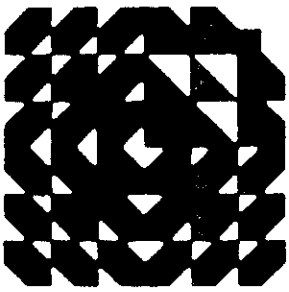
PROCEEDINGS

Twelfth Annual Conference



NORTH
EAST
ASSOCIATION FOR
INSTITUTIONAL
RESEARCH

INSTITUTIONAL RESEARCH: GETTING TO THE CORE

Hartford, CT

Oct. 20-22, 1985

FOREWORD

The Association is deeply indebted to those who made the Twelfth Conference a success.

The program was coordinated by Judith Dozier Hackman of Yale University. It proved to be stimulating, challenging, and of high quality in the NEAIR tradition. Many thanks to Judith for the time, thought, and effort that went into making our time spent in Hartford professionally enriching.

Edward Delaney of Southern Connecticut State University was responsible for all on-site arrangements, the registration process, the special event (the Hartford tour and clambake) as well as taking care of any glitches in the system that might have occurred during the conference. The local arrangements were smooth and splendid. Ed and those who assisted him are to be commended for making our stay in Hartford a pleasant one.

Many, many others assisted both of the above in making the arrangements that virtually created the conference. It is only because we have such talented folks who are willing to expend their time and efforts that NEAIR can move forward and continue to provide a forum for the exchange of ideas and learning each year. The vitality of the Association is a product of this collegial effort. Thanks.

Special appreciation is expressed to Dr. Stephen Joel Trachtenberg, President of the University of Hartford for his keynote address. His insights into the functions and uses of Institutional Research from the executive's vantage point set a helpful tone as the conference began. We thank him for sharing his time and expertise.

We hope that you enjoyed the workshops and workshares created by your colleagues for your enrichment. The panels and papers stimulated much discussion both during and between sessions. We hope that both the novices and veterans left Hartford with new insights and professional contacts.

Thanks to all who submitted papers for publication. We are grateful for the time you took to share your ideas and work.

Nancy Neville, Editor

THE NEAIR LOGO

The NEAIR logo was designed by Sharon Heyenck, MS in Communication Design, Rochester Institute of Technology. Since 1980, it has represented the Association as a professional organization with members actively engaged in an information network. The arrows symbolize the sharing and exchange of ideas among members and others outside the Association. The north east quadrant of the design is highlighted to emphasize the regional orientation. The organized structure of the design symbolizes the disciplined approach to problem-solving which is the contribution made to higher education through the field of Institutional Research.

PROCEEDINGS

TWELFTH ANNUAL CONFERENCE
of the
NORTH EAST ASSOCIATION FOR INSTITUTIONAL RESEARCH

The Parkview Hilton
Hartford, Connecticut
October 20-22, 1985

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DEMOGRAPHIC DECLINE: THE SLIDE FOR LIFE

Dr. John Kraus
Director of Institutional Research
The University of New Hampshire

INTRODUCTION

We are moving into a new era. Historically a growth industry, higher education is facing diminished student "natural" resources. This is especially difficult since the post-Sputnik period of institutional expansion and baby-boomer college populations pushed enrollments to all-time highs. Economic recession and public disenchantment with campus disturbances in the seventies tarnished the luster of the ivory tower. Hopefully, however, student unrest and retrenchment toughened us to meet this new challenge--the enrollment crunch.

DENIAL OR ACCEPTANCE

We have come far since the early 1970's when a few hardy souls were pointing to declining birth rates in the 1950's as potentially reducing the national college age population. Acceptance was a slow and difficult process. A 1973 letter from the Dean of Institutional Research and Planning at the University of New Hampshire to the President refuted projections of declining student population, indicating such projections "...are potentially politically dangerous. Further, they set a tone that pops up often in the document: retrenchment, make-do, caution...I think it would be better to say that enrollments will increase during the next decade and may somewhat level off in the following decade." To another person, he stated, "In regard to your question about what happens if enrollments decline, all I can say is that this is totally unrealistic." He maintained that national trends would be overridden by a stable New Hampshire birthrate and "considerable and continuous" in-migration.

The publication in 1979 of the Western Interstate Commission for Higher Education report, High School Graduates: Projections for the Fifty States, stirred controversy and served to stimulate increasing recognition of the nature of the demographic decline. Suddenly, "enrollment management" is big business. My mail over the last several months included offers from the Ingersoll Group, the College Board Enrollment Planning Service, Barton-Gillet, and Response Analysis.

Attending an "Enrollment Management Conference" would keep me on top of student marketing, while becoming a charter subscriber to College Marketing Alert would help me push "aggressively forward in the increasingly competitive years ahead...."

Yes, we have come a long way, but while the entrepreneurs, consultants, and fad followers are busy making money, are chief executives and political decision makers really convinced that it CAN happen here? How many times recently have we heard that the great strength and quality of our academic programs or the location and attractiveness of our campus will save the day? Or, our region is growing -- we don't have to worry. Political sensitivities last year forced the British government to revise upwards its official projections of university enrollment through the 1990's. The original prediction of sharp drops was now moderated by the "new evidence" of an influx of "young mature entrants." Naturally, British government spending plans were tied to anticipated student enrollments.

Denial of the future reality has been reinforced by current experience. A December, 1983 New York Times article reviewed how the long-expected and much-discussed decline had once again failed to materialize. A page one story the following February noted that top colleges were surprised by a deluge of applicants despite a decline in graduating high school students and rising costs. And applications continued to build, as the Boston Globe indicated in a 1985 story that was an instant replay of the Times article the previous year.

But many were becoming skeptical. One admissions counselor commented, "Somebody, someplace is missing or else everybody is lying. I really do believe the sky is going to fall. It just hasn't fallen yet. I don't think Chicken Little was wrong."

THE APPROACHING CRUNCH

As some colleges quietly veil enrollment losses, other, like Manhattanville College, openly discuss steps taken to reduce their enrollment because of the population drop. Clearly, the message has reached some quarters. The evidence begins to accumulate. New Jersey state colleges and universities post a 2.3 percent decline in Fall, 1984. National Center for Education Statistics reports released within the last six months document fewer high school graduates in 1981-82 and, for the first time since 1978, a decline in public higher education

enrollment in 1983. The NCES "back to school" statistical forecast estimates a reduction of 100,000 students this fall from last fall. An NCES specialist indicates, "We're probably talking about a drop of about five percent or 360,000 full-time students between 1985 and 1990." On the surface, 360,000 students doesn't seem like much against a total of over twelve million in higher education. But this represents about sixty percent of the current full-time enrollment of the general baccalaureate private non-profit institutions and, at a tuition rate of $5,000 per head, it equals over one and three quarter billion dollars in revenues. Spread out over all of higher education, the decline will hurt. Focused in any one sector and it will be killing.

"THE BUBBLE"

The two graphs below display projections of total high school graduates for the United States and by region for 1983 through 1999. The reality of the demographic decline is stark, as much as forty percent in some New England states. But as we stand in the trough of 1985-86, the cliff edge is shielded from view by a slight rise in high school graduates in 1987 and 1988.

Figure 1

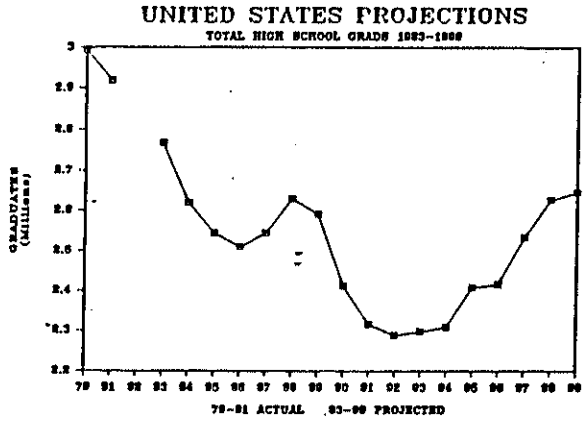
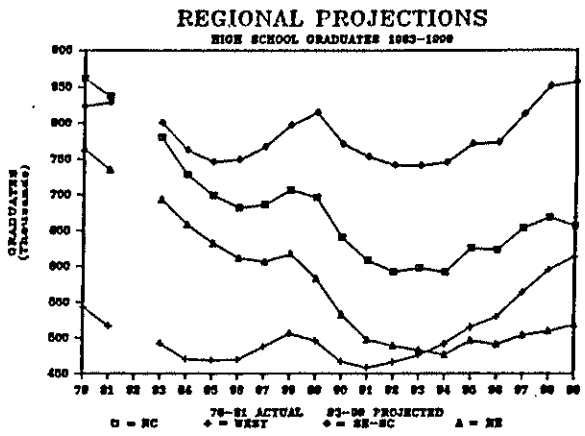


Figure 2



Source: High School Graduates (WICHE), 1984

At the University of New Hampshire, we call this "The Bubble." Its origin is in births in the 1969-1971 period. We believe it is closely related to Vietnam War era draft avoidance. Many couples chose to have children to reduce the risk of military induction. The bubble burst in 1972-74 as the Vietnam concern receded and a serious economic recession intruded into family life. Birth rates fell sharply.

This bubble, however, mocks those endeavoring to increase awareness of the future. We seem to be crying wolf, since in the very short range, there may actually be an up-turn in enrollments. Some may say, "Is that all?" or "See I told you, there's no enrollment decline, it's a myth." Well folks, crawl up to the edge. The view is straight down.

THE FUDGE FACTOR

The bubble directly hides the cliff edge. In other subtle ways, however, we have contributed to obscuring the true onset of the demographic slide.

First, there has been a tendency to over report enrollments. I'm not saying we are given to mendacity. But there may have been some fudging. New methods of counting have probably been employed. Students perhaps not previously included have been incorporated in total figures for example, external degree candidates, and students in overseas programs or participating in exchanges. This may be only a small number at each institution, but in the aggregate, the arrival of the enrollment decline is masked and a false sense of security is fostered.

Second, we must maintain positive, enrollment-healthy institutional images. As the Times has noted, "Some smaller, less selective private colleges, though participating in the application boom, say they are hindered by the specter of not surviving an enrollment decline." No parent wants to invest their dollars or their progeny in a school with falling enrollments which could mean a failing college. Enrollment questions are only whispered in closed circles behind closed doors. We boast of steady enrollments, but don't mention the almost exponential increase in applications required to achieve that goal. Yields are down. We are running uphill to keep level numbers. In itself, this foreshadows problems, but realization of difficulty is lost in our need to protect image. The image makers' fudge sugar coats reality. Almost everyone will choose a box of fudge over a glass of wormwood.

IT CAN'T HAPPEN HERE

Although the reality of demographic decline is now generally acknowledged, we have, as I have indicated, retarded its apparent onset in the present. Consequently, its effect in the future is still often denied. A combination of the following are advances as ameliorating the plunge in the coming years:

- increased participation rates
- minority enrollments
- foreign students
- part-time enrollments
- adult enrollments
- in-migration
- reduced attrition

I remain unconvinced that any of these will save the day.

College participation rates will probably not increase. The Census Bureau has reported that young men who matured during the Vietnam era were educational overachievers, spurred on by draft deferments and the G.I. Bill. The college attendance rates for men during that period exceeded those either before of since. The percentage of women in higher education has continued to increase, but this is a factor of the total attending. And we know that there will be a smaller pool to enroll. College education is no longer perceived as a route to gainful employment. The education is also very expensive. Can we expect increased participation when we have disenchantment coupled with rising costs?

Minority enrollments will not slow the decline. Minorities are indeed a growing portion of the total population with increases in the Hispanic population projected to be especially significant. Minority groups have, however, been only a very small part of the total enrollment in higher education. As the Chronicle of Higher Education recently noted, "While the proportion of black 18 to 24 year olds graduating from high school has never been higher, the proportion of black high school graduates enrolling in colleges has declined steadily in recent years." A combination of demographic, economic, social, and political circumstances are suggested as contributing to this. Since many minority students tend to be less well prepared for college than the traditional college student, substantial increases in their numbers

in higher education will require unlikely dynamic changes.

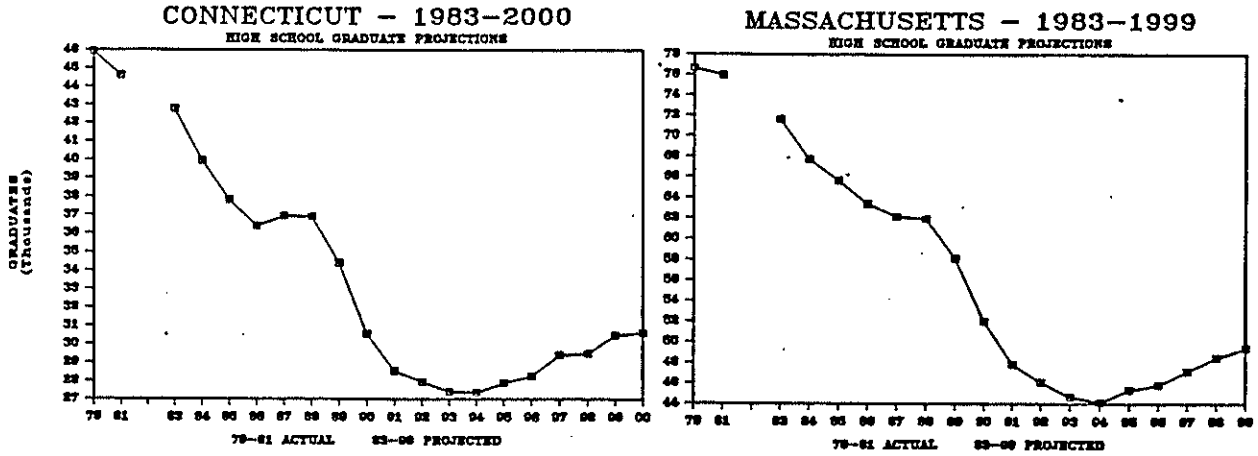
Foreign students are not an answer. They are often expensive to recruit and must run the immigration gauntlet. They can vanish in a flash of international politics. In any significant numbers within an institution, they provide short term revenues and long term problems. The demographic valley is too wide for stop-gap measures. The smaller, rural liberal arts colleges, which may be most seriously hurt by the decline, are least well suited to accommodate foreign students.

Part-time and adult continuing education enrollments are frequently cited as filling the ranks, replacing dwindling numbers of full-time traditional students. This solution is oversold. The numbers are there on the surface. The baby boom wave is now moving into middle age. Many say that this highly educated group will want more education. But perhaps the boomers have had enough. Whatever education they seek could be in limited special programs and advanced work rather than a second bachelor's degree. Other providers in industry and the proprietary sectors are moving to meet such needs. Most important, it takes many part-timers to equal the residential, full tuition, traditional student now filling those expensive dormitories. The 5,204,000 part-time students in higher education in Fall, 1983 equalled only 1,905,000 FTE students or a ratio of nearly 3 to 1.

In-migration is no salvation. Higher education is a small world, and we are playing a zero sum game for the traditional student. State borders are meaningless in guarding our best and brightest from raiders. The better students will be able to go just about anywhere. In New Hampshire, the percentage of applications to four year out-of-state institutions rose from 9.2 in 1973 to 15.1 in 1984.

The graphs on the next page display projected declines in Connecticut and Massachusetts. Institutions in these states will be looking far and wide for students to replace these losses. New England is an interlocking market, a very small neighborhood, and everyone will be peering across the fence at their neighbor's grass.

Reduced attrition or increased retention (depending upon your perspective) is another solution promoted. For years, there has been much talk about student retention, but hard results are difficult to achieve. Even if successful, one would be holding only a slightly larger slice of an ever-shrinking population.



Source: High School Graduates, Supplementary Tables, Northeast Region (WICHE), 1984

SERIOUS SCENARIOS

It is painfully unhappy to paint a picture of the future. The recent ERIC/ASHE monograph on futures research contains possible scenarios for higher education as developed by Richard Heydinger. They offer a future fraught with problems. The most difficult situation would be a double whammy of demographic decline and economic recession. Heydinger portrays it this way, "The long-awaited enrollment decline hits, with full force, and the advent of lifelong learning never materializes. The slumping economy forces the states to make deeper funding cuts and close some campuses." Not a very nice version. Think about it, however. The enrollment decline is a fact. So is the national debt, and there is heightened anxiety about its impact on the economy. This tag team may be the reality of the near future.

A couple of scenarios are certainly likely as we pick up speed on the demographic slide for life.

The first I call the "Here Today, Gone Tomorrow" scenario. Institutions which, on the surface, appear to be sound will suddenly announce bankruptcy, closure, or similar actions. Why no warning? No college or university can risk the appearance of difficulty, as we've already discussed. Parents and students are looking carefully at their educational investment both the immediate costs (which are considerable)

and for long term value. If an institution is perceived as having problems, it will be seen as a bad risk. Therefore, the school will maintain the stiff upper lip and appearances until the very end. When they can no longer continue, finally and suddenly, everything will collapse.

The second, "High Class/Low Class" scenario, envisions higher education dividing into two camps: those getting the good students and continuing with quality programs and those struggling with falling enrollments, poor students, and failing reputations. Others have foreseen this. One small college president said, "It's very frustrating. Corporations only want to support the elite colleges because they know they will make it. This could be a self-fulfilling prophecy because if enough people believe colleges like ours won't make it, then we won't."

A real split in higher education could develop between "good" schools and "bad" schools. The bad schools would be preceived as admitting and graduating anyone. Their degrees would have little value and their academic work would not be accepted by good schools. Their numbers would likely diminish in a descending spiral of closures. In their wake would be many students with no place to go except another equally troubled school. This situation would impair confidence in higher education and undercut participation rates.

HURRICANE PREPARATIONS

What to do? First, we must face the facts. The decline is really going to come. Second, we had better be prepared for it.

It is rather like getting ready for Hurricane Gloria which passed over or close to many of our institutions last month. Gloria was billed as the storm of the century, and indeed she was at the outset. A variety of factors influenced and moderated her destructive powers. All agree that with another 20 miles per hour wind speed or slower passage across land, damage would have have been many fold.

A few hours before Gloria hit it was difficult to envision the threat several hundred miles away. The air was leaden. A light rain fell. One felt foolish wondering if all the taping and boarding of windows was really necessary. Wasn't this just more media hype?

Demographic decline may well be higher education's storm of the century. We cannot easily predict its course or its full power. Indeed

its impact might less than I indicate. But it could also be greater. Many dissimilar unknowns will influence its effect -- inflation, possible compulsory military service, the federal debt, balance of payments, financial aid, the job market, and the value of a college degree.

Unfortunately in a hurricane, the small boats have it the roughest. The big ships can ride out the storm at sea. So with higher education, the small schools must be especially prepared.

The enrollment bubble gives us a lull before the storm. It is difficult to cry danger when all seems relatively calm. But when the winds of decline hit with hurricane force, it is too late to nail up protective plywood or evacuate beach frontage. Take advantage of the lull, shore up the physical plant, weed out marginal programs, avoid long-term additions to staff and faculty, and finally scale down enrollments while increasing quality.

REFERENCES

An Informational Study of New Hampshire Public High School Graduates. New Hampshire State Department of Education, Concord, NH Issued annually

Broyles, S.G. Fall Enrollment in Colleges and Universities, 1983 National Center for Education Statistics, Washington, DC, US Government Printing Office, 1985

Enrollment Drops at Jersey Colleges, New York Times, Feb. 13, 1984, p. B2

Evans, G. Social, Financial Barriers Blamed for Curbing Blacks' Access to College. Chronicle of Higher Education, August 7, 1985, p.1

Fiske, E.B., Colleges Curbing Their Enrollments. New York Times, October 3, 1983, p. 1

Gerald, D.E. Projections of Educational Statistics to 1992-93. National Center for Education Statistics, Washington D.C., US Government Printing Office, 1985

High School Graduates: Projections for the Fifty States, (1982-2000). Supplementary Tables, North East Region. Boulder: Western Interstate Commission for Higher Education, 1984

Hraba, J. Letter to Thomas N. Bonner, University of New Hampshire, August 23, 1973

Hraba, J. Letter to Lila Chase, University of New Hampshire, December 6, 1973

Maeroff, G.I. Top Colleges Find Applicant Deluge New York Times, February 21, 1984, p. 1

McCain, N. N.E. College Applications Continue to Rise. Boston Sunday Globe, February 17, 1985, p. 85

McConnell, W.R. High School Graduates: Projections for the Fifty States Boulder: Western Interstate Commission for Higher Education, 1979

McConnell, W.R. and Kaufman, N. High School Graduates: Projections for the Fifty States (1982-2000). Boulder: Western Interstate Commission for Higher Education, 1984

Morrison, J.L., Renfro, W.L. and Boucher, W.I. Futures Research and the Strategic Planning Process: Implications for Higher Education ASHE-ERIC Higher Education Research Report No. 9, Washington DC, Association for the Study of Higher Education, 1984

Public High School Graduates, 1982-83, NCES Bulletin, May, 1985

Slight Decline Predicted in College Enrollment. Higher Education and Natinal Affairs, September 2, 1985, p. 1

Vietnam War Drew More to College. Foster's Daily Democrat, (Dover, NH) September4, 1984, p. 13

Walker, D. British Government Withdraws Prediction of Sharp Drop in University Enrollment. Chronicle of Higher Education, August 1, 1984 p. 24

RE-EXAMINING THE RELATIONSHIP OF HIGH SCHOOL GRADUATES AND POSTSECONDARY ENROLLMENT IN THE NORTHEAST

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Planners and institutional researchers are well aware of the demographic trends that affect higher education generally as well as the trends for specific states or regions. One of the most publicized of these trends is the current and continuing decline in the number of traditional college age youth and high school graduates in the Northeast. McConnell and Kaufman (1984) estimate that the number of high school graduates in the Northeast will decline sixteen percent between 1981 and 1987, and will reach a low point in 1994 that will be approximately thirty-five percent below the 1981 figure. Declining birth rates and net outmigration of the population in many of the states in the Northeast will make for a realignment of the nation's population, leaving the size of future college age cohorts in the Northeast some twenty to thirty percent smaller than they were in 1981. Despite the compelling logic of these projections, it appears that higher education leaders are moving slowly to address the long-term implications of these demographic changes. This may be due, at least in part, to the fact that total higher education enrollment appears to change more slowly than its components, especially first time enrollments.

The prime elements contributing to the declining numbers of high school graduates in the Northeast are by now well known: declining birthrates throughout the late 1960s and 1970s combined with net outmigration of population from the eleven states (Connecticut, Delaware, Maine, Maryland, Massachusetts, New Hampshire, New Jersey, New York, Pennsylvania, Rhode Island, and Vermont) plus the District of Columbia, which comprise the Northeast region, leave the region with an aging population and radically smaller college age cohort, both now and in the forseeable future (Rogerson and Plume, 1985). The aging of the baby boom cohort ensures that successive cohorts of 18-24 year olds will be much smaller than the cohorts born in the period from 1946 to 1964 and reaching college age in the '60s and '70s (Spencer, 1984). Now that the downward spiral has begun, it may be worthwhile to review and describe

the relationships between the declining traditional college age cohort, represented by the number of high school graduates, and college enrollments in order to see what relationships are apparent, and which still remain subject to further speculation.

OBJECTIVE

This study sought to gather and compare data on high school graduates, first-time enrollments, and total enrollments in public and private institutions for the period 1979 to 1984 in order to describe changes that had occurred and to assess their implication for planning. The study concentrates on the question of whether declining numbers of high school graduates indicate declining enrollments in higher education.

METHOD

In May, 1985, the author sent a letter to the state higher education agency in each of the Northeastern states and the District of Columbia requesting information on the number of high school graduates and fall enrollments for the period from June, 1979 through September, 1984. The request called for a breakdown of enrollment by sector (public or private), by full-time and part-time status, and first-time and total undergraduate enrollment. Officials in ten of the twelve political units responded with all or part of the data requested.* For ease of comparison, this report focuses on five states, which illustrate both the similarities and differences among the states in the region. The analysis focuses on first-time, full-time enrollment, and total full-time enrollment.

FINDINGS AND DISCUSSION

Table 1 summarizes, in percentage terms, the changes in high school graduates, first-time, full-time enrollment, and total full-time enrollment for the five selected states: Connecticut, Maryland, New Jersey, New York, and Pennsylvania. The results vary from state to state and by sector, but generally illustrate the expected declines in high school graduates and first-time enrollments. Figures 1 through 5 depict these trends graphically.

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*The author wishes to acknowledge those individuals and state agencies for their assistance in providing data on enrollments and high school graduates.

HIGH SCHOOL GRADUATES

Declines in the number of high school graduates from June, 1979 to June, 1984 varied from a low of 7.3 percent in Maryland to 14.9 percent in Pennsylvania. These actual figures very somewhat from WICHE projections published in January, 1984, but the variations between the WICHE 1983-84 projections and the actual 1983-84 figures do not alter the overall pattern of decline. No evidence exists to refute the proposition that the number of high school graduates in the late 1980s and early 1990s will be dramatically lower than the number in 1979, 1980, or 1981.

FIRST-TIME, FULL-TIME ENROLLMENT

Variations in first-time, full-time enrollment existed from state to state and by sector within each state, but were apparently unrelated, directly, to changes in the number of high school graduates in the state the previous June. In contrast to a fifteen percent decline in the number of high school graduates in Pennsylvania, first-time, full-time enrollment in public institutions declined only 1.3 percent between fall, 1979 and fall, 1984, while private institutions showed gains of 2.6 percent. New York, with a 13.4 percent decline in high school grads, saw its first-time enrollment in private institutions increase 3.6 percent and its public first-time enrollments decline 8.6 percent. In stark contrast, New Jersey witnessed a 10.6 percent decline in high school graduates and declines of 19.1 percent and 17.1 percent in first-time, full-time enrollment in public and private institutions, respectively. Public institutions in all states experienced greater declines in first-time students than did private institutions. In New York, the brunt of these declines were borne by the two-year colleges. (The study did not request these data from the other states.)

TOTAL FULL-TIME ENROLLMENT

Despite the prevailing declines in first-time enrollment, total full-time enrollment in these five states tended to be stable within modest bounds of variation. Only New Jersey exhibited sharp declines in both its public and private sectors. These gains in four states were surprising because the data reported here deal only with full-time students, omitting part-time students, which are a source of extreme variation and a cushion against declines in total headcount.

PUBLIC vs. PRIVATE ENROLLMENT

Although private sector total full-time enrollment was stronger in three of the five states under consideration, their percentage increases and decreases followed the same pattern, which suggests that they are subject to the same demographic and market forces as public enrollment. Although total enrollment did not fall as dramatically as first-time enrollment, it appears that fall, 1984 marked the beginning of the downward spiral in these states.

IMPLICATIONS

The lack of drama in the enrollments I've described suggests that institutional leaders and planners may be fighting a holding action while scrambling for new enrollments. The demographic "nay-sayers," while not at all incorrect, have failed to produce evidence of an impending decline that will make the collective leadership of institutions and systems take notice. This lack of suspense in the trend data results, most probably, from the increasing sophistication of college admissions and marketing operations and from the relatively strong demand for college graduates in the economy, which may have resulted in increased participation rates for both first-time and continuing students. While we focus our attention on these short term trends we may, however, fail to recognize the long term implications of the deomgraphics in the Northeast:

1. The major decline in high school graduates and first-time students will not occur until the early 1990s.
2. The big decline will follow a period of slower decline in the 1980s that may have lessened the collective ability of higher education to respond to new challenges. For example, short term gains induced by better marketing and program differentiation plus the effects of incremental adjustments and faculty and facilities may leave the bulk of institutions unable to cope with major enrollment declines.
3. The data suggest clearly that there is a lag between changes in first-time enrollments and total enrollments. Thus, there will always be a certain dissonance between those who want to prepare for worst and those who follow the edict of the gentleman from Missouri.

4. Despite the slowing of population outmigration from the Northeast, the region still loses 130,000 to 150,000 individuals per year, many in their 20s, 30s, and 40s, which suggests that the market for recurrent education may not be a strong as it will be in other regions of the country.
5. Differences among states, sectors, and individual institutions suggest that policy development will be difficult and subject to the pulls of competing interests. In light of the long range population declines and the fact that the traditional college age cohort will never return to its previous size, policy makers will have to decide on the relative merits of across-the-board shrinkage in public and private institutions versus more selective means of downsizing.

REFERENCES

McConnell, W. R., and Kaufman, N. S. High School Graduates: Projections for the Fifty States (1982-2000). Boulder, Colorado: Western Interstate Commission for Higher Education, 1984.

Rogerson, P. A., and Plane, D. A. Monitoring Migration Trends. American Demographics, February 1985, 27-29, 47.

Spencer, G. Projections of the Population of the United States, by Age, Sex, and Race: 1983 to 2080. Current Population Reports, Series P-25, no. 952. Washington, D. C.: U. S. Department of Commerce, Bureau of the Census, September 1984.

TABLE 1

HIGH SCHOOL GRADUATES AND FULL-TIME ENROLLMENT BY STATE AND SECTOR

CONNECTICUT	PUBLIC		PRIVATE		
FALL	FIRST-TIME	TOTAL	FIRST-TIME	TOTAL	HIGH SCHOOL GRADUATES
1979	13,189	45,527	8,505	30,641	48,147
1980	12,862	45,913	9,028	31,073	46,064
1981	14,354	46,107	9,010	31,231	46,673
1982	13,343	45,907	8,577	30,271	46,253
1983	12,853	45,914	8,091	30,168	44,936
1984	12,214	44,492	7,948	29,906	44,536 ESTIMATE
% CHANGE	-7.4%	-2.3%	-6.5%	-2.4%	-7.5%

MARYLAND	PUBLIC		PRIVATE		
FALL	FIRST-TIME	TOTAL	FIRST-TIME	TOTAL	HIGH SCHOOL GRADUATES
1979	22,818	85,419	4,035	13,975	61,943
1980	22,619	85,430	3,822	14,442	61,367
1981	22,299	86,019		14,745	60,893
1982	21,478	86,498	3,603	14,544	61,578
1983	21,399	86,886	4,240	14,812	59,353
1984	20,754	84,013	3,967	14,487	57,440
% CHANGE	-9.0%	-1.6%	-1.7%	3.7%	-7.3%

NEW JERSEY	PUBLIC		PRIVATE		
FALL	FIRST-TIME	TOTAL	FIRST-TIME	TOTAL	HIGH SCHOOL GRADUATES
1979	36,357	118,212	8,970	35,058	97,643
1980	36,324	119,491	8,699	35,249	94,564
1981	35,189	119,278	8,301	34,092	94,157
1982	32,988	119,308	8,261	33,969	93,750
1983	32,122	116,922	7,905	32,548	90,048
1984	29,425	110,750	7,432	31,240	87,297
% CHANGE	-19.1%	-6.3%	-17.1%	-10.9%	-10.6%

NEW YORK	PUBLIC		PRIVATE		
FALL	FIRST-TIME	TOTAL	FIRST-TIME	TOTAL	HIGH SCHOOL GRADUATES
1979	95,149	323,109	51,905	209,514	240,054
1980	95,432	325,275	53,128	217,641	235,937
1981	95,858	327,305	52,971	221,149	230,237
1982	90,936	326,738	51,641	220,064	226,856
1983	90,507	328,578	53,232	221,303	216,082
1984	86,929	314,853	53,799	220,326	207,823
% CHANGE	-8.6%	-2.6%	3.6%	5.2%	-13.4%

PENNSYLVANIA	PUBLIC		PRIVATE		
FALL	FIRST-TIME	TOTAL	FIRST-TIME	TOTAL	HIGH SCHOOL GRADUATES
1979	46,457	161,701	41,960	138,119	181,480
1980	47,191	164,179	42,315	140,599	170,646
1981	47,611	167,017	42,807	147,126	169,095
1982	48,661	170,715	45,002	146,855	167,541
1983	48,304	172,933	49,522	152,710	160,329
1984	45,840	171,145	43,061	143,684	154,412
% CHANGE	-1.3%	5.8%	2.6%	4.0%	-14.9%

FIGURE 1

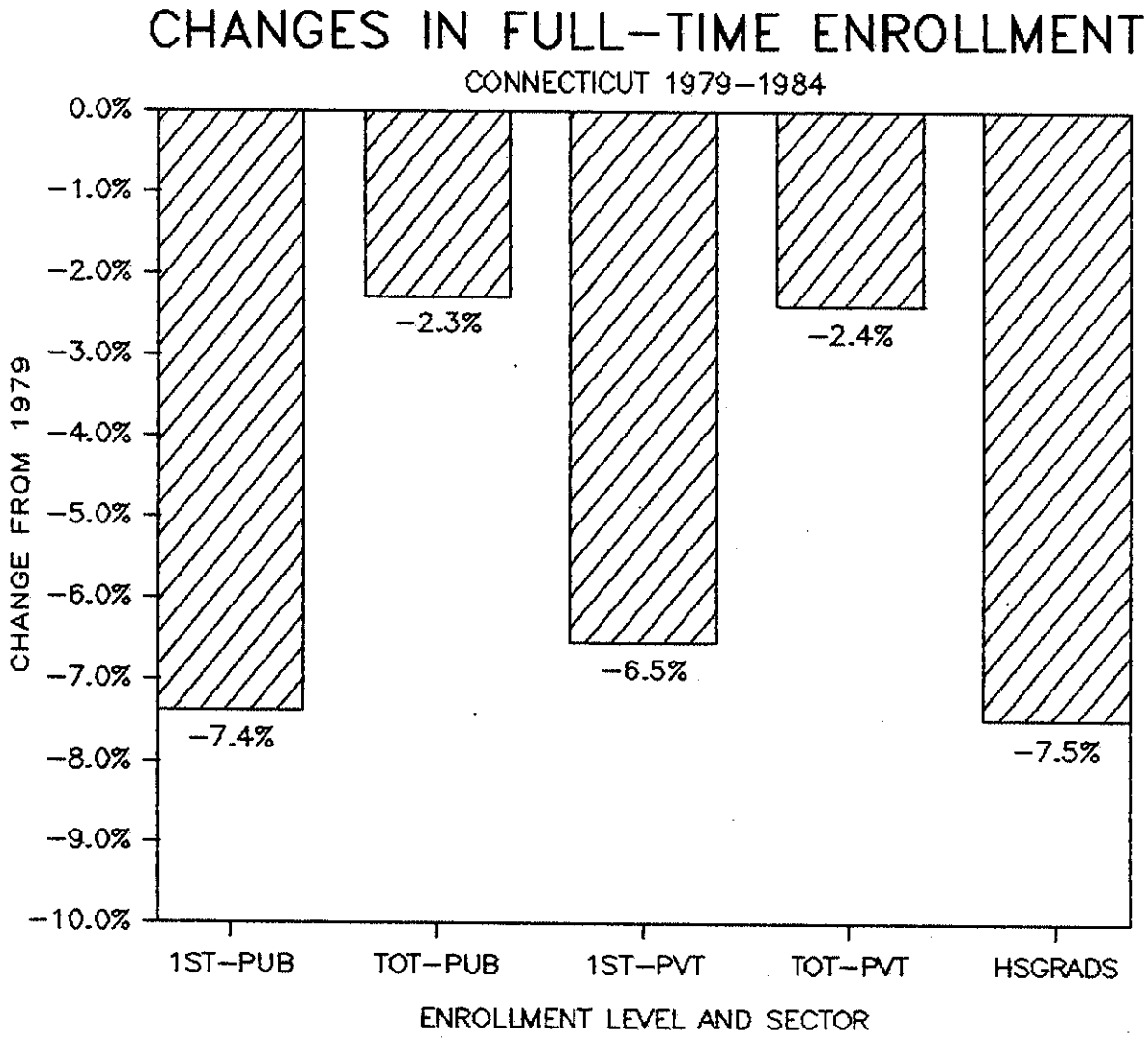

CHANGES IN FULL-TIME ENROLLMENT
CONNECTICUT 1979-1984
0.0%
-1.0%
-2.0%
-3.0%
-4.0%
-5.0%
-6.0%
-7.0%
-8.0%
-9.0%
-10.0%
CHANGE FROM 1979
-7.4%
-2.3%
-6.5%
-2.4%
-7.5%
1ST-PUB
TOT-PUB
1ST-PVT
TOT-PVT
HSGRADS
ENROLLMENT LEVEL AND SECTOR

FIGURE 2

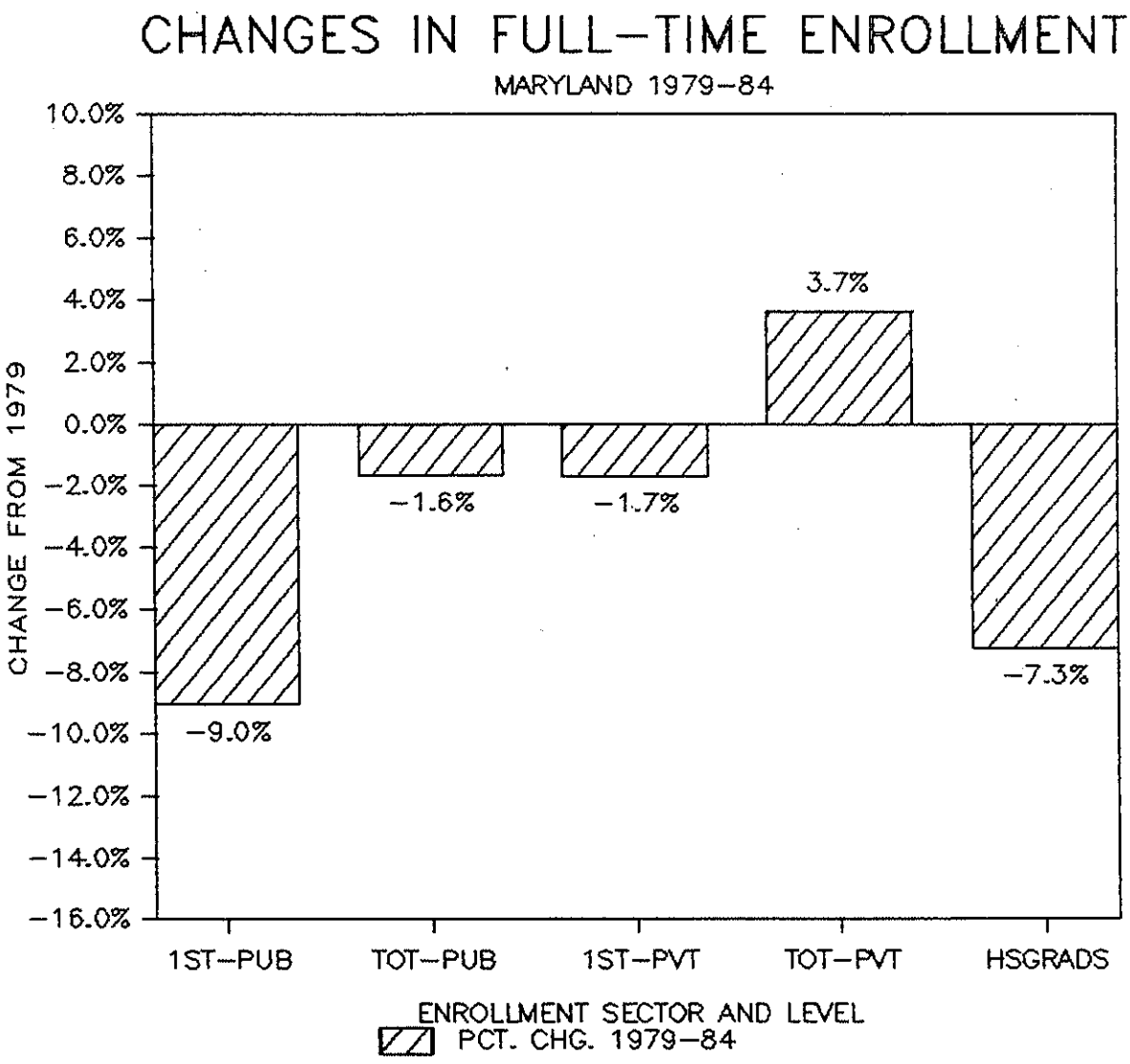

CHANGES IN FULL-TIME ENROLLMENT
MARYLAND 1979-84
CHANGE FROM 1979
10.0%
8.0%
6.0%
4.0%
2.0%
0.0%
-2.0%
-4.0%
-6.0%
-8.0%
-10.0%
-12.0%
-14.0%
-16.0%
-9.0%
-1.6%
-1.7%
3.7%
-7.3%
1ST-PUB
TOT-PUB
1ST-PVT
TOT-PVT
HSGRADS
ENROLLMENT SECTOR AND LEVEL
PCT. CHG. 1979-84

