper* Student Profile Forms (SPFs) provide supplemental information to be used in the admission of applicants with lower than required grades. The political and logistical challenges of using SPFs is discussed, as well as the on-going analysis comparing the academic performance of SPF students with their peers.

October 30 1:30 - 2:25 PM Amphitheater	Craig A. Clagett Director, IR & Analysis Prince George's Community College Karl Boughan Supervisor of IR Prince George's Community College	**A Student Outcomes Typology for Community Colleges: Identifying Achievers with Longitudinal Cohort Analysis** *Paper* Development of a longitudinal student tracking system facilitated creation of an outcomes typology useful for both external accountability and internal decision support. Logistic regression and discriminant function analysis were used to identify correlates of student achievement.
1:30 - 2:25 PM Emerald I	Larry Litten Director of Research COFHE Stuart Rich Director, IR Georgetown	**Freshmen Self-Image at Highly Selective Institutions** *Paper* COFHE has American Freshmen Survey data from 22 selective private institutions (over 10,000 students). This paper will examine the personal and situational variables that are associated with how freshmen at these institutions rate themselves, relative to their peers, in the following areas: intellectual ability, intellectual self-confidence, social self-confidence, and emotional health. Early results have revealed some interesting effects. SAT scores and high school GPA correlate with self-ratings of intellectual ability at about the same level that the College Board reports they correlate with freshman GPA; the strongest correlate with self-ratings of popularity is self-rating of physical appearance.

October 30 1:30 - 2:25 PM Emerald II	Jim Trainer Director The Higher Education Data Sharing Consortium Melinda K. Burrell, Research Associate The Higher Education Data Sharing Consortium	**Effects of Proposed Reductions in Federal Support for Research** *Paper* The development of the Federal FY96 budget may serve as a watershed in terms of governmental support for academic research. A longitudinal analysis by Trainer and Burrell examines trends in federal support for research in an effort to identify institutions that risk losing funds as research support is reduced. Particular attention is paid to the dispersion of funds by federal agencies across institutions and the diversity of each institution's funding base. This analysis reveals that some institutions receive most of their funds in the same "basket", while other are supported more broadly. This raises a number of important questions: Do some schools risk being cut off completely, depending upon where there dollars are from? Will some fields of research be abandoned because the relatively meager support cannot justify the overhead? Will the number of institutions funded for research via federal dollars revert to the pre-1980's level?
2:30 - 3:25 PM Diamond I	Barbara Erdsneker Assistant Director, IR Bergen Community College Arthur Kramer Director, IR Passaic County Community College	**Surviving the Surveys: Practice, Pragmatism and Priorities** *Panel* Special initiatives within an institution often result in a seemingly overwhelming demand for multiple and/or multipurpose surveys. Three researchers will describe the procedures they used to meet this demand as well as the lessons they learned.

October 30 2:30 - 3:25 PM Diamond II	Keith J. Guerin Director, IR & Plng County College of Morris	**Constructing Longitudinal Models for Retention Research and Enrollment Projections: SAS Programming Tips** *Recitation* With the move to desktop computing, institutional data is frequently accessible only through ASCII file extracts supplied by a campus computing center. This recitation provides researchers with the tools for conducting longitudinal studies using SAS PROGRAMMING.
2:30 - 3:25 PM Amphitheater	Kelly Long Graduate Student Springfield College	**Withdrawn Students: Characteristics and Descriptors** *Paper* Ms. Long will present the results of a survey administered at Springfield College describing the characteristics of withdrawn students.
2:30 - 3:25 PM Emerald I	Kathleen Kern Bowman Research Associate COFHE	**Student Activities and Satisfaction: The COFHE Survey of the Class of '94** *Paper* This analysis of COFHE senior survey data from the Class of 1994 will relate how students' activities influence their satisfaction with various aspects of campus life.
2:30 - 3:25 PM Emerald II	Jack Dunn Happily Provisionally Retired	**Institutional Strategy: A President's Perspective** *Paper* An overview of institutional processes, situations, and options a president has for helping move an institution in the desired direction will be presented. In addition, one president's perspective on the IR role in understanding and assisting in that process will be put forward.