FIGURE 3

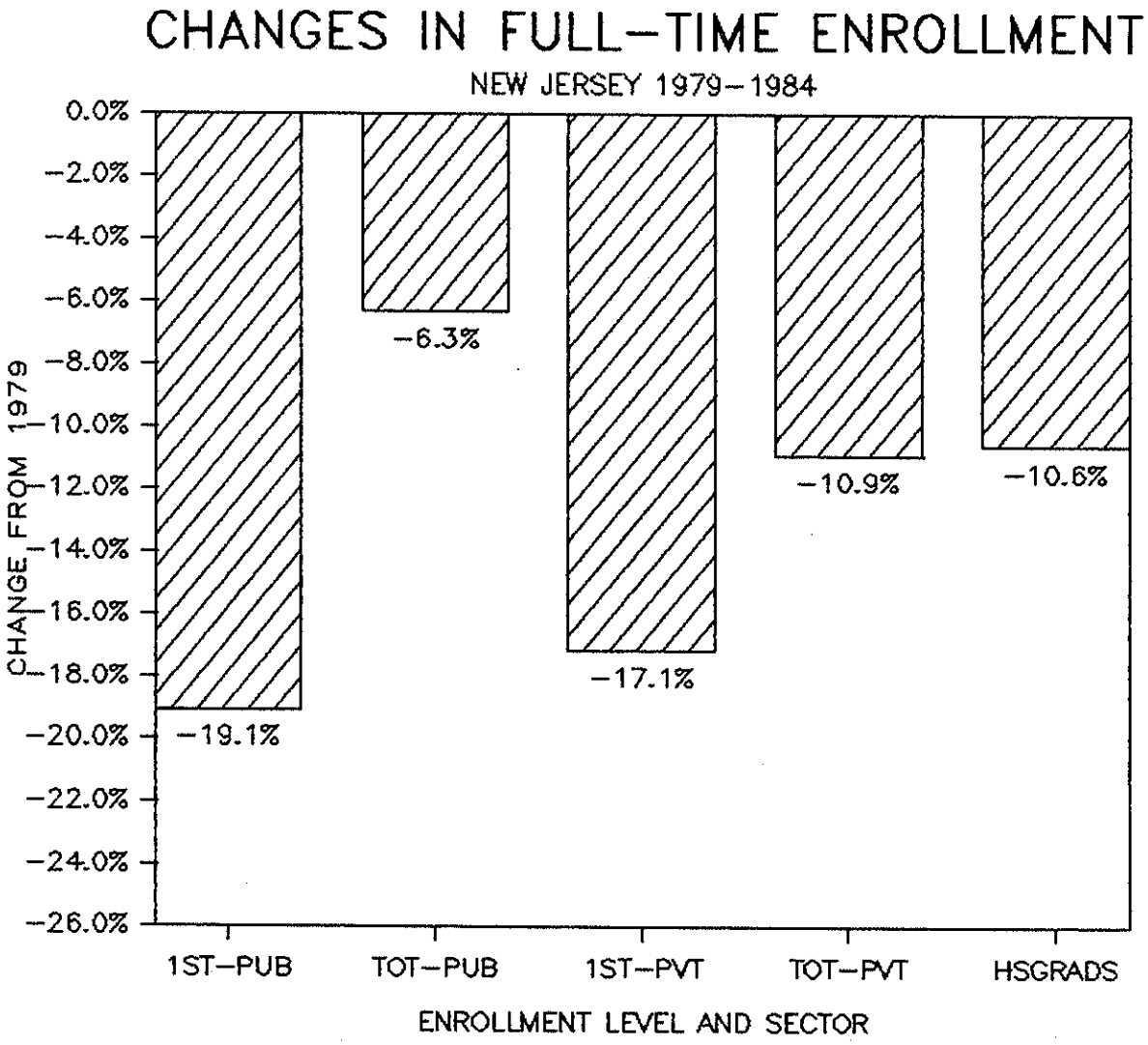

CHANGES IN FULL-TIME ENROLLMENT
NEW JERSEY 1979-1984
0.0%
-2.0%
-4.0%
-6.0%
-8.0%
-10.0%
-12.0%
-14.0%
-16.0%
-18.0%
-20.0%
-22.0%
-24.0%
-26.0%
CHANGE FROM 1979
-19.1%
-6.3%
-17.1%
-10.9%
-10.6%
1ST-PUB
TOT-PUB
1ST-PVT
TOT-PVT
HSGRADS
ENROLLMENT LEVEL AND SECTOR

FIGURE 4

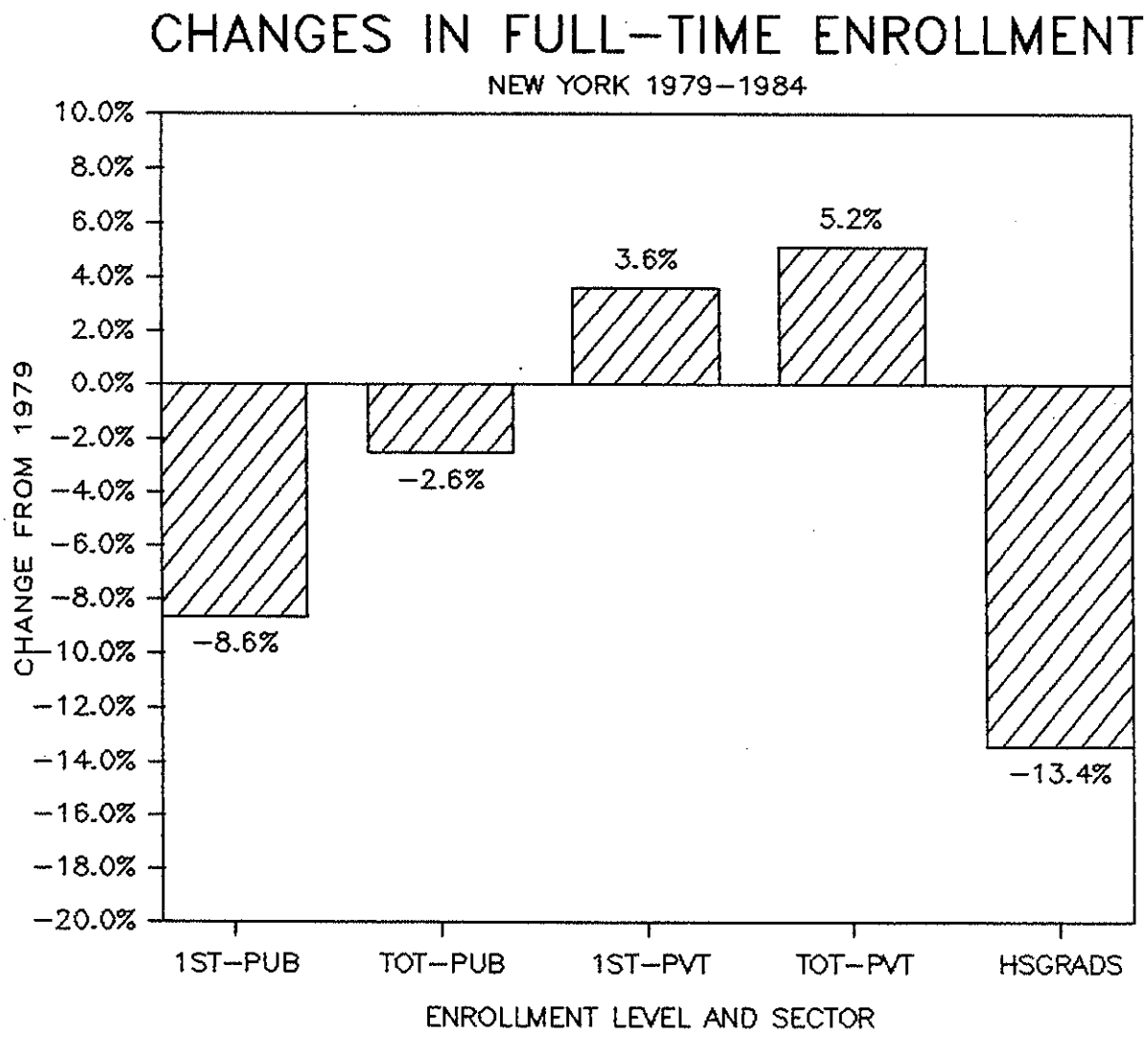
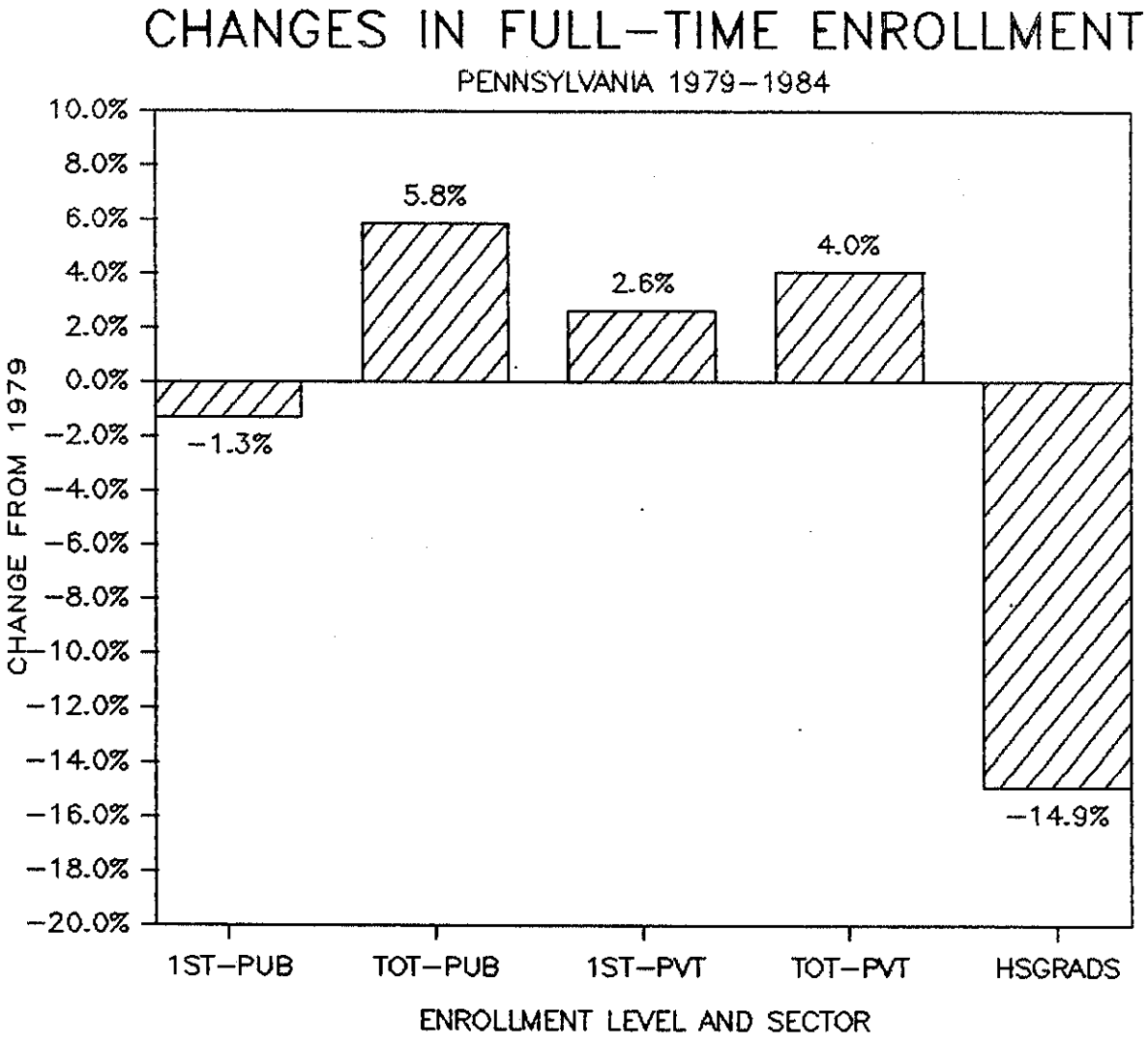

CHANGES IN FULL-TIME ENROLLMENT
NEW YORK 1979-1984
10.0%
8.0%
6.0%
4.0%
2.0%
0.0%
-2.0%
-4.0%
-6.0%
-8.0%
-10.0%
-12.0%
-14.0%
-16.0%
-18.0%
-20.0%
CHANGE FROM 1979
-8.6%
-2.6%
3.6%
5.2%
-13.4%
1ST-PUB
TOT-PUB
1ST-PVT
TOT-PVT
HSGRADS
ENROLLMENT LEVEL AND SECTOR

FIGURE 5


CHANGES IN FULL-TIME ENROLLMENT
PENNSYLVANIA 1979-1984
10.0%
8.0%
6.0%
4.0%
2.0%
0.0%
-2.0%
-4.0%
-6.0%
-8.0%
-10.0%
-12.0%
-14.0%
-16.0%
-18.0%
-20.0%
CHANGE FROM 1979
5.8%
2.6%
4.0%
-1.3%
-14.9%
1ST-PUB
TOT-PUB
1ST-PVT
TOT-PVT
HSGRADS
ENROLLMENT LEVEL AND SECTOR

TRENDS IN COMPETITIVE MARKET SHARES: A GEOGRAPHIC ANALYSIS OF SUNY FRESHMEN IN THE 1980s

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INTRODUCTION

Enrollment management and marketing for traditional students in New York State is a difficult occupation. The number of high school graduates has already declined significantly: ten percent between 1979 and 1983. Further decline is expected. Projections from the New York State Education Department (1984) anticipate an additional twenty percent loss through 1990. Within the public State University of New York (SUNY) system, since tuition is not a factor in the college choice process, a major emphasis is being placed on competitive geographic market shares in a declining environment. This paper graphically examines some recent trends in SUNY market shares and illustrates some possible scenarios based upon projected high school graduates.

DATA SOURCES AND METHODOLOGY

Data on recent and projected New York State high school graduates by county are readily available (New York State Department of Education, 1983 and 1984). SUNY publishes the number of first-time, full-time freshmen by county each year. The 1980-81, 1983-84, and projected 1989-90 high school graduate information and the SUNY University College Fall 1981 and Fall 1984 Freshman Data (SUNY 1983 and 1985) were selected for analysis. Several other variables were developed from this base using LOTUS 1-2-3 (1983). Specifically, the percent of change in high school graduates between 1984 and 1990; the fall, 1984 market shares; the estimated number of full-time 1990 freshmen based on the 1984 market shares; and the required change in market shares to achieve the 1984 freshman levels in 1990 were calculated for all University Colleges and for Brockport. This LOTUS worksheet was translated into a DIF file and loaded into the Atlas Advanced Mapping Package (1985) for graphing.

RESULTS

Figure 1 is a map of the projected number of New York State high school graduates in 1989-90. This shows an expected pattern of high values in the New York City and Long Island counties and low values in Northern, Central, and Southern Tier areas. However, Figure 2 shows the percent decline between 1984 and 1990. New York City counties have nearly a ten percent decline and Long Island is expected to have over twice that loss. Several of the smaller upstate counties have much smaller losses, or in once case, an increase. This creates a conflict in targeting large, but rapidly declining, counties where competiton can be expected to be more intense, or smaller counties where the decline will be less dramatic.

Figures 3, 4, and 5 provide a description of the University College environment in which these choices can be made. Figure 3 shows the fall, 1984 market share that was achieved in each county. The highest shares are in parts of Northern, Central, and Western New York, while the lowest shares are in the New York City, Hudson Valley, and Southern Tier areas. Figure 4 estimates the number of full-time freshmen in fall 1990 if the market shares remain stable. Key enrollment areas remain in the New York City, Long Island, and Western New York areas, which are those areas anticipating the greatest declines. Finally, Figure 5 contains the increases in market share needed in 1990 to achieve the same number of full-time freshmen as in 1984. Large share increases are needed in parts of Northern, Western, and Central New York, as well as in Suffolk County. Small increases are needed in New York City and the Southern Tier.

The same type of analysis was performed for one institution, SUNY College at Brockport, in Figures 6, 7, and 8. Figure 6, the fall, 1984 market share, shows that Brockport is a regionally focused college for full-time freshmen. High market shares are concentrated in the Rochester area and Western New York. Moderate share values are generally in Central New York, with low values in New York City and Long Island, even with its low market share. Finally, Figure 8 emphasizes that market shares need to be incresed in Erie and Monroe Counties, which provide the largest enrollments, if fall, 1984 enrollment levels are to be maintained.

FIGURE 1

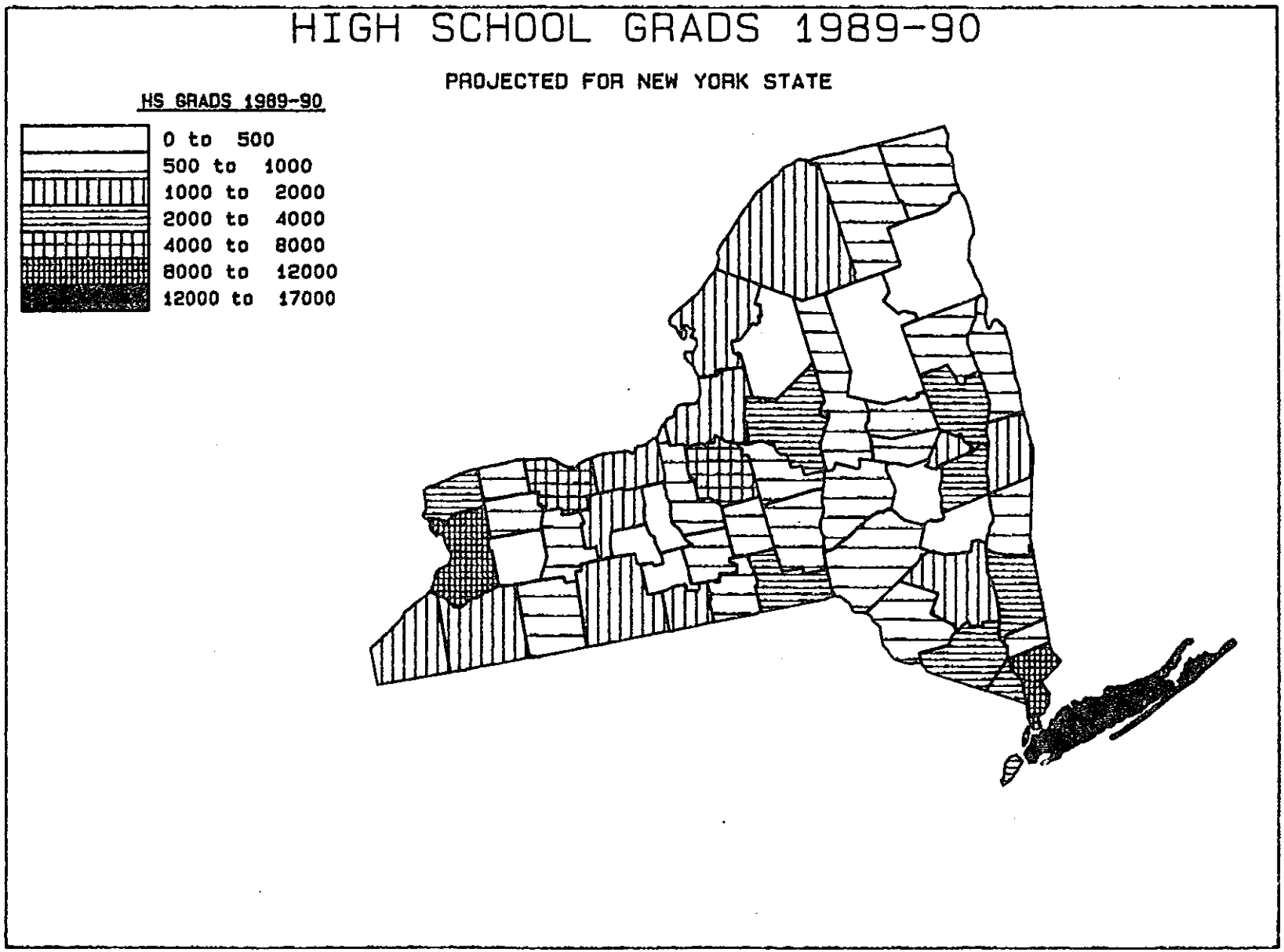

HIGH SCHOOL GRADS 1989-90
PROJECTED FOR NEW YORK STATE
HS GRADS 1989-90
0 to 500
500 to 1000
1000 to 2000
2000 to 4000
4000 to 8000
8000 to 12000
12000 to 17000

FIGURE 2

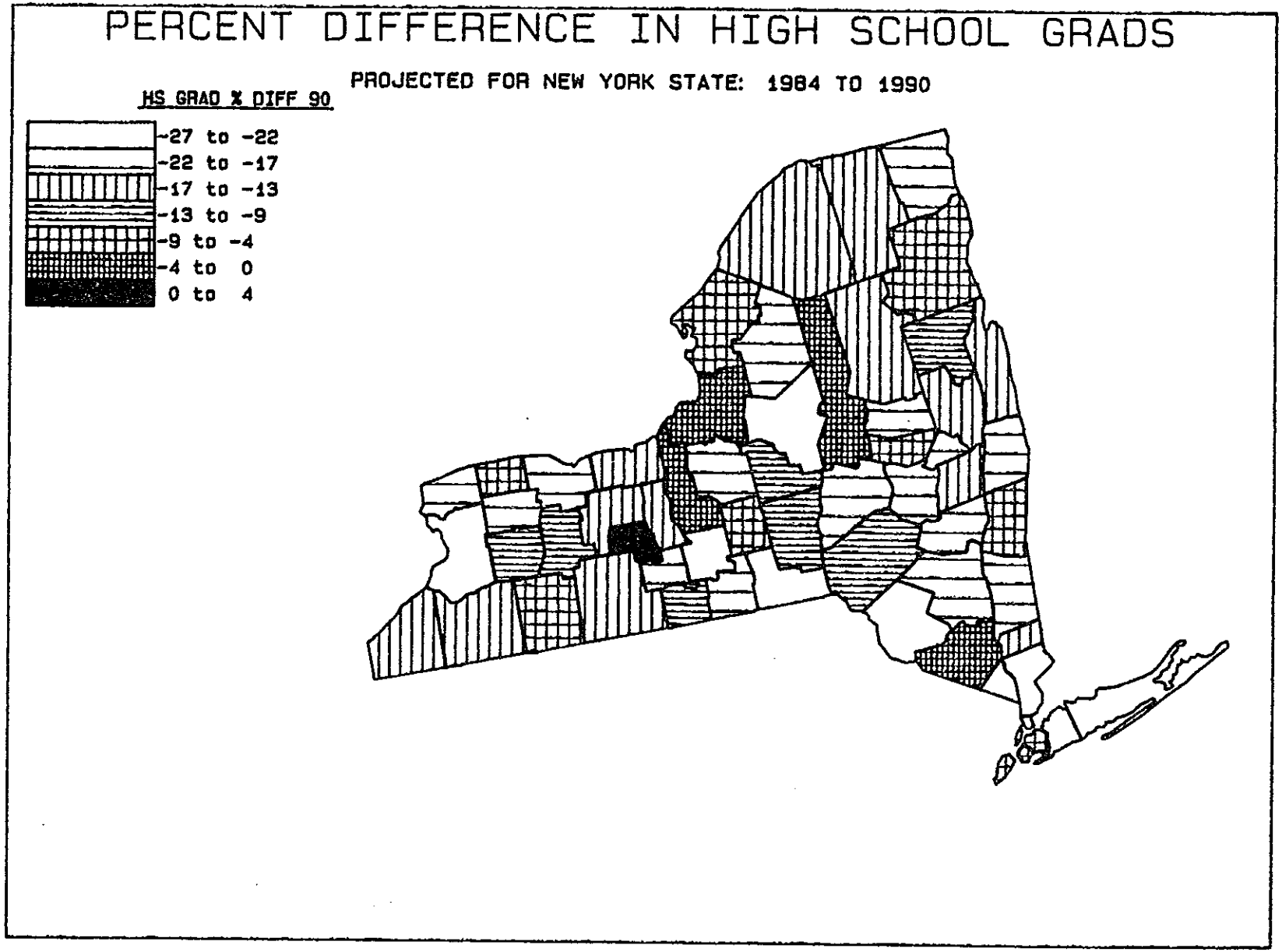

PERCENT DIFFERENCE IN HIGH SCHOOL GRADS
PROJECTED FOR NEW YORK STATE: 1984 TO 1990
HS GRAD % DIFF 90
-27 to -22
-22 to -17
-17 to -13
-13 to -9
-9 to -4
-4 to 0
0 to 4

FIGURE 3

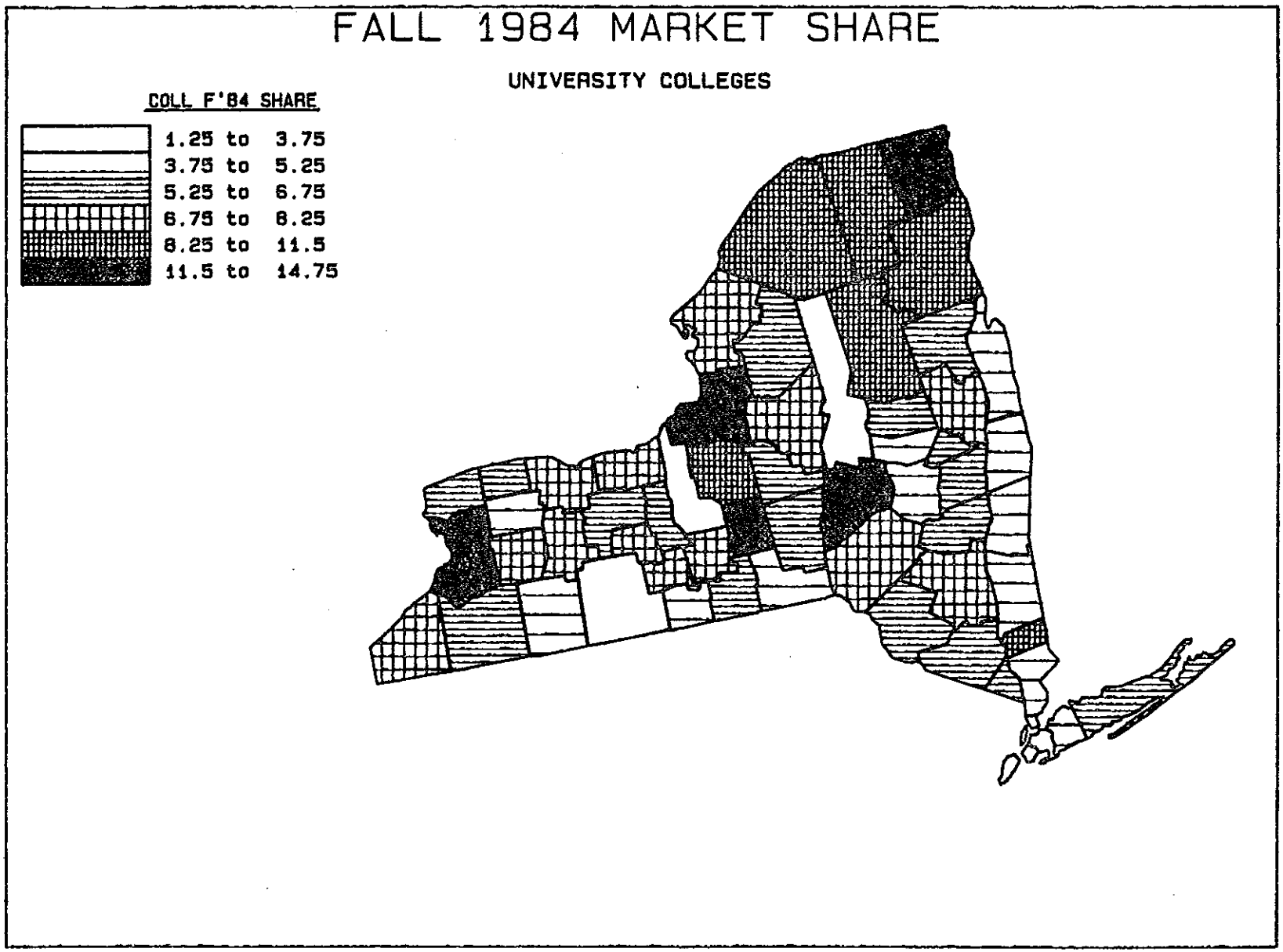

FALL 1984 MARKET SHARE
UNIVERSITY COLLEGES
COLL F'84 SHARE
1.25 to 3.75
3.75 to 5.25
5.25 to 6.75
6.75 to 8.25
8.25 to 11.5
11.5 to 14.75

FIGURE 4

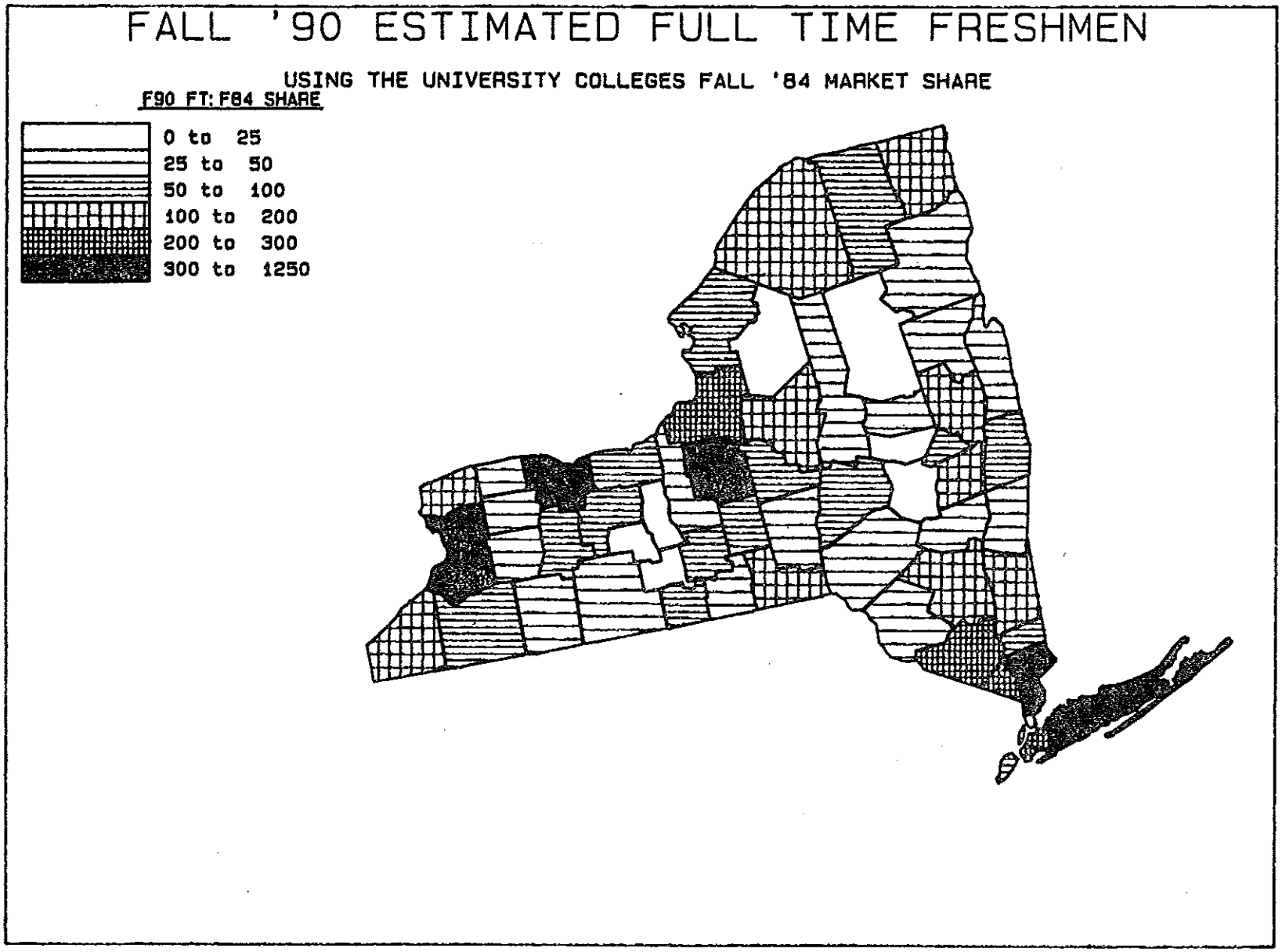

FALL '90 ESTIMATED FULL TIME FRESHMEN
USING THE UNIVERSITY COLLEGES FALL '84 MARKET SHARE
F90 FT: F84 SHARE
0 to 25
25 to 50
50 to 100
100 to 200
200 to 300
300 to 1250

FIGURE 5

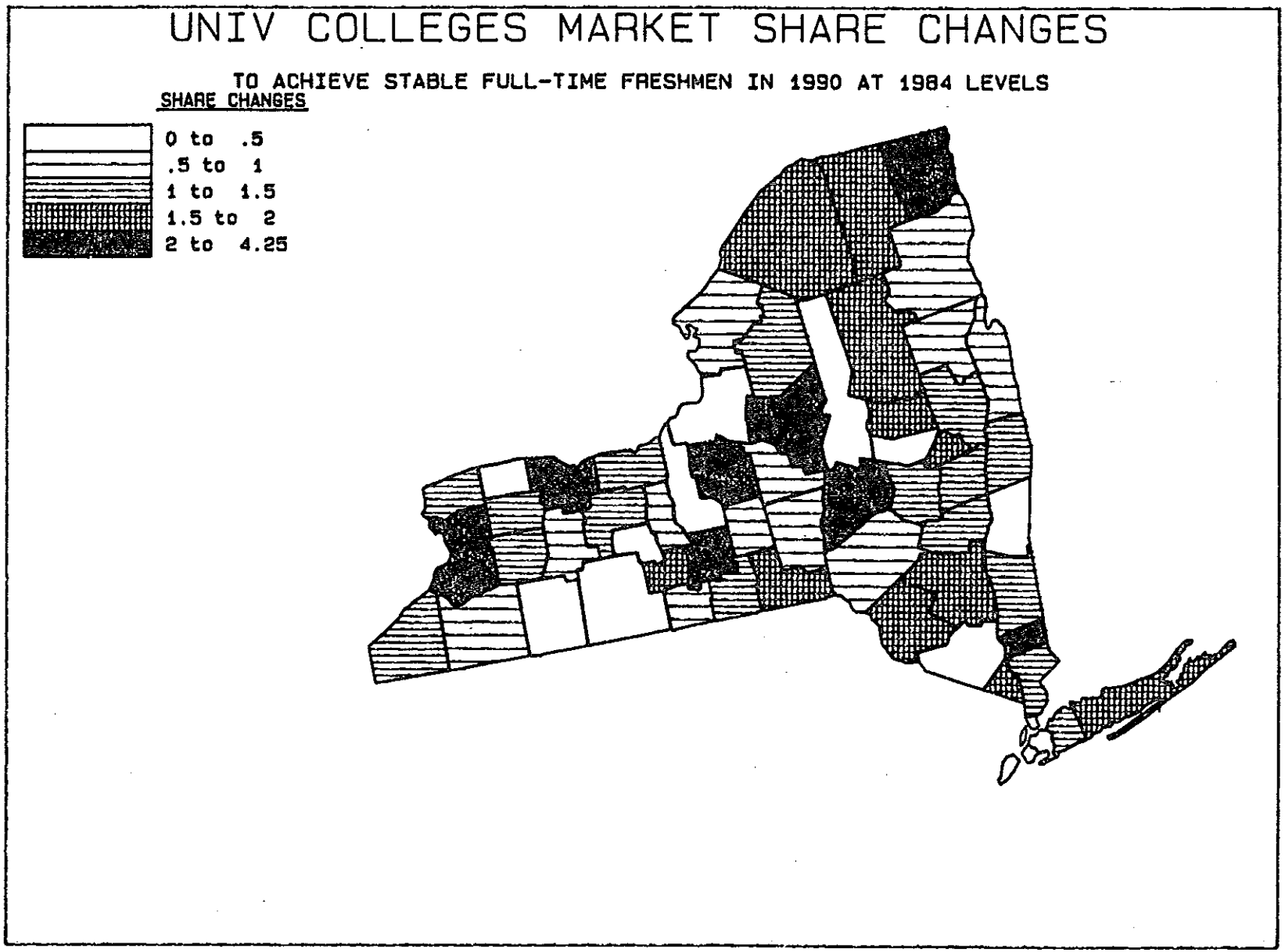

UNIV COLLEGES MARKET SHARE CHANGES
TO ACHIEVE STABLE FULL-TIME FRESHMEN IN 1990 AT 1984 LEVELS
SHARE CHANGES
0 to .5
.5 to 1
1 to 1.5
1.5 to 2
2 to 4.25

FIGURE 6

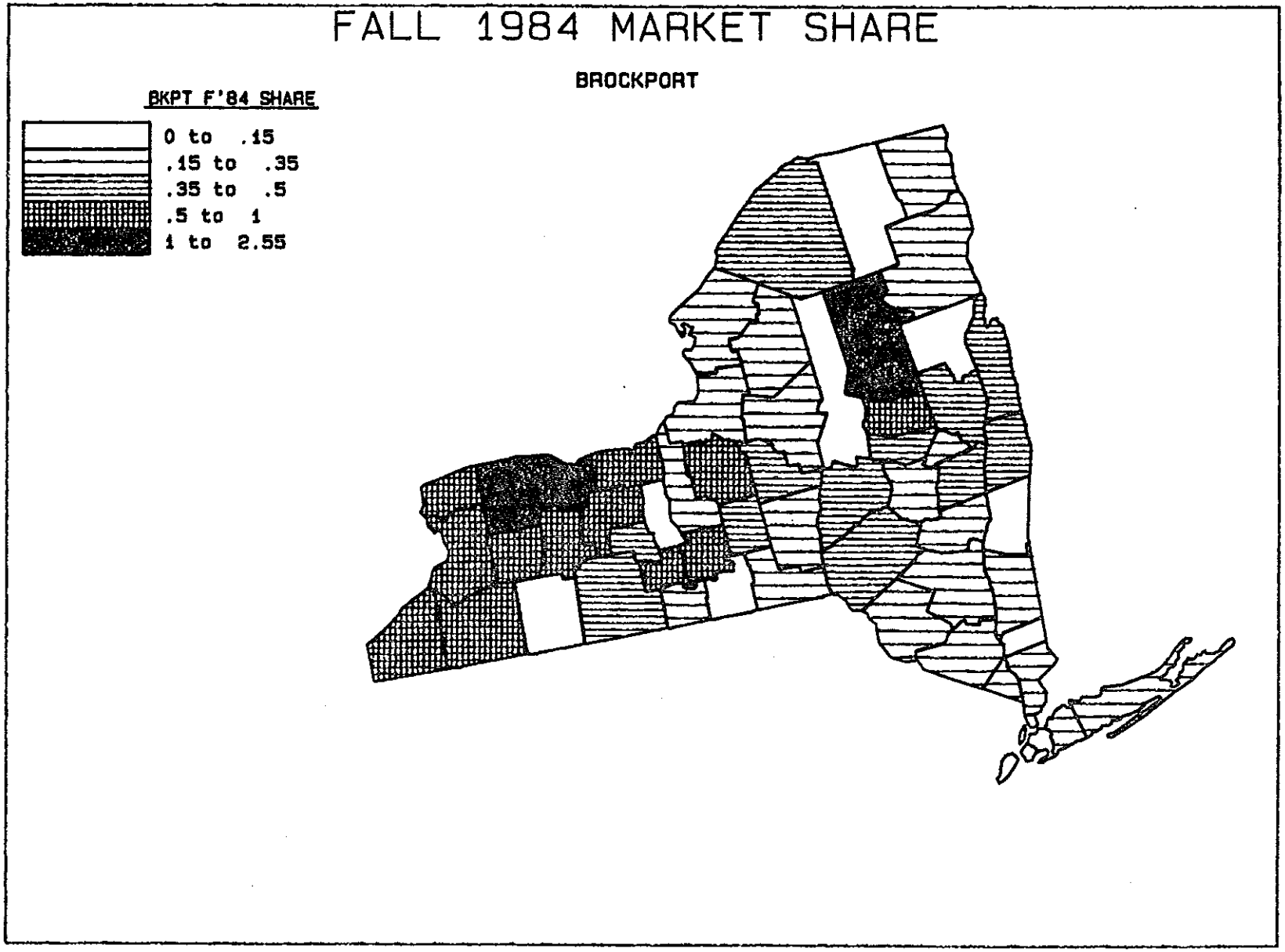

FALL 1984 MARKET SHARE
BROCKPORT
BKPT F'84 SHARE
0 to .15
.15 to .35
.35 to .5
.5 to 1
1 to 2.55

FIGURE 7

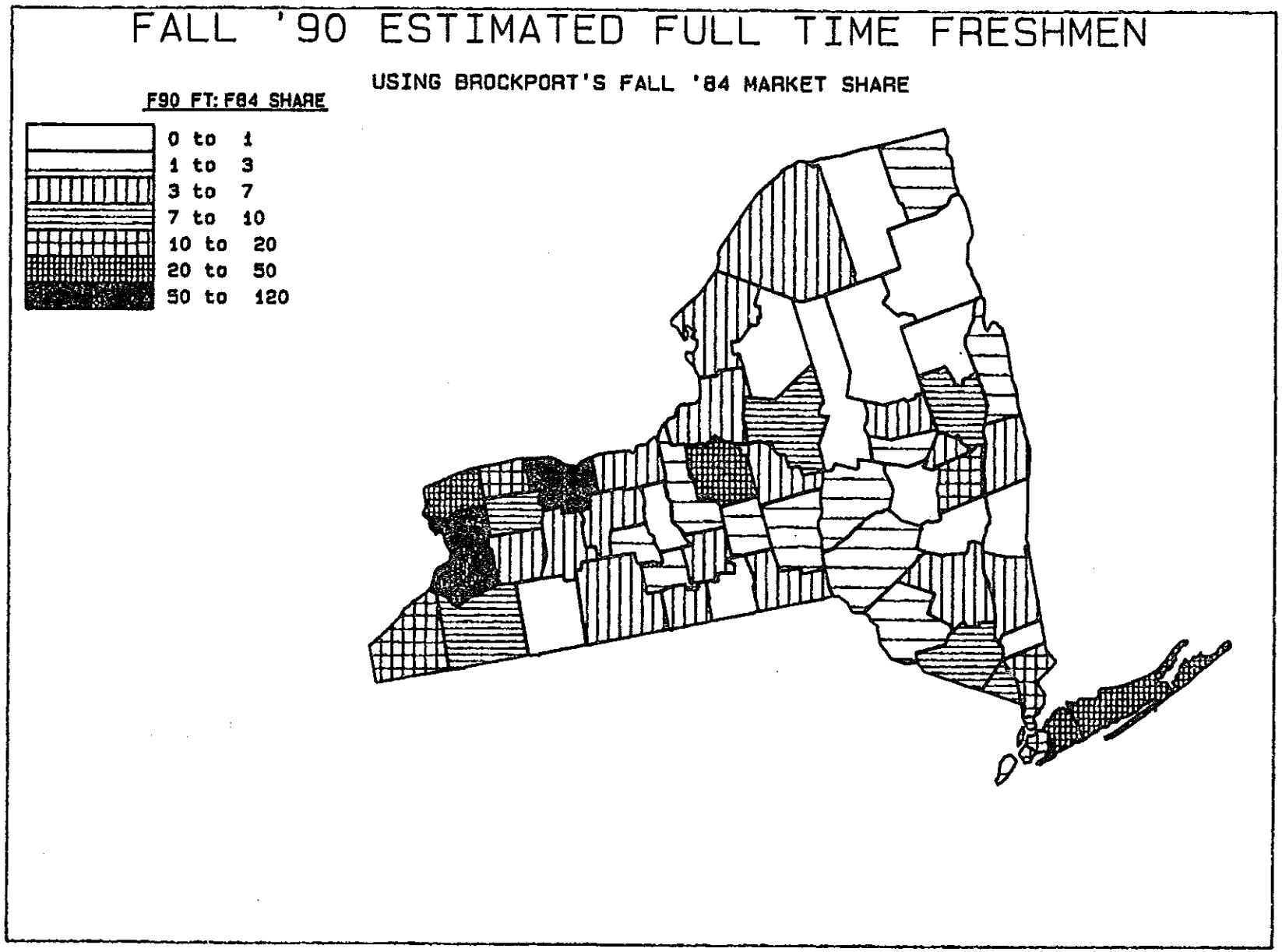
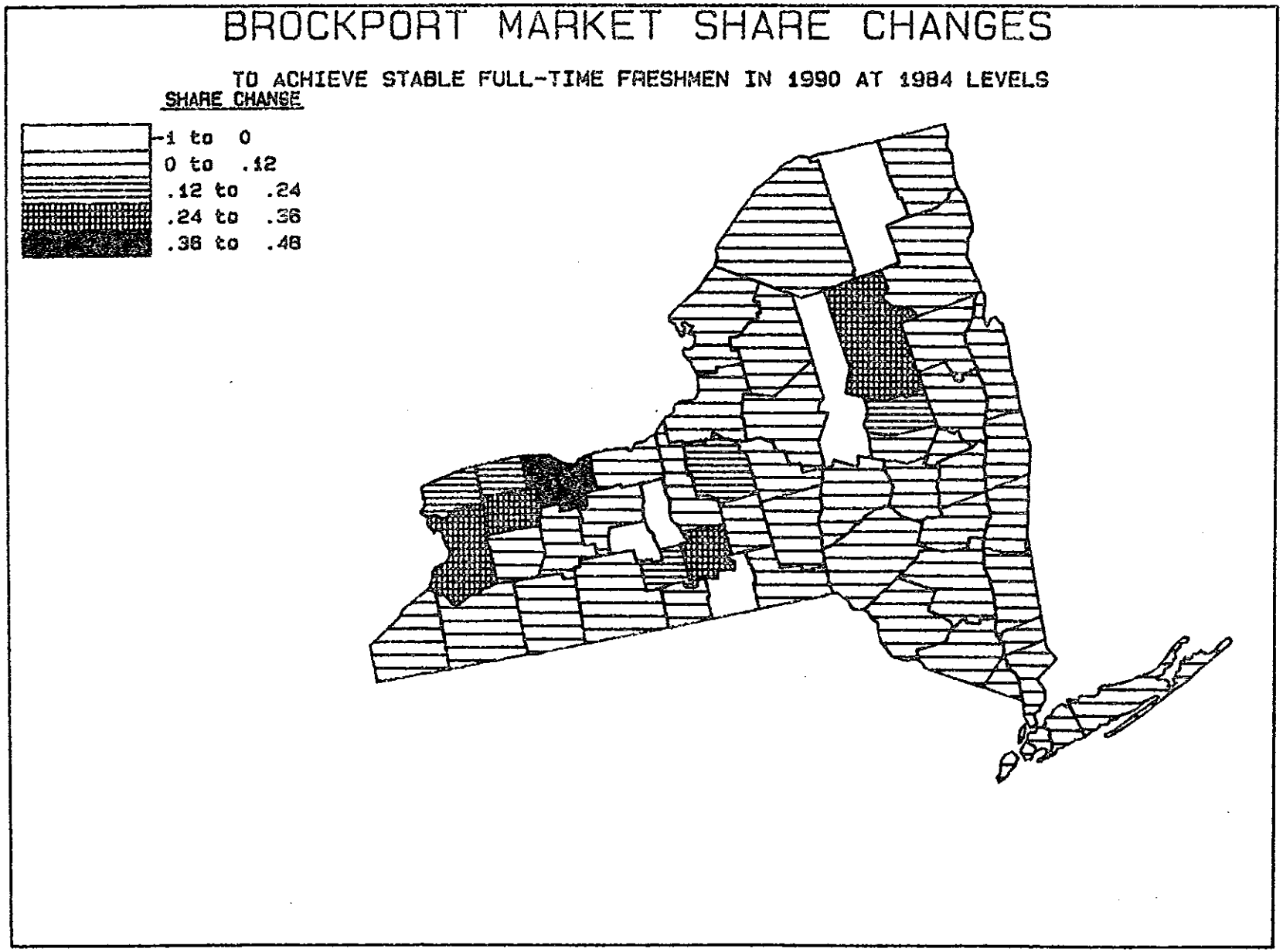

FALL '90 ESTIMATED FULL TIME FRESHMEN
USING BROCKPORT'S FALL '84 MARKET SHARE
F90 FT: F84 SHARE
0 to 1
1 to 3
3 to 7
7 to 10
10 to 20
20 to 50
50 to 120

FIGURE 8


BROCKPORT MARKET SHARE CHANGES
TO ACHIEVE STABLE FULL-TIME FRESHMEN IN 1990 AT 1984 LEVELS
SHARE CHANGE
-1 to 0
0 to .12
.12 to .24
.24 to .36
.36 to .48

CONCLUSIONS

The use of geographic marketing software allows institutional researchers to uncover underlying patterns within their enrollment and demographic data. The analyses shown provide a basis for decisionmaking in the admissions and recruitment process and can lead to better evaluation of results. Many other applications can be examined with this software, including application, yield, and attrition rates.

REFERENCES

Atlas Advanced Mapping Package, Strategic Locations Planning, San Jose, CA, 1985.

LOTUS 1-2-3, Lotus Development Corporation, Cambridge, MA, 1983.

New York State Education Department, "Revised Projections of Public and Nonpublic High School Graduates, 1982-83 to 2001-02", Albany, NY, 1983.

New York State Education Department, "Revised Projections of Public and Nonpublic High School Graduates, 1983-84 to 1999-2000", Albany, NY, 1984.

State University of New York, "Geographic Origins of First-Time Students Fall 1980 and Fall 1981", Albany, NY, 1983.

State University of New York, "Geographic Origins of Students Fall 1984", Albany, NY, 1985.

LENGTH OF STAY AS A FACTOR IN ENROLLMENT SIZE

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Rochester Institute of Technology

INTRODUCTION

As colleges and universities face the effects of a shrinking pool of traditional college age students, more attention is being given to enrolling new student cohorts to fill the enrollment gap created by fewer young people. Marketing strategies and program developments are focusing more on transfer students, graduate students, part-time students, and retraining students for new careers.

When shifts in the type of student being served occur, there should be resultant shifts in the rate of flow of students through the institution. During the years when colleges had an abundance of students to meet their enrollment goals, they had to admit only enough students to maintain projected enrollment levels. Little attention was given to attrition, or, more importantly, how long a student continued in the educational environment. Yet, as this paper will demonstrate, the length of stay for students is as important a factor in enrollment maintenance as is meeting specified admission goals. However, the impact on enrollment of the interaction between the parameters of number of enrollees and length of stay have rarely been modelled for the university setting.

The purpose of this paper is to document the relationship between length of stay and admission levels on overall Full-Time Equivalent (FTE) enrollment in a private, urban, technical institution which is predominantly undergraduate. The findings should provide some insight for planners concerning the effects of changing student mixes on enrollment size. In addition, a model will be presented for use in evaluating the effects of program changes on overall student enrollment.

LITERATURE

Lyell and Toole (1974) describe seven methodologies for projecting enrollments at the post-secondary level and indicate that attempts at forecasting student enrollments and estimating the student flow through academic programs must become an ongoing activity at the institution.

The literature generally indicates that knowing the historical trends related to student flow is essential to any accurate projection model. Yet the historical information is often a major roadblock in model construction. However, most of the past literature such as Lin (1968), Wasik (1970) and Oliver and Hopkins (1972) has developed models for enrollments of large state university systems which draw, for the most part, from a well known pool of high school graduates within a given state.

Another focus in the more recent literature has been with analysis of the variables related to preferences in choice of a college and prediction of college choice. Krampf and Heinlein (1981) and Maguire and Lay (1981) have tried to predict matriculation using variables related to the university's image. Most recently, Tiffany (1985) has described the use of an econometric model for enrollment projections at the University of South Alabama and East Tennessee State University. This model used data from unemployment rates and a Help Wanted Index to predict seasonal changes in enrollment at these institutions.

Generally, the majority of the literature has focused on variables external to the institution to predict enrollment of new students, with little attention given to documenting the internal variables in the institution that can affect the enrollment figures. While it is recognized that the inputs into the eucational system are of primary concern, the rates at which these inputs are processed by the institution also play an important part in maintaining enrollment numbers. The purpose of this paper is to document this fact by demonstrating how length of stay affects enrollment size.

METHOD

The method for this study consisted of calculating mean Cohort Survival Rates (CSR's) for students who entered the Rochester Institute of Technology during the academic years 1976, 1977, and 1978. The CSR's were established by calculating the percent of students who continued to be enrolled each year over a seven year period. The CSR's were calculated for six groups of students: full-time and part-time non-transfer undergraduates, full-time and part-time transfer undergraduates, and full-time and part-time graduate students. These groups were chosen because they represent the major target groups for recruiting and,

potentially, differing lengths of stay in the pursuit of a degree.

Using the survival rates developed through the above analysis, a model was developed to estimate enrollment in the institution given the specified size of an entering class. The interactions of the number of new students and the CSR's provide input sufficient to model enrollment for the Rochester Institute of Technology. The rest of this paper will expolore the results of applying this approach to determine enrollment size.

RESULTS

Table 1 reports the mean CSR's for the six cohorts of entering students. It can be observed that that group of full-time transfer students has a higher rate of survival after one year, than does any other group, while the part-time non-transfer group has the lowest survival rate after the first year. Full-time graduate students have the overall shortest survival rate in the Institute. It must be pointed out that these rates of survival are the result of a combination of attrition, and the time it takes to complete a degree program. Full-time graduate students traditionally take courses for a shorter prioed of time than do undergradute non-transfers and transfers, while the part-time student group traditionally has the highest level of attrition for any entering cohort.

Table 1. Mean Cohort Survival Rates (CSR) for six groups of students entering the Rochester Institute of Technology

Entering Classification	Yearly Return Rate 1st	2nd	3rd	4th	5th	6th	7th
Full-time Non-transfer	1.00	.78	.64	.59	.27	.07	.05
Full-time Transfer	1.00	.82	.58	.15	.07	.01	.00
Full-time Graduate	1.00	.70	.15	.02	.01	.00	.00
Part-time Non-transfer	1.00	.27	.19	.15	.12	.09	.07
Part-time Transfer	1.00	.56	.37	.17	.09	.06	.05
Part-time Graduate	1.00	.53	.39	.17	.16	.09	.05

To more fully illustrate the differences in length of stay, it is possible to calculate, from Table 1, a length of stay in years and a standard deviation for each of the six groups. Table 2 illustrates that entering full-time non-transfers have the longest average length of stay and full-time graduate students the shortest length of stay.

Table 2. Average length of stay (in years) for six cohorts of students entering RIT in 1976, 1977, 1978

Entering Classification	Average length of stay	Standard Deviation
Full-time Non-transfer	3.13	1.80
Full-time Transfer	2.33	1.34
Full-time Graduate	1.58	1.08
Part-time Non-transfer	1.65	1.98
Part-time Transfer	2.02	1.67
Part-time Graduate	1.79	1.78

The results presented in Tables 1 and 2 have implications for enrollment planning. Using the CSR's presented in Table 1 and projected new student enrollments, it is possible to simulate enrollment trends in an institution. For the purposes of this paper, we will develop a hypothetical institution with yearly admission patterns presented in Table 3.

Using the CSR's presented in Table 1, and the number of new students admitted each year (Table 3), it is possible to generate the projected enrollments presented in Table 4. It can be seen that admissions levels (here a steady state) yield a yearly enrollment of 14,790 headcount, and an FTE of 10,900.

Changes taking place in unversity enrollment patterns can be modelled using similar information. Assume that full-time non-transfer

Table 3. New enrollment distributions for an "ideal" institution for a five year time period

	YEAR				
	1984	1985	1986	1987	1988
	NUMBER OF NEW STUDENTS				
FT Non-transfer	1800	1800	1800	1800	1800
FT Transfer	1000	1000	1000	1000	1000
FT Graduate	100	100	100	100	100
PT Non-transfer	1800	1800	1800	1800	1800
PT Transfer	400	400	400	400	400
PT Graduate	600	600	600	600	600

Table 4. Enrollment distributions for an "ideal" institution using the CSR's from Table 1 and the new enrollments from Table 3

	YEAR				
	1984	1985	1986	1987	1988
	ENROLLMENTS				
FT Non-transfer	6138	6138	6138	6138	6138
FT Transfer	2630	2630	2630	2630	2630
FT Graduate	188	188	188	188	188
PT Non-transfer	3456	3456	3456	3456	3456
PT Transfer	932	932	932	932	932
PT Graduate	1446	1446	1446	1446	1446
Total Headcount	14790	14790	14790	14790	14790
Total FTE	10900	10900	10900	10900	10900

enrollments are projected to decrease during the next five years, but the difference will be made up by attracting more full-time graduate students. This shift in newly admitted students is reflected in Table 5 by decreasing the number of new, full-time non-transfers by 50 students each year and increasing the number of full-time graduate students by 50 each year (table 5). When the modelling program is run (using the CSR's presented in Table 1), it can be observed, in Table 6, that the institution will experience a declining overall net enrollment from 10,900 FTE's in 1984 to 10,712 by 1988, even though the gross number of new enrollees has remained constant during the five years.

Table 5. Changes in admission numbers for new full-time non-transfer and new full-time graduate students for a five year period of time

	YEAR				
	1984	1985	1986	1987	1988
	NUMBER OF NEW STUDENTS				
FT Non-transfer	1800	1750	1700	1650	1600
FT Transfer	1000	1000	1000	1000	1000
FT Graduate	100	150	200	250	300
PT Non-transfer	1800	1800	1800	1800	1800
PT Transfer	400	400	400	400	400
PT Graduate	600	600	600	600	600

Table 6. Effects of changing admission numbers (Table 5) on net institutional enrollments using the CSR's from Table 1

	YEAR				
	1984	1985	1986	1987	1988
	ENROLLMENTS				
FT Non-transfer	6138	6088	5999	5878	5584
FT Transfer	2630	2630	2630	2630	2630
FT Graduate	188	238	323	415	553
PT Non-transfer	3456	3456	3456	3456	3456
PT Transfer	932	932	932	932	932
PT Graduate	1446	1446	1446	1446	1446
Total Headcount	14790	14790	14786	14757	14601
Total FTE	10900	10900	10896	10868	10712

This decline results from the fact that it takes a shorter period of time for full-time graduate students to complete their program of courses than it does for full-time non-transfer students in traditional four and five year programs. It becomes apparent that attention only to admission numbers is not enough to maintain a desired enrollment level--the length of stay for a student also affects the net enrollment level of an institution. For example, with the average length of stay described in Table 2, it would take an admission level of about two hundred full-time graduate students to produce the same net enrollment as 100 full-time non-transfers. Similar results could be calculated using other mixes of new student inputs.

The CSR's can also be altered to examine the effect of changed student flow rates on net enrollment size. Consider the effects of changing the CSR's presented in Table 1 to those presented in Table 7. In Table 7, we have increased the survival rates for non-transfer and transfer full-time students by only 2% for the first two years of attendance. Table 8 presents the impact of these improved survival rates on the total enrollment of the "ideal" institution when the modelling program is run using the admissions numbers from Table 3. It can be seen that this "small" improved rate of retention will result in an increased enrollment FTE from 10,900 for the CSR's in Table 1 to 11,042 for the CSR's in Table 7. This increase of 142 FTE's results only from improving the retention of students.

CONCLUSIONS

These two examples illustrate applications of the model to assessing the effects of increased institutional efforts in attrition reduction and in developing new programming to attract different groups of students to the institution.

PROGRAM DEVELOPMENT

Perhaps the greatest impact of these findings is in the area of program planning and development. As an institution begins the planning necessary to develop new markets, it must attend also to program length as a critical factor in estimating the impact of the new market on net institutional enrollment. If a program is only defined as two years in length, more new students will be required each year to meet a specified enrollment level than if the program were of four or five years in duration. This finding is especially critical if the new market is viewed as recouping enrollment losses for programs having longer lengths of stay. Thus, for the example provided here, if an institution wishes to maintain a net enrollment equilibrium, it will take twice as many new graduate students each year to make up for a given reduction in admission of the traditional four year entering non-transfer student.

RETENTION OF STUDENTS

Another way to improve the net enrollment of an institution is by improving upon the length of stay once students are admitted. This can be done by increasing the length of programs by adding to the curriculum (i.e. requiring more courses or co-op), or by focusing on a reduc-

Table 7. Cohort Survival Rates projecting a 2% increase for full-time non-transfer and transfer first and second year students

Entering Classification	Yearly Return Rate 1st	2nd	3rd	4th	5th	6th	7th
Full-time Non-transfer	1.00	.80	.66	.59	.27	.07	.05
Full-time Transfer	1.00	.84	.60	.15	.07	.01	.00
Full-time Graduate	1.00	.70	.15	.02	.01	.00	.00
Part-time Non-transfer	1.00	.27	.19	.15	.12	.09	.07
Part-time Transfer	1.00	.56	.37	.17	.09	.06	.05
Part-time Graduate	1.00	.53	.39	.17	.16	.09	.05

Table 8. Effects on enrollment of changing the CSR's (Table 7) for full-time non-transfer and transfer students using admission rates from Table 3

	YEAR 1984	1985	1986	1987	1988
			ENROLLMENTS		
FT Non-transfer	6210	6210	6210	6210	6210
FT Transfer	2670	2670	2670	2670	2670
FT Graduate	188	188	188	188	188
PT Non-transfer	3528	3528	3528	3528	3528
PT Transfer	948	948	948	948	948
PT Graduate	1446	1446	1446	1446	1446
Total Headcount	14990	14990	14990	14990	14990
Total FTE	11042	11042	11042	11042	11042

tion in the number of students who leave without graduating. If the institution can increase the average length of stay of students, there will be a net increase in enrollment. The example presented in Tables 7 and 8 illustrates the effect on net enrollment by improving first and second year survival rates by only two percent. As can be seen, the effect is significant on the net enrollment for the institution.

LIMITATIONS

This model relies on past performance of the institution in terms of the length of time it takes to process students. Policy or program changes currently underway in an institution will not be reflected in the historical data. Some "guesses," however, can be made as to the effects of special marketing strategies or efforts at improving retention of students. These effects can be built into the model, and a projection made based on these "guesses." Likewise, future changes that will affect the parameters are not presented in the results, although these can be reflected through estimates of the input parameters of new student numbers, and the CSR's. Because of these limitations, the best application of this model is not so much to predict what will happen in the future as much as it is to help evaluate the effects of changes in institutional policy or practice that will impact on the parameters which drive the model.

SUMMARY

In summary, this paper has attempted to develop a model to represent the enrollment and student flow rates for the Rochester Institute of Technology. The model demonstrates the interaction between admissions (the traditional determiner of enrollment level) and student length of stay. It has been demonstrated that the length of stay in a program and number of new students admitted are determiners of enrollment level. This model should be helpful to institutional planners in assessing the effects of changing institutional attributes on the net enrollment size.

REFERENCES

Krampf, R.F. and Heinlein, A.C. Developing marketing strategies and tactics in higher education through target market research, Decision Sciences, 12, 1981.

Lin, L.J. Estimates and projections of enrollments for the University of Wisconsin and Wisconsin State University, ERIC ED037037, 1968.

Lyell, E. and Toole, P. Student flow modeling and enrollment forecasting, Planning for Higher Education, 3, 1974, 2-6.

Maguire, J. and Lay, R. Modeling the college choice process: Image and decision, College and University, 56, 1981, 123-139.

Oliver, R.M. and Hopkins, D. An equilibrium flow model of a university campus, Operations Research, 20, 1972.

Tiffany, D.M. Enrollment Forecasting: Application of Alternative Approaches, Report to the Twenty-Fifth Forum of The Association of Institutional Research, Portland, Oregon, 1985.

Wasik, J. The development of a mathematical model to project enrollments in a community college, ERIC ED0476674, 1970.

INFLUENCING MATRICULATION DECISIONS: PILOT STUDY RESULTS

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INTRODUCTION

Qualified students are essential to the success of a university. Competition for such students has become more intense in recent years due to the decrease in college-age population, and promises to further intensify as this trend persists through the 1990's (Centra, 1980). To survive in this environment, universities must be able to accurately predict enrollments, and effectively influence student choices.

During the period of an increasing high school graduate pool which ended in approximately 1980, Northeastern University was modestly successful in predicting freshman enrollments (Perry & Goncalves, 1982). But passively predicting enrollents and then reacting to them is not a fruitful strategy for the future since the pool of applicants is predicted to decrease.

The universities which survive will engage in aggressive and effective marketing campaigns, euphemistically referred to as recruiting efforts by higher education. College education attributes will be altered, within limits, in response to consumer preference. Such attributes will include physical characteristics of the institution, tuition charges, financial aid, appeal to specific minority groups, and less tangible image determining factors. To do this, one must first identify those key attributes which affect student choice.

Admissions offices have responded to the declining applicant pool with a variety of marketing efforts such as additional site visits, increased mailings, wider geographical boundaries on recruitment, scheduling of faculty and staff for meetings during applicants' campus visits, and increased emphasis on quality of publications. Surveys have been performed on accepted students, both matriculants and non-matriculants, to evaluate the average effectiveness of such efforts.

But their influence on matriculation decisions is is still largely not understood.

In response to this changing environment, the focus of our efforts at Northeastern University has shifted from predicting college enrollments by extrapolating high school data to prediction of matriculation using the accepted student pool as a base. This is not unlike what the admissions department currently does primarily in a qualitiative way.

Our objective in recent work has been to identify those attributes, both hard variables and perceptions, which distinguish between the matriculating and no-matriculating student for Northeastern. We have endeavored to do this using survey data from questionnaires which have been mailed to all students accepted to Northeastern University since 1981. Discriminant analysis of these data has shown that knowing certain facts about an applicant allows prediction of the matriculation decision with a high probability of success (Perry and Rumpf, 1984).

This implies that a formal admissions policy which initates differing strategies depending on the estimated probability of matriculation could improve the efficiency of the admissions office, and more importantly, could result in an increased number of matriculants. The pilot study results reported here partially confirm the validity of the discriminant function and represent a tentative beginning in the application of these findings to student recruitment policy formulation.

PILOT STUDY DESIGN

The pilot study had a twofold purpose: (1) to confirm the validity of the matriculant classification rule developed from our annual freshman questionnaire, and (2) to test the hypotheses that students who were predicted to be undecided by our discriminant model could be influenced to matriculate by positive actions. These actions were accomplished through the admissions department.

The general approach of the study was as follows. One thousand of the students accepted for the Fall of 1985 were mailed a short form of our attitude questionnaire. Telephone follow-up was conducted, thus obtaining a 45% response rate. Each respondent was then classified as having a low, medium, or high likelihood of matriculation using or discriminant function. Those students classified as having either a low

or high likelihood were deemed beyond influence. The target group, students with a medium likelihood of matriculating, were divided into experimental and control groups. The experimental group was given some form of special treatment, for example, modestly increased financial aid. A quasi-experimental design was used to assess the impact of intervention.

Turning now to some of the details of the study design, we begin with the questionnaire design. Our primary objective was to include all of the variables from our annual freshman questionnaire which had been shown to have good predictive power. But, an important constraint was the length of the questionnaire. Too long a form would reduct response rate, and perhaps even influence some matriculation decisions negatively.

Eighteen items were ultimately included in the questionnaire, which is included in Appendix I. These items were selected from the 10 most predictive items in our recent annual questionnaire. They included consistently predictive attributes such as the attitude toward the cooperative education plan, estimated cost after financial aid, and the impact of a visit to the University campus.

This short questionnaire was mailed to a random sample of 1,000 accepted students. In addition, for students who had not returned the questionnaire within three weeks of the mailing, a telephone follow-up was conducted. When contacted, the student was asked to respond to the questions on the telephone. Table 1 summarizes the questionnaire responses. The data suggest that there was some bias introduced into the telephone responses, as discussed in a subsequent section.

TABLE 1

Number (%) of responses to original questionnaire	382 (38)
Number (%) contacted by telephone	65 (7)
Total number (%) of respondents	447 (45)
Number (%) of non-respondents	553 (55)
Total sample size	1000

The responses from the 447 respondents were used to calculate a discriminant score for each student. Based on these scores, each student was categorized as having a low, medium, or high likelihood of matriculation. A major consideration in category assignment was a desire to achieve reasonable group size in all categories. The low and high scores were not considered further. The remaining 157 students

were considered for special treatment.

The only treatment available was increased financial aid. For the 157 students considered for special treatment, 61 did not apply for financial aid. For the 96 applying for aid, 21 were not eligible. Thus, the group available for consideration shrunk to 75. These 75 were split into a control group and an experimental group. The control group was left as previously treated by the financial aid office. The experimental group was given an increased award. The final numbers in the control and experimental groups were even smaller (19 and 14 respectively) due to logistics problems in the financial aid office. The bias cited above for telephone responses proved to be modest, so these results were included in the overall analysis. It was possible to stratify by the college within Northeastern to which the student applied, and competing colleges to which he/she applied. Thus, the analysis includes consideration of these factors.

The classification function used for the pilot study is based on a survey mailed to over 10,000 accepted students during the summer of 1983. A total of 1974 responses was received. First, a split sample approach was used to determine the ten best variables for classifying matriculants versus non-matriculants. Then the full sample was used to determine the standardized coefficients for the ten best variables. These ten questions were included in the 1985 pilot study survey and responses determined the classification or forecasting function value for the accepted students who responded to the pilot questionnaire.

ANALYSIS

The 1985 pilot study was the first operational test of the predictive accuracy of the classification function. As such, the study tested operational feasibility of obtaining required data; provided a real life test of the forecasting accuracy of the classification function; and allowed preliminary evaluation of the effects of intervention strategies. This analysis will focus on the accuracy of the classification function to predict matriculation for the entire sample, for each Northeastern college applied to, and for applicants grouped by the school listed a prime competitor.

How persistent is the 1983 classification function? Using the approach of assigning membership based on closeness to group mean score from the 1983 sample, as suggessted in Mendenhall (1983), the results

are disappointing. Although statistically significant at the .005 level, only 49% of the applicants are correctly assigned (see Table 2). One problem is that over 85% of the pilot study cases are forecast to be matriculants. A comparison of the average scores reveals an increase of 1.46 for the pilot study group versus the 1983 sample. That is, applicants surveyed in February 1985 rather than in July 1983 had a higher classification score independent of final matriculation status. If the cutoff score is translated to reflect this fact, the predictive ability (see Table 3) is improved to 61% with a Chi-square significance level of .001. Although not as accurate as the approximately 80% split sample results obtained in 1983, the results support use of the classification function for management purposes if the cutoff point is translated to reflect changes in mean score over time.

TABLE 2

Confusion Matrix

Prediction Based on 1983 Cutoff Value = -0.11

	Matriculation Decision Actual		
Predicted	No	Yes	Percent Correctly Predicted
No	45	15	75%
Yes	214	173	45%
		TOTAL	49%

TABLE 3

Confusion Matrix

Prediction Based on Translated Cutoff Value = +1.35

	Matriculation Decision Actual		
Predicted	No	Yes	Percent Correctly Predicted
No	166	83	67%
Yes	93	105	53%
		TOTAL	61%

MANAGEMENT USE

From a management perspective, the classification function can arguably best be used to divide the applicant pool into three groups: one group very unlikely to attend, a second group which appears uncertain but which might attend if encouraged appropriately, and a third group which is quite likely to attend. One of the immediate questions faced is how to decide on cutoff values for the three groups. One approach is to divide the total group into the upper quartile, the middle 50%, and the lower quartile. The results of such an approach for the 1985 pilot study sample is displayed in Table 4. The predictive accuracy for the upper and lower quartile averages 71%, while the middle 50% of applied students matriculate at a 40% rate as opposed to a 42% rate for the entire sample. Stratifying the applied student population as shown provides the opportunity of focusing certain recruitment efforts on a population most likely to result in additional matriculants.

TABLE 4

Predicted Versus Actual by Quartile
1985 Pilot Study Results

Classification Function Score	Matriculation Decision Actual No	Yes	Percent Correctly Predicted
-2.0 to 0.6	93	32	74%
0.6 to 2.0	132	87	NA
2.0 to 6.0	34	69	67%

Management use of classification function results can provide further benefits if one divides accepted students by college applied to at Northeastern. Three colleges had statistically significant behavior for classification scores cutoff at the same break points as the overall quartile groupings listed in Table 3. The results are summarized in Table 5.

TABLE 5

Quartile Results for NU College Applied To

	Northeastern College Engineering	Arts & Science	Criminal Justice
Percent Correctly Predicted (1st & 4th quartile)	70%	83%	78%

A final approach is to group applied students by competitor school. That is, by the school listed as the first of the other colleges applied to by the student. Dividing these subgroups by the same two cutoff points (0.6 and 2.0), three of the nine major competitors had statistically significant (Chi-squared) results. A summary of the three is provided in Table 6.

TABLE 6
Quartile Results for Competitor Schools

Competitor School	Percent Correctly Predicted (1st & 4th Quartile)
Bentley College	88%
University of Lowell	81%
University of New Hampshire	100%

The original pilot study design provided for interventions with certain subgroups of the same population. For example, additional financial aid awards to members of the middle 50% category in expectation that a higher percent of students given extra aid would decide to matriculate. Unfortunately, only a very small subgroup was provided the financial aid intervention while no members of the sample had other interventions monitored. The results of the financial aid intervention were positive, but not statistically significant. The lack of monitoring on other interventions has made us determined to repeat the pilot study in the spring of 1986 with a heavier emphasis on interjecting and tracking interventions. The interventions will include open houses sponsored by faculty, telephone contacts with accepted students, and special campus orientation sessions for prospective students.

FUTURE WORK

The ultimate goal of admissions efforts is to attract and enroll students in sufficient numbers and of sufficient quality to maintain the university as an academically challenging and rewarding setting in which to learn and do research. To achieve this requires knowledge of the predictors of matriculation which can be influenced by the university. The next stages of this research will be expanded studies of the type

described here in cooperation with the admissions department to better determine which available actions have the most impact on matriculation decisions.

REFERENCES

Centra, J. A., "College Enrollments in the 1980's: Projections and Possibilities," Journal of Higher Education, Vol. 51, pp. 18-39, 1980

Mendenhall, Gilbert, Marketing Research, 3rd Edition, The Dryden Press, 1984

Perry, R.F. & Goncalves, H., "Enrollment Projection Models: Seeking Effective Predictor Variables", PROCEEDINGS of the North East Association for Institutional Research Ninth Annual Conference, Durham, N.H., October, 1982

Perry, R.F. & Rumpf, D.L. "Predicting the Likelihood of Matriculation for College Applicants", Research in Higher Education, Vol. 21, Number 3, 1984

APPENDIX I

ADMISSIONS STUDY
NORTHEASTERN UNIVERSITY

Please complete all parts of this questionnaire, placing each answer in the space provided. Responses will be used for statistical analysis only. The data will be completely confidential and will not affect your admission to Northeastern University. Thank you.

1. Rate the financial aspects of the Cooperative Education Plan at Northeastern.

   very negative 1 2 3 4 5 very positive 1 |_|

2. Rate the academic aspects of the Cooperative Education Plan at Northeastern University.

   very negative 1 2 3 4 5 very positive 2 |_|

3. What was your attitude regarding your visit to the Northeastern University Campus (Admissions office visit and campus tour). Enter 0 if you have not yet visited the campus.

   very negative 1 2 3 4 5 very positive 3 |_|

4. List two other colleges to which you have applied.

   (A)_____ (B)_____

5. Listed below are some concerns which typically are important in choosing a college. Please give your own evaluation of Northeastern University and school (A) which you listed on question number 4. Enter 0 if you have no opinion on an item.

Northeastern University unsatisfactory--excellent						College (A) listed on Question #4 unsatisfactory--excellent					
1	2	3	4	5		1	2	3	4	5	
|_|				a. Expected cost to you and your family (after financial aid)	a. |_|				
|_|				b. Distance from home	b. |_|				
|_|				c. Employment opportunities after graduation	c. |_|				
|_|				d. High school guidance counselor's rating	d. |_|				
|_|				e. Parents' preference	e. |_|				
|_|				f. Academic reputation (due to specific major, student/faculty ratio, etc.)	f. |_|				
|_|				g. Extracurricular activities (athletic facilities and social activities)	g. |_|				

CHARACTERISTICS OF COLLEGE SENIORS WHO PLAN TO ENROLL IN A&S GRADUATE OR PROFESSIONAL SCHOOLS IN THE FALL AFTER GRADUATION*

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(* Based on "Post Baccalaureate Plans," Report 2, Part 1 in a Series on the COFHE Survey of Graduating Seniors -- Class of 1984. Cambridge, MA: Consortium on Financing Higher Education, March, 1985)

In 1982, the Consortum on Financing Higher Education (COFHE) conducted its first survey concerning graduating seniors' plans for graduate education and loan debts. The survey was repeated in the spring of 1984. This paper addresses the characteristics of seniors who planned to enroll in A&S graduate or professional schools in the fall after graduation.

A standard questionnaire developed by COFHE was distributed at the 22 institutions that elected to participate. Each institution chose the mechanism and timing for distribution that was most appropriate for them within the following guidelines: the survey was to be distributed not more than 6 weeks before the end of the term; the respondents could be the entire senior class or a sample. If a sample was selected, it was to include a minimum of the class or 150 respondents, whichever was larger, and be representative of the class on a number of characteristics.

Because of the potential for bias if data from low response institutions are included in the analyses, only data from the 9 institutions that obtained at least a 75% response rate are included. They represent college/university, coed/single sex, Ivy/non-Ivy, a reasonable geographic distribution, and a range of selectivity.

The unweighted number of respondents who are citizens or permanent residents, on which all of the analyses are based, is 3,959. The number of respondents following weighting to adjust for sampling and different response rates is 6,805 (3,228 males and 3,567 females; because of differential weighting, the combined number of males and females here and in the analyses is slightly different from the total).

Before proceeding to the discussion of post-baccalaureate plans, we should note the somewhat distinctive characteristics of the families whose children graduate from COFHE institutions: Williams, Trinity, Pomona, Barnard, Smith, MIT, Princeton, Yale, and Georgetown that are included in the analyses. Family income, as reported by the students, is higher than that of the general population. Of the 93% of respondents who provided this information; 30% reported family incomes of at least $80,000; 44% of $60,000 or more.

Over three-fifths of the mothers (61%) and more than three-quarters (79%) of the fathers have bachelor's degrees or higher. The composition of the data set by racial/ethnic group is as follows: Asian 5%; Black 6%; Hispanic 4%; Native American 1%; White 85%; and Other 1%.

The 1984 graduates from COFHE schools continue to have high aspirations, 9 out of 10 plan to pursue an advanced degree, and of those a majority (57%) plan to seek a professional degree. Nearly half (47%) expect a final degree at the doctoral level (Ph.D. or professional doctorate). Student expectations of attaining an advanced degree vary considerably within field of undergraduate major (from 63% to 100%) and across racial groups. Almost all (95%) of Blacks and Asians plan an advanced degree at some point in the near or distant future, as do 82% of Hispanics, 74% of Native Americans (N=76) and 91% of Whites. Men and women are similar in their final degree aspirations.

The Class of 1984 are on the whole high academic achievers - 3 of 5 graduated with a GPA of B+ or better; a substantial range of high GPA's exists across institutions, from 49% at one institution to 76% at another. We also found a large range in GPA across racial groups, with only 31% of Blacks having a GPA of B+ or better as compared with 41% of Hispanics and 64% of Whites.

Most of the Class of 1984 plan to work in the fall after graduation. As in 1982, 3 of 5 reported that they plan fall employment; only 30% plan to move directly into advanced study. Again, there is substantial variation across schools, with a range of 70% at one institution to 48% at another who plan to work. In the spring just before graduation, 31% had already accepted a job (43% of males, 23% of females).

Of those planning direct entry into advanced study, slightly more students plan to attend Arts and Sciences (A&S) graduate schools in 1984 (13%). We examined plans for advanced study in the fall by under-

graduate major and discovered a wide range across majors. The low is nursing majors (3%) and the high is biological science majors (58%). It is not surprising to learn that more than three-quarters of the biological sience majors are going on to a professional degree. Although only 9% of males and of females do not plan to obtain an advanced degree someday, 37% of males and 23% of females plan to enroll in the fall.

When asked if they had changed their post graduation plans between their freshman and senior years, more than half (54%) indicated they had. Who influenced them to change? Most (3 of 4) said they themselves were responsible for changing their plans; however, other people (parents, faculty, others) do seem to be important influences for students who change their plans. Generally, parents are more important in strongly encouraging advanced study (35%) than are faculty (28%) or friends (22%).

The majority of professional-school-bound students (75%) had not changed their plans since college entry but the majority of other fall activity groups had: employment (58%) change, A&S graduate school (55%), completely undecided (60%), and other activity (63% change). There is an interesting racial difference, with a higher percentage of Blacks reporting a faculty member responsible for their change in plans (15%, N=27) versus a 1% change for Asians, 5% for Hispanics, and 7% for Whites.

Since the majority of the Class of 1984 aspired to advanced degrees but planned to work in the fall, we asked why they had chosen employment. Their answers were not very different from those of the Class of 1982. Desires for income, for independence, and the need for non-academic experience for personal development were all cited by more than three-fifths of the graduates. Thirteen percent plan to study and work concurrently.

The seniors who chose to move directly on to advanced study were pretty clear about their choices -- 50% applied exclusively to professional schools, 44% exclusively to an A&S graduate school, while 6% applied to both. The great majority (more than 85%) already had been accepted by at least one school. More seniors who are going on to an A&S graduate school have 1 or fewer parents with a bachelor's degree; those going to professional school are more likely to have 2 parents

with bachelor's degrees or more.

A continuing question in the graduate education community concerns the quality of students who pursue professional degrees versus those planning to attend an A&S graduate school. Information onthe Class of 1984 is encouraging. An undergraduate GPA of "A" was reported by 57% of those planning A&S graduate school and 43% of those planning to go to professional school.

This is a reversal of our 1982 findings, but it may be an artifact of differences in question content related to definitions of professional and graduate school in the two surveys. A GPA of "A" within major was reported by about half of each group (49% A&S graduate school and 50% professional school). When all seniors with B+ or better grades are combined, 48% plan to enroll in A&S graduate school and 52% in professional school.

Among students who are planning to go to school in the fall, 78% of those who have asked their parents for financial support for advanced study are planning to go to professional school (22% will go to A&S graduate school). Seventy-four precent of those who would not ask their parents for support are planning to enter A&S graduate school in the fall.