3:30 - 3:55 PM Promenade	**Break** **Featuring Holy Cow!** **Ben & Jerry's Ice Cream**	
October 30 4:00 - 4:55 PM Diamond I	Dawn Geronimo Terkla, Ed.D. Director, IR Tufts University Kelli J. Armstrong Research Analyst Tufts University	**Parents as a Valuable Resource:** **A Survey of Parents Highlights Methods of Financing a College Education** *Paper* An ongoing concern at one private research university has been determining how parents finance their children's education. This paper will describe the findings from a survey of college parents. Information provided in the presentation will focus on the analyses involving comparisons between parents of different undergraduate classes and methods of financing their children's education over four years.
4:00 - 4:55 PM Diamond II	By Baylis Associate Dean Messiah College	**Taking Values Seriously** *Paper* The formation of values is a component of many institutional mission statements. This paper introduces a multi-year, multi-faceted, multi-institution research project on the assessment of values when students enter college, as they graduate and two years after graduation.

4:00 - 4:55 PM Amphitheater	Rena Cheskis-Gold Sr. Research Analyst Yale University	**Family Leave Policies for Faculty** *Paper* With more and more tenure track faculty living in dual-income households, family related issues such as childcare and elder care have taken on increased importance in recent years. In this paper Ms. Cheskis-Gold will present a typology for analyzing family leave policies, describe the current policies at a set of select institutions, and relate the processes via which the needed data were collected.
4:00 - 4:55 PM Emerald I	James Shulman Andrew W. Mellon Foundation	**College and Beyond:** **First Findings** *Paper* The Andrew W. Mellon Foundation is in the process of conducting a major study which will document both the long-term benefits of higher education for students as well as recent structural changes in higher education itself. The study includes data from incoming classes of 1951, 1976, and 1989. In this paper Dr. Shulman will present initial findings from the study.

October 30 4:00 - 4:55 PM Emerald II	Robin Worley Senior Associate, Plng Connecticut Dept of Higher Education Jennifer Brown Asst Vice President, Academic Affairs Connecticut State University System	**Collaboration and Cooperation: The Story of a Statewide Accountability and Productivity Study** *Paper* The authors will discuss the background, process, and results of a state-wide, collaborative, two-staged, research project which surveyed students, faculty, and alumni of all four systems of public higher education and surveyed legislators and employers about public higher education. The study, coordinated by the Department of Higher Education, was developed by the "Higher Education Accountability and Productivity Study Group" to get empirical verification of what several critical constituencies feel are the roles of a public higher education system, the most important products of the system, and the system's strengths and weaknesses.
5:00 - 5:55 PM Diamond I	Wendell Lorang Associate Director of IR SUNY-Albany	**Enrollment Projections and Monitoring** *Workshare* Wendell Lorang will share examples of enrollment tracking reports, and discuss enrollment monitoring and enrollment projection techniques. Colleagues are encouraged to attend and share similar reports, practices, and techniques used at their respective institutions.
5:00 - 5:55 PM Diamond II	J. Frederick Volkwein Director of Institutional Research SUNY-Albany	**State Regulation and Campus Autonomy** *Paper* This paper gives a progress report on an NEAIR-funded study of administrative flexibility and state regulation. The purpose of the research is to measure the changes that have occurred since 1983, and to examine these changes in relation to the characteristics of the states within which they occurred.

October 30 5:00 - 5:55 PM Amphitheater	Glen Lum, Ph.D. Director, IR Harrisburg Area Community College Mariane Guidos Educational Data Specialist Harrisburg Area Community College	**Development of a Computerized Student Tracking System at Harrisburg Area CommunityCollege** *Workshare* The presenters will discuss the history of the development of the tracking system at Harrisburg Area Community College, the preparation of the tracking model, the structure of the tracking system, and the planned use of the tracking data.
5:00 - 5:55 PM Emerald I	William H.Freund Director, Technology Programs NCES	**NCES Technology -SQL Databases on the Internet** *Workshare* NCES is in the process of placing IPEDS data into a SQL database for access via the Internet. However, there are questions about the structure of the data tables and which IPEDS data elements should be loaded. This Workshare will analyze these issues and help guide the Center's efforts.
TUESDAY, OCTOBER 31, 1995		
7:30 - 9:00 AM Emerald III	**Breakfast** (All Breakfast SIGS and Table Topics will be in Emerald III)	
8:00- 8:55 AM Emerald III	John P. Jacobsen Data and Information Manager PA State System of Higher Education	**How to Respond to Excessive Legislative Requests** *Table Topic* When a legislator asks for information that will be used to your institution's detriment how does one respond? A few ideas to soften the blow.