Seniors planning to go on to advanced study were asked to rate potential major sources of financial support and, as in 1982, there is a clear difference in the patterns for A&S graduate school and professional school. While 50% of both groups said they would look to their own earnings, 72% of the advanced study students planning professional school mentioned loans (compared to only 28% going to A&S graduate school) and only 32% mentioned grants (versus 68% for A&S graduate students). Women expected to be more heavily dependent on loans than men in A&S graduate school.

Seniors with undergraduate loan debt do not seem to be discouraged from planning on A&S graduate school. Students entering A&S graduate school were most likely to have debts in the $7,500 - 9,000 range; those who were undecided on fall plans were most likely to have no loan debt.

TABLE 1

Total Loan Debt within Fall Activity Group

	Employment			Graduate Study			Professional Study		
	Total	M	F	Total	M	F	Total	M	F
$0	24%	23%	25%	20%	19%	23%	29%	29%	30%
$1-2,499	3	3	3	3	3	2	3	2	4
$2,500-4,999	9	10	9	10	12	9	11	12	10
$5,000-7,499	17	19	16	15	16	12	13	11	17
$7,500-9,999	19	21	19	24	20	29	23	23	23
$10,000-12,499	18	13	22	12	14	10	18	20	14
$12,500-14,999	4	6	3	9	11	7	2	2	2
$15,000 or more	5	8	3	8	7	8	1	2	1
Number	3,928			870			976		
Males		1,632			532			593	
Females		2,293			375			393	

In order to differentiate the characteristics of 3 fall activity groups: seniors planning fall employment, A&S graduate school, and professional school, we used discriminant function analysis. Thirty-four variables were entered into an SPSS-X discriminant program using system default values. The variables can be grouped into the following: career values, significant others encouragement of advanced study, type of undergraduate major, grade point average (GPA), loan debt, gender, parents' educational levels, ethnic background, parents' income, and willingness to ask parents for financial help for advanced study.

Two discriminant functions are significant at $p<.01$. Sixty-nine percent of the employment group, 66% of the professional-school bound seniors, and 55% of the A&S graduate school seniors are correctly classified according to the functions. The first function has an eigenvalue of .442, accounts for 78.5% of the variance among groups, has a canonical correlation of .553, and has a Wilks' lambda of .619. The groups best discriminated by the first function are the employment seniors and the professional-school bound students, with some crossover by the A&S graduate school group weighted toward the professional end of the continuum. The group centroids are .607 for the employment seniors, -.960 for the graduate school seniors, and -1.609 for the professional

school seniors. The variables with standardized canonical discriminant function coefficients of .30 or greater are: GPA (.408), and willingness to ask for parental financial support (.312). High GPA and willingness to ask for support are associated with advanced study, particularly professional school. Those variables with coefficients between .20 and .30 and phrased in terms of their relationship to the advanced study end of the continuum are: perceiving kinds of associates as an unimportant career value (.275), having a mother who encouraged advanced study (.246), having an undergraduate major in the sciences (.220), perceiving status as an essential career value (.219), perceiving time for other activities as an unimportant career value (.214), and being male (.210).

The second function best discriminates the professional school bound seniors from the A&S graduate school group; the employment seniors are weighted more toward the professional school seniors.

The group centroids are .258 for the professional school seniors, .098 for the employment seniors, and -1.053 for the A&S graduate school seniors. The eigenvalue for the second function is .121, the percent of variance explained is 21.5%, the canonical correlation is .328, and Wilks' lambda is .892. The variables with weights of .30 or greater, described with reference to the A&S graduate school bound seniors, are: considering income as an unimportant career value (.446), having a faculty member strongly encourage advanced study (.406), perceiving the career attribute "opportunity to express own values and ethical standards" as unimportant (.3400), holding the career value creativity to be essential (.295), and perceiving the career value of low stress as essential (.295). Variables with coefficients between .20 and .30 and phrased in terms of their relationship to A&S graduate school are: having an undergraduate major in the sciences (.277), holding the career value "interest in day-to-day work" as essential (.251), perceiving the career value of helpfulness to others as unimportant (.247), perceiving status as unimportant (.231), being unwilling to ask for parental financial help (.212), being non-white (.215), and holding the career value of a secure job as unimportant (.211).

It is interesting to note the relative importance of the encouragement of a faculty member on planned attendance in graduate school but its relationship may not be in a causal direction. It is en-

tirely possible that a student who informs a faculty member that he/she plans to attend professional school becomes less interesting to that professor and is not encouraged. Somewhat surprisingly, extent of loan debt is unimportant in choice of fall activity, but willingness to ask parents for help is important, particularly for professional school attendance.

Finally, we would like to let a few of the seniors speak for themselves concerning their fall plans:

"I plan to attend law school next year. As a child of divorce, I have learned that a woman must always have a marketable skill in the event that she may one day be left in a lurch and have to support herself and any children of the marriage. My accounting degree, coupled with a law degree, will give me the necessary skills needed for two professions, and thus, a contingency plan. I also want to live comfortably. I am sick and tired of being a poor student!"

"I chose employment because I couldn't decide between an MBA and a Ph.D. and want time to decide."

"Sick of school. I want to work. That's it!"

"I believe I would enjoy a teaching lifestyle. However, financial considerations may hamper my ability to raise a family on a low teacher salary. I like 'good' things -- material possessions -- so I may have to leave teaching, if I ever do become a teacher. As a teacher, I will probably not reach the income level of my parents -- who are blue-collar workers."

"I will be pursuing a career in banking. I chose this field because it would best utilize my skills and talents, and is of interest to me. A secondary factor is that the compensation is very good. This is important because I have $10,000 of outstanding loans to be repaid."

"While I plan to take 2 years off from school before applying to law school just because I'm tired of school, I'm also taking a break from school to enable me to earn some (much-needed) money to finance law school. I feel much less confident about financing my graduate education than I did my undergraduate education. I will receive no parental support, I have no assets at all, and I'm $5,000 in debt. I'm frankly a bit worried that, should I get into a decent law school, I won't be able to afford it. (I couldn't even afford to apply to law schools this year had I chosen to do so.)"

"I'm kind of hoping that things turn out completely differently from what I can imagine."

ALUMNI SURVEY
1983

Jean Morlock
SUNY at Plattsburgh

INTRODUCTION

Plattsburgh has been actively engaged in an on-going Outcomes Research Project since 1973. The project has included surveying freshmen and seniors on an annual basis. Periodically, sophomores and alumni have been surveyed, as further checks on the impact of the college experience. The first Alumni Survey was sent in 1971 in response to a Middle States Evaluation. And, in 1979, Alumni Surveys were sent to the graduating classes of 1977, 1978, and every fifth year preceding these years, back to 1947. (1) A revised Alumni Survey was developed in 1983 because of many changes in the curricular complexion of the College and the adoption of a new General Education Program in 1978.

Beginning with the students entering as freshmen in 1976, longitudinal studies became possible because the same questions were asked of the same students as freshmen and when they became graduating seniors. (2) This longitudinal cohort was an especially important group to follow, and special emphasis was placed on surveying as many of them as possible in the current study.

METHOD

The classes of 1976 to 1981 were chosen to be surveyed in the Spring of 1983. The survey was confined to the more recent classes in order to receive the most current, timely feedback. The 1982 class was the first to experience the new General Education Program, but was already targeted to receive a Career Placement survey that Spring. Therefore, a few items from the General Education evaluation section of the Alumni Survey were inserted into the Career Placement survey, so

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(1) See "Back to Basics: What the Alumni Say" presented at the 1980 Annual Meeting of the North East Association for Institutional Research, Amherst, MA.

(2) "How Students Change: A Longitudinal Study" presented at the 1981 Annual Meeting of the North East Association for Institutional Research, Princeton, NJ.

that comparisons could be made with earlier classes that were not subject to the new General Education requirements.

Surveys were mailed to a random sample of approximately half of the 6,624 alumni graduating in 1976 through 1981. Of the 3,056 surveys mailed, 693 were returned for a response rate of 22.7%. Each of the 303 longitudinal subjects received a survey to maximize sample size for the longitudinal analyses. A response rate of 51.3% occurred when 154 subjects returned surveys, after one follow-up mailing.

In order to receive more information without exceptional cost, two forms of the survey were sent out. Section IV of the survey had two formats: one contained questions designed to evaluate the achievement of General Education goals; the other emphasized evaluation of specific student services, such as dorms, library, counseling, etc.

DESCRIPTION OF TOTAL SAMPLE

The sample was roughly representative of the 1976-81 graduating classes, with some exceptions. Students from the three most recent graduation classes responded in greater numbers, and there was a larger proportion of Professional Studies students, particularly Nursing and Home Economics students, in the sample. This is typical of our findings that females are more likely to return questionnaires, particularly those in the Nursing program. These deviations from randomness should be kept in mind when interpreting results.

A profile of alumni of the 1976-81 classes emerged from this survey as follows:

62% have pursued or are pursuing additional education
80% plan to receive another degree
27% have already earned an additional degree
90% are employed
Median salary is $16,147 with a Mean salary of $18,522
60% say their job is very related to their major

With regard to job satisfaction, they are most satisfied with "type of work," followed by "location" of job, "career potential," and then "salary."

Their occupations are concentrated in: Education (21%), Business (17%), Health Services (16%), and Public Affairs (7%).

They rate themselves highest on the following traits: Self-knowledge, Reasoning Ability, Independence, Social Knowledge; and lowest on (3): Artistic Ability, Literary Acquaintance, Impulsiveness, and Speaking Ability.

Aspects of the Plattsburgh experience rated the highest by alumni were its: Social Life, Library, Courses (both in and out of the major), Classrooms, and Dormitory Life; while Administrative and Student Services (such as counseling and advising) and the Computer were given the lowest ratings.

With the exception of the size of introductory courses, other aspects of the departments of their majors were given very favorable ratings. Eighty percent said that they would advise others to pursue the same major.

On the whole, alumni viewed their Plattsburgh experience favorably. This is further supported by the fact that 88% said they would recommend attendance at Plattsburgh to a friend or their children. An overall evaluation of 3.82 on a five-point scale was given to Plattsburgh. This was a bit lower than the 1979 Alumni Survey evaluation.

CONTRAST BETWEEN IMPORTANCE OF VARIOUS SKILLS AND IMPACT OF PLATTSBURGH

Students rated the importance of various general education abilities and other skills to a successful life and also rated Plattsburgh's impact on the development of these skills. The results of the entire sample appear in Table 1 and Figure 1. Communicating effectively and personal understanding were rated the highest in importance, while quantitative skills and appreciation of arts and literature were seen as least important. Plattsburgh's greatest impact was on personal understanding and the development of specific skills. The greatest gap between importance and impact occurred in communication skills, followed by analyzing and solving problems. The General Education Program was given an overall rating of 3.44 on a five-point scale.

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(3) In this regard, they are similar to freshman classes, with the exception that they seem to have gained a better understanding of themselves; alumni rated self-knowledge as their most superior trait, and they have become less impulsive. These may be natural maturational developments, possibly heightened by experience in the job market.

FIG. 1. COMPARISON OF RATINGS OF THE IMPORTANCE OF VS. IMPACT OF PLATTSBURGH ON EDUCATIONAL GOALS AND ACHIEVEMENTS

1983 ALUMNI SURVEY RESULTS

_____ Important to a successful life (Scale: 1 = Not important; 5 = Very important)

------ Amount of impact of Plattsburgh (Scale: 1 = No help; 5 = Helped a great deal)

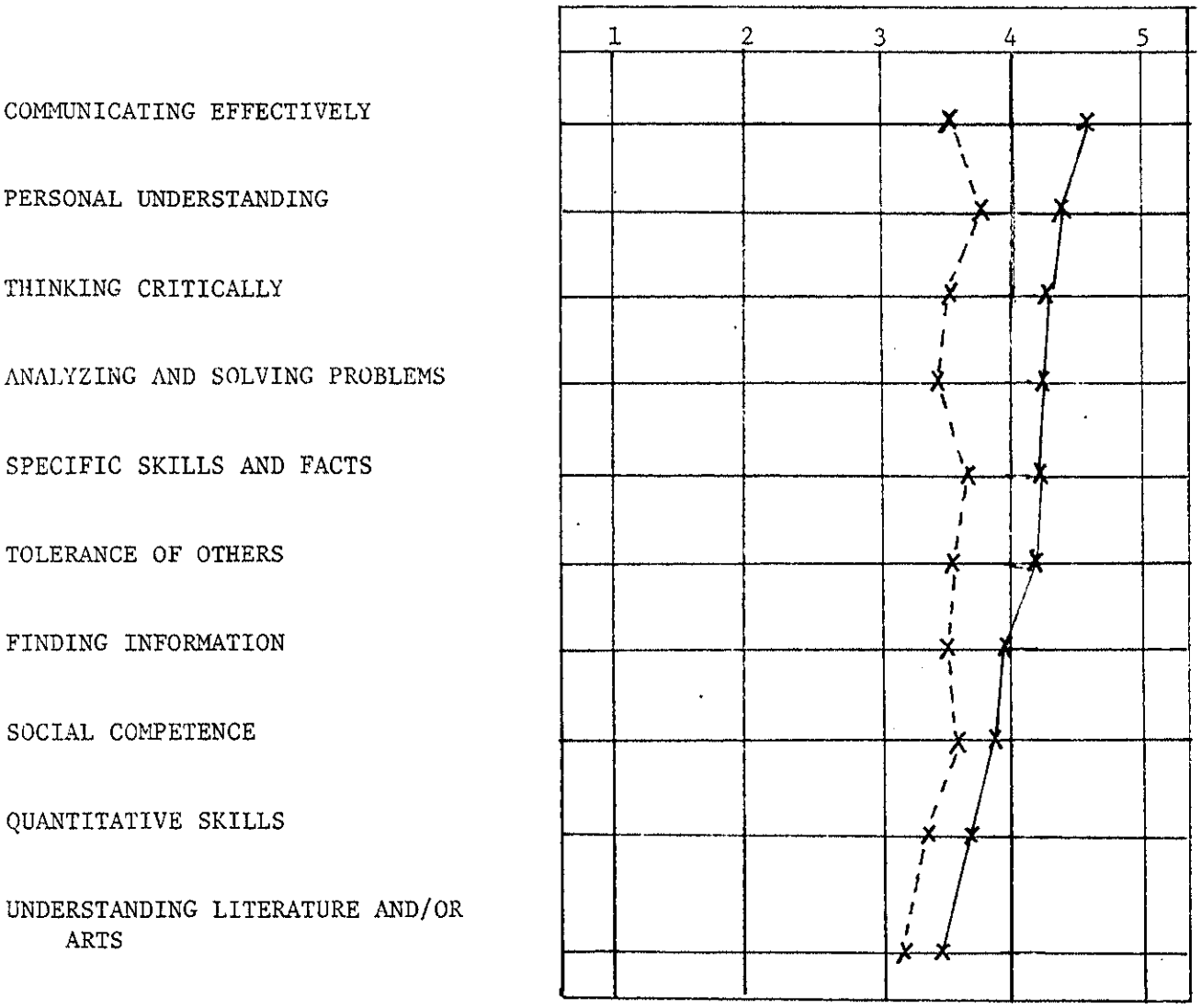


Table 1. Comparison of Ratings of the IMPORTANCE OF vs. IMPACT OF PSUC on Educational Goals and Achievements.*

	MEANS	
	Impact	Importance
Communicating Effectively	3.51	4.62
Understanding Personal Strengths and Weaknesses	3.76	4.31
Thinking Clearly and Critically	3.55	4.20
Analyzing and Solving Problems	3.47	4.19
Specific Skills and Facts in Various Fields	3.72	4.14
Tolerance and Understanding of Others	3.63	4.09
Finding Information	3.57	3.99
Social Competence	3.64	3.96
Quantitative Skills and Abilities	3.34	3.69
Understanding and Enjoyment of Literature and/or Fine Arts	3.15	3.36

* Listed in order of descending value of mean importance.

COMPARISON OF RESULTS WITH OTHER SURVEYS

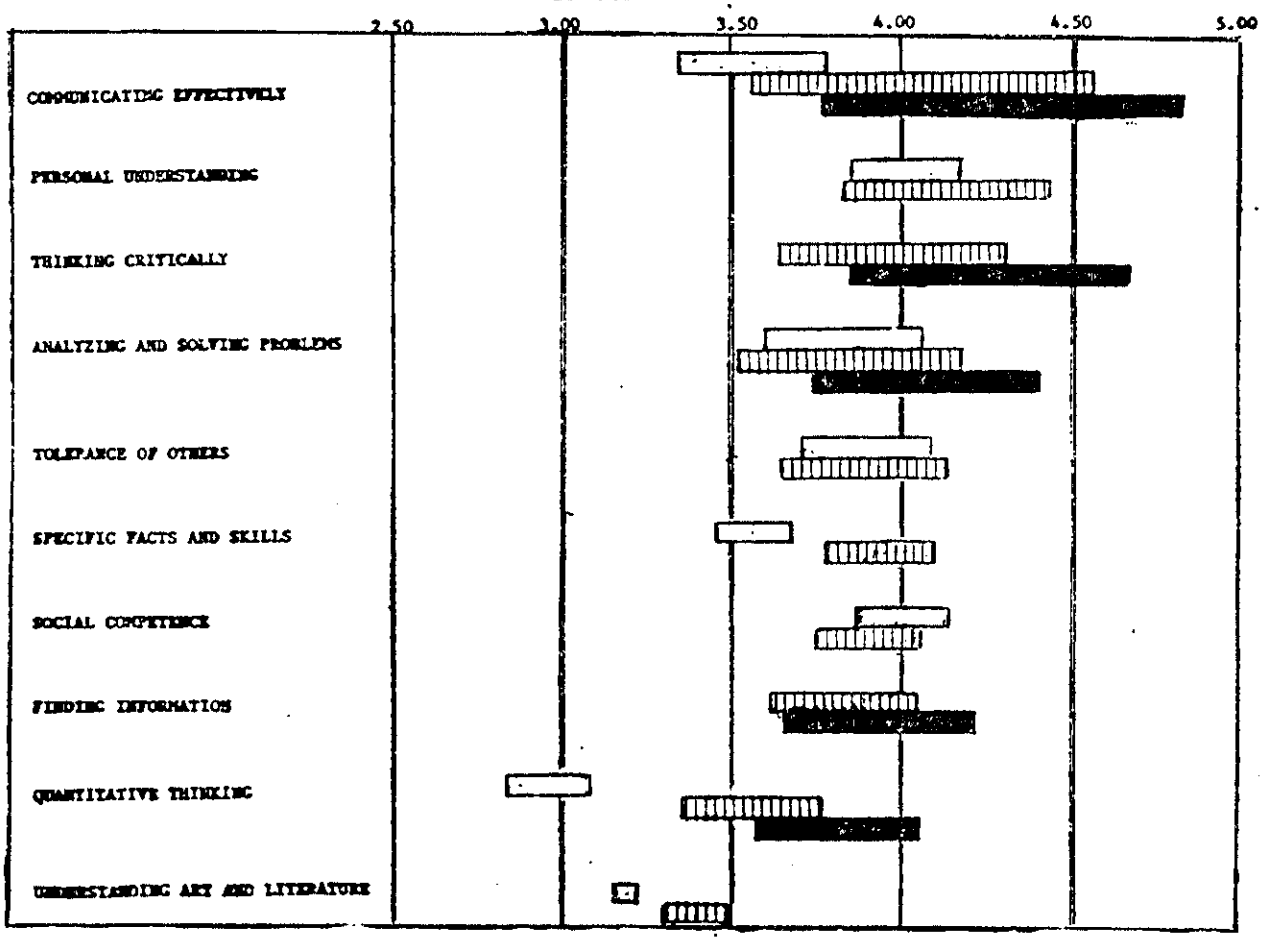
Compared to the previous survey done in 1979 (Classes of 1977 and 1978 and every fifth class previous, back to 1947), the 1983 survey results differed as follows:

1. A higher percentage of recent graduates are employed: 90% vs. 82%
2. Fewer have earned a higher degree after graduation from PSUC: 27% vs. 37%
3. Of course, median salary has increased: $16,147 vs. $10,000-15,000 range
4. Overall evaluation of the Plattsburgh experience is somewhat lower than in the earlier study
5. How well Plattsburgh prepared the students for their current occupation is also lower
6. With regard to ratings of the impact of Plattsburgh and the importance of various general skills and abilities (Figure 2)(4):
    a. Generally, importance ratings were higher in the later survey (1983) than the 1979 survey, leading to larger discrepancies between importance and impact.
    b. A different emphasis was placed on the various skills than in the earlier Alumni Survey:
        1. Communication Skills are now seen as <u>most</u> important; moving above Personal Understanding and Social Competence, as well as Tolerance for Others.

(4) Figure 2 compares the results of the 1978 class surveyed in 1979 with the 1981 class surveyed in 1983 and the 1982 class, surveyed in 1983 by Career Life Planning. Variables are listed in order of ratings of importance by the 1981 class (1983 Alumni Survey).

FIG. 2 - COMPARISON OF 1979, 1983 ALUMNI SURVEYS AND CAREER PLACEMENT SURVEY OF 1982 CLASS

MEAN RATINGS ON A FIVE-POINT SCALE



= 1979 Alumni Survey (1978 Class)

= 1983 Alumni Survey (1981 Class)

= Career Placement (1982 Class)

2. Analyzing Problems was seen as more important than previously, as were Specific Skills and Knowledge.
3. Plattsburgh's impact was perceived as less for Social Competence, but greater for Specific Skills, Communication Skills, and Quantitative Thinking.
4. Yet, the greatest discrepancy between importance remained Communication Skills; the size of the discrepancy has doubled due to its increased perceived importance. A similar phenomenon led to larger gaps between importance and impact for most variables but not as dramatically as for Communication Skills.

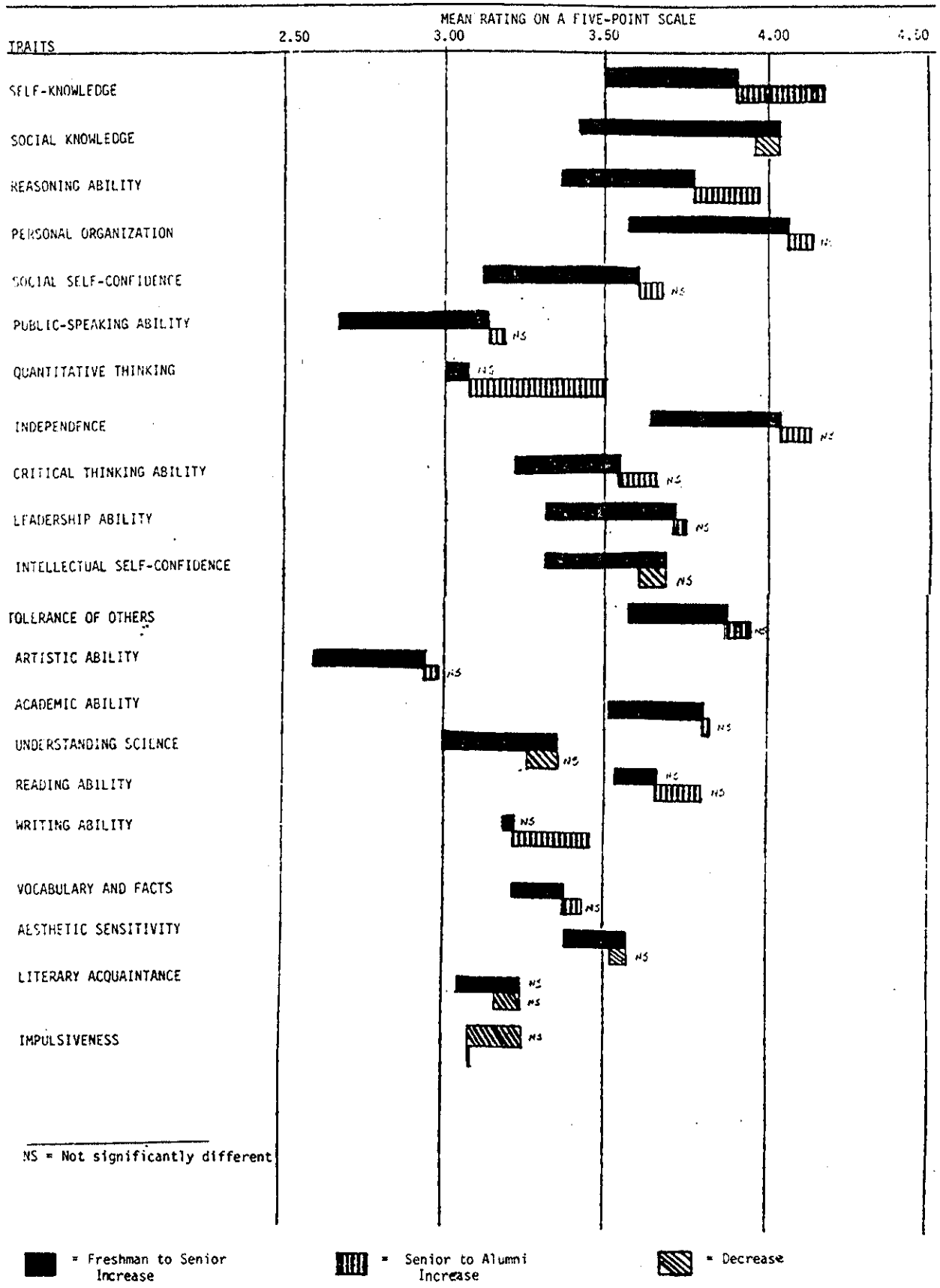
When results from the Alumni Surveys were compared to later Career Planning and Placement surveys, similar findings occurred. Importance was rated higher for all variables by the 1982 and 1983 classes, as was impact. Yet the same relative size of discrepancies remained. The largest discrepancy, again, was for Communicating Effectively, followed by Critical Thinking and Analyzing Problems.

LONGITUDINAL STUDY

Beginning with the graduating classes of 1980 and 1981, it was possible to link the survey responses to the same questions for the same students when they were freshmen, seniors, and as alumni two to three years after graduation. Cohorts were matched and results processed separately for the two classes so that replications were possible. Paired-comparison T-tests compared the freshman-alumni, senior-alumni, and freshman-senior pairs (Figure 3).

When freshman and alumni responses were compared, students showed gains in all variables except Literary Acquaintance and Impusiveness. Results for Aesthetic Sensitivity are inconsistent (the 1981 class showed a gain but 1980 did not), but they suggest a loss occurs after graduation. This is also true for Literary Acquaintance, although neither difference was significant. Students showed the greatest gains from freshman to alumni in Self-knowledge, Reasoning Ability, Social Knowledge, and Social Self-confidence, as well as in Personal Organization. Students continued to develop Reasoning Ability and Self-knowledge (or personal understanding) after graduation. And, two variables, Quantitative Thinking, and Writing Ability, showed no gains from freshman to senior, but significant gains were made after graduation. This suggests the College could improve in these areas.

FIG. 3 - RESULTS OF ALUMNI SURVEY LONGITUDINAL STUDY



Variables are listed in descending order of size of increase from freshman to senior or freshman to alumni. Results of the 1981 class are shown.

In general, the gains that were made in the traits and abilities assessed occurred from the freshman to senior years. With the exceptions of Reasoning Ability and Quantitative Thinking, no consistent, significant changes, i.e., for both the 1980 and 1981 classes, were found between senior and alumni responses. While causation is impossible to assess in this type of study, the fact that the gains were made during the college years rather than after graduation is suggestive. Of course, these changes could be due to maturation, but presumably the college experience had facilitiated them. Also, the alumni had only been out of college for two to three years, while the freshman-senior period was four years long. Follow-ups of longer periods after graduation have to be done on this longitudinal panel group to rule out this explanation.

Comparison of these changes with ratings of the impact of Plattsburgh on similar variables suggests that the changes which occurred for the most part from the freshman to senior year, were due to the Plattsburgh experience (Figure 4). Impact was rated highest for variables which showed the greatest gains, namely Personal Understanding and Social Competence, and lowest for Quantitative Thinking and Understanding and Enjoyment of Literature (5) and the Arts, which showed no significant gains during college. Also, changes in the various components of communication skills fit the impact ratings given by alumni. There were no significant gains in either reading or writing ability for the 1981 class, although gains made after graduation led to our overall significant increase from freshman to alumni. These results differed for the 1980 class who showed significant, but relatively small, gains. Public speaking ability showed large increases from freshman to senior for both classes, yet the skill remains at a relatively low level and suggests room for further development in which the College could play a role.

CONCLUSIONS AND IMPLICATIONS FOR ACTION

Plattsburgh's greatest impact has been on the social and personal growth of its students, and on the development of general reasoning and thinking abilities. Impact on the development of specific skills has improved. However, impact on certain academic skills (general

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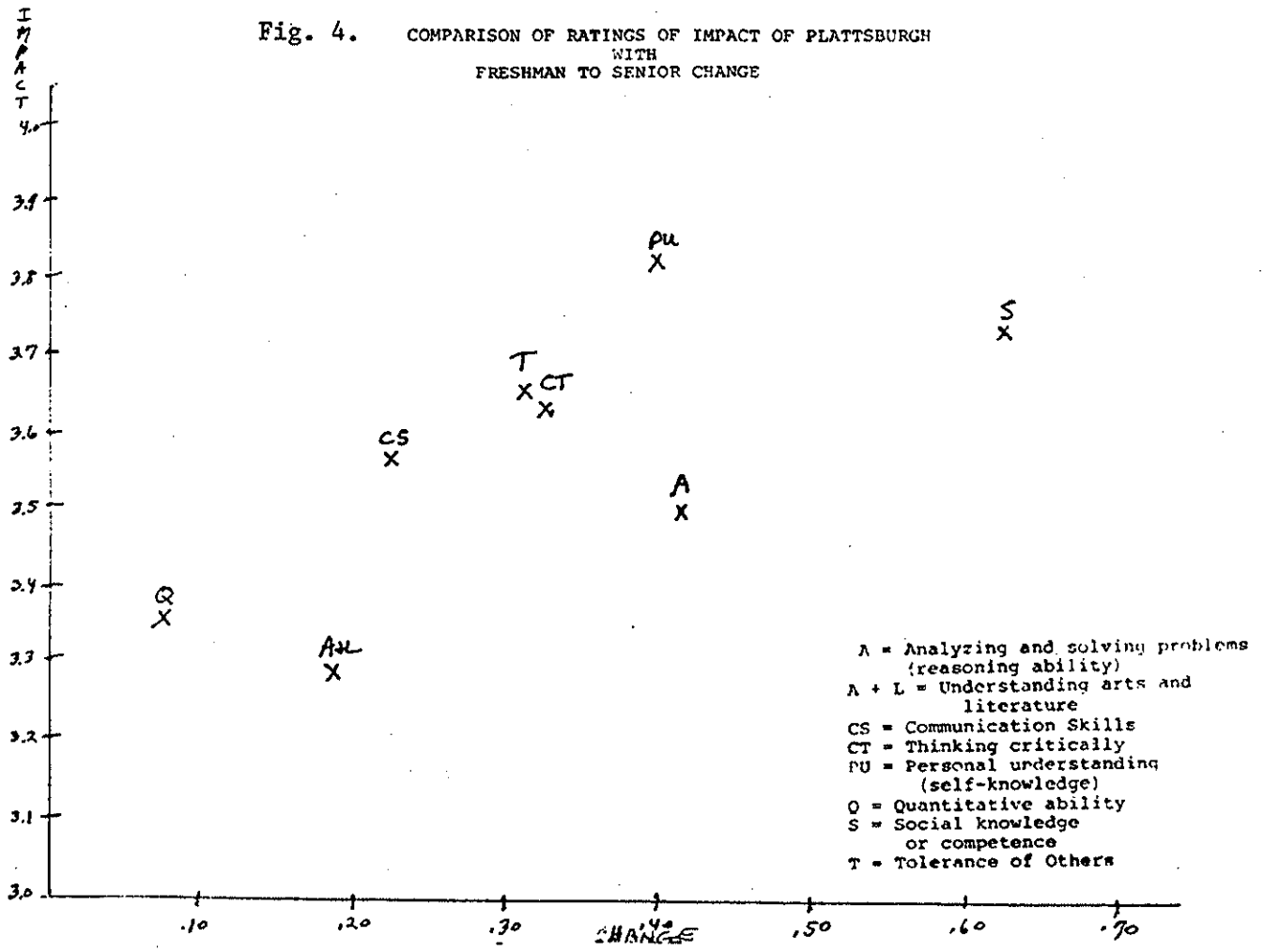
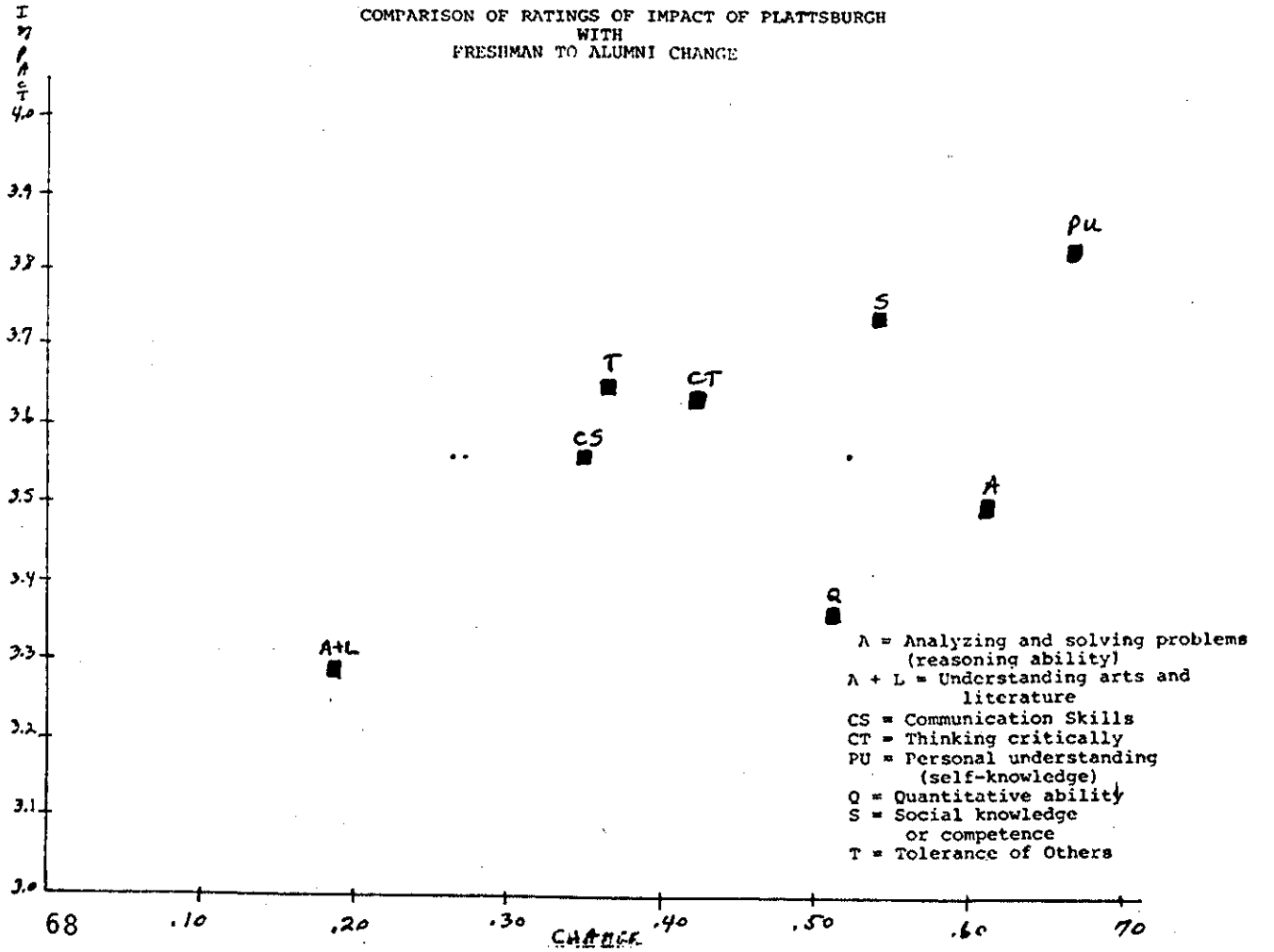
(5) Aesthetic Sensitivity and Literary Acquaintance.

Fig. 4. COMPARISON OF RATINGS OF IMPACT OF PLATTSBURGH WITH FRESHMAN TO SENIOR CHANGE



COMPARISON OF RATINGS OF IMPACT OF PLATTSBURGH WITH FRESHMAN TO ALUMNI CHANGE



education) could be improved. For example, it is distressing to note that while students are making gains in public speaking ability, their rating of this ability is still among the lowest ratings. This indicates that Plattsburgh could do a better job preparing these students for their occupations, which are concentrated in areas requiring public speaking skills, such as Education and Business. We could be doing a better job in the development of communication skills, as well, now perceived as the most important skill for a successful life. And, the potential for growth in quantitative ability is not being realized until after college.

The results of this study provide the basis for further action. For the most part, the Plattsburgh experience was viewed very favorably by its alumni. Both weaknesses and strengths were revealed for the College as a whole and for specific academic programs. The longitudinal data suggest stongly that the College does have a measurable impact on many specific abilities. The increasing impact and yet widening gap between that impact and the importance of those abilities offers the College evidence of its success and also suggests areas deserving further study.

SUCCESS STORIES: THE REGENTS COLLEGE DEGREE AS A CREDENTIAL

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Regents College Degrees

INTRODUCTION

The purpose of this paper is to discuss the development of a data base for graduates in a non-traditional college setting to establish the usefulness of the degree in other institutional and employment settings. Graduates of Regents College Degrees (RCD) were surveyed to find out whether their RCD degrees aided them in their pursuit of graduate study or in their pursuit of occupational change.

Regents College Degrees is part of the University of the State of New York, and is the oldest and largest national external degree program in the country. It has been awarding degrees to students for twelve years. RCD presents a unique research situation because it does not reside on a traditional campus with faculty or students. Instead, an administrative staff is located in Albany, and faculty and students may be located anywhere in the United States and occasionally overseas.

The College is based on the concept that what a person knows is more important than how or where the knowledge is acquired. Its central mission is "to provide an opportunity for earning a college degree to academically able individuals at low cost, regardless of age, place of residence, prior educational credentials, or constraints imposed by occupation." The College implements this mission by offering academic recognition of college-level learning through examinations, college coursework completed through other accredited institutions, and/or other approved means.

Students enrolled in the College often state that they choose to pursue a college degree in order to prepare for further education or for a change in occupational status. A 1981 survey of actively enrolled students showed that 66% of the students enrolled in a Baccalaureate degree program other than nursing were pursuing a college degree "to meet academic requirements necessary to enter a professional or graduate school." Eighty-five percent of the students responding to the survey also selected the statement "to meet educational requirements for a

future job," and 71% selected "to develop a new career or enter a new profession."

The purpose of this study was to discover whether students did meet their goals by continuing their educations or by changing their occupational status after graduation from Regents College Degrees. In addition, the acceptability of the RCD as a credential in the academic and employment worlds was explored.

The study was conducted in two parts. In Part I, graduates were sent two questionnaires. One contained questions about their future educational plans and their present experiences with graduate schools. The other contained questions about present employment, occupation, and any other changes experienced since graduation. As part of each questionnaire, graduates were asked to name a contact person, either a graduate advisor or an employer, and to give permission for that person to be sent a questionnaire. In Part II of the study, these program advisors and employers were contacted to solicit their opinions of the RCD transcript and of the preparation of RCD graduates as compared to graduates of other educational institutions.

PART I

Subjects: All graduates of the baccalaureate or business degrees, from 1977 until January, 1983 were surveyed, for a total of 4,803 graduates. Nursing degree program graduates were not surveyed because they were included in surveys conducted by the nursing degree program.

Instrument: The questionnaires used were based on a previously constructed questionnaire used as part of a 1981 Candidate/Graduate Survey. The first questionniare included questions about graduates' plans for further education, and about their experiences with graduate institutions. Graduates who had continued their formal education were asked to name a contact person at the college or university they attended. Finally, graduates were asked for permission to circulate their names to other RCD students and graduates who are interested in attending a specific graduate school.

The second questionniare included questions about graduates' occupations, and about changes in employment status. Graduates who were employed were asked to name a contact person at their place of employment.

Method: A mailed survey technique was chosen to contact graduates because they are so widely dispersed. All 4,803 graduates were first mailed the questionnaire about further education with a cover letter explaining the purpose of the survey. This packet also contained a business reply envelope, and a copy of the questionnaire to be sent to the program advisor or contact. A copy of the questionnaire to be sent to the program advisor was included so that graduates could make an informed decision about allowing contact to be made. Six months later, the same graduates were mailed the questionnaire about employment. A similar packet was sent, including a copy of the questionnaire for the employer.

Overall Results: Approximately 40% or 1,753 of the graduates responded to the survey on further education, and approximately 35% or 1,431 responded to the employment survey. The following responses are broken down according to the two questionnaire forms.

Further Education Survey: Table 1 summarizes graduates' plans for further education. Fifty-one percent of the graduates (898) have not pursued a graduate degree. The rest of the responses are summarized for the 855 remaining students. Of these remaining students, 612 or 30% of the total number of graduates applied and were accepted into graduate school. Of these, 226 or 13% were in the process of applying when they received the survey.

Only one percent of the students were not accepted at any college to which they applied. Another one percent are pursuing a second RCD degree. Finally, 9% of the students said that they were involved in other kinds of educational pursuits. These pursuits included work at community colleges, non-degree work at all levels, and job-related coursework.

Altogether, 680 graduates reported that they were either in the process of applying to graduate school, or had already done so. More than two-thirds of these students reported that the RCD transcript was acceptable without supplementary original records. Of the 31% who reported that original transcripts were necessary, many commented that the school required all transcripts whenever a student had attended more than one college.

As expected, 70% of the students pursuing studies were employed full-time, and 17% were employed part-time. About 60% considered them-

TABLE 1

Plans to Pursue Further Education

What plans have you made to further your education since graduating from RCD?

	N	%
I have no plans to pursue another degree	217	12
I have thought about getting another degree, but I have not yet applied to any colleges/universities	681	39
I am in the process of applying to colleges/universities, but have not yet heard if I am accepted	47	3
I applied but was not accepted by any college/university	20	1
I applied and was accepted at a college/university, but chose not to attend	51	3
I applied, was accepted, and am attending a college/univ	335	19
I completed another degree at another college/university since graduating from RCD	226	13
I am currently working on another RCD degree	16	1
Other	160	9
TOTAL	1753	100

selves to be part-time students, but 96% considered their coursework to be part of a degree program. Most (80%) were pursuing Masters' degrees.

Most graduates of RCD (90%) viewed themselves as very or fairly well prepared to continue graduate study. Few were denied admission to a college or university to which they had applied.

Employment Survey: Most RCD graduate respondents are employed, and were employed during their enrollment in RCD. This is consistent with the findings grom the first survey. Most work full-time in professional, technical, or managerial positions, and fall into a middle income category.

Table 2 shows the changes in employment that RCD graduates have experienced since graduation. Graduates were asked to select as many

TABLE 2

Changes in Employment Status

		n	%
Since graduating from RCD I have:			
Had no change in employment		381	27
Obtained a promotion with the same employer		393	27
Obtained a better position with a new employer		327	23
Changed occupations		383	27
Increased my income (beyond cost-of-living increases)		590	41
Obtained greater job security		331	23
Improved my job satisfaction		572	40
Became eligible for a better position where a college degree is needed		513	36
Became unemployed		81	6
Changed employment status is some other way		270	19
Was your RCD degree a significant factor in any of the above changes?			
	Yes	776	54
	No	515	36
	No response	140	10
	Total	1431	100

choices as were relevant, so percentages do not represent discrete categories. As can be seen, 27% reported that they had no change in employment. Another 27% obtained a promotion with the same employer, while 23% obtained a promotion with a new employer. Twenty-seven percent reported that they changed occupations. Only 6% became unemployed. Many of these respondents stated that they had either returned to school as full-time students or had retired.

Many RCD graduates reported that they had increased their incomes beyond the cost-of-living increase (41%) and had improved job satisfaction (40%). In addition, 36% said that they had become eligible for a better positin where a college degree is needed, though they may not have obtained that better position.

Over half of the respondents (54%) stated that RCD was a significant factor in their change in employment status.

Few RCD graduates (14%) were denied a position or promotion since graduating from RCD. Fewer yet attributed this denial to having a RCD degree (7%). Most RCD graduates (46%) did not feel that earning the RCD degree had a direct influence on job performance. Though only four respondents stated that the degree adversely affected their performance, 17% said it improved performance a great deal, and 26% said it improved performance somewhat.

RCD graduates in general believe that they are well prepared by the RCD degree to function in their present occupations. Of the total group, 53% state that they are well prepared, while no graduate states that he or she is poorly prepared. In addition, 27% say that their degrees are irrelevant to their present occupations. Of those that are employed, 62% state that they are well prepared for their jobs.

PART II

In this part of the study, employers and graduate school advisors were contacted with a questionnaire designed to determine two types of information: 1) was the RCD transcript acceptable to the institution, and 2) was the performance of RCD graduates comparable to graduates of other institutions.

Subjects: Program advisors or contacts and employers who were named by graduates were surveyed. Questionnaires were sent only if the graduate gave his or her permission for direct contact to take place. About 450 program advisors and 450 employers were contacted.

Instrument: Questionnaires were designed to determine the familiarity of the contact with RCD as a whole, and with the performance of an individual student. Contacts were asked to compare the performance of the RCD graduate to graduates of other institutions.

Method: All contacts named were mailed a questionniare with a cover letter explaining the purpose of the survey. In addition, a copy of the graduate's signature indicating permission to make contact was included. This packet also contained a business reply envelope.

Overall Results: For each group, approximately 74% of the contacted group responded. Most of the education contacts were advisors, and most of the employer contacts were immediate supervisors.

Advisors tended to be aware that the student in question was a RCD graduate. Almost two-thirds knew the student was a RCD graduate, and 41% said that they were aware that other RCD graduates had attended their institution. About 60% were involved in the admission process for the student.

About 51% of the advisors agreed that the RCD transcript provided adequate documentation to assess the student's undergraduate preparation.

Of the 60% of the respondents who were involved in the admission process, 85% of those involved agreed that the RCD transcript was adequate, while 12% did not agree. Three percent did not respond.

Of the 12 who were unsatisfied with the RCD transcript, 33% required additional documentation, while 55% did not. Twelve percent were unsure a to whether additional documentation was required. Only ten percent of the respondents thought that RCD could provide additional information that would be helpful in the admissions process.

Keeping in mind that only 60% of the advisors/contacts were involved in the admission process, again 85% of those involved found the content of the individual's RCD degree sufficient preparation for admission to their program. Of the 14% that did not find it sufficient, 36% (8) required additional undergraduate work, and 59% (13) required the successful completion of some undergraduate courses.

The advisors were asked to compare RCD graduates with other students in their program. Table 3 shows their responses. As can be seen, most advisors rated RCD graduates as well prepared.

TABLE 3

Evaluation of Student Preparation

	(N = 263)							
	Well Prepared		Moderately Prepared		Not Very Well Prepared		No Response	
	n	%	n	%	n	%	n	%
By comparison with other students in your program, how well prepared was this student in the following areas upon enrolling?								
Knowledge of major subject or concentration	116	44	29	11	9	4	109	41
Verbal communication	128	49	23	9	10	4	102	39
Writing skills	116	44	28	11	14	6	105	40
Quantitative skills	74	28	35	13	13	5	139	53
Ability to analyze and synthesize information	118	45	28	11	13	5	104	40
Interpersonal skills	118	45	27	10	12	5	106	40

Employers were asked a similar question, but in more general terms. Table 4 shows their responses to questions about employee performance.

This line of inquiry was continued by asking employers whether earning a college degree affected the graduate's chance for promotion. Almost half of the employers stated that earning a degree greatly improved the chances of promotion, and another 34% stated that it somewhat improved chances. Most said that the fact that the employee in question chose a non-traditional route to earning a degree did not influence their views of that person as an employee.

Those employers who stated that the employee was hired after graduation from RCD were asked if the transcript provided by RCD gave adequate documentation to assess the graduate's undergraduate preparation. Of the 88 who responded, 69% said that the transcript was adequate. Of those who responded that it was inadequate, most required

TABLE 4

RCD Graduates' Employee Performance

	n	%
On the whole, how would you compare this employee's job performance to that of his peers?		
Very favorably	227	71
Generally favorably	67	21
About the same	21	7
Generally unfavorably	2	>1
Very unfavorably	0	0
Don't know	2	>1
No response	2	>1
Total	321	100
In your opinion, how does the fact that this employee earned a college degree affect his or her performance?		
Greatly improves performance	141	44
Somewhat improves performance	107	33
Does not make a difference	60	19
Detracts from performance	0	0
Greatly detracts from performance	0	0
No response	13	4
Total	321	100

additional documentation in the form of transcipts from the colleges originally attended.

CONCLUSION

Based on the responses, the RCD degree appears to be a valid credential for entrance into graduate school. Approximately 39% of the RCD graduates who responded to the survey stated that they were either in the process of applying to graduate school or had already done so. More than two-thirds of these students reported that the RCD transcript was

acceptable without supplementary original transcripts. As a whole, these RCD gradutes felt themselves to be as well prepared as other graduate students.

The responses of the RCD graduates' advisors and contacts confirmed the finding that for the most part, the RCD degree was a valid credential. Most of these advisors and contacts who were part of the admissions process found the RCD transcript acceptable, and the content of the RCD degree sufficient preparation for admission. Advisors and contacts found RCD graduates generally to be a well prepared for graduate study as other students.

The responses from both goups seem to indicate that the RCD degree does not present a barrier or hindrance to graduate school admission or performance.

In terms of employment, the RCD degree seems to be serving its purpose as a credential in the job market. RCD graduates do not view thir degrees as causing a significant change in their job performance. However, about half believe that the RCD degree aided them in making occupational changes. Employers did feel that the degree improved job performance, and that RCD graduates performed as well as or better than their peers. In addition, the employers who responded were not opposed to non-traditional college programs or their graduates.

The graduates reported the typical changes in occupational status that might be expected over time, such as promotions, increased income, and improved job satisfaction. About half of the graduates attributed these changes to their RCD degrees. However, most did not think that the degree improved or affected their job performance. In fact, a fourth of the respondents stated that the degree was irrelevant to their present occupation.

Employers, on the other hand, did feel that having a college degree improved the job performance of the graduate in question. On the whole, employers also stated that RCD graduates' job performances compared favorably with other employees'. Most employers were not directly involved in the hiring of the RCD graduate. Employers felt that knowing the graduate had a non-traditional degree did not adversely affect their view of the employee. However, most were not aware that the employee had earned a RCD degree at the time of the hiring.

In both cases, earning a RCD degree enabled graduates to apply for further study and to make the job changes they expected. Employers and advisors rank these students as being at least as well prepared as graduates of other educational institutions. The Regents College Degree helped the students to fulfill their goals in a non-traditional manner that was better suited to their needs, and provided a widely accepted credential for further study and work.

CAN A HIGH SCHOOL PROFILE PREDICT SUCCESS FOR THE OLDER STUDENT?

Yvonne Freccero
Director

Sandy Price
Assistant Director
Office of Planning and Research
Smith College

We are here today to talk about work-in-progress rather than formal conclusions, and we ask that you share in designing the future development of our work. We want to tell you about our research on a very interesting group of women studying at Smith College.

Today, the Ada Comstock Program is some 250 women strong. It comprises one-tenth of the student body. The program was established in 1975 to facilitate the return to college of women whose education had been interrupted prior to completion of a bachelor's degree. The ages of these women range from twenty-four to mid-sixties.

The Ada Comstock story is one of success. More and more women are applying, knowing full well that they will face a very tough challenge. Yet, each year as high or higher a percentage of these women graduate with honors as of the traditionally-aged student body. These women are mainstreamed. They take the same courses and meet the same requirements as all other undergraduates, and no allowances are made other than that they are permitted to study on a part-time basis. Traditionally-aged students are expected to complete degree requirements in eight semesters, Adas generally take longer, but not much longer.

Unlike many programs for adult students springing up today, this one was not instituted to compensate for the decline in numbers of the traditionally-aged students. Nevertheless, for the world of higher education in general, this age group has become an important contribution to the survival of many institutions. The Ada Comstock program grew out of Smith College's commitment to the development and education of women of all ages, races, and classes. Every Ada must meet the College's admissions standards, but the criteria are different. In the first place, no SAT scores are required.

Let me digress for a moment to talk about SAT scores. Until now, most four-year colleges have considered SAT scores combined with high school grade point average as the best predictor of a student's success in college. The validity of the SAT as a predictor has come under fire in recent years and has been the subject of much research. An important contribution to this field has been published recently by the College Board (Success in College, Warren W. Willingham, New York: CEEB, 1985). We need to find additional predictors in order to expand the ability of colleges to select potentially succesful students. High school grades and SAT scores are indicative of one type of intelligent student - often the one who has been fortunate enough to have had a supportive home life, attended a good school, and not been intimidated by tests. There are many others, including minorities, who do not fit that pattern.

Hence, the relevance of our current study. If the Ada applicants have taken SAT test scores earlier, the are encouraged to submit the scores, but the absence of scores is unimportant. Applicants to the program are asked to write a brief evaluative autobiography in whichthey state clearly how and why the pattern of their academic experience has been unusual. They are also asked to list any honors or awards they have received, college, community, or other activities that have been important to them, work experience, and other pertinent information. They are asked why they wish to enter Smith College, and what they plan to do after completing work for their bachelor's degree.

They are also required to send transcripts of all recent and earlier college academic work. If they have never attended college, they are usually recommended to attend another academic institution for at least one semester, and preferably one year, before applying. They are admitted according to several criteria:

a) level of recent academic work
b) their own sense of intellectual interest and achievement
c) the pattern of their life and their current readiness for academic challenge.

Many of these women did not complete high school. For many of them, their high school profile is very different from that of the traditionally-aged undergraduates admitted to Smith. In late May, 1985, Charles Kuralt, on the show CBS Sunday Morning focused on some graduates of the program in the Class of '85. He interviewed Robert Coles, who

made a very telling comment about the Ada Comstock Program. "It teaches us," he said, "that what is is not necessarily what might be and that a lot of people could be doing things that they don't seem now able to do, or that it's not acknowledged even that they can do."

The Director of the Program, Eleanor Rothman, saya that "motivation is different for every woman who enrolls. Each one has decided to make a change in her life, and the majority must make some sacrifices in otder to do so. The overwhelming commonality is the desire to persevere in completing education, and to do so in a formal, structured program at a demanding institution."

These women have engaged our curiosity. What can we learn from the success that results from the combination of a high level of motivation and energy with the sort of education that Smith offers? These women are not seeking the acquisition of knowledge; they want an education that teaches them to think, to analyze, to problem-solve; an education that will stretch them to use every quality they have and their life experiences. And, they want to be with others who have the same thirst for excellence.

The challenge for us is to identify whether there could have been any way of predicting from their high school profiles that they could and would become such high academic achievers. What lessons can we learn about the barriers that prevented these women from continuing in higher education after high school? What are the factors now motivating them? Why were they not present earlier? Or were they? Could anyone have predicted their success?

These are the roots of the study. By examining the high school profiles of thse women and comparing it to the high school profile of their younger peer group, is there something to be learned?

At the present time, data have been collected on the graduating Classes of '84 and '85. This constitutes a sample of 82 Adas (the total number of Adas graduating in these classes), and 82 traditional students (selected randomly from the traditional student cohort); 41 from the Class of '84 and 41 from the Class of '85. The purpose of this study is to compare the two different sets of criteria used for admission of these two groups, and their outcomes, defined as Smith GPA.

The criteria used for Ada Comstock admission are mostly subjective; specifically, the three essays on the application: an evaluative auto-

biography, an essay on accomplishments in life, and why the applicant wants to go to Smith College. Included in the quantitative data considered is the recent college GPA. The high school profile is reviewed, along with the SAT scores if taken and recorded. However, high school performance and SAT scores are not reasons for rejection, no matter how poor. Only 40 of the 82 Adas in the sample had SAT scores on their high school records. Four of the Adas in this sample were born and attended secondary school outside of the United States; very little data are available regarding their performances in high school. Three Adas did not graduate from high school, but obtained their GED's later.

In addition to the essays and recent college GPA, an interview is required for all Adas.

At this time, therefore, the quantitative data consist of the Smith GAP (dependent variable), high school GPA, high school rank, SAT scores, and recent college FPA. The qualitative data have not as yet been coded for analysis. Extracting and coding themes from the essays is the most challenging and important part of this research. This must be done with great care so that resulting variables accurately represent the internal and external environments affecting the actualization of the Adas' intellectual abilities through education at the time of graduation from high school, and what it is that eventually awakens them to their abilities and their need to expand. Determining this might give us additional predictors, qualitative rather than quantitative, for choosing students of high ability when academic records are poor.

Fruit is not always ripe at the same moment in time; ripening depends on environmental factors. According to Eleanor Rothman, these women always had the ability, but it had not yet be realized academically. The challenge to educators is to accept this and learn to determine when the fruit is ripe for harvest, so that this valuable resource does not rot and fall to the ground, wasted.

The following are some examples of internal and external factors responsible for delaying academic achievement in Adas' lives.

One woman, who did not graduate from high school but married at age 17 and had 2 children, was devastated by her divorce. She had relied exclusively on her husband for emotional support, her very identity. That support gone, she was forced to develop her own strength as a

person. "At this time, an emotional transformation took place in me. I had to re-order my priorities. I decided to return to school."

Another woman, who graduated Phi Beta Kappa from Smith, had also dropped out of school on a full-time basis, but always was eager to continue her education and learn more. She was unable to overcome conflicts between being a woman, a manager at work, and a friend. She lacked self-confidence, yet was eager for the "rigorous demands of academic achievement and performance that Smith requires of its students. ...I know I will be greatly stimulated by coming in contact with other women who are willing and eager to meet these demands because of their desire to excel."

Yet another Ada had had a good GPA in high school but no motivation. She married her high school boyfriend, and had three children in close succession. Then her life began to change. She talks of feeling "uncertain in a life that seemed secure...restless in a life full of activity...unfulfilled...I was on the verge of an epiphany."

Violence figures largely in many of these women's lives. One woman talks of it as a way of life, of hunger, disease, and despair. She speaks of struggling for her dignity in the face of the degradation of racism. Her thirst for knowledge led her to choose education as a way of fighting those that denied her her rights. She speaks of her awareness of the importance of history when she first stood on a truly historical site, that resulted in her feeling connected with the rest of humanity and her responsibility to contribute in a positive way to that history.

Yet, another sought the unyielding standards of Smith that would challenge her to greater clarity of mind and discipline of the spirit.

Some of the success stories are phenomenal. One woman's long journey towards self-confidence finally has led her to Harvard Law School, where she recognizes the legitimacy of her ambition.

There are so many of these lives that could be shared, stories to be told, women who have suffered abuse, violence, absence of self-confidence, lack of encouragement, and every societal barrier that can be imagined, who reach a moment in their lives when Smith is the right environment for them; tremendous intellectual growth follows.

One of the qualitative independent variables that I chose to use was the epiphanous event. As I was reading the autobiographies, this

specific word was used to describe the change in self-perception or awakening to the need for self-actualization through education, either suddenly as a result of an event or over a period of time, during a particular stage in life that brought about a rebirth or awakening. Quite often, giving birth and motherhood is the catalyst. As I continued to read, two other Adas also used the word epiphany. Three of the 82 women used this specific, rather uncommon, term in their autobiographies, and it would have been appropriate for many of the others.

Data collected on traditional students are not complete at this time. Smith College GPA, SAT scores, and high school rank have been collected, but high school GPA's are not yet recorded. There follows a table of the descriptive statistics of the Adas' quantitative data, comparable traditional students' data, and a table of all the quantitative data on the Adas' listed by student in chronological order, from high school GAP to Smith GPA. The mean and median scores for the Smith College GPA are slightly higher for the Adas than for the traditional students; the standard deviation slightly smaller. Further data will be gathered and qualitative variables analyzed and coded. The research is in its early stages, and we shall be reporting progress at a later time.

ADA PROFILES

HIGH SCHOOL GPA	SAT VERBAL	SAT MATH	RECENT COLLEGE GPA	SMITH GPA
-	-	-	3.70	3.92
3.50	-	-	3.97	3.92
3.50	682	552	4.00	3.88
3.50	677	527	3.86	3.87
3.40	720	650	3.75	3.85
-	-	-	3.89	3.81
2.00	493	508	4.00	3.79
2.00	690	340	4.00	3.78
2.00	-	-	3.65	3.77
3.50	-	-	3.81	3.76
3.50	520	630	3.87	3.75
2.75	-	-	3.80	3.74
2.59	492	436	3.30	3.74
3.30	600	660	3.50	3.74
1.75	-	-	4.00	3.73
3.00	700	650	3.84	3.72
3.30	712	598	2.79	3.71
3.00	-	-	3.79	3.71
2.75	562	463	2.00	3.69
3.00	716	510	-	3.69
2.90	547	371	3.68	3.69
3.02	-	-	3.60	3.68
2.50	580	520	3.30	3.65
2.75	-	-	3.69	3.63
-	-	-	3.91	3.62
-	660	310	3.55	3.62
3.00	590	600	-	3.61
2.70	-	-	3.21	3.60
2.50	-	-	3.80	3.59
2.54	650	380	4.00	3.58
3.50	-	-	3.90	3.58
-	-	-	3.96	3.58
3.00	600	460	3.50	3.57
2.75	537	475	4.00	3.54
2.00	453	473	3.30	3.54
3.75	560	505	3.27	3.54
-	547	552	3.37	3.52
3.65	572	575	3.51	3.49
3.30	-	-	3.90	3.49
2.50	506	559	3.80	3.49
2.75	-	-	2.00	3.47
2.50	510	390	4.00	3.47
2.00	628	494	3.00	3.45
3.00	600	451	4.00	3.43
3.00	530	357	3.70	3.43
3.50	-	-	3.36	3.43
-	-	-	3.20	3.42
1.75	-	-	3.70	3.41
3.00	-	-	4.00	3.41

3.75	-	-	4.00	3.40
-	-	-	3.58	3.39
2.00	-	-	3.56	3.38
2.50	-	-	3.25	3.37
-	-	-	3.00	3.37
3.30	-	-	3.75	3.36
3.40	714	700	3.20	3.35
-	-	-	3.64	3.35
3.00	-	-	3.00	3.34
3.30	-	-	2.88	3.34
3.00	680	410	3.00	3.33
2.50	710	620	3.60	3.28
2.50	-	-	3.60	3.28
1.75	-	-	3.67	3.27
2.00	-	-	3.65	3.26
3.75	-	-	3.75	3.26
3.50	-	-	3.90	3.26
3.00	525	329	3.30	3.24
1.75	-	-	3.44	3.23
2.00	-	-	3.60	3.19
3.50	519	563	3.00	3.18
2.75	676	595	3.80	3.18
3.30	-	-	3.60	3.17
3.50	-	-	3.40	3.17
1.75	458	499	3.50	3.17
1.77	-	-	3.67	3.16
3.56	-	-	3.79	3.14
3.00	553	550	3.70	3.13
3.00	670	530	2.50	3.08
3.00	599	505	2.11	3.01
3.30	669	558	3.82	2.70
-	-	-	2.50	2.68
-	-	-	3.30	2.46

STUDENTS' ACADEMIC GROWTH IN THE FIRST TWO YEARS OF COLLEGE

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ABSTRACT

This paper describes the results of a test of the predictive validity of Tinto's (1975) model of college student attrition applied to the explanation of students' reports of their academic skill development during the first two years of college. Results of a LISREL analysis reflect, with minor exceptions, strong support for the validity of the theory. Academic integration, as predicted, was found to have a direct effect on reported freshman year academic skill acquisition and on sophomore year academic integration and reported academic growth. Students' levels of social integration were related to freshman year academic development and to sophomore year social integration, but not to sophomore reports of academic skill acquisition.

INTRODUCTION

Despite the enormous volume of research on student outcomes (Lenning et al., 1974a, 1974b; Feldman and Newcomb, 1969; Bowen, 1977), a number of weaknesses are evident. First, most studies focus on relatively easy-to-measure outcomes (e.g., percentage going on to graduate school or into full-time employment), rather than on those more central to the purposes of higher education (e.g., students' personal or cognitive development). Second, of those studies that assess student growth over time, most compare senior scores on some measure with those obtained during the freshman year or at the time of entry to college. Few studies explore student devlopment during the intervening years. Finally, very few studies assess the relation between students' growth and the institutionally-controllable experiences presumed to influence that growth.

This study builds upon the work of Terenzini, Theophilides, and Lorang (1984) in two ways. First, the use of OLS regression techniques is problematic in longitudinal research because of the confounding

effects of correlated error terms and autocorrelation among the same measures taken at different points in time. The result is generally unreliable (usually over-estimated) regression coeffients, tending to suggest stronger relations among variables than may, in fact, exist. The present study deals with these problems by adopting a more powerful analytical technique (LISREL), described in greater detail in a later section of this paper. Second, whereas Terenzini, Theophilides, and Lorang based their study on a theory of college student attrition given by Tinto (1975), adapted for other types of student outcomes, there was no explicit, specific attempt to validate Tinto's model. Rather, the model served as a general set of guiding principles for variable selection and model specification. The present study adopts the same theoretical base, but offers a more explicit test of the validity of that theory for predicting student outcomes by developing a structured equation model of the causal influences presumed to affect students' perceived academic growth over the first two years of college. Finally, the present study extends the work of Terenzini, Theophilides, and Lorang by replicating their work on a independent sample of students.

THE THEORETICAL FRAMEWORK

In his model of undergraduate student attrition, Tinto (1975) theorizes that students' pre-college traits lead to varying levels of goal and institutional commitment. These commitments, in turn, influence the manner in which the student interacts with the academic and social environment of the institution, resulting in varying levels of integration in the institution's academic and social systems. "Other things being equal, the higher the degree of integration of the individual into the college systems, the greater will be his commitment to the specific institution and to the goal of college completion" (Tinto, 1975, p. 96).

Tinto's model can also be a useful framework for conceptualizing the variables and processes potentially involved in the impact of college on students. If the college experience influences positively the personal and academic growth of a student, then the student who is more integrated into (or "involved" in) the academic and social life of an institution might be expected to grow more in a number of ways than is a less integrated or involved student.

DESIGN AND SAMPLE

The study was longitudinal and ex post facto. During the summer of 1980, freshmen attending five of nine summer orientations at a large public university in the northeast were asked to complete a locally developed questionnaire. Usable responses were received from 1,105 freshmen who subsequently matriculated at the university (approximately 50% of the 1980 freshman class).

In April of 1981, a detailed questionnaire asking students about their freshman year was sent to the 1,105 summer respondents. After a follow-up mailing, usable responses were received from 723 freshmen (65.4%). In April of 1982, a questionnaire survey was mailed to the 723 students who responded to the freshman year-end survey. After a follow-up mailing, usable responses were received from 460 students (63.6%) who were now in their sophomore year. Test indicated that the respondents were representative of the population of freshmen with respect to academic aptitude (combined SAT scores) and high school achievement (high school percentile rank), gender and combined parental education.

VARIABLES

The following pre-college student characteristics were treated as exogenous variables (i.e., outside the causal model): 1) high school achievement (percentile rank in graduating class); 2) highest degree planned (bachelor's, master's, or doctorate); and 3) students' estimates of the probability of changing theiracademic major plans during college.

Each year's follow-up instrument asked students to: 1) estimate the number of times during the year they had met with a faculty member outside the classroom for each of six reasons (only conversations lasting 10 to 15 minutes or more were to be counted); 2) indicate the number of hours per week, on the average, they had spent in organized, extracurricular activities in both the fall and spring semesters (subsequently averaged to form a single index); 3) to respond to a series of 34 Likert scale items (taken from Pascarella and Terenzini, 1980) designed to measure various dimensions of social and academic integration in the Tinto model; and 4) to respond to ten items describing various indicators of classroom and social involvement.

The 34 Likert items comprise five dimensions labeled: "Peer

Relations," "Faculty Relations," "Faculty Concern for Student Development and Teaching," "Academic and Intellectual Development," and "Institutional Goal Commitment." (Pascarella and Terenzini, 1980) Only the first three of these scales listed above were used in this study, however.

Frequency of contact with faculty was measured by students' estimates of the number of times during the year they had met with a faculty member outside of class for "academic" purposes (to get academic program advice, to discuss careers, and to discuss intellectual or course-related topics), and for "non-academic" purposes (to discuss personal problems, campus issues, or to socialize informally). The indicators of classroom and social involvement were taken from Terenzini, Pascarella, and Lorang (1982).

Thus, the predictor variables in this study were the three covariates listed earlier and eight independent variables, or "college experience" variables, grouped in two sets for each of the two years under study. Academic integration was reflected by the Faculty Relations scale, the Faculty Concern for Student Development and Teaching scale, the frequency of contact with faculty for non-academic purposes, the frequency of contact with faculty for academic purposes, and the Classroom Involvement scale. Social integration was indexed by the Peer Relations scale, the amount of time spent in organized extracurricular activities, and the Social Involvement scale.

On each of the follow-up instruments, students were also asked to indicate the amount of progress they had made during the year just ending in each of twenty-nine skill or growth areas. (Terenzini, Pascarella, and Lorang (1982) One of four components derived factorially from these items, the "Academic Skill Development" scale, was adapted as the dependent measure in this study. The scale includes the following four items: gaining factual knowledge (terminology, methods, trends); developing the ability to evaluate critically ideas, materials, and methods; developing the ability to apply abstractions or principles in solving problems, and learning fundamental principles, generalizations, or theories.

ANALYTICAL METHOD

LISREL was employed to fit Tinto's theoretical framework to the variables and processes potentially involved in the impact of college on

students' academic growth. The LISREL technique offers several advantages over the more common ordinary least-squares (OLS) path analytic technique. First, LISREL offers a more comprehensive test of a model's empirical adequacy as an explanatory system (its internal validity) than can be obtained using statistics routinely computed from OLS estimates of the standardized regression coefficients (Hennessy, 1985).

Second, LISREL models are nonrecursive: they can estimate reciprocal (simultaneous) effects. OLS path models, by comparison, are recursive (i.e., they cannot model reciprocal effects).

Third, LISREL permits the researcher to control measurement error and any correlation between error terms, thus producing unbiased path estimates. This is particularly useful in longitudinal studies where autocorrelation between Time1 and Time2 measures is a significant confounding factor when measuring structural effects and assessing changes that occur between occasions (Joreskog, 1981).

Fourth, LISREL allows the researcher to estimate the effects of latent (unobservable) constructs on the ultimate endogenous (dependent) variable while simultaneously controlling for correlations between their empirical indicators, thus producing more reliable (unbiased) estimators than can be obtained using OLS procedures.

The adaptation of Tinto's theoretical framework to the study of the variables and processes potentially involved in the impact of college on students' academic growth required three steps. First, the causal relations specified by Tinto's model are translated into a structural equation model. Second, a measurement model, which treats the endogenous concepts of academic and social integration as "latent" or unobservable variables with multiple indicators, is incorporated into the system of equations. Third, specific hypotheses and the overall fit of the model are evaluated using both tests of structural parameter estimates and a more global goodness-of-fit test as a measure of the model's overall empirical adequacy.

The structural model specified that goal commitment was a latent construct influenced by two exogenous variables: highest degree expected and the likelihood of the student changing majors. A second latent construct, high school achievement, was operationalized by the student's percentile rank in the high school class. These two constructs were theorized, in turn, to influence students' levels of

academic and social integration. Academic integration was presumed to be reflected in students' scores on the faculty concern for student development and teaching scale, the faculty relations scale, the classroom involvement scale, and the frequency of students' contact with with faculty for academic and for social purposes. Students' level of social integration was assumed to be indicated by scores on the peer relations scale, the social involvement scale, and the level of involvement in extra-curricular activities. Both academic and social integration levels were hypothesized to have a direct effect on students' reports of their academic skill development during a given year, and on the level of social and academic integration in the subsequent year, which, in turn, would influence reported sophomore year academic skill development.

RESULTS

Table 1 reports the means and standard deviations for all variables used in the analysis. It also provides a key to variable abbreviations used subsequently in the paper.

Figure 1 summarizes the results of the LISREL analysis. The square boxes represent the observed variables used in the analyses, with the ovals connected to them representing the latent constructs presumably reflected. The values next to the lines connecting the boxes to the ovals are interpretable as factor loadings and reflect the relative contribution of each variable to the operationalization of the latent construct. For purposes of model identification, one parameter (the best indicator of the underlying construct) was set equal to 1.0. The numbers associated with the lines at the top of the figure linking various pairs of boxes indicate the degree of correlation between the error terms (for variables within the same year) or the extent of the autocorrelation between the same variables at two different points in time.

Of greater interest are the numbers associated with the lines between and among the ovals. The ovals represent the theoretical model being tested, and the numbers associated with the connecting lines are the path coefficients, interpretable as standardized regression coefficients and reflecting the relative strength of the influence of one latent construct on another.

Overall, the structural model produced an R-square of .202, indi-

TABLE 1
MEANS AND STANDARD DEVIATIONS
(N = 463)

	Variable	Mean	Standard Deviation
V1056	Highest degree planned	4.13	1.15
V1087	Probability of changing major	2.31	.84
V1420	High school percentile rank	85.70	10.70
	FRESHMAN YEAR		
FRFCSDT	Faculty concern for student development and teaching scale	2.63	.61
FRXACTS	Extracurricular activities[a]	.73	.56
FRPEERS	Peer relations scale	3.42	.65
FRFACREL	Faculty relations scale	2.55	.95
FRFACSOC	Frequency of contact with faculty for non-academic purposes[a]	.45	.71
FRSOCACT	Social activities scale	2.98	.66
FRFACACA	Contact with faculty for academic purposes[a]	1.97	.58
FRCLSACT	Classroom involvement scale	2.50	.49
FRACGRO	Academic skill development scale	2.90	.51
	SOPHOMORE YEAR		
SOFCSDT	Faculty concern for student development and teaching scale	2.60	.61
SOXACTS	Extracurricular activities[a]	.82	.61
SOPEERS	Peer relations scale	3.44	.59
SOFACREL	Faculty relations scale	2.66	.96
SOFACSOC	Frequency of contact with faculty for non-academic purposes[a]	.53	.82
SOSOCACT	Social activities scale	2.90	.63
SOFACACA	Contact with faculty for academic purposes[a]	1.65	.89
SOCLSACT	Classroom involvement scale	2.48	.53
SOACGRO	Academic skill development scale	2.84	.54

[a]Logarithmically transformed.

Figure 1: Structural Equation Model

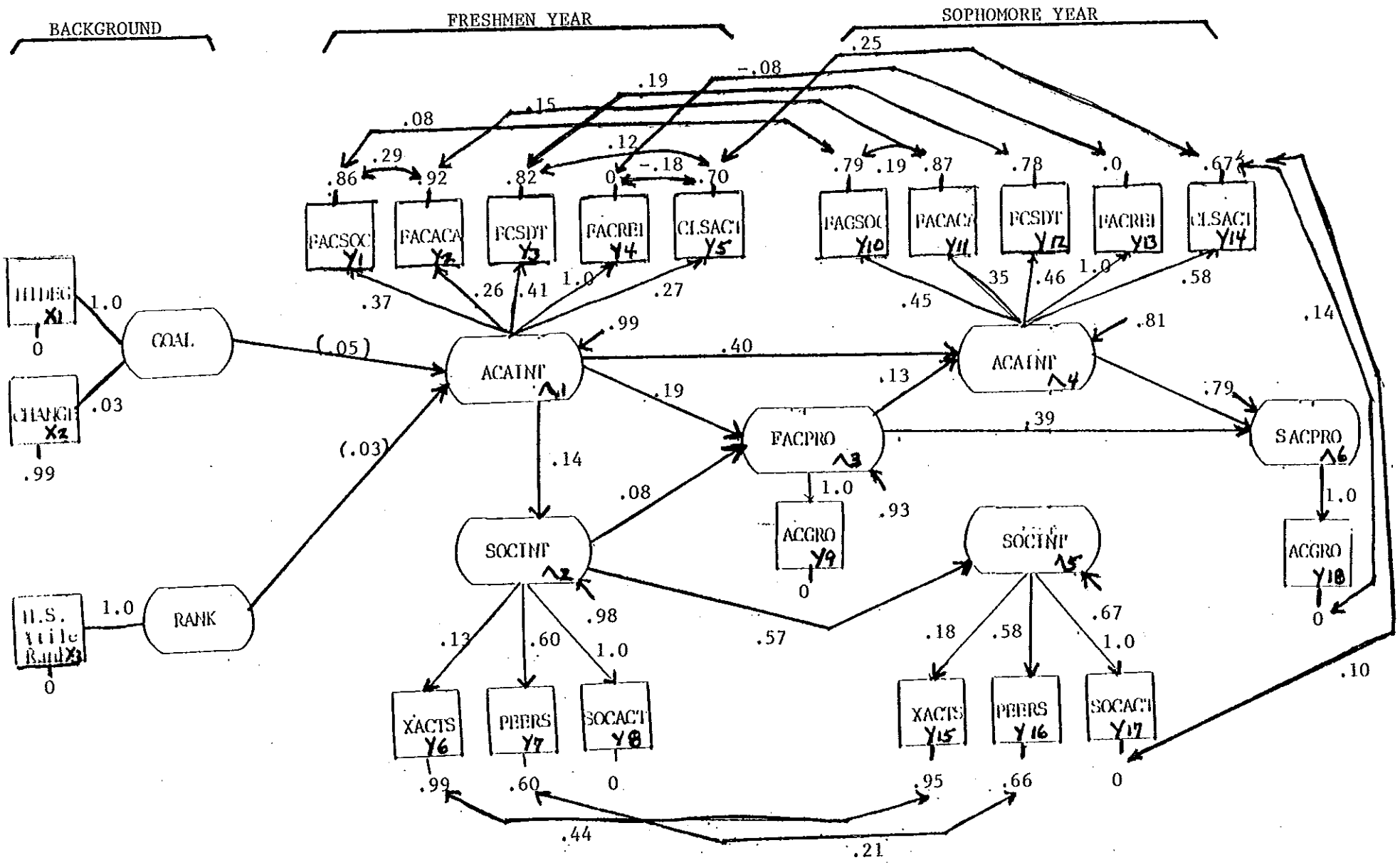

Figure 1. Structural equation model.

cating that the model explained about one-fifth of the variance in the final dependent variable (sophomore academic progress). While this R-square is approximately half that of the .41 reported by Terenzini, Theophilides, and Lorang (1984), one must remember that OLS models are unable to correct for correlated error terms and autocorrelation. When these errors are systematic (as when the model is not perfectly specified, a condition likely in the present analysis) the systematic errors tend to produce inflated variance estimates. Thus, the difference between the results obtained in this study and those obtained in the earlier study are probably attributable, at least in part, to the more precise estimation techniques used in the present study.

Additional evidence for this likelihood is contained in the overall goodness-of-fit index, which can vary from 0 to 1, where 0 reflects no fit and 1 indicates a perfect fit. In this study, the index value was .945, indicating a high degree of "fit" between the observed covariance matrix and the covariance matrix predicted by the structural model.

Giving primary attention to the ovals (Eta's) in the model, one can see that the background traits employed in this study are unrelated to freshman year levels of either academic or social integration (the parentheses around the path coefficients indicate the path was statistically unreliable, although the coefficients approached, but did not reach, conventional levels of statistical significance). Consistent with theoretical expectations, freshman year levels of both academic and social integration had direct effects on students' reported academic skill development, the effect of academic integration, however, being more than two times as great as that of social integration.

Of interest in this area of the Figure is the fact that the reciprocal relationship between academic and social integration, reported by Pascarella and Terenzini (1979, 1983), was not found in this study. Rather, the direction of the influence is direct, academic integration in the freshman year influencing the level of social integration in that same year.

Not only did freshman year academic and social integration levels influence reported freshman year growth, each also had a direct effect, consistent with theoretical expectations, on sophomore year levels of academic and social integration. Moreover, freshman year levels of academic skill development were also found to influence directly both

sophomore year academic integration and reported sophomore year skill development--both findings predictable from the Tinto model.

There was no evidence, however, of any relationship (reciprocal or otherwise) between academic and social integration in the sophomore year. Moreover, sophomore year level of social integration was unrelated to reported academic skill development during that same year.

Finally, as would be expected from the theory, sophomore level of academic integration had a direct effect on reported growth in that same year, but the strength of the effect was only about half that of reported freshman year progress.

SUMMARY AND CONCLUSIONS

The results of this study offer generally strong support for the construct validity and research utility of Tinto's (1975) model of college student attrition when applied to the study of other student outcomes. With minor exceptions, the results obtained in this study were consistent with theoretical expectations.

More specifically, the findings indicate that the students' background characteristics used in this study (and perhaps other background traits as well) are not strongly related to students' levels of integration in the academic or social systems of the institutions they attend. Although the direction of the relations between students' academic and personal background and subsequent academic integration were in predicted directions, they nonetheless failed to reach conventional levels of statistical reliability.

In most respects, however, the model's constructs, and the relations among them, were supported. Freshman year academic and social involvement had direct effects on students' reported academic skill development in the freshman year, with academic integration (as might be expected) being about twice as important as social integration. Moreover, freshman year academic integration had a direct effect on sophomore year academic integration, as did freshman year academic development. Also, as predicted by the model, freshman year skill development had a direct effect not only on sophomore year academic integration, but also on reported academic progress in the same year.

Social integration, however, appears to be important in students' academic lives only during the first year of college. Although social integration in the first year had a direct effect on sophomore year

social integration, there were no reliable relations in the second year between social integration and either academic integration or academic skill development.