October 31 8:00 - 8:55 AM Emerald III	James F. Trainer Director Higher Education Data Sharing Consortium	**Higher Education Data-Sharing Consortium** *Special Interest Group* An opportunity for HEDS members and others interested in data exchange activities to discuss current issues and concerns.
8:00 - 8:55 AM Emerald III	Pam Roelfs Director, IR University of Connecticut	**ZIP Code: Is it a Good Proxy for Family Income?** *Table Topic* A proxy for family income of students was examined using median household income by ZIP code. This income information was merged with a file of freshman data and compared with income reported in freshmen financial aid applications.
8:00 - 8:55 AM Emerald III	Ellen Armstrong Kanarek Program Director Applied Education Research, Inc.	**ASQ & ASQ+** *Table Topic* An opportunity for those interested in the Admitted Student Questionnaire, or Admitted Student Questionnaire Plus, to discuss their experiences, have their questions answered, and learn what changes may be planned.
9:00 - 9:55 AM Emerald I	Audrey Adam Research Analyst Tufts University	**The University Intellectual Environment: Do Perceptions Mirror Reality?** *Paper* In response to a sense of student discontent with the intellectual and social life at a private research university, students were surveyed to assess their perceptions and experiences on campus. The researcher was interested in discovering how the students' perceptions changed over time and how perceptions and experiences differed when examined by various background variables.

October 31 9:00 - 9:55 AM Emerald II	Michael Middaugh Director, IR & Plng University of Delaware	**National Study of Institutional Costs and Productivity: First Findings** *Paper* For the past several years Mike Middaugh has been conducting a mult-institutional study of instructional costs by academic discipline. In this session research findings from that work will be presented. Mike has just received a federal grant to continue this work .
9:00 - 9:55AM Amphitheater	Bette Johnson Associate Director, Admissions MIT	**Predicting Major** *Workshare* Data will be presented about a recent graduating class that includes intended major, actual major, and work done to predict actual from intended. The great increase in pre-med interest is a stimulus for this research.
9:00 - 9:55 AM Diamond II	Fred Cohen Director Enrollment Research & Analysis New York University	**Another New Way to ScanSurveys: No Number 2 Pencils and No Expensive Scanner Needed -or- How is the NEAIR Conference Evaluation Tabulated?** *Workshare* There are many optical scanners as well as packages to create forms to be used with the scanners. New York University has begun using software which requires only a general purpose scanner to read forms. It has the added benefit of allowing forms to be created in any word processor or graphics program and to be filled out with any writing implement.

October 31 9:00 - 9:55 AM Diamond I	David L.Brodigan VP for Research George Dehne & Associates	**College Student Typologies** *Paper* A familiar set of questions about the goals students have for college and for life is used to create a set of college student personality typologies. These typologies are used further in the measurement of educational progress, quality of student effort, and student satisfaction. The utility of these typologies in admissions efforts has been explored also.
10:00 - 10:25 AM Promenade	**Break**	
10:30 - 11:25 AM Diamond II	Karl Boughan Supervisor, IR Prince George's Community College Patricia Diehl Senior Research Technician Prince George's Community College	**Lifestyles of the Targeted and Enrolled: Using Geo-Demographics for Marketing and Analysis in a Community College Setting** *Paper* Geo-demographic analysis creates a "lifestyle" typology of neighborhoods within a service area by applying sophisticated mapping and statistical clustering techniques to U.S. Census tract data. This paper illustrates the use of geo-demographics for enrollment recruitment and outcomes assessment.
10:30 - 11:25 AM Diamond I	Joseph E. Revelt IR Associate Millersville University of PA Robert J. Brodnick Director of IR and Planning Shippensburg University of PA	**Clustered Learning Program Assessment** *Paper* The Clustered Learning Program groups culturally diverse students together in a core of courses to encourage support structures and academic performance. Clusters remain together throughout their freshman year. This study will evaluate the success of the program in terms of both academic performance and persistence.

October 31 10:30 - 11:25 AM Amphitheater	Helen S. Kerr Director, Research & Analysis Maryland Independent College and University Association Craig A. Clagett Director, IR & Analysis Prince George's Community College	**Defining and Exceeding Campus Expectations for Institutional Research** *Paper* This paper identifies what an institution should expect from its IR office. In addition, the question of what an IR office should expect from its institution will be addressed. The session will conclude with the presentation of a performance monitoring system for the assessment and continuous improvement of institutional research.
10:30 - 11:25 AM Emerald I	Kathleen Kennan Director, IR Massachusetts College of Art Rhonda Gabovitch Director, IR Massosoit Community College	**Evaluating the Impact of a Freshman Seminar Program on Student Development and Retention** *Paper* A freshman seminar course, designed to assist first semester students' adjustment to college and to improve retention, was evaluated over a four year period. Significant impact was found on students' knowledge of campus resources, learning skills, use of support services, career planning, and retention to the second semester.

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