Whereas Pascarella and Terenzini (1979, 1983) had previously identified a reciprocal relationship between academic and social integration (high levels of one compensating for low levels of the other) in promoting student retention, no evidence was found in this study to support such a relationship in students' acquisition of academic skills. Indeed, academic integration was found to have a unidirectional effect on social integration, but only during the freshman year. This finding suggests that the relation between these two latent constructs may be situational, or dependent on the particular student outcome in question, or both. Additional research will be required to clarify this issue.

From a practical standpoint, the results suggest in at least two ways the importance of the freshman year in students' reported academic development. First, in freshman year, both academic and social integration play a role in students' academic skill development, although the role of academic integration is the stronger. The potential academic benefits of helping new students become socially integrated may not be fully appreciated. Second, the results highlight the importance of helping new students find a niche in the academic system of the institution as well. Freshman year academic integration had a direct effect on freshman year growth, on sophomore year academic integration, and on reported sophomore year development. These findings strongly suggest that the beneficial effects of involvement in the academic system of an institution may be cumulative, a good start in the first year leading to greater and continued development in subsequent years.

Finally, the results of this study, and their less-than-perfect replication of similar, previous studies suggest the enormous complexity of the college-related growth process. We are just beginning to understand some of the dimensions of that process, and future research, using models similar to that employed in this study and extended over longer periods of time with different samples of students and in different institutional settings, will add much to that understanding, and to the ability of colleges and universities to better serve their students.

REFERENCES

Bowen, H.R. Investment in learning: The individual and social value of American higher education. San Francisco: Jossey-Bass, 1977.

Feldman, K.A., & Newcomb, T.M. The impact of college on students. San Francisco: Jossey-Bass, 1969.

Hennessey, M. Path analysis using LISREL: Comparing income attainment of white and black men. Journal of Applied Behavioral Sciences, 1985, 21, 51-63.

Joreskog, K.G. Statistical models for longitudinal studies. In S. Mednick (ed.), Longitudinal research in the behavioral, social and medical sciences. Boston: Martinus Nijhoff, 1981.

Joreskog, K., & Sorbom, D. LISREL. Chicago: International Educational Resources, 1981.

Lenning, O.; Munday, L.; Johnson, O.; Vander Well, A., & Brue, E. Nonintellective correlates of grades, persistence, and academic learning in college: The published literature through the decade of the Sixties. Monograph 14. Iowa City: American College Testing Program, 1974a.

Lenning, O.; Munday, L.; Johnson, O.; Vander Well, A., & Brue, E. The many faces of college success and their nonintellective correlates: The published literature through the decade of the Sixties. Monograph 15. Iowa City: American College Testing Program, 1974b.

Long, J.S. Confirmatory factor analysis. Sage University Paper No. 33. Beverly Hills: Sage, 1983a.

Long, J.S. Covariance structure models. Sage University Paper No. 34. Beverly Hills: Sage, 1983b.

Pascarella, E.T., & Terenzini, P.T. Interactive influences in Spady's and Tinto's conceptual models of college dropout. Sociology of Education, 1979, 52, 197-210.

Pascarella, E.T., & Terenzini, P.T. Predicting freshman persistence and voluntary dropout decisions from a theoretical model. Journal of Higher Education, 1980,51, 60-75.

Pascarella, E.T., & Terenzini, P.T. Predicting voluntary freshman year persistence/withdrawal behavior in a residential university: A path analytic validation of Tinto's model. Journal of Educational Psychology, 1983, 75, 215-226.

Terenzini, P.T.; Pascarella, E.T., & Lorang, W.G. An assessment of the academic and social influences on freshman year educational outcomes. Review of Higher Education, 1982, 5, 86-109.

Terenzini, P.T.; Theophilides, C., & Lorang, W.G. Influences on students' perceptions of their academic skill development during college. Journal of Higher Education, 1984, 55, 621-636.

Tinto, V. Dropout from higher education: A theoretical synthesis of recent research. Review of Educational Research, 1975, 45, 89-125.

SURVEYING THE CAMPUS ENVIRONMENT: ARE WE GETTING TO THE CORE?

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Surveys of students can answer important questions about the campus environment. For example, are students satisfied with their college experience? What aspects of their experience are less than satisfactory? What are the concerns of today's students? As interesting as the answers may be, a question remains about how applicable these survey data are to the decision-making at an institution. We at the University of Massachusetts at Amherst have been using a survey of the campus environment for eleven years, providing us with a basis for evaluating the usefulness of this type of research.

HISTORY OF CYCLES

The "Cycles" survey, distributed each spring to a random sample of undergraduates, provides us with longitudinal data that identifies annual changes and trends, if any, in students' perceptions of their college experience. The questions ask students to rate their satisfaction for a range of topics -- the overall experience at the University, student services, the non-academic environment, and personal concerns.

The Cycles survey was originally developed in 1975 by Dr. Daniel Kegan, then the Director of Institutional Research at Hampshire College. The Student Affairs Research and Evaluation Office (SAREO) at the University of Massachusetts-Amherst, has conducted the survey every spring since 1975. The questionnaire has been modified annually, although a basic core of questions has been retained. The other colleges in the Five College area - Amherst, Hampshire, Mt. Holyoke, and Smith College - have participated in various years since 1975. This co-operative effort allows for comparisons among the five institutions on common items. WIth years of practical experience behind it, the methods for administering Cycles, collecting and analyzing the data, and reporting on the results are well established. Yet, after all these years, the applicability of Cycles to central issues at the University

can be challenged. Although many factors can be viewed as positive characteristics of Cycles, they each limit our ability to modify the survey and make it more applicable to our current needs.

LIMITATIONS TO CYCLES

Cycles had a well-defined purpose and appropriate methodology when developed in 1975 - to systematically assess particular aspects of undergraduate life on a repeated basis. Any number of changes to long-standing procedures, e.g., altering the length of the survey or modifying the sampling procedure, could increase the utility of the survey for current purposes. However, most of these would risk changing the survey's original purpose and historical continuity. We accept the advantage of having a "proven" method, and hence make alterations only where we can demonstrate that we are not jeopardizing our ability to make comparisons with prior years.

The items on the Cycles survey are, by necessity, very general and efforts are made to cover as many topics as possible in order to be cost effective. Therefore, only a small number of questions can address each topic to keep the length within reason. Still, we continue to bemoan our inability to get deeper into topics. It is obvious that the more specific we can be, the more likely it is we can provide useful data.

Two additional concerns catch us between our desire to continue to use the same questions and our wish to improve. We want to make comparisons from year to year, but repeating questions gives us very little room to respond to new information needs, and item validity requires constant examination. In addition to comparisons with past years, we value our ability to make comparisions among the five colleges in our local consortium. The time-consuming negotiations over questions and agreeing on common procedures with researchers at these institutions result in further constraints on our ability to improve.

Why do we continue? Overall, we believe that Cycles is a good project. The final product serves us well in understanding the undergraduate student mood, and provides this understanding to the media as well. We know that many other institutions envy our eleven year history of survey research. Still, we cannot "sell" Cycles without describing the above cited limitations that occur when a survey effort is "institutionalized."

We think these limitations are worth the cost. This is particularly true now that we have developed other means to alter Cycles to suit current needs without losing historical comparisons. We will describe both some technical and methodological improvements that have enhanced the value of Cycles for us.

TECHNICAL IMPROVEMENTS

With the limitations to Cycles in mind, we devised technical means to improve the usefulness of our campus environment survey. To being with, we now make better use of our sample selection process to allow us to track respondents and nonrespondents. We also have more efficient means for comparing respondent characteristics with those of the nonrespondents. Improved data entry techniques have enhanced our ability to accurately input survey data. Other considerations have been important in transporting and merging data sets. Finally, these technical improvements allow us to link the survey results with background information on students. While some of the technical considerations are unique to our setting, we believe these improvements can stand as examples from which all can profit.

Sample Selection: A user-oriented language is used to select a random sample of students from our computerized student data base. The sample, sorted by zipcode, residence hall, and last name is then written to a magnetic tape. A listing of all the sample, with a record number attached to each potential respondent, is also produced at this time. This background data file is transported to a minicomputer where we use a data entry program that allows the entry of information useful for tracking survey responses. We update the file daily as questionnaires are returned. This system allows us to work easily with our sample pool to determine response rates and to generate subsequent mailings to non-respondents.

Respondent Characteristics: Tracking respondents in the manner described above is of additional utility in understanding the characteristics of our respondent pool. By retaining background information from the student data base, we can quickly ascertain whether our respondents represent our student population. Specifically, we can compare respondents and nonrespondents on a variety of dimensions, e.g. age, major, college, academic performance, etc. Having a thorough knowledge of whether and how our respondents and nonrespondents differ

on these dinensions has provided us with additional insight in our analysis of Cycles data.

Entering Data: Once questionniares are returned and checked off on our local data base, we use a microcomputer data entry package which allows us a high degree of quality control and data security. Clearly, it would be optimal to use the same data entry environment to track the sample and enter the data. However, technical considerations make this an impossibility for us. We use a software package that permits a user-designed file structure, has the ability to detect certain types of data entry errors, restricts values within a field, and fills in certain values when information is missing. Back-up copies of the entered data are continually made, as storing information on floppy disks presents many hazards.

Merging Data: To this point, we have involved our administrative mainframe, a mini, and a microcomputer. What remains to be done is to transfer the critical information to our academic manframe computer and merge the data into a single file for analysis. Again, we are aware that a single computer enrivonment would be optimal for such an enterprise. However, we have designed a system which, for us, optimizes the potential in each of the systems available to us. The academic mainframe houses sophisticated tools for merging and analyzing the combined data set. The final product includes not only the responses to the questionnaire (entered on the microcomputer), but also vital information (from the administrative mainframe) on each respondent's background: SAT scores, high school rank, cumulative average, class year, college enrolled, and so on.

Linking Results: By linking student demographic information with our survey data, we are in a position to ask questions of greater interest than just "how satisfied are our students." For example, is there a relationship between student satisfaction or concerns and behavior (e.g., grades, major, hours spent working for pay or playing?). Is college performance different among those who considered withdrawing from the University and those who intend to stay? What best discriminates those students who express satisfaction with the University and those who do not?

IMPROVING SURVEY USEFULNESS

In spite of the pressures to continue survey features that appear remote from original intentions, we think we have implemented some relatively simple methodological procedures that have helped us produce more useful work. These involve reserving a section for flexible items, reanalyzing data to focus on a particular issue, merging survey results with other files, and combining with other research methods.

Flexible Items: Although a primary goal of Cycles is to track student responses to the same items over time, different issues emerge and recede from year to year. Rather than mounting full scale efforts to investigate such concerns, we have adopted procedures that leave room for an albeit small number of items that can be included in our annual survey. By paring down our annual items to fifty in number, we still have space in our three page questionnaire for another 10-15 items.

This past year, for example, we deleted items that assess student levels of loneliness and enthusiasm to ask about participation in activities at other colleges in our area. This was of special concern to us as our local college consortium was interested in learning about patterns of student use of available resources. We included eleven items which asked students how many courses they had taken at other consortium colleges, what barriers they perceived to registering for these courses, and how often they made use of Five College resources, such as libraries and bus service.

Re-analyze Data: By looking at the results of our standard items with slightly different analyses, we have been able to get more information about certain questions. Typically, we have looked at the percentages of students responding to each item in a particular way, and performed the standard breakdown of answers based on demographics, i.e. class year, sex, college, and residence. By adding just a few items to the questionnaire, we have been able to examine in greater depth areas of importance to us.

For example, we have been interested in learning what relationship exists between students' levels of satisfaction with different aspects of their college experience and the status of their own major. In order to do this, we added a question that asked students whether they had declared a major, and if this major was the one they still preferred. We then ran a crosstabulation looking at all satisfaction items based on

this reported status of major. We found that students who prefer a major different from their declared one expressed lower satisfaction ratings on several specific items, such as satisfaction with academic experience and academic progress, but not on global satisfaction ratings of the University experience.

As student retention issues assume greater priority, we need to know what proportion of our students are thinking of withdrawing, and how this relates to specific dimensions of satisfaction. We added four items that asked students if they had considered withdrawing - or already had withdrawn for a time - from the University for any reason, and what was their most important reason for considering such a step. Again, we ran a crosstabulation of satisfaction items based on consideration of withdrawing. Although most of our students indicated they had not thought of withdrawing, just over one-fourth did report giving it at least some consideration. Financial concern was given most frequently as the most important reason for thinking of leaving the University, but students who had actually taken some time off reported that academic problems were more critical in their decision to do so.

Merge Results: As previously described, we have been merging our data sets with elements in the administrative data base. One application of this procedure that is of special interest here pursues our interest in student retention - which students in our Cycles sample from the Spring of 1985 did not return to the University for the Fall semester? We are currently comparing profiles of satisfaction ratings between students who did return with those who did not. This is, of course, a long-term project, but we are beginning a process of identifying which groups of students are more likely to leave the University.

Other Methods: Those of use who research the campus environment share the fear that our results are not representative of the entire student population despite all our efforts. We have been even more concerned with that of late, as our response rate continues to decline.

In addition to the usual comparisons between survey sample, survey respondents, and the general student population on demographic information, we conduct several comparisons to further check on our respondents' representativeness. As part of our procedure to check our sample, we have telephone interviewers ask some of our nonrespondents

some 20 key items from our questionnaire, such as global satisfaction items and consideration of withdrawing. Preliminary indications are that our nonrespondents tend to be slightly more satisfied with their University experience than are those who return our questionnaires; they also express lower levels of concern about a variety of issues such as career planning and social life. We intend to pursue this by examining the differences between telephone and written responses to our survey.

As we did for our Cyvles sample, we also ran analyses to see if our respondents were different from our nonrespondents in other ways. We checked for sex differences (women are more likely to respond), class year differences (juniors were most likely to respond), and differences based on enrollment in a particular college or school (no differences). Our respondents also tend to have higher GPA's and SAT's, though it is much too early for us to speculate as to whether this affects our results in significant ways. We will, of course, continue to pursue these directions to learn more about these results.

Another way we stretch the usefulness of Cycles is to include several of its key items on other research projects, such as the evaluations of special programs. This allows us to compare, for example, satisfaction ratings of a particular subgroup of students with the ratings of our random sample. Such a calibration process helps place a program evaluation in a more meaningful context.

CONCLUSION

Our experiences with Cycles, though mixed, continue to reinforce our belief in the value and importance of this effort. Although the methodology developed for such an effort becomes fairly rigid, we believe that Cycles continues to play a significant role. What's been crucial for us, however, is to recognize the possibilities for using our data in new ways. It's easy for old hat projects to take on the aura of an old shoe - very comfortable, perhaps, but short on style and vitality. We've definitely decided to keep this one around for a while, even if it entails some retooling.

UNDERGRADUATE PROFILES: DROPOUTS, PROLONGERS, AND COMPLETERS

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Three of every ten students who enter college will never obtain a college degree. Estimates of college attrition rates actually range from 30 percent to 60 percent, depending upon the research method chosen the definition employed, the type of institution, and the year of matriculation (Iffert, 1957; Gekowski & Schwartz, 1981; Panos & Astin, 1968; Eckland, 1964; Pantages & Creedon, 1978). This deserves analysis in its own right; as the traditional college-age population shrinks it becomes still more important.

The primary objective of this paper is to present descriptive profiles of three groups of students who enrolled in college for the first time in the fall of 1972 and to identify any differences that may exist. The three groups include: (1) completers - students who received a bachelor's degree or an associate's degree within 7 years of matriculation; (2) prolongers - those individuals who had not received a degree within 7 years of matriculation but were still enrolled in a two-year or four-year institution, and (3) dropouts - those students who had not obtained a bachelor's degree or an associate's degree within 7 years of matriculation and were no longer enrolled in a college.

DATA

The primary source of data for this study is the National Longitudinal Study (NLS) of the High School Class of 1972. The first data collection was in the spring of 1972. At that time, 19,001 high school seniors from 1,061 high schools were surveyed (Riccobono, Henderson, Burkheimer, Place, and Levinsohn, 1981). Information came from five sources: 1) a student questionnaire, 2) a test battery, 3) a school record information form, 4) a school questionnaire, and 5) two counselor questionnaires.

Four follow-up surveys were conducted: the first in 1973-74, the second in 1974-75, the third in 1976-77, and the fourth in 1979-80. (1)

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(1) Prior to the first follow-up, an additional 4,450 individuals were added to the base-year lists. However, there are no test data for these individuals.

The four follow-up surveys collected data on college enrollment status, type of academic program, financial support, academic achievement, employment status, and a wide range of attitudes. (2) As a result there are over 3,500 variables in the current data set. The overall response rate to these four follow-up surveys was very high: 91 percent, 93.3 percent, 92.1 percent, and 89.3 percent, respectively. A total of 12,980 individuals (78 percent of the base year respondents) provided information on all questionnaires. Of the original sample members, approximately half entered college in the fall of 1972. Of these approximately 5,000 responded to the full set of instruments used in this paper: the base year student questionnaire; the first, second, third, and fourth follow-up questionnaires; the test battery; the school questionnaire and the student school record information form.

DROPOUT DEFINITION

An issue of primary importance to this research is the appropriate definition of dropout used. The definition of dropout employed will influence the results of any analysis. Unfortunately, there is no universally accepted definition for either "dropout" or "attrition." The following list provides a brief description of five widely used definitions:

1. FAILURE TO ADVANCE: This measure defines students as dropouts when they do not advance from year to year in an orderly fashion at a given college. (This measure is frequently used in two-year studies which examine progression from the freshman to sophomore year.)
2. FAILURE TO RETURN: This measure defines students as dropouts when they fail to enroll in the same college on a term-to-term basis.
3. FAILURE TO ENROLL: This measure defines students as dropouts only when they miss a semester or quarter because they failed to enroll at any institution.

(2) Since the survey instruments were longitudinal, unadjusted student weights were calculated for all students sampled (Riccobono et al, 1981). In addition, several set of adjusted weights were computed. Using the computed weights would result in responses that reflect the size of the total population in question (ie. the entire class of 1972). In order to avoid making the sample estimates more accurate than they actually are, the weights are reduced proportionally until the total weighted sample size equals the actual sample size. All the statistics in this study are weighted in this manner.

4. FAILURE TO COMPLETE: This measure defines students as dropouts when they fail to complete a degree within ten years (or some such time period) of original matriculation.
5. INTENTIONAL DROPOUT: This measure defines students as dropouts when they leave college with no intention of returning.

In this study, a slightly modified version of definition 4, Failure to Complete, is used. A dropout is defined as any student who 1) enrolled in an academic program at a two-year or four-year instutution by October 1972, 2) had not obtained a bachelor's degree or an associate's degree by May 1979, and 3) was no longer enrolled in a college in May 1979. Students who transfer from one institution to another are not classified as dropouts. Students who received associate's degrees and subsequently enrolled in four-year institutions are treated identically to their counterparts who originally enrolled in four-year institutions. In addition, students who are prolongers -- that is those who take on or two years off -- are not classified as dropouts. (3)

Of the 4,838 individuals who originally entered college in the fall of 1972, 2,685 (55%) are classified as completers; 1,763 (36.4%) as dropouts; and 390 (8.1%) as prolongers. (4) This finding is basically consistent with research spanning the last fifty years (Terkla, 1981).

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(3) Estimates of attrition vary if determination is made after one year, four years, five years, or ten years. For example, the El-Khawas and Bisconti (1974) ten year longitudinal data on the Class of 1961 reported that 53% of their sample graduated after four years and that 80% received a degree within ten years of matriculation. Thus, it is possible that this definition will yield a slight overestimate of the true attrition rate, since prolongers who happen not to be enrolled in 1979 are counted as dropouts.

(4) Approximately 54% (about 10,000 students) attended some form of postsecondary school in the fall of 1972 (Burkheimer and Novak, 1981). The number of individuals in this sample is somewhat smaller for several reasons. First, only students who were enrolled in either two-year or four-year institutions are included in this sample. Thus, those individuals who were enrolled in vocational, trade, business, or other career training schools were not considered. In addition, only those students who participated for the duration of the study (ie. they answered the base-year questionnaire and all four follow-up questionnaires) are included. Lastly, those individuals from the subsample who did not have test battery information were dropped.

Two-year institutions have higher withdrawal rates than four-year institutions (Astin, 1975; Bayer, 1973; Cope and Hannah, 1975; Lenning, Beal, and Sauer, 1980). In the NLS sample, the attrition rate for those originally enrolled in two-year institutions was 59.6% as compared to 28.3% for those students who orignially matriculated at a four-year institution.

PATTERNS BY TYPE OF INSTITUTION ATTENDED

The dropout and stopout patterns by type of institution originally attended (two-year or four-year) are quite interesting. Of those students who originally matriculated at a two-year institution, 439 (approximately 35%) received an associate's degree and 145 (approximately 12%) received a bachelor's degree. The figures for those who originally enrolled in a four-year institution are quite different: 117 (about 3%) students received an associate's degree and 2,302 (a little over 64%) individuals received a bachelor's degree. In addition, the number of years from date of matriculation to date of graduation is quite varied (Table 1). Of the students who received an associate's degree, a little over 1% completed the degree after the first year, 54% completed after the traditional two year period, 20% after three years, 10% after four years, and 13% in years five, six, and seven. For those individuals who earned a bachelor's degree, 6% indicated that they graduated early (in fewer than 4 years), 65% completed after four years, 19% after five years, 6% after six years, and 4% after seven years.

College withdrawal seems to be associated with institutional control. Private four-year institutions have lower attrition rates than do public four-year institutions (Astin, 1975; Fetters, 1977; Ramist, 1981). The NLS data support this general finding (Tables 2 and 3). Fewer students (15.4%) who attended private four-year institutions were dropouts as compared to those who attended public four-year institutions (24.5%). In addition, public four-year institutions had more prolongers (7.95%) than did private four-year institutions (3.9%). In contrast, institutional control seems to be less of a factor for two-year institutions. For example, 49% of public two-year institution students were dropouts as compared to 46% of the private two-year institution students. It has also been found that religiously affiliated institutions have a positive effect on retention (Astin, 1975). In this study, 68% of the students who attended religiously affiliated two-year

Table 1

Completion Rates

Years to Complete	AA Degree	BA Degree
1	1%	
2	54%	
3	24%	6%
4	10%	65%
5	6%	19%
6	4%	6%
7	3%	4%
	100%	100%

Table 2

Students at Two-Year Institutions

	Completers	Prolongers	Dropouts	Total N
Public	40.1%	10.6%	49.3%	723
Private	40.8%	13.4%	45.7%	29
Religious	67.7%	2.7%	29.6%	44

Table 3

Students at Four-Year Institutions

	Completers	Prolongers	Dropouts	Total N
Public	67.5%	8%	24.5%	2079
Private	80.7%	3.9%	15.4%	444
Religious	80.7%	2.9%	16.7%	482

institutions and 80% of the students who attended religiously affiliated four-year institutions were completers.

The quality of the institutions has been found to influence college retention (Astin, 1971; Kamens, 1971; Nelson, 1966; Tinto, 1975). (5) Fetters (1977) showed that the more selective the institution, the lower the dropout rates.

In this study, the completion rate for students attending institutions in the first two categories -- top privates and quality privates/top state universities -- was very high (Table 4). In fact, out of the 86 students who reported attending an institution in the top privates category, there were only 5 dropouts and 1 prolonger. Seventy-six percent of the students who attended institutions in the third category (state universities, mainstream landgrants, and equivalent privates) were completers as compared to 7% who were prolongers and 17% who were dropouts. While the completion rate for students who attend institutions in the third and fourth categories were very similar, the dropout rate (21%) for students attending category four institutions was much higher. The dropout rate for students attending institutions in the fifth category, which included all two-year institutions, was higher (35%) than any other category. It is interesting to note that the majority (57.5%) of students in this study attended institutions in the fifth groups and that another one-fifth attended category three institutions (state universities, mainstream landgrant institutions, or comparable private institutions).

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(5) There are a variety of factors which contribute to the quality of an institution. Rather than create my own composite variable which incorporates such attributes as the quality of the student body, the quality of the faculty, institutional selectivity, social prestige, and the condition of the physical plant, I chose to use one measure which was readily available as a rough approximation. Using Richard Coleman's social prestige rating, which categorizes institutions on a scale from 1 to 13, I grouped the institutions in my study into five categories: 1) top privates; 2) quality privates and top state universitites; 3) state universities, mainstream landgrants and equivalent privates; 4) weaker landgrant institutions, upgraded technical colleges, and equivalent privates; and 5) non-rated institutions, public two-year institutions (Table 4).

Table 4

Institutional Prestige

	Completers	Prolongers	Dropouts	Total N
Top Privates	80 (93%)	1 (1.2%)	5 (5.8%)	86 (100%)
Top State	174 (80.9%)	11 (5.1%)	30 (14%)	215 (100%)
Mainstream Landgrants	618 (76.4%)	56 (6.9%)	135 (16.6%)	809 (100%)
Technical Colleges	412 (74.6%)	26 (4.7%)	114 (20.7%)	552 (100%)
Non-Rated Colleges	1193 (56.1%)	184 (8.6%)	751 (35.3%)	2128 (100%)
	2477	278	1035	

BACKGROUND CHARACTERISTICS

Most studies conclude that the withdrawal rate for males and females is about the same (Howell, Perkins, and Yound, 1979; Cohen, 1979, Frank and Kirk, 1975; Hackman and Dysinger, 1970; Panos and Astin, 1968). This analysis reveals similar findings (Table 5). Thirty-seven percent of the females and 36% of the males were classified as dropouts. The proportion of female graduates (56%) was slightly higher than their male counterparts (55%). As a result, the stopout rate for males was higher than that of females. This difference may be partially explained by the fact that males tend to have a higher graduation rate ten years after college entry than females (El-Khawas and Bisconti, 1974).

Most researchers have found that race has little or no effect on college persistence when variables such as SES, achievement, and aspirations are controlled (Bayer, 1968; Peng and Fetters, 1978; Pascarella and Terenzini, 1979). When these variables are not controlled for, black students have slightly higher dropout rates than do whites (Anderson, 1981). In this study, native Americans and Hispanics had the highest attrition rates (54% and 60%, respectively). Blacks had the third highest dropout rate. It is, however, interesting to note that the percentage of completers and dropouts was almost identical (approximately 44%). The majority of students in this study were white. The proportion of white students who completed (57%) was considerably greater than the number who dropped out (35%). Lastly, Asian students has the highest completion rate. Over 70% of these students indicated that they had completed their degrees (Table 6).

There were some differences among the groups according to religious affiliation (Table 7). Protestants had the second highest completion rate (58.6). The dropout rates for Protestants (35%) and Catholics (35.5%) were not significantly different. Almost 80% of the Jewish students were completers. This group of students also had the lowest dropout rate (18%).

Most research findings provide no evidence of an independent effect of SES on persistence in college. This analysis also supports the finding. It reveals, however, that SES had an significant indirect effect on persistence. In this study, dropouts had a lower SES composite score (.153) than either the completers -- who had the highest score (.418) -- or the prolongers (.256).

Table 5

Gender

	Completers	Prolongers	Dropouts	Total N
Male	55%	9%	36%	2506
Female	56%	7%	37%	2332

Table 6

Race

	Completers	Prolongers	Dropouts	Total N
Native American	32.4%	13.5%	54.1%	37
Black	44.3%	11.2%	44.5%	366
Hispanic	32.3%	7.7%	60%	130
Asian	71.4%	6.5%	22.1%	77
White	57.1%	7.7%	35.2%	4134

Table 7

Religion

	Completers	Prolongers	Dropouts	Total N
Protestant	58.6%	7.4%	34%	2112
Catholics	55.5%	9%	35.5%	1513
Other Christian	42.1%	8%	49.9%	603
Jewish	77.9%	4.1%	18%	222
Eastern	38.1%	14.4%	47.5%	118
None	51.6%	8.6%	39.8%	186

PRE-COLLEGE ACADEMIC FACTORS

The majority of studies have reported that high school grade point average (GPA) and class rank are the best predictors of persistence and attrition (Pantages and Creedon, 1978; Tamist, 1981; Summerskill, 1962). In addition, most studies have found a significant difference between dropouts and non-dropouts on measures of scholastic aptitude and high school program (Astin, 1973; Peng and Fetters, 1978 ; Ramist, 1981). This analysis reinforces these conclusions. The dropouts in this study, on average, received lower scores on the test battery (52.91) than did either the completers (57.22) or the prolongers (54.72). The school reported GPA was also lower for those in the dropout category (2.27) than for those who had completed (2.89) or those who were prolongers (2.52). Students in the top fifth of the GPA distribution had an average GPA of 3.86 as compared to those in the lowest fifth whose average GPA was 1.34. In addition, fewer dropouts were enrolled in an academic program (62%) than were the completers (84.4%) or the prolongers (69.9%).

OCCUPATIONAL GOAL

Evidence on whether having a vocational goal is related to persistence is inconclusive. Some argue that having such a goal provides motivation for undertaking a particular course of study (Frank and Kirk, 1975). Others have uncovered no significant effects of vocational goals on retention (Barger and Hall, 1965; Iffert, 1957; Panos and Astin, 1968). In this study, completers had the highest index rank aspiring to careers which required an average 4.5 years of higher education as compared to the prolongers whose career aspirations required 3.82 years of postsecondary education and the dropouts who needed 2.97 years of additional education beyond high school. Approximately 77% of the completers aspired to a professional career as compared to 62.7% of the prolongers and 58.9% of the dropouts.

DEGREE LEVEL GOAL

Many researchers support the notion that a student's commitment to completing the educational program has a strong effect on persistence in higher education (Fetter, 1977; Munro, 1981; Ramist, 1981; Tinto, 1975). The educational aspirations, recorded at the time of high school graduation, of those who complete were greater than those who did not complete. On average, the completers aspired to 4.6 years of higher

education as compared to the 3.6 years for the prolongers or the 2.8 years for the dropouts. The students in the top fifth of the degree level goal distribution had an average aspiration level of 6.56 years of education beyond high school as compared to those in the lowest fifth who aspired to an additional 1.24 years.

COLLEGE PERFORMANCE

Studies dealing with the relationship between attrition and college grades found that a significant relationship existed (Anderson, 1982; Astin, 1975; Barger and Hall, 1965; Blanchfield, 1971; Bragg, 1956; Morrisey, 1971; Panos and Astin, 1968; Peng and Fetters, 1978; Spady, 1971; Tinto, 1975). Some postulate that poor grades are a predictor of persistence. (Ramist, 1981; Summerskill, 1965). In this analysis, the completers consistently reported higher GPAs than those in the other two categories. In their first academic year (1972-73) the average GPA for completers was 2.91 as compared to 2.68 for the prolongers and 2.55 for the dropouts. The average GPA for the completers in the second academic year (1973-74) was 3.05 as compared to the dropouts' 2.74 and the prolongers' 2.78 GPA. For the two academic years 1974 and 1975, the average GPA for completers was 3.20 as compared to 2.91 for prolongers and 2.79 for the dropouts. Thus the GPA for the completers was consistently higher than those of either the prolongers or the dropouts.

FINANCIAL ASSISTANCE

Existing research findings on the effects of student financial aid are inconclusive. Most studies are institution-specific. For example, in a study of students at Utica College, a branch of Syracuse University, Blanchfield (1971) reported that there was a significant relationship between persistence and the receipt of loans. Jenson (1981) found that at Washington State University, student financial aid had a small positive effect on persistence. In addition, he reported that denying aid to students who applied for it (non-recipients) resulted in a decrease in persistence.

In a study of students at Oregon State University, Fields and Lemay (1973) reported that financial aid awards did not affect students' persistence in college. Selby (1973) also found in his study of students at the University of Missouri-Columbia that no significant relationships existed among race, persistence, and the amount of financial aid received by students for their freshman year.

Cross-sectional studies are even more rare. Astin (1975) surveyed 101,000 students who entered 358 two- and four-year colleges and universities in 1968. He concluded that 1) participation in work-study programs had the most positive impact on student persistence, and 2) scholarships and grants were associated with small increases in persistence rates, and 3) reliance on loans was associated with decreased persistence among men and highly variable effects on women. Anderson's (1981) study, which used data from the same National Longitudinal Study (NLS) of the high school class of 1972, found that holding a work-study job led to a higher probability of persistence. Anderson's study examined the persistence of students only during the first two years of college. Peng and Fetters (1978), using data from the first year and first and second follow-ups of the NLS, found that the receipt of either grants, loans, or scholarships was not significantly related to college persistence.

This analysis reveals that in each of the seven academic years that the cohort was enrolled, a greater proportion of the completers received some form of financial assistance. Types of aid included grants, loans, college work-study, and cooperative education programs. The major sources of aid were both federal and non-federal. Approximately 62% of the students reported receiving some form of financial assistance for at least one year. Of the aid recipients, 63% were completers as compared to 8% who were prolongers and 29% who were dropouts. Consistently more students reported receiveing scholarships or grants as a major source of financial assitance. Every year the average scholarship award increased, in all likelihood reflecting increases in tuition and fees. Loans were another major source of assistance and the average dollar amounts were comparable to the scholarship awards, increasing annually. In both cases, students who were classified as completers received the largest proportion of these aid sources, and their average awards were higher than those of either the prolongers or the dropouts. Lastly, only a small proportion of the the respondents reported receiving college work-study funds during the time period studied. However, of those receiving these funds, completers received the largest proportion of the work-study monies.

CONCLUSION

After examining the student profiles and the differences between the three categories of individuals, it appears that certain characteristics are more prevalent among completers (Table 8). Thus, one might deduce that these variables have some impact on the persistence decision. High school academic experience, degree level goals, and college academic experience seem to have a strong effect on college retention, whereas financial assistance appears to have a moderate influence on persistence. Lastly, family background and vocational goals seem to have little or no direct effect on the withdrawal decision.

Table 8

Summary Table

	Completers	Prolongers	Dropouts
Gender	NAD	NAD	NAD
Race (a)	Asian White	Native American Black	Hispanic Native American
Religion (a)	Jewish Protestant	Eastern None	Other Christian Eastern
H.S. GPA	2.89	2.52	2.27
Vocational Goal	4.5 years	3.8 years	2.9 years
Degree Goal	4.6 years	3.6 years	2.8 years
College Performance	2.91 GPA	2.68 GPA	2.55 GPA
Aid (b) Recipients	70%	65%	49%

NAD - No Apparent Differences

(a) The two categories within which, completers, prolongers, or dropouts represented the highest percentage.

(b) Students could have received aid in one or more years.

Anderson, K.L. Post-high school experiences and college attrition. Sociology of Education, 1981, 54, 1-15.

Astin, A.W. Predicting academic performance in college. New York: Free Press, 1971.

Astin, A.W. Preventing students from dropping out. San Francisco: Jossey-Bass, 1975.

Barger, B. and E. Hall. Time of drop out as a variable in the study of college attrition. College and University, 1965, 41, 84-88.

Bayer, A.E. The college dropout: Factors affecting senior college completion. Sociology of Education, 1968, 41, 305-316.

Blanchfield, W.C. College dropout identification: A case study. Journal of Experimental Education, 1971, 40, 1-4.

Bragg, E.W. A study of student withdrawal at "W.U." Journal of Educational Psychology, 1956, 47, 199-202.

Cohen, A.J., A.J. Mann, and D.L. Shepherd-Look. Factors related to freshman college attrition. 1979. ED176170.

Cope, R.G. and W. Hannah. Revolving college doors. New York: John Wiley & Sons, 1975.

Eckland, B.K. College dropouts who came back. Harvard Educational Review, 1964, 34, 402-420.

El-khawas, E.H. and A.S. Bisconti. Five and ten years after college entry: 1971 followup of 1961 and 1966 college freshmen. Washington, D.C.: American Council on Education, 1974.

Fetters, W.B. Withdrawal from institutions of higher education: An appraisal with longitudinal data involving diverse institutions. Washington, D.C.: National Center for Educational Statistics, 1977.

Fields, C.R. and M.L. LeMay. Student financial aid: Effects on educational decisions and academic achievement. Journal of College Student Personnel, 1973, 14, 425-429.

Frank, A.C. and B.A. Kirk. Differences in outcomes for users and nonusers of university counseling and psychiatric services: A five year accountability study. Journal of Counseling Psychology, 1975, 22, 252-258.

Gekoski, N. and S. Schwartz. Student mortality and related factors. Journal of Educational Research, 1961, 54, 192-194.

Hackman, J.R. and W.S. Dysinger. Research notes: Commitment to college as a factor in student attrition. Sociology of Education, 1970, 43, 311-324.

Howell, L.R., M.L. Perkins, and S. Young. Characteristics of student persisters and non-persisters at Old Dominion University. 1979. ED180366.

Iffert, R.E. Retention and withdrawal of college students (Bulletin 1958, 1). Washington, D.C.: U.S. Government Printing Office, 1957.

Jensen, E.L. Student financial aid and persistence in college. Journal of Higher Education, 1981, 52, 280-294.

Kamens, D.H. The college charter and college size: Effects on occupational choice and college attrition. Sociology of Education, 1971, 44, 270-296.

Lenning, O.T., K. Sauer, P.E. Beal. Student retention strategies. Washington, D.C.: American Association for Higher Education, 1980.

Morrisey, R.J. Attrition in probationary freshmen. Journal of College Student Personnel, 1971, 17, 279-285.

Munro, B.H. Dropouts from higher education: Path analysis of a national sample. American Educational Research Journal, 1981, 18, 133-141.

Nelson, A.G. College characteristics associated with freshmen attrition. Personnel and Guidance Journal, 1966, 44, 1046-1050.

Panos, R.J. and A.W. Astin. Attrition among college students. American Educational Research Journal, 1968, 5, 57-72.

Pantages, T. and C.F. Creedon. Studies of college attrition: 1950-1975. Review of Educational Research, 1978, 48, 49-101.

Pascarella, E.T. and P.T. Terenzini. Interaction effects in Spady's and Tinto's conceptual models of college dropout. Sociology of Education, 1979, 52, 197-210.

Peng, S.S. and W.B. Fetters. Variables involved in withdrawal during the first two years of college: Preliminary findings from the national longitudinal study of the high school class of 1972. American Educational Research Journal, 1978, 15, 361-372.

Ramist, L. College student attrition and retention. New York: College Entrance Examination Board, 1981.

Riccobono, J., L.B. Henderson, G.J. Burkheimer, C. Place, and J.R. Levinsohn. National Longitudinal Study: Base Year (1972) through Fourth Follow-up. National Center for Educational Statistics, 1981.

Selby, J.E. Relationships existing among race, student financial aid, and persistence in college. Journal of College Student Personnel, 1973, 14, 38-40.

Spady, W.G. Dropouts from higher education: Toward an empirical model. Interchange, 1971, 2, 38-62.

Summerskill, J. Dropouts from college. In N. Sanford (Ed.), The American college. New York: Wiley, 1962.

Terkla, D.G. Empirical and Programmatic Perspectives on College Student Attrition. Qualify Paper Harvard University, 1981.

Tinto, V. Dropout from higher education: A theoretical synthesis of recent research. Review of Education Research, 1975, 45, 89-125.

ESTIMATING THE SUPPLY AND DEMAND FOR COURSES UNDER A NEW SET OF GENERAL EDUCATION REQUIREMENTS

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INTRODUCTION

Many institutions of higher education are in the process of revising their general education requirements (those requirements which must be completed by all students independent of their major). Major changes in general education requirements will, in turn, cause significant changes in student demand across both individual courses and academic departments, as well as changes in the number and capacity of general education courses offered by academic departments. Failure to predict these changes could result in a signigicant misallocation of academic resources and a severe shortage or capacity in a number of required courses.

This paper (1) describes the palnned changes in general education requirements which become effective Fall 1986 at the University of Massachusetts at Amherst, and (2) presents a theoretical model for predicting the effect of the changes on student demand for individual courses and the offering of courses by academic departments.

NEW VERSUS OLD REQUIREMENTS

As can be seen from Table 1, the planned changes at the University of Massachusetts represent a movement away from a distribution system toward a more structured set of requirements. Under the old system, students were required to take three courses within each of the three borad curriculum areas: (1) Natural Science and Mathematics, (2) Humanities and Fine Arts, and (3) Social and Behavioral Sciences, in addition to two writing courses. Because over 1,000 courses had been approved over the years for general education credit, students had virtually an unlimited number of options in completing the requirements.

The new requirements were designed to ensure that students (1) acquire the math and writing skills which are to be expected of today's better-trained college graduates, (2) understand modern scientific methodology, (3) achieve breadth of knowledge by being educated in the arts, literature, history, and social/behavioral science, and (4) understand the importance of other cultures. Under the new system,

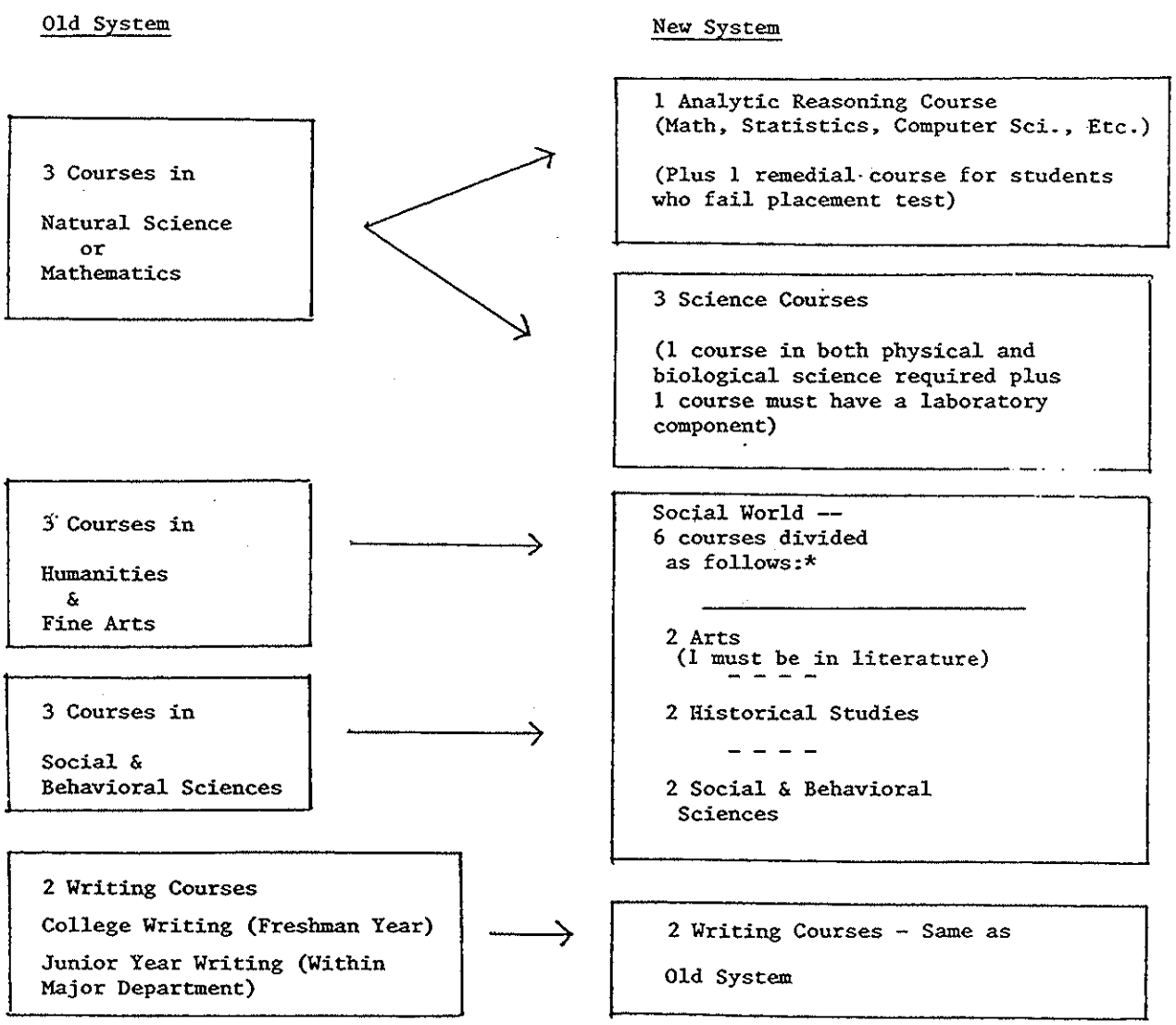
TABLE 1

UNIVERSITY OF MASSACHUSETTS, AMHERST

A COMPARISON OF OLD AND NEW

GENERAL EDUCATION REQUIREMENTS

(Number of Semester Courses)



*Of the six courses two must also have a curriculum which covers Human and Cultural Diversity.

NOTE: Up to three interdisciplinary courses may be substituted for the above requirements but only one course per specific requirement.

students will be required to take a course in analytic reasoning, three science courses, and two courses each in the arts, historical studies, and social/behavioral sciences, as well as the two writing courses. In addition, two of the courses must deal with social and cultural diversity.

Given the rather substantial change in the general education curriculum, the problem faced by the institutional researcher is to predict to what extent the curriculum change will necessitate reallocation of resources acorss acaemic units in order to adequately staff the required general education courses. To make this determination, one must first estimate the pattern of course offerings and student demand which would exist in the absence of a resource allocation.

ESTIMATING COURSE SUPPLY

Estimating the courses to be offered and their respective capacities would be almost impossible to do on the basis of past patterns. Course offerings are the result of yearly decisions made by departments based on a number of factors which are likely to change frequently. In addition, the enabling legislation passed by the Faculty Senate of the University allowed any department to offer courses in any curriculum area, but limited each department to offering no more than 25% of its total undergraduate courses as general education courses. Accordingly, it was decided that the only accurate way to estimate course supply was to conduct a direct survey of academic departments. Table 2 Shows the survey form as it was completed by the Department of Anthropology. Note that the Anthropology Department plans on offering courses in several curriculum areas including social and behavioral science, historical studies, biological sciences, and the arts, with several courses having a social and cultural diversity designation. In addition to the courses being proposed, each department was asked to provide estimates of the annual capacity of the course (under the assumption that their resources would remain constant) as well as the number of large and "small" sections to be offered. By aggregating the results for all departments, one can obtain estimates of the total course capacity to be offered in each of the respective curriculum areas. As of the completion of this paper, not all forms had been returned, and hence, no quantitative results can be reported.

Table 2
GENERAL EDUCATION COURSE OFFERINGS

Academic Year 1986-87

Anthropology (Name of Department) | (Name of person completing form) | 5-2221 (Phone number)

Course Number	Course Title	General Education Code (see attached list & use as many as apply)	*Total Capacity All sections combined	*Number of Large Lecture Sections (200 students or greater)	*Number of Small Lecture Sections (less than 200 students)
100	Human Nature	SBS/SCD	400	2	
102	Archaeology & Prehistory	SBS/SCD	320		2
103	Human Origins	BS	400	2	
104	Culture, Society and People	SBS/SCD	320		2
105	Language, Culture and Comminication	SBS/SCD	100		2
150	Ancient Civilizations	HS/SCD	150		1
206	Culture through Film	SBS/SCD	600	2	
208	Human Ecology	Exp/I (SBS/BS)	50		1
234	Art in Cross-Cultural Perspective	A/SCD	150		1
270	North American Indians	SBS/SCD	70		1 (not yet proposed)
275 (may change number to 217)	Health, Disease and Culture	Exp/I (SBS/BS)	70		1 (not yet proposed)
317	Primate Behavior	BS	70		1

COURSE DEMAND

In order to estimate student demand for individual course, a model will be constructed using the following assumptions: (1) The general education requirements of a specific institution usually allow students to use a number of different courses to satisfy a particular requirement. Individual departments, however, frequently require their majors to take specific courses from the general education curriculum and it can herefore be assumed that departmental requirements will be a major determinant of the demand for individual courses for the general education curriculum. (2) Where a student's major department does not require a specific course, students are free to choose among several alternatives. For general education courses which are common to both the old and new general education curricula, demand can be predicted on the basis of past data on student enrollment by major. (3) For courses which will be offered for the first time, predictions cannot be made on the basis of past data. Consequently, it will be assumed that student demand will be spread equally over new courses after first deducting that demand which results from assumptions (1) and (2).

STAGE I - UNCONSTRAINED DEMAND

Using the three assumptions sepcified above, the model can be used to predict what might be called the unconstrained demand for general education courses, where unconstrained means "without taking into account the available capacity of the individual courses to be offered." The unconstrained demand, when matched up against course capacity, would identify excess capacity and a shortage of capacity for both individual courses and academic departments. If the institutional objective were to provide adequate capacity in the specific courses desired by the students, such estimates could then be used as a basis for examining the allocation of instructional resources both within and across departments.

STAGE II - CONSTRAINED DEMAND

A shortage of capacity for some courses may not present a serious problem if there are other general education courses within the same curriculum area which students may take. Consequently, a more reasonable institutional objective may be to insure that students are able to complete their general education requirements by taking one of several courses in a required curriculum area as opposed to the specific

course they desire. If this is the case, then the appropriate measure is constrained demand, which is defined as the total demand for courses within curriculum areas where students are forced to take other courses if their first choice is not available.

Where there are a number of substitute courses which are offered and there is excess demand for some courses but not others, one can expect the demand from the "oversubscribed" courses to be deflected to substitute courses once registration takes place. Stage II of the model, therefore, will assume that excess demand for a particular course will be deflected to those substitute courses which have excess capacity after Stage I. Stage II estimates, therefore, will be able to identify particular parts of the general education requirements for which there may not be enough overall capacity to satisfy student demand.

RESULTS

Results were not available at the time this paper was completed, but they should be available for presentation at the 1986 NEAIR conference.

MEASURING INSTRUCTIONAL ACTIVITY AT A MAJOR RESEARCH UNIVERSITY

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INTRODUCTION

Devising an analytical system for measuring the instructional activity of faculty is an extremely difficult task, both politically and analytically. To fully describe that effort within the confines of a brief paper and presentation is impossible. Therefore, we will present our ideas and discuss our experiences in the form of a three-part summary. Furst, we will describe the administrative and political process prerequisite to implementing a system for measuring the instructional activity of university faculty. Second, we will suggest a data administrationu protocol that facilitates the implementation of a generalized data resources, thus enabling the production of a wide variety of information about facuty, students, and curricula. Third, we will describe the set of analytical concepts we use to assess instructional activity and discuss techniques for their implementation.

Our current work is part of a larger effort to provide a measurable and auditable account of the full range of the faculty's professional activity. Consistent with the traditional three-part mission of land-grant universities, we identify three domains of faculty activity: instructional, research and scholarship, and public service. Thus, our current effort to measure instructional activity must contribute to a system that ultimately accommodates the measurement of faculty activity within the other two domains.

SUMMARY

Administrative and Political Process

An institution's faculty is its most valuable and expensive resource; faculty salaries represent 60-80% of the cost incurred in institutions of higher education. In public higher education, the support provided by legislative bodies, in the form of funds to defray these

costs, is becoming increasingly conditional. The conditions imposed upon institutions frequently pertain to the principle of accountability. Unfortunately, all too often this principle is manifested as accountancy.

Accountancy typically involves institutional attempts to measure mechanically "how much" before defining conceptually "what." An accountancy orientation also facilitates a rush to employ analytical models developed in non-educational organizations to institutions of higher education where the benefits resulting from the costs incurred are not as well defined and thus not as easily measured. In general, the challenge to institutional researchers is to apply the management models required by accountability demands while preserving the collegial values that differentiate institutions of higher education from those in the profit-making sector.

Attempts to measure and analyze faculty activity have had a long and uneasy history (cf. Yuker, 1984), largely due to the inherent dissonance between accountancy and collegial values. We agree, in large part, with the sentiment -- "From a practical point of view, the solution to this problem ... is both impossible and imperative (Bunnell, 1960, p 92).

The University of Massachusetts at Amherst has been a part of the long and uneasy history of attempts to measure faculty activity. Nevertheless, the impossible remains imperative. Therefore, we are embarked on another attempt to measure faculty activity. However, we are doing so with a particular commitment to recognize collegial values throughout. Our hope for success is based on this commitment and the faculty's recognition of this commitment gained by their participation in system design and implementation. In addition, our prospect for success is enhanced by support from executive management.

Specifically, we identified the actual and perceived shortcomings of previous campus efforts through informal meetings with faculty and by reviewing all available documentation. After formulating an initial conceptual design, we approached executive managment for support and guidance. The newly appointed Executive Vice-Chancellor and Provost found the proposed system to be quite congruent with this own informational needs. Thus "he decided" to charge the Director of Institutional Research and Planning with the task of implementing a system for

measuring faculty activity. The Provost next devoted an entire meeting of the council of deans to a presentation of our proposal for measuring faculty activity.

Since late fall of 1984, the Provost has appointed an advisory council of four deans of our choosing to work closely with us as we have further clarified the concepts and boundaries of our developing system. Simultaneous to our work with the advisory council, a series of unstructured interviews was conducted with 20 faculty members in order to identify and define a taxonomy of instructional modes applicable to the courses offered on the Campus. This taxonomy is currently being reviewed by our advisory council of deans and they, in turn, have agreed to have it reviewed by the chairs of their academic departments.

In summary, the chief academic officer, deans, department chairs, and faculty have all participated in identifying the parameters of the system. Along the way, we have never missed an opportunity to demonstrate how what we are doing differs from prior attempts. Specifically, we have noted how our system (a) will not require massive data provision, (b) recognizes instructional effort as distinct from the other activities of university faculty, and (c) will limit the tendency of external agencies to make inaccurate comparisons between university and community college faculty activity.

DATA ADMINISTRATION PROTOCOL

The types of data resources available at most institutions of higher education often limit the ability to generate timely and valid faculty activity information. In an attempt to remove this limitation, institutional researchers, often aided and abetted by data processing personnel, collect the prerequisite data and store them electronically so as to serve the specific functional requirements of the task at hand. Unfortunately, systems so designed do not provide a long-term return on the considerable time and resources invested in them.

We suggest an alternative approach to data collection and storage. Initially, we carefully distinguish between *data* and *information*. Essentially, data are the fundamental elements of analyses that do not, in and of themselves, have meaning. Information results from the application of analytical processes to the data for the purpose of addressing a specific informational need. A reasonably limited set of well-defined and logically related data elements can support the generation of an

almost infinite variety of information. At the risk of redundancy, but because the distinction is important, we claim that one data system can support numerous types of information systems -- operational, planning, evaluation, and management. The principle is that DATA SHOULD BE ADMINISTERED SEPARATELY FROM THE INFORMATION TO BE GENERATED AS WELL AS SEPARATELY FROM THE FUNCTIONS OR OPERATIONS TO BE SERVED BY THE INFORMATION GENERATED.

Conventional approaches to system design and implementation fail to adhere to this principle, resulting in (a) inflexible systems, (b) the proliferation of systems, (c) costly and time-consuming application programming when the information requirements change (as they will), (d) short-lived and minimal return on resources invested and, most importantly, (e) the unavailability of timely, accurate, and appropriate information. Generally speaking, data become a frozen asset capable of purchasing but one commodity, that being a particular report containing a specific type of information directly supportive of but one organizational operation.

Since an information system regarding faculty activity is complementary to those required for program costing, strategic planning, budgeting, and program evaluation functions, one generalized data resource serving all of these information systems is preferred to several. The conventional method of creating separate data resources for each function is inefficient and leads to inconsistencies when the informational need cannot be satisfied by any one of them.

The approach we are following to create a generalized data resource is Peter Chen's as presented in his Entity-relationship Approach to Logical Data Base Design (1977). Logical is here meant in contrast to physical; that is, Chen's approach is a tool for a data architect not a data builder (computer programmer or analyst). This approach generally ignores specific informational needs and facilitates an understanding of the enterprise, the entities important to the enterprise and the relationships among those entities.

In the higher education enterprise, examples of material and abstract items on importance (i.e., entities) would include Course, Course Section, Student, and Instructor. The relationship between two entities can be illustrated as follows: the Course and Course Section entities exist in a "one-to-many" relationship; that is, each course can

have many course sections, but each course section can belong to only one course. As another illustration, a "many-to-many" relationship exists between the Course Section and the Student entities; that is, each course section can have many students and each student can be enrolled in many course sections.

With the entities identified and the relationships among them described, the next step in Chen's approach is to identify the attributes of each entity and of each relationship. An attribute is a characteristic of an entity or relationship; in data processing parlance, an attribute is a data element. As an illustration, attributes of the Student entity would include Gender and Birthdate; of the Course entity, Level and HEGIS Code.

A relationship can also have attributes. Consider the "many-to-many" Course Section-Student relationship illustrated above. Grade would be an attribute of this relationship. That is, the grade is meaningful only as a characteristic of the joint event of a particular student enrolled in a particular course section.

The conceptual work required in employing Chen's approach not only provides an architectural guideline for data processing personnel, but also helps the architect and others to more fully understand the extent to which existing data resources can respond to informational needs. Further, the resulting data system can be enhanced without disrupting information systems based upon it.

ANALYTICAL CONCEPTS AND THEIR IMPLEMENTATION

Analytical Concepts: Given our broader objective -- to account for the full range of the faculty's professional activity -- our current objective is to identify and measure the portion of faculty activity devoted to instruction. Our analytical measures, summarized below, focus on the concept of instructional effort.

Although there are no widely accepted standards for measuring instructional effort, there are standard measures that may be conceived of as measures of student scholastic effort. Examples include the measures Student Credit Hour (SCH) and Full-time Equivalent Student (FTES). SCH's are determined, in part, by the mode of instructional delivery employed in the course, and also by the amount of time demanded by the course. The generation of FTES's from SCH's is further dependent on the level of study (i.e., undergraduate or graduate).

In an analogous fashion, we propose a basic unit of instructional effort, which we label the Instructional Unit (IU). The IU is equated with the effort required to instruct the equivalent of a one credit-hour "lecture" course. Thus, in order to calculate the number of IU's expended by faculty, we need to identify and define other modes of instruction and relate them to the "lecture" mode in terms of the intensity of instructional effort required.

Building from the IU, a Full-Time Equivalent Instructor (FTEI) measure is derived, which takes into account the level of instruction (i.e., lower division undergraduate, upper division undergraduate, master's level graduate, and doctoral level graduate). At this point in time, we have not established these equivalencies between IU's and FTEI's. The method we will use to establish them is described more fully below.

Based on the measures described above, one can calculate a Student-Instructor Ratio by dividing the number of FTES's generated in courses by the number of FREI's expended. This can be done separately for different levels of instruction and for different modes of instructional delivery. Further, useing the budgetary device of a Full-Time Equivalent Faculty (FTEF) member, we can also determine the proportion of effort that a faculty member devotes to instruction (i.e. FTEI +FTEF) and thus the proportion of faculty salary expended on instruction ([Faculty Salary] x [FTEI /FTEF]).

Implementing the Analytical Concepts: Using Chen's entity-relationship approach, we identified the data elements from our generalized data structure that we would initially require. We then considered the available data resources and identified data that were either unavailable, unreliable, or simply unworkable.

Although the University maintains data identifying each course section's mode of instruction, it does so in classical terms (i.e. lecture, laboratory, discussion). Therefore, in order to associate our new taxonomy of instructional modes with course sections, we devised a computerized "turn around" document. This data collection document required departments to categorize each of their courses according to our new taxonomy of modes.

At the same time that we physically implement our logical data structure, we will begin to use modeling techniques to establish the

parameters for the instructional activity information system. Specifically, we must establish the weight for each new mode of instruction, and the equivalences between the IU's and FTEI's. We will do so by demonstrating to the advisory group of deans how different weighting and equivalence parameters affect the values observed for the Student-Instructor and the Instructor-Faculty ratios. This simulated information should assist the deans in judging the academic appropriateness of these parameters.

Although we gave employed Chen's method of logical data base design to conceptualize our generalized data resource, we are not implementing the system in a physical data base environment. It is important to note that data base software is not required to support a logical data base design, it simply makes data access faster and easier for the "end user." Instead, we are using the Statistical Analysis Software (SAS) package for data manipulation and analysis. Although mimicking a data base environment with SAS requires moderately sophisticated programming techniques, the effort is worthwhile considering the powerful data analysis facilities also available within SAS.

CONCLUSION

In this brief paper, we have attempte to capture the essence of a project that has been one year in the works and is likely to require several more months before we see the first fruits of our labors. It is noteworthy that very little of this time has been devoted to what may be considered the institutional research component of this project -- the development and implementation of the analytic concepts. Rather, the vast majority of our time and efforts have been devoted to the administrative and political processes and the design and implementation of a generalized data structure. Oru commitment to preserving collegial values, via the participation of faculty and academic administrators, often slowed our progress. Further, developing a generalized data resource from among data resources that were constructed one application at a time, is a tedious, time-comsuming, and often frustrating activity. Of course, the most significant delays in the development of our system stem from maintaining on-going office functions.

Yet, in spite of all the delays and frustrations, we still believe that our investment will reap substantial benefits for the institution. In the near future, we will be able to provide useful information

regarding the faculty's instructional activity. And, further along in time, we can readily enhance our generalized data structure to enable us to respond to an even wider variety of informational requests.

REFERENCES

Bunnell, Kevin, ed., 1960. Faculty Workload, Washington, D.C. American Council on Education.

Chen, Peter, 1977. The Entity-Relationship Approach to Logical Data Base Design, Data Base Management Monograph Series, No. 4, Wellesley, MA: QED Information Sciences.

Yuker, Harold E., 1984. Faculty Workload: Research, Theory and Interpretation, ASHE-ERIC Higher Education Research Report No. 10, Washington, D.C.: American Association for Higher Education.

A CONCEPTUAL MODEL OF THE INSTITUTIONAL RESEARCHER AS INITIATOR, FACILITATOR, AND RESOURCE IN A FOUR PHASE MARKETING MANAGEMENT PROCESS

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INTRODUCTION

Essentially, the marketing management process attempts to create a need in a potential population for goods and services offered by a particular organization (Kotler, 1984). "In higher education's new environment of scarcity and competition for students, many institutions have discovered marketing" (Alpert, 1985). However, institutions of higher education are characterized by their unique organizational structure and distinct mission (Trow, 1977; Clark, 1971). Thus, marketing services they offer (or plan to offer) to a defined (or undefined) demographic population has become an increasingly complex strategic process. This process can be market by chaos and dissention due to the bifurcated hierarchial structure, which necessitates involvement by a number of interrelated yet vested constituencies. While the institutional researcher is not in a position to control this process, (delegation resides with the chief executive officer), she/he can significantly influence its design. Thus, the theme of this paper will focus on the three roles of the institutional researcher in a four phase marketing management process for a two year community college (Figure 1).

PHASE I DEVELOPMENT

There are several factors which can force institutions into a marketing management process. They can range from a combination of declining or steady state enrollments to a decrease in the amount of available financial resources. The institutional researcher can serve as an initiator of the marketing management process by generating and appropriately distributing: historical demographic and program headcount/FTE data, enrollment projection data by demographics and programs (Table 1), data associated with community assessment surveys, and data

Figure I

Conceptual Model of a Four Phase
Marketing Management Process

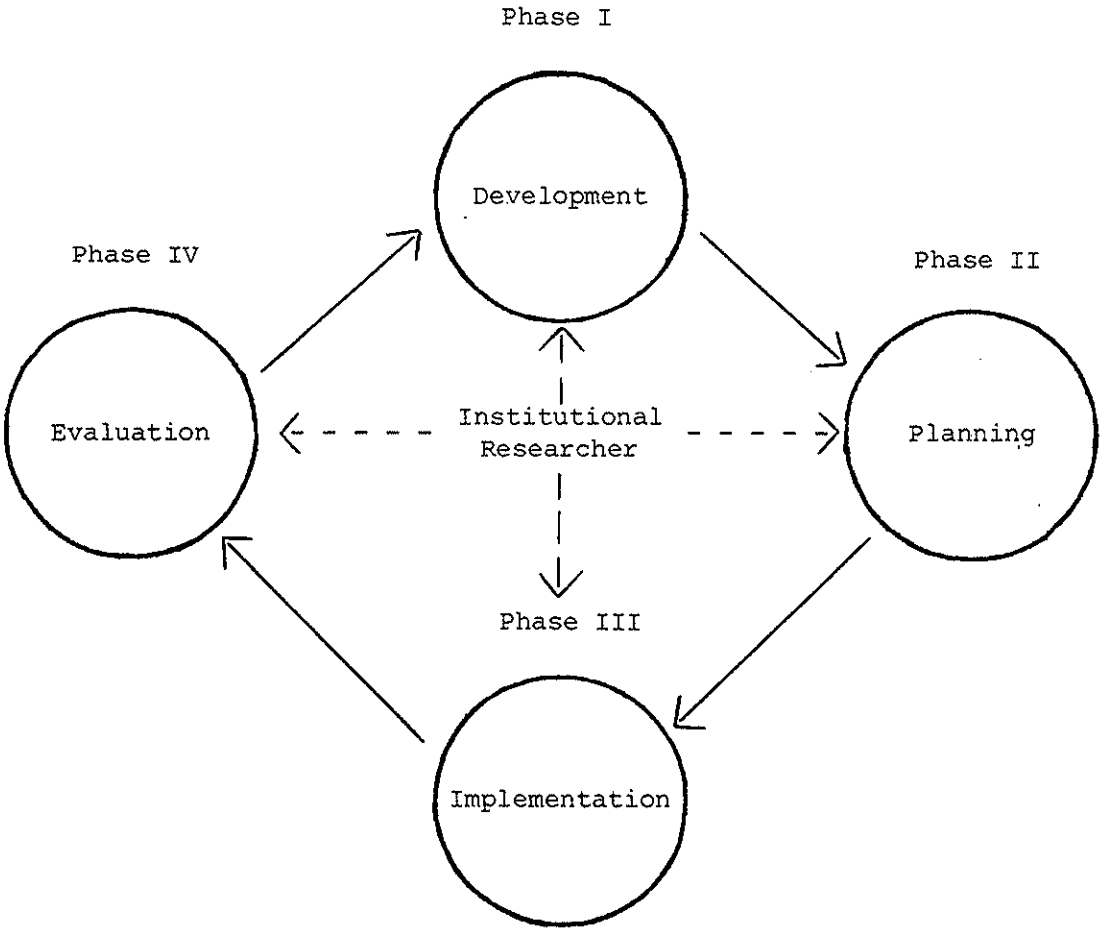

Table 1

First-Time Matriculated Students by Program of Study

Degree	Program	Fall 1979	1980	1981	1982	1983	1984	1985
AA	Adirondack Studies	0	1	2	0	0		
AA	Gen Elect/Hum/Soc Sci	69	93	79	70	69	94	
AA	Individual Studies	7	2	11	3	0		
AS	Business Administration	25	32	21	49	26	40	
AS	Computer Science	0	0	0	0	0	8	
AS	Env Sci/Forestry (SUNY)	0	0	0	0	0		
AS	Math/Science	42	85	60	60	59	19	
AS	Individual Studies	0	0	0	0	0		
AS	Physical Education	0	0	0	0	0	28	
AS	Wanakena Forestry Program	0	0	0	0	0		
AS	Wilderness Rec Leadership	0	18	9	9	16	10	
AAS	ADN/RN	0	0	0	0	0		
AAS	Biological Technology	25	15	8	11	6	4	
AAS	Business Administration	24	25	24	20	46	30	
AAS	Canton ATC (1+1)	0	0	0	2	0		
AAS	Com Men Health Asst	9	15	11	13	13	6	
AAS	Com Men Health Asst/Geron	1	6	0	0	2	3	
AAS	Crafts Management	14	6	4	3	5		
AAS	Criminal Justice	31	29	30	28	39	40	
AAS	Extended Radiologic Tech	0	0	0	0	0		
AAS	Individual Studies	0	1	0	0	0		
AAS	Radiologic Technology	7	11	3	3	5	11	
AAS	Retail Business Mgmt	16	10	16	9	13	7	
AAS	Secretarial Sci/Executive	14	15	10	5	14	12	
AAS	Secretarial Sci/Medical	2	6	5	3	6	9	
Cert	Clerical Studies	1	31	4	5	15	4	
Cert	Community Res Care	0	0	0	0	14	11	
Cert	Gerontology	0	0	2	1	2	1	
Cert	Individual Studies	0	0	0	0	0		
Cert	Practical Nursing	59	79	45	39	36	37	
Cert	Pulp & Paper Technology	0	0	0	0	0		
Cert	Secretarial Studies	7	8	11	12	15	10	
Cert	Ski Area Mgmt	30	15	7	8	5	2	
	TOTAL	383	503	362	353	406	386	

associated with alumni employment or institutional satisfaction surveys (Table 2). In addition, the IR person can initiate studies with an admissions office on enrollment rates for applicants based on demographics and programs. Concurrently, some of the previously mentioned data can be utilized to forecast several scenarios on institutional revenues. These data can be useful for setting objectives in the second phase of the process.

PHASE II PLANNING

Once the rationale for the marketing management process has been identified, sets of objectives need to be established. These may range from setting goals by demographic locations and/or increasing headcounts in new or low enrollment programs, to redefining the institutional image for increases in sponsor budget allocations. This may be they most important phase of the model because it provides directions for the process. In essence, the involved parties should know: why they are there; what is required of them, and how success will be determined. The institutional researcher can serve as a facilitator in this phase by redefining appropriate goals/objectives into quantifiable terms, helping to establish time frames, and initiating necessary investigations for Phase IV evaluations. In addition, the IR person may suggest a variety of contingency plans for potential obstacles.

PHASE III IMPLEMENTATION

Once the plan has been established, implementation must commence. As with many plans, revisions may be necessary. These revisions may evolve from inappropriate timelines to a decrease in financial resources. Such required revisions can have a significant impact on previously established objectives. As a resource, the institutional researcher can provide appropriate data projections to ascertain what effect these revisions may have on the process. Utilizing that data, the IR person can serve as a facilitator helping to develop modified evaluation models. These will be necessary for the final phase.

PHASE IV EVALUATION

In order to determine the effectiveness of any process, appropriate evaluations are required. The evaluation format must be established at an earlier phase in conjunction with the stated plans (or modifications thereof). It is primarily the responsibility of the institutional researcher to serve as a resource collecting, analyzing and

Table 2

1983-84 Alumni Satisfaction Survey of NCCC Services

Actual Graduates 226

Useable Surveys Received 129 % Useable Return 57

Breakdown by Percentage for Each Area and Category

	Very Satisfied	Satisfied	Dissatisfied	Very Dissatisfied	No Basis For Option
Classroom Instructor	51.94%	41.86%	.78%	0	5.43%
Course Offerings	25.58%	65.89%	6.20%	1.55%	.78%
Individual Assistance by Instructors	56.59%	37.98%	3.10%	.78%	1.55%
Classroom Facilities and Instruction	29.46%	64.34%	3.88%	.78%	1.55%
Lab Facilities and Equipment	24.03%	53.49%	6.20%	1.55%	14.73%
Independent Study Areas	23.26%	43.41%	7.75%	3.88%	21.71%
Library Services	32.56%	55.81%	6.20%	1.55%	3.88%
Class Scheduling	24.81%	66.67%	4.65%	2.33%	1.55%
Admissions Counseling	27.13%	54.26%	4.65%	3.88%	10.08%
Academic Advising	37.21%	45.74%	7.75%	3.10%	6.20%
Career Counseling	17.83%	44.96%	15.50%	5.43%	16.28%
Personal Counseling	24.81%	46.51%	5.43%	2.33%	20.93%
Transfer Counseling	10.85%	32.56%	10.08%	6.20%	40.31%
Financial Aid Program	37.98%	40.31%	4.65%	1.55%	15.50%
Registration Procedures	26.36%	65.12%	3.88%	.78%	3.88%
Bookstore Services	26.36%	59.69%	6.20%	3.10%	4.65%
Food Services	17.83%	41.86%	6.98%	4.65%	28.68%
Recreational Facilities and Clubs	24.03%	44.96%	6.20%	2.33%	22.48%
Student Association	16.28%	48.06%	8.53%	4.65%	22.48%
Business Office	27.91%	51.94%	7.75%	7.75%	4.65%

Survey Conducted Nov/Dec 1984

Breakdowns by individual major, degree and certificate programs are available for use in the Institutional Research office or from division chairs.

appropriately distributing the results. Success for some might mean failure for others, therefore it is imperative that data interpretation be presented in an unbiased fashion. Ultimately, the evaluations should be incorporated into the development and planning phases in future utilization of the model.

CONCLUSIONS/RECOMMENDATIONS

The development of a marketing management process is in essence a strategic process which involves a number of interrelated yet vested areas. Individual areas or combinations of these areas will attempt to overtly or covertly manipulate the process to suit their particular interests. In order to minimize such a scenario, an appropriate committee structure will be required with delegation and accountability ideally eminating from and to the chief executive officer. Thus, the institutional researcher must remain objective and flexible. Yet, she/he can exert considerable influence with the dissemination of accurate and timely data. Therefore, considerable preparation for the process will be necessary. While Fact Books are helpful, a number of initial studies may be required. Results of these studies should be available to the entire college community. However, data should be disseminated over a period of time to allow for comprehension. In addition, the institutional researcher may occasionally be an opponent of the process by posing "what if" questions. If done tactfully, this can strengthen the process with the development of contingency plans. Finally, this is a cyclical process. Therefore, what is not accomplished in the first year may become a priority in the second year. Conversely, mistakes in the first year should not be repeated.

REFERENCES

Alpert, Richard "Using Consultants in Institutional Marketing," in AAHE Bulletin, Volume 37, No. 8, April, 1985, Page 7

Clark, Burton "Faculty Orgainization and Authority," L. Baldridge, ed., Academic Governance. Berkeley: McCuthraham, 1971

Kotler, Philip Marketing Essentials, Prentice-Hall, Inc., Englewood Cliffs, NJ, 1984

Trow, Martin "Departments as Context for Teaching and Learning", Dean McHenry (ed.), Academic Departments, Washington: Jossey-Bass, 1977

DEVELOPING DECISION SUPPORT: A CASE STUDY IN WORKING RELATIONSHIPS

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The literature on decision support systems has been growing at a rapid pace over the last few years, and the number of papers on this topic that have been presented at this conference is no exception. However, while the definition of terms, discussion of theories, analysis of systems, and design of applications are common subjects, there are few case studies of the actual process through which decision support has been developed, especially within the context of small, developing institutions. This paper describes such a study, with sections on the setting, the need for decision support, difficulties encountered in developing decision support, and some strategies for overcoming those difficulties.

THE SETTING

Tompkins Cortland Community College is one of thirty public community colleges in New York State under SUNY. While SUNY collects data from the College on a variety of the usual research topics, it's only in comparative enrollments, programs, and salaries that much value is derived from the current standard reports. Although the College has access through SUNY to a program very similar to the induced course load matrix, the rigid requirements necessary to get those data into the program have not been helpful, at least to this point. Additionally, it's very likely that the output from this program, when it is available, will prove to be so overwhelming in scope that a good deal of additional work will be required in order to extract significant kinds of information from the various comprehensive reports.

During the Summer of 1984, the College was in the process of filling several key positions. The President of the College had returned from a two-year leave, and searches were underway for a Dean of Administration and a Dean of Academic Affairs. Also, a successful search for Director of Institutional Research had just been completed.

By September of 1984, the administration of the College had stabilized, with the returning President back in charge and the new Dean of Administration, Academic Dean, and Director of Institutional Research employed and learning their jobs. Because the College was in the second year of the first Faculty Association contract, the new administrators spent the first 6 to 8 months establishing working relationships with the new Faculty Union structure. Because the Academic Dean had not been at the College before, in fact had no community college experience prior to accepting this position, it was also a time when the problems and opportunities for the institution were being discovered, assessed, and plugged into a decision-need cycle.

THE NEED FOR DECISION SUPPORT

The College had been founded in the late '60's and to a considerable extent had adopted and maintained the free, open, non-restrictive attitudes of the 1960's and early '70's. Over the years, these were institutionalized in a significant way. In the Summer of 1984, there had been a 3 to 4 year gap in academic program development; and little attention had been paid to the changing competencies and specialties required of faculty to meet the programmatic needs of the institution as it actually existed. Additionally, the contract negotiated by the Faculty Association and the College had resulted in some rather extreme positions being staked out in most of the areas of significance. For instance, for all intents and purposes, there could be no retrenchment at the College that would do anything other than create immediate havoc. As is true with most community colleges, 30 to 35% of the instruction was being assigned to adjunct instructors. For a variety of reasons, the course development and program modification that is so vital to the survival and relevance of an institution had been ignored by regular permanent faculty and, to the extent that it was occurring, was fostered by adjuncts and new people.

The College had, for a number of years, been driven by the budget process. That is, an initial determination would be made as to the amount of money that could likely be raised for the coming year's budget; and after that was achieved, some attention would be paid as to how that money might be spent. The institution was not driven by the academic and staffing needs, but rather by the budgetary possibilities.

As a result, no program-based seniority list had been erected. No on-going examination of workload, in terms of output, was available. Only input numbers had been used with the result that it wasn't really clear whether each member of the Faculty Association was carrying an appropriate load. The general education requirement had largely become subject to the erosion that occurs when that aspect of a curriculum is ignored over an extended period of time. Also, a number of the programs had, under the guise of General Education, extended their programmatic requirements to the point that they were significantly greater in credit hour number than was probably appropriate.

This is not an exhaustive list. Essentially, what we've tried to describe is an institution that started in the late '60's, that had gone through significant growth over a number of years, and that in the early 1980's peaked at an enrollment of about 2,100 FTE's. To its chagrin, it then dropped to under 1,900 FTE's a year or two later. This was the setting for the new Academic Dean, whose task was to bring the institution into the last fifteen years of the 20th Century in a way that would optimize its usefulness to the sponsoring counties and enhance the likelihood that it would survive into the 21st Century.

We are still struggling with most of these problems. The kinds of significant deep-rooted developments outlined above are not changed overnight. They require a good deal of internal battling, structuring, posturing, and the kind of ritual dancing with which most of you in this room are probably familiar. In a very real sense, it is an opportunity that is exciting for an administrator. There are so many areas within the institution that need change and modification that there is no shortage of opportunites for creative management. Additionally, the faculty and administrative staff of the institution clearly recognize that change is not only appropriate but, in fact, required. The only question then is how to manage that change in an atmosphere of shared decisionmaking while avoiding the kinds of blind alleys that can be so destructive at developing institutions.

The answer to this question, insofar as the Institutional Research Director and the Academic Officer are concerned, is by working together to generate relevant information support for the most crucial management decisions.

SOME DIFFICULTIES IN DEVELOPING DECISION SUPPORT

To define and begin to meet the needs for decision support at Tompkins Cortland Community College has required initiative, responsiveness, ingenuity, and cooperation from both the Academic Dean and the IR Director. Fortunately, the Academic Dean has had professional experience in institutional research, and the IR Director has been a faculty member and department chair, so communication and understanding of the needs and possibilities for decision support are relatively easy. However, the agenda for Institutional Resarch was already set by State requirements and by responsibilities for College-wide planning and evaluation. In addition, the College Plan for 1984-85 stipulated that the Director of Institutional Research would conduct or assist with 11 major projects, only two of which (feasibility studies for new academic programs and routine reviews of six academic programs) were related to the needs of the Academic Dean for decision support. Together with the additional responsibility of generating and analyzing market research in the absence of a Director of Marketing, this official agenda seemed to leave little time for the Director of IR to respond to the emerging needs of an Academic Dean. Moreover, the Academic Dean had little control over this agenda, since the Director of IR formally reported to another Dean.

STRATEGIES FOR DEVELOPING DECISION SUPPORT

1. Integration of Related Projects

Despite the apparent lack of necessary resources, it was clear that the needs of the Academic Dean for decision support were of primary importance to the institution. Moreover, the working relationship that developed between the Academic Dean and IR Director more than compensated for the lack of a direct, formal relationship. As a result, two strategies were pursued to develop decision support. The first strategy was to incorporate decision support for the Academic Dean into other related activities. For example, the Academic Dean expressed a need to develop enrollment projections on the level of the academic program, so that these projections could be used to drive an induced course load matrix, resulting in staffing projections for each academic division. By combining this need with related needs for enrollment projections as part of the budget development process, the development of a marketing plan and the updating of SUNY's multiphase rolling plan enrollment pro-

jections, a by-program enrollment projection model was developed and reviewed by the Dean and his Division Heads. This model is currently being revised to produce projections in the form desired by these decision-makers. Meanwhile, an extant credit hour contribution report has been transformed into an induced credit load matrix, which will be used to convert these by-program enrollment projections into projections of credit hour demand for each academic division.

By negotiating for an appropriate one-year objective in next year's College Plan, it should now be possible to place on the official IR agenda the development of a staffing model to convert these credit demand projections into a staffing needs analysis. An appropriate long-range objective might then provide for the extension of this staffing model into a comprehensive cost simulation model. The use of the planning system in this way would, in fact, constitute another strategy for the development of decision support systems.

Another example of the strategy of incorporating decision support into other related activities was to combine the Academic Dean's request for an analysis of the general education courses taken as electives by a sample of graduates, with the analysis of elective courses taken by the majors in a program that was called for as part of the model for routine program review. A file of required courses for each program was developed in anticipation of the program review process and then related to the transcript file of a sample of graduates in order to produce needed support for the Task Force on General Education, which has just submitted a report containing significant recommendations. Moreover, the induced course load matrix developed as part of the support for making staffing decisions can now be used to generate credit demand projections based upon the recommendations of this Task Force.

2. Modification of Planned Projects

A second strategy that was employed to provide support for the management decisions of the Academic Dean was to modify and adapt the official agenda of IR projects so that some of them would better accommodate these emerging needs. For example, a needs assessment for an honors program was delayed so that more emphasis could be put on conducting initial feasibility studies for a variety of possible new programs. Seven of these have now received preliminary approval.

Another example of this strategy concerns the planned review of six academic programs. This review was postponed until an adequate, detailed model of the review process could be developed and approved, thus giving the revitalized review process more credibility than it might otherwise have had.

A final example of this strategy concerns the Academic Dean's need for information on the students who transfer from the College into baccalaureate programs. Information provided by SUNY on these students was analyzed, and a data summary was prepared as part of the annual revision of the College's Planning Data Book.

CONCLUSION

As with any case study, the findings described here may not be generalizable to the development of decision support in other settings. However, for small, developing institutions with limited resources, which are faced with the problem of uncertain enrollments, the needs that were identified for decision support in this case, the difficulties that were experienced in meeting these needs, and the strategies that were found to be successful in developing decision support, might have some relevance.

THE PLANNER AS POLITICIAN:
A LEADERSHIP ROLE IN GUIDING CHANGE

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A SAD, SAD HISTORY

Once upon a time, a long, long time ago, a College President said, "I need some facts before I can make this decision." Voila! An institutional research office was created. The inhabitants busily put together reports on topics of interest to the President.

Not long after that, a state legislator said, "I need some facts before I can make this decision." Presto! A state bureaucracy was created to gather facts from college campuses. The inhabitants of the institutional research office dutifully put the numbers in the boxes.

A little while later, a congressman said, "I need some facts before I can make this decision." Wham! A federal bureaucracy was created to gather facts from colleges and universities. The inhabitants of the institutional research office filled in more boxes with numbers.

Soon there were so many presidents, state bureaucrats, and federal bureaucrats asking for data that whole forests were consumed by the paper used to file reports.

Then one day the researchers all came to the same conclusion. No one is really paying attention to our reports.

The moral to the story: A long as researchers are passive and just comply with data requests, it is quite probable that no one will pay attention to their reports. The first point of this over-simplified story is that the stereotypical researcher and planner, if there is such a thing, is data oriented, apolitical, and, most probably, politically naive.

Furthermore, many researchers are exhibiting a malaise that has symptoms such as inwardness, short-term focus, poor morale, and fragmentation. These people develop an approach to their job that is best described by George Bernard Shaw:

> The worst sin towards our fellow creatures is not to hate them, but to be indifferent to them; that's the essence of inhumanity.

Rosabeth Kanter has a set of rules for indifference that are worth sharing with you:

Rules for Stifling Innovation

1. Regard any new idea from below with suspicion--because it's new and and because it's from below.
2. Insist that people who need your approval to act first go through several other levels of management to get their signatures.
3. Ask departments or individuals to challenge and criticize each other's proposals. (That saves you the job of deciding; you just pick the survivor.)
4. Express your criticisms freely, and withhold your praise; (that keeps people on their toes). Let them know they can be fired at any time.
5. Treat identification of problems as signs of failure; to discourage people from letting you know when something in their area isn't working.
6. Control everything carefully. Make sure people count anything that can be counted, frequently.
7. Make decisions to reorganize or change policies in secret, and spring them on people unexpectedly. (That also keeps people on their toes).
8. Make sure that requests for information are fully justified, and make sure that it is not given out to managers freely. (You don't want data to fall into the wrong hands.)
9. Assign to lower-level managers, in the name of delegation and participation, responsibility for figuring out how to cut back, lay off, move people around, or otherwise implement threatening decisions you have made. And get them to do it quickly.
10. And above all, never forget that you, the higher-ups, already know everything important about this business.

Another favorite of mine that lists some typical reactions of people who are suffering from malaise are "Seven Steps to Stagnation."

1. We've never done it that way.
2. We're not ready for that.
3. We're getting by without it.
4. We tried it before.
5. It might cost too much.
6. It's not our responsibility.
7. It just won't work.

Are you guilty of stagnant thinking?

The second point of the story is that researchers and planners need to become more politically aware. They need to take an active part in guiding change in their institutions. They are well poised to quickly change roles because they possess the gold of the Information Age - the facts!

WHY THIS PRESENTATION?

"The best way to predict the future is to create it."

-Peter Drucker

After I submitted my proposal outline to the selection committee, I began accumulating some reading materials that dealt with excellence, change, and leadership. These readings form the basis for my presentation today. The readings were:

Bennis, Warren and Nanus, Burt: Leaders

Kanter, Rosabeth: The Change Masters

Peters, Thomas and Austin, Nancy: A Passion for Excellence

Bellah, Robert: Habits of the Heart

Kuhn, Eileen and Martorana, Sebastian: Managing Academic Change

I originally had hoped to talk about the political overtones of strategic planning. But, as my opening story indicates, I've decided to approach my topic "The Planner as Politician: A Leadership Role in Guiding Change" from a broader perspective.

A caveat is that this presentation is a subjective presentation of my point of view which I suspect may be dramatically at variance with the opinions held by many in the audience. I am suggesting that researchers and planners be passionate, not dispassionate, involved not neutral, political not isolated, and committed to guiding change not watching it.

The thrust of my argument rests on three qualities of the future effective researcher and planner. He or she will:

- Be political
- Be marketing oriented
- Be a change leader

THE POLITICAL DIMENSIONS OF THE ROLE

"People do not utilize research the way they utilize a hammer."

-Carol Weiss

You've probably all had Political Science 101 back in undergraduate days, so I won't bore you with theories of influence and power boxes. I will briefly give some examples of what I mean when I suggest that we "Be Political." Ask yourself these questions:

1. Who uses the information they produce and for what purposes?
2. Who are the power brokers on the campus? What is the formal political structure? What is the informal political process?
3. Are the people in 1 and 2 above the same people? If not, why?

To be effective, be political by assessing what information the power brokers need and give it to them. If the power brokers are not using the information produced by researchers and planners, the reason may very well be that they don't view it as important to the political process or to the politics of the institution.

What are the institutional political issues? Here are a few:

1. Internal distribution of power
2. Distribution of economic benefits
3. Distribution of fiscal resources
4. Economics of institutional operation
5. Determination of programs
6. Responsiveness to needs
7. Delivery of services
8. Opportunities for development

What are the political tactics used to deal with these issues (only some of which have research components)? Here are a few:

1. Confrontation
2. Trial balloon
3. Emotionalism
4. Historical precedent
5. Organized campaigns
6. Passive resistance
7. Selective communications
8. Compromise/concession
9. Counter thrust timing
10. Divide and conquer
11. Front man
12. Membership/chairperson
13. Ad hocracy
14. Carrot and stick
15. Pressure
16. Publicity

The last word in the political aspect is for God's sake do something. As Will Rogers said, "Even if you're on the right track, you'll get run over if you just sit there." Peter and Austin said it even better: "Inaction is not tolerated, period!"

THE MARKETING DIMENSION

"You can't build a reputation on what you are going to do."

-Henry Ford

Philip Kotler in Marketing for Non-Profit Organizations identified four levels of organizations responsiveness: unresponsive, casually responsive, highly responsive, and fully responsive. It is my feeling that most colleges

are currently "casually responsive." In view of the changing environment and the resulting decline in traditional student numbers it is essential that the institution move from "casually responsive" to "highly or fully responsive."

A "highly responsive" organization is typified as follows:

1. Shows a keen interest in learning about the needs, perceptions, preferences and satisfactions of its constituents and relies on systematic information collection procedures suchas formal opinion surveys and consumer panels.
2. Encourages its constituents to submit inquiries, complaints, suggestions and opinions, and creates formal systems to facilitiate this such as suggestion boxes, comment cards, ombudsmen, and consumer committees.
3. Sifts the incoming information and takes positive steps where called for to adjust products, services, organizational policies and procedures.

The role for researchers in marketing should be clear.

How do the researchers market their offices? Here are some examples:

1. Volunteer for service on important committees and supply good information.
2. Use statistical graphics to relate information instead of detailed narratives and charts.
3. Widely distribute executive summaries of research reports.
4. Publish and widely distribute year-end compliations of research reports, studies, and findings.

THE "GUIDING CHANGE" DIMENSION

"In human affairs, the logical future determined by the past and present conditions, is less important than the willed future, which is largely brought about by deliberate choices."

- Rene Dubos

"The sine qua non of innnovative policy is controversy."

- Richard Neustadt

"There is nothing more difficult to take in hand, more perilous to conduct, or more uncertain in its success than to take the lead in introducing a new order of things."

- Niccolo Machiavelli

Change and innovation are necessities. Why? Here are a few reasons, exerpted from Martorana and Kuhns' book Managing Academic Change:

1. Rising expectations
2. Public disenchantment
3. Pressure for accountability
4. Competition for students and dollars
5. A different student body
6. Student insistence on flexibility

7. Concern for effective learning values
8. Developments in technology
9. Federal programs
10. Shift to buyer's market

Kanter describes the people who guide change as "Change Masters" or people who are adept at the art of anticipating the need for, and of leading, productive change.

What tactics should change masters utilize. I've already discussed some in my early comments on politics and marketing. But, at the risk of giving too many lists, there is another one from Martorana and Kuhn under the heading "Guideline for Change Leaders:

1. Action profile
2. Systematic experimentation
3. Participant involvement
4. Creation of demand
5. Development of legitimacy
6. Creation of power blocks
7. Control of internal organization
8. Control of communication

There are ways, of course, to stop the "wrong" change. Here are seven time honored tactics:

1. Make up a file
2. Call a meeting
3. Hold a conference
4. Staff the matter
5. Initiate an investigation
6. Appoint a committee
7. Call in a consultant

THE ELEMENT OF RISK

"If you're never scared or embarrassed or hurt, it means you never take chances."

All these nonconventional approaches to research and planning that I have presented today involve an element of risk.

All the readings from the summer emphasized that failure is not only to be tolerated, but learned from. Politicians and marketers make mistakes because they make decisions that are based on a combination of facts and instinct, not carefully laid out plans. I encourage you to take the risks. It's worth it! George Patton once said "A good plan violently executed right now is far better than a perfect plan executed next week."

EDUCATIONAL DECISIONMAKING: RATIONALITY, POLITICS, OR ORGANIZED ANARCHY?

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PREFACE

An academic discipline or any broad field of study requires conceptual frameworks around which facts and ideas can be organized and analyzed. The purpose of this paper is an examination of one of the more popular methodologies currently in use in the area of political analysis. The utility of that methodology in explaining how decisions are made in an educational setting will be assessed through application to a series of actual decisions between 1975 and 1981 regarding the fate of a specific institution. Graham Allison (1871), in his analysis of the events surrounding the Cuban Missile Crisis of 1962, developed three separate conceptual lenses for examining and organizing those events. The Allison paradigms readily lend themselves to the arena of educational decisionmakeing, and their value in contributing to an understanding of how those decisions are formulated will be the focus of this paper.

THE GRAHAM ALLISON PARADIGMS

Until recently, analysis of political decisions has in large part been accomplished using a rational conceptual framework. Yehezkel Dror (1968), a leading proponent of rational policy analysis, devised an elaborate model for rational decisionmaking. Rooted largely in the principles of cost-benefit analysis, Dror's model relies heavily on the "value processing" element in decisionmaking, in which organizational goals are clearly identified and all alternative courses of action are evaluated with in the context of organizational values. In fact, Dror crystallized and neatly packaged a decisionmaking paradigm that had long been used by historians and political scientists in the analysis of public policy decisions (Allison, 1971). So firmly entrenched is the rationale policy analysis paradigm, that data processing software is available to facilitate the process (Quade, 1975).

Allison in no way attempts to denigrate the rational policy paradigm, and suggests that there are instances when it is useful for

understanding the decision process. He does suggest, however, that there are other, equally useful ways for examining policy making. Allison (1969, 1971) analyzed within the traditional rational analysis framework, the events surrounding the placement and subsequent withdrawal of Soviet missiles in Cuba. He went on the assert, however, that socio-political phenomena unattended by rational analysis might well be explained through other analytical frameworks. To that end, he developed the organizational process paradigm and the bureaucratic politics paradigm. This paper will apply the three Allison models -- rational, organizational process, and bureaucratic politics -- to the series of decisions within a major public university system to construct a new campus at a time when systemwide enrollments were sharply declining. An explanation of each of the paradigms precedes the application.

THE RATIONAL MODEL

The rational policy analysis paradigm presupposes that the basic actor in the decision process is a unified actor. Institutional goals are clearly stated and are understood by all parties to the decision-making activity. Personnel within the organization share a common understanding and acceptance of institutional goals. Key constituencies outside the organization also share the same understanding and acceptance of institutional goals because of the face validity and legitimacy of that organization's activity within the external environment. In other words, it is assumed that all parties to the decision-making process, both within the organization and external to it, have a common set of values relative to institutional goals. The common values imply general acceptance of those policies which lead to realization of institutional goals.

Having processed values to arrive at a common understanding of institutional goals and objectives, the ground rules for rational decisionmaking mandate that choices be made which result in adoption of that course of action which results in maximum goal achievement at the least cost to the institution. Rationality dictates that the organization will identify all potential courses of action within the context of the decision under consideration, will project the extent to which each course of action contributes to the realization of institutional goals, and will estimate costs associated with each course of action.

In summary, then, the rational model calls for identification of the values of the decisionmakers, and evaluation of alternative courses of action against those values and objectives. The consequences of each alternative course of action will have been full explored, and the degree to which those consequences are consistent with stated values and objectives estimated. The course of action that is selected will have been chosen on the basis of cost benefit analyses, with the analyses performed in a politically neutral context against a backdrop of values and objectives that have been commonly agreed upon as contributing to the overall "health" of the organization.

The rational policy making paradigm poses the following questions for analysis of decision processes:

1) What is the problem?
2) What are the goals, objectives, and values of the decisionmaker(s)?
3) What are the alternative courses of action?
4) What are the costs and benefits associated with each alternative?

THE ORGANIZATIONAL PROCESS PARADIGM

Unlike the rational policy analysis paradigm, the organizational process paradigm does not view the decisionmaker as a unified actor. Rather, each component group within the decision unit has its own identity and its own "organizational processes," thereby giving rise to the name of this model. The decision is viewed as the "product" of the organizational processes of the component decisional groups. In other words, action is viewed as organizational output.

The crucial factor within this paradigm is the concept of standard operating procedures (SOP's) and programs for action that are in place within each of the component elements of the decisional unit. These SOP's contain a number of characteristics that are clearly non-rational in nature. The SOP's tend to address problems in a fashion that Herbert Simon characterized as "satisficing." That is, the decisionmaker, operating within the constraints of fiscal and manpower limitations will not conduct an exhaustive search for solutions to a given problem, but will instead serially review readily available solutions and will settle on the one that appears to most closely "fit" with the existing values and objectives of the decisionmaker. These values can and do take on parochial overtones. The survival of the particular group or unit involved in decisionmaking within the organi-

zation assumes priority status in the hierarchy of values. Thus, any course of action will be viewed by a given group only in a light that assures the perpetuity of that group and its mission.

The organizational process paradigm poses the following questions:

1) Of what organizations (and organizational components) does the decision unit consist?
2) Which organizations traditionally act on a problem of this sort and with what degree of influence?
3) What repertoires, programs, and SOP's do these organizations have for making information about the problem available to decisionmakers?
4) What repertoires, programs, and SOP's do these organizations have for generating alternative solutions to a problem of this sort?
5) What repertoires, programs, and SOP's do these organizations have for implementing alternative courses of action?

THE BUREAUCRATIC POLITICS MODEL

As with the organizational process model, the bureaucratic politics paradigm presupposes no unified character to the decisionmaker. The underlying premise for this model is bargaining between and among consituencies within the decisionmaking body. Each of the component groups within the decisionmaking body is viewed as having its own parochial interests and goals, as was the case for the organizational process model. However, the major organizing concept in this paradigm is that of bargaining power. Each of the components in the decisionmaking body is viewed as occupying a bargaining position vis-a-vis the other components. The bargaining position is shaped by two factors: the priorities and perceptions of the groups which are highly parochial in nature; the group's bargaining power, which is largely a function of the control it exerts over the destinies of other groups within its sphere. This control, in turn, is governed by such phenomena as possession of available resources, etc. Bargaining positions and the power associated with them change over time. Thus, the decision process is governed by the bargaining process at a particular moment in time, and the process is critically affected by deadlines and the immediacy of the issue being decided. The bureaucratic politics paradigm rests on the principle of power sharing. Where the organizational process paradigm viewed a decision as the synthesis of the organizational output of all component groups within an organization, the extent to which that output is heeded within the bureaucratic politics paradigm is a function of the percentage of power held by the component. The extent to which power is

held determines the degree to which one's will shall prevail.

The bureaucratic politics paradigm raises the following issues:

1) What are the existing action channels for producing solutions to problems of this kind?
2) Which players in what positions are centrally involved?
3) How do pressures of job, past stances, and personality affect central players on this issue?
4) What deadlines will force the issue to resolution?
5) Where are misperceptions or miscommunications likely to occur?

FOCUS OF THE STUDY

The State University of New York College of Technology at Utica/Rome commenced operation in 1966 as a graduate education extension center of the SUNY College at Cortland. By 1973, it had received a charge from the SUNY Board of Trustees to offer upper division baccalaureate instruction in the areas of business, management, information science, health sciences, and technology, as well as continuing graduate education. The College, then known as Upper-Division College at Utica/Rome, accepted its first undergraduate transfer class in Fall 1973, and offered classes in "temporary" quarters in a refurbished 19th Century woolen mill. In 1974, the State of New York acquired an 800 acre site for a permanent campus for the College, to be located in Marcy, New York. An architectural consulting firm was retained, and a campus master plan was developed for an institution of 5,000 to 7,000 FTE students. When ground was broken for campus construction in 1981, the College of Technology was scheduled to be a specialized institution, with curriculum focused on computer science, management science, applied science, and nursing, and an enrollment of 1,600 FTE. The events that led to the downsizing of the institution and the focusing of the curriculum are the object of this paper. A brief chronology of those events follows in Table 1.

A VIEW THROUGH THE RATIONAL LENS

The rational policy analysis model presupposes that all parties to the decisionmaking process will have identified the problem at hand and will have clarified a set of common values with respect to the problem's solution. In this instance, the specific problem appears to be straightforward: where is the permanent campus for the State University's College at Utica/Rome to be located, and under what conditions is it to be operated? Similarly, the values associated with the

TABLE 1

1974	Acquisition of 800 acre site in Marcy, New York as permanent campus for Upper Division College at Utica/Rome campus master plan developed.
1975	New York State faces bankruptcy. In light of fiscal crisis, a freeze is imposed on all capital construction of state facilities.
1977	Syracuse University proposes a co-location arrangement whereby its private, four year liberal arts branch, Utica College, would share facilities with Upper Division College while maintaining separate administrations and institutional integrities.
1977	Memorandum of understanding signed by presidents of Utica College and Upper Division College agreeing to basic terms and conditions for moving ahead with co-location.
1978	Intensive negotiation commences with respect to co-location.
1978	Upper Division College receives approval for degree granting authority in Engineering Technology; changes its name to SUNY College of Technology.
1978	Negotiations on co-location are broken off. Syracuse University and New York State enter into preliminary discussion of a state buy-out of Utica College.
1979	Discussions on proposed merger between Utica College and the SUNY College of Technology collapse; Syracuse University will retain control of Utica College.
1979	State initiates feasibility study on proposal for acquisition of abandoned department store in downtown Utica as anchor building for permanent College of Technology campus.
1980	State abandons plan to construct inner-city campus for College of Technology; appoints task force chaired by University Provost to study the future of College of Technology.
1981	Provost releases report on College of Technology; recommends re-focusing of curricular mission, reduction of overall enrollment targets.
1981	Ground is broken for construction of permanent campus for College of Technology on original 800 acre Marcy site; state appropriates $50 million to commence sitework.

resolution of the problem also seem straightforward. Delivery of upper division instruction to graduates of the State's two year institutions, especially in the technical fields supportive of the area's depressed economy, is the central mission for the College. Within that context, the events leading up to the construction of the permanent Marcy campus for the College of Technology would be structured as follows within the rational model.

The decision to establish Upper Division College at Utica/Rome was made for the following reasons:

A. The need for baccalaureate opportunities exists for graduates of the State's two year institutions, especially those holding the associate in applied science degree within technical and professional fields.

B. While declining enrollments were forecast for the overall university system, the number of degrees granted in the computer and information sciences, business and management sciences, and engineering technologies was projected to grow and stabilize during the 1980's.

C. Graduates in computer, management, and technical programs would provide needed manpower for small, emerging high technology industries within the Mohawk Valley's depressed economy. No other local college addresses this need.

It was decided to construct a permanent campus for 6,000 FTE students in Marcy, New York. When the State's fiscal crisis preempted ground breaking in 1975, alternative courses of action were explored, evaluated, and acted upon as follows:

A. Co-location with Utica College of Syracuse University would be the least expensive option. The State of New York owns extensive acreage adjacent to the Utica College campus. Construction of classroom/laboratory facilities unique to the College of Technology curriculum while sharing common facilities, such as library, gymnasium, general classrooms, etc., would be highly cost effective. REJECTED on the basis of incompatible academic missions and potentially competing curricula.

B. State University of New York could purchase Utica College from Syracuse University. Utica College suffers from fiscal and enrollment problems, and a buy-out would be mutually advantageous to both Syracuse University and SUNY. REJECTED on stated public grounds that such a buy-out would seriously erode the separation of public and private higher education within the State of New York.

C. State University could acquire abandoned Boston Store Department Store in downtown Utica and use it as an anchor for construction of a downtown campus, along with permanent acquisition of present "temporary" facilities. REJECTED on grounds that refubishing existing buildings would be more expensive than construction of new buildings and would result in a campus that meets only minimal specifications. Moerover, to remove additional property from Utica tax rolls would further depress an already bad economy.

D. SUNY could move forward on construction on permanent campus on Marcy site. ACCEPTED on condition that SUNY would refocus the mission of the College of Technology to include only program in applied science, computer and information sciences, and management science. In light of recovery of State economy from near bankruptcy, the proposed "specialized" mission of the College would enable construction of a downsized but nonetheless permanent campus, whose programs would be responsive to the needs of the greater Utica area.

A VIEW THROUGH THE BUREAUCRATIC PROCESS LENS

The bureaucratic process model for examining policy decisions requires that constituent units within the decisionmaking body process information through a series of standard operating procedures to arrive at a solution that is basically satisfactory to all parties, although it may not be the most cost effective. Elements of the organization process paradigm are evident in the decision to construct a permanent campus at Marcy, as follows:

A. During the negotiations between Upper Division College and Utica College with respect to co-location, the respective staffs of each institution assembled data which pointed to a basic incompatibility in the curricula and educational missions of the two institutions. The concept of co-location was rejected as mutually unsatisfactory based upon the information gathered by respective institutional units.

B. The SUNY Board of Trustees and Counsel's Office, acting as units within the decision process, determined that acquisition of Utica College as a component within the university system would be inconsistent with the SUNY mission of cooperation with the private sector of higher education within New York State. The concept of purchase of Utica College was rejected publicly on that basis.

C. Examination of the physical facilities of the Boston Store and the Globe Mill in which the College of Technology was temporarily housed resulted in a determination that essential laboratory facilities could not be adequately housed in a refurbished building. Moreover, State and municipal tax officials argued against further erosion to the Utica tax rolls. The downtown campus was rejected.

D. The State University System, drawing upon data collected by the Provost's Task Force on the College of Technology, the Construction Fund, and the Executive Offices of the Governor, determined that sufficient resources were available to construct a small, specialized campus within SUNY. The synthesis of these bodies of data produced a solution that was minimally satisfactory to a) College of Technology, b) Utica College, c) SUNY Central Administration, and d) the City of Utica.

A VIEW THROUGH THE BUREAUCRATIC POLITICS LENS

The bureaucratic politics paradigm requires that the researcher focus on two concepts: key actors and power. A key actor need not be powerful in and of himself/herself so long as that actor can align with other individuals willing to share their power. The bureaucratic politics model lends itself nicely to an analysis of the events surrounding a permanent campus for the College of Technology.

Several key actors emerge within the series of scenarios that took place from 1975 through 1981. The President of the College of Technology was an experienced administrator who fully understood political processes and who made it a point to cultivate close working relationships with local State assemblymen and State senators. It is worth noting that Utica's State Senator chairs the Senate Committee on Education. In that capacity, he was able to muster the forces of the Republican-controlled Senate, but was ineffective in the Democratic assembly and in working with a Democratic governor. It was only when Utica's incumbent Republican assemblyman lost to a Democrat in 1980 that the totality of the State government came out squarely behind construction of a new campus. In the preceding years, the governor had shifted positions from co-location to an urban campus to merger. Only when the freshman Democratic assemblyman, thoroughly cultivated by the President of the College of Technology, joined forces with the Speaker of the Assembly, did the Governor come out for construction. At that point the

momentum for construction was unstoppable.

The President of Utica College was also a key actor. The memorandum of understanding for terms and conditions for co-location was negotiated and signed by the President of Upper Division College and an Acting President of Utica College. When the permanent President was appointed, he clearly had no intention of being a lame duck, or of being bound by his predecessor's agreements. While not openly disavowing the memorandum of understanding, objections to it were raised which would inevitably be unpalatable to the College of Technology. Similarly, proposals for operation of the co-located campuses were equally bitter to Upper Division College (e.g., single President appointed by Utica College Trustees). Upper Division College still felt that a campus of its own was in its best interests and used the occasion to rally support for that end. The polarization between the two institutions was so intense by 1979 that the respective campuses each garnered so much public and political support for separate existence that a merger was doomed before talks got underway.

A new SUNY Chancellor was appointed in 1978, and he worked carefully with all parties to resolve the situation in a fair and equitable manner. As noted, however, by 1980 the College of Technology had mobilized sufficient local and state level political support to ensure construction of a campus. The steamroller effect on the Chancellor and SUNY Trustees was clear. Thus, it was not surprising that, in the resolution of the Trustees authorizing construction, the College was ordered to divest itself of all non-mission related programs and to reduce its enrollments to 25% of the original campus targets.

SUMMARY

Clearly throughout the process, different key actors wielded different levels of power at different times. While the rational policy-making paradigm and organizational process paradigm are intellectually attractive, the bureaucratic politics paradigm best explains what really happened in this series of decisions. Institutional researchers, in order to be effective, must be concerned with more than assembly of objective data for rational decisions. They must understand how other units reveal information for data collection. Perhaps most importantly, they must understand the concept of political power and who wields it. All the data in theworld will be of no value unless they are used by

those in power to make decisions.

BIBLIOGRAPHY

Allison, Graham T. "Conceptual Models and the Cuban Missile Crisis" in the American Political Science Review, Vol. 63, No. 3, 1969, pp., 689-718.

Allison, Graham T. The Essence of Decision. Boston: Little, Brown & Company, 1971.

Dror, Yehezkel Public Policymaking Reexamined. San Francisco: Chandler Publishing Company, 1968.

Quade, E.S. Analysis for Public Decisions. New York: American Elsevier Publishing Company, 1975.

SUMMARY OF THE ALLISON PARADIGMS

ALLISON (1971) POINTS OUT THAT EACH OF HIS POLICYMAKING PARADIGMS SUGGESTS QUESTIONS THAT CAN BE USED AS A GUIDE IN APPROACHING THE ANALYSIS OF PUBLIC POLICY:

THE RATIONAL POLICYMAKING PARADIGM LEADS ONE TO ASK:

1. WHAT IS THE PROBLEM?
2. WHAT ARE THE GOALS, OBJECTIVES, AND VALUES OF THE DECISIONMAKER?
3. WHAT ARE THE ALTERNATIVE COURSES OF ACTION?
4. WHAT ARE THE COSTS AND BENEFITS ASSOCIATED WITH EACH ALTERNATIVE?

THE ORGANIZATIONAL PROCESS PARADIGM LEADS ONE TO ASK:

1. OF WHAT ORGANIZATIONS (AND ORGANIZATIONAL COMPONENTS) DOES THE DECISION UNIT CONSIST?
2. WHICH ORGANIZATIONS TRADITIONALLY ACT ON A PROBLEM OF THIS SORT AND WITH WHAT DEGREE OF INFLUENCE?
3. WHAT REPERTOIRES, PROGRAMS, AND SOP'S DO THESE ORGANIZATIONS HAVE FOR MAKING INFORMATION ABOUT THE PROBLEM AVAILABLE TO DECISIONMAKERS?
4. WHAT REPERTOIRES, PROGRAMS, AND SOP'S DO THESE ORGANIZATIONS HAVE FOR GENERATING ALTERNATIVES ABOUT A PROBLEM OF THIS SORT?
5. WHAT REPERTOIRES, PROGRAMS, AND SOP'S DO THESE ORGANIZATIONS HAVE FOR IMPLEMENTING ALTERNATIVE COURSES OF ACTION?

THE BUREAUCRATIC POLITICS PARADIGM LEADS ONE TO ASK?

1. WHAT ARE THE EXISTING ACTION CHANNELS FOR PRODUCING SOLUTIONS TO PROBLEMS OF THIS KIND?
2. WHICH PLAYERS IN WHAT POSITIONS ARE CENTRALLY INVOLVED?
3. HOW DO PRESSURES OF JOB, PAST STANCES, AND PERSONALITY AFFECT THE CENTRAL PLAYERS ON THIS ISSUE?
4. WHAT DEADLINES WILL FORCE THE ISSUE TO RESOLUTION?
5. WHERE ARE MISCOMMUNICATIONS AND/OR MISPERCEPTIONS LIKELY TO OCCUR?

THE RESEARCH DIVISION IN ASSOCIATION MANAGEMENT: A TOWN-GOWN MARRIAGE OF CONVENIENCE

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BACKGROUND

An association, by its very nature, requires complex interrelationships among a large number of people. The most delicate of these relationships is the one that exists between the elected volunteer leadership and paid staff of the organization (Low, 1978). This dual hierarchy complicates the internal structure of the organization and places limitations on the external linkages.

A formal organization chart does not easily fit an association managed by an external staff. The two hierarchies create two lines of authority which must be kept separate and distinct if they are to remain manageable:

1. One line of authority and responsibility runs from the board of directors to the chief elected officer and down through the committees and task forces
2. The second runs from the board of directors to the chief paid executive officer and on down through the members of the paid staff (Williford, 1977)

The elected leaders ultimately make the decisions that govern the organization. They must have the vision and the foresight to look to the future to make decisions that may be unpopular but reflect the trends and needs in their industry. They must also have the information, structures, and support to enable them to move those decisions into action (Low, 1978).

Associations are created to represent, protect, encompass, and promote the needs and interests of diverse members (Stafford, 1982). The membership governs the organization through boards of directors, executive committees, and other elected officials, but many of these "volunteer" leaders find it difficult to keep on top of important industry and association-impacting issues while maintaining full-time careers.

The paid staff members support the leaders. They provide infor-

mation, design educational programs, train volunteers in leadership and management skills, and conduct research on the membership and its industry. They also produce the publications, coordinate publicity and public affairs efforts, and interpret the collected membership and industry statistics. Staff members define and shape the issues so that the elected leaders can make well-informed decisions with quickness and quality.

The field of association management grew out of this perceived and felt need for leadership support. It was a formal organizational and management-oriented response to a time and information problem. In the past ten years, the field has increased in sophistication, and now multiple association managment companies have surfaced. These companies organize under divisions much like university departments and serve several associations simultaneously. The paid staff managment teams are run by highly skilled and well educated academics, business executives, marketing experts, educators, journalists, and association specialists.

NEW TRENDS

These experts realize that all effective strategic planning is based on information. Because of the diverse services a company offers (publications, public affairs lobbying, educational seminars, membership retention and recruitment) the types of information needed are also varied. The leaders and managers are beginning to realize that they need information brokers and research experts to help them move their industry, their associations, and their members into the future. Resarch has begun to surface as the new frontier--and one that the academic researcher is free to pioneer.

ROLE OF RESEARCH

What exactly is the role of research in the growing field of association management as we move through the '80s and beyond?

Research, unlike the past, is no longer an isolated "flash-in-the-pan" function, or an annual demographic survey of the membership. John Naisbitt in Megatrends has proclaimed us in an "information age," and research is the fuel to propel the successful association into the mainstream of that exciting future. A concerted original research effort should be a part of every future-minded association.

The remainder of this paper will focus on one possible structure for a centralized research effort: The Research/Resource Center. It

will describe the center and its functions within the broader context of the purposes of research in management.

THE CORPORATE CREATIVE

Paul Givens in "Identifying and Encouraging the Creative Process" defines creativity as a uniquely human ability wherein an individual conceives a synthesis of ideas which is original for him, searches for deep meanings of the ideas, and seeks to find either their correspondence with reality or their relation to the thoughts of others (Givens, 1962). This creative process is recognized in artists, encouraged in scientists, and has been recognized recently as an identifying characteristic of exceptional corporate executives. The successful executive is one who envisions new and different futures, and who can plan and structure alternatives toward that vision. The Creative mental process that drives this vision is a function within the intellect. It is characterized by a unique mode of synthesis and mental reorganization using newly assembled "symbols" or data which might take the form of a creative product (Gulford, 1950). This product is a painting for the artist, a song for the musician, but could easily be a company vision or an alternative decision for the corporate-creative. Albert J. Sullivan in "the Right to Fail: Creativity vs. Conservatism" insists that in order for the process to be cultivated and encouraged in individuals, there can be no fear of failing (Sullivan, 1963). Society, the educational system, and the individual's environment must provide support if the process is to become an active part of the intellect.

The business environment has traditionally been a more structured and success oriented environment. These "stress and success" forces are not the best cultivators of the creative process. Now that creativity is a valued commodity, business environments need to change to include the nurturing of this process.

THE CREATIVE PROCESS

But how does this process that enables great and visonary thought work? Many psychologists have attempted to understand the creative process by dividing it into phases, and then analyzing each phase. All agree that there is a period of mental preparation.

Osborn describes this phase as a process of gathering all pertinent data and piling up alternative ideas (Osborn, 1953). Rossman calls it a mental survey of all available information (Rossman, 1963). Wallas says

it's a search and pursuit for facts and ideas (Wallas, 1926). Despite the semantic differences, all of these creativity-psychologists believe that the creative process is born out of an individual's need for answers to known and/or unknown questions.

It follows a pattern of active searching followed by contemplation, after which an inspiration or intuition leads the individual to an answer or solution. Silvano Arieti in his recent and comprehensive work, "Creativity," describes the process as a "magic synthesis," a mental process through which seemingly scattered ideas and assorted pieces of information merge, rearrange, and take new form. In doing so, they enlighten the thinker and communicate new ideas to others (Arieti, 1981).

INFORMATION GATHERING

Inherent in the process of creativity, problem solving, and idea generation is the step of information gathering.

For the corporate creative, this is an essential and increasingly more difficult task to perform. With the information explosion, the amount of data that has become available by computer, tape, television, and the written word has increased drastically. It is no longer routine to gather all of the pertinent data oneself before a meeting or to help with an important decision. An executive must depend on abstracts, summaries, or the pieces of information selected for him by outside specialists. The term "information broker" will increase in meaning as researchers learn how to "invest" and control information with the cunning and complexity with which successful stockbrokers conquered and controlled the economy of past years.

ASSOCIATION PLANNING

In association management, information is also the key resource for planning and decision-making.

Old structures and past methods of information gathering are no longer sufficient for meeting the needs of the staff and the membership. Information is the capital, resource, and economy-driving force for associations. The future-minded association will structurally and psychologically center itself around the most relevant information to its industry and membership.

Bill Taylor in Future Directions comments that the heralding of the information explosion is of particular concern to association executives

because the "driving force behind every association is information." In an information society where information is the major resource and measure of power, the organization and the utilization of information becomes the cu ing edge of competition and success. Anyone can generate facts, figures, lists, and statistics. The key issue today lies within the choice of information to be gathered, the types of analyses to be conducted, and the strategies for dissemination, use, and further study. Association management must develop research specialists, structures, and strategies that are specifically designed to investigate, collect analyze and provide useful, exciting and stimulating information.

What is the structure of research in the future-minded association?

One method of delivering these internal and external services and products is to synthesize and organize the association's research efforts under the organizational umbrella of a Research/Resource Center.

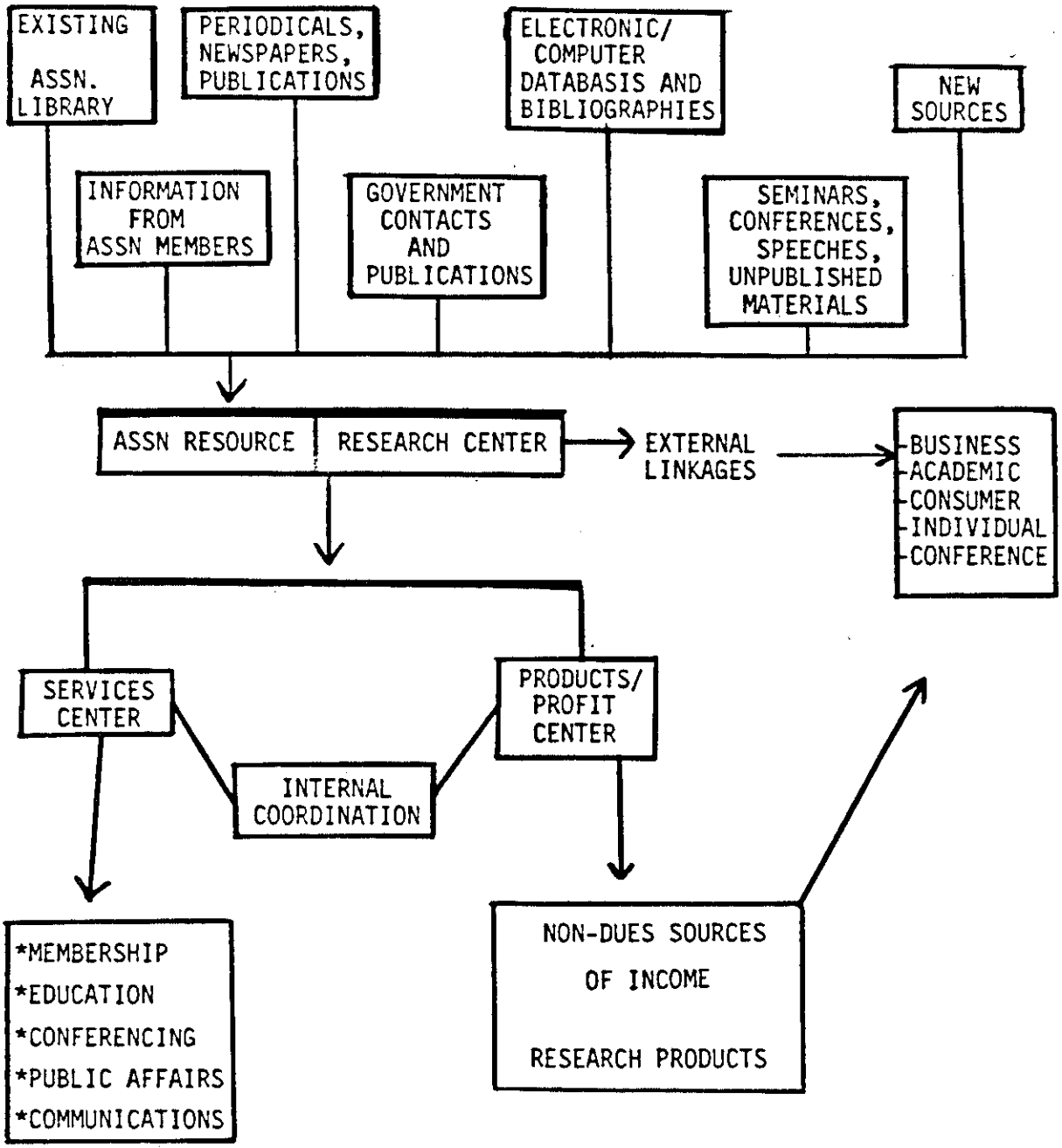
This center combines internal resouces and provides a trysting place for the prolific pieces of industry information that often endlessly circulate among staff in-boxes. Much more than a library, however, the Research/Resource Center represents a strong commitment to information and data gethering, and centralizes these efforts throughout the association's other divisions. It facilitates a growing level of sophistication within self-conducted membership and industry research, and serves as an internal and external coordinating link. Associations need to think about forming research units/centers that capture information and operate more similarly to institutional research centers in higher education. These academic divisions run major projects while still serving the faculty, students, and disciplines in which they exist. (See Chart I)

A research center within an association can serve the staff, the divisions (membership, public affairs, education, communications) and the members and their industry, by coordinating and supporting the on-going association management efforts while conducting original industry research.

A Research/Resource Center provides ground on which all pieces and levels of the organization can meet and merge in a joining of ideas and resources. Kinsey Green believes that in order for leaders to be future-minded, and be able to lead with insight, they must "know the

The following chart illustrates one possible structure for a Research/ Resource Center in association management:

THE RESEARCH/RESOURCE CENTER:
An Organizational Model



social, economic, technological, and sociological trends and issues that are shaping our future." The place of the Research Center is to provide this information as well as a context of insight and intuition.

This Research/Resource Center combines modern technologies, traditional resources, and human insight and intuition.

I. It provides the following resources and services:

   A. A library of catalogued industry information
      1. Articles
      2. Journals
      3. Newspapers
      4. Speeches
      5. Unpublished presentations
      6. Books

   B. Computerized bibliographical search services and/or staff trained toconduct searches for topics and issues

   C. Major research projects and reports to identify industry trends and forces affecting the membership and association

   D. Membership division assistance in the collection and analysis of member opinions and demographics

   E. Education division assistance in identifying member's needs, and in defining the industry issues that apply to educational programs and services

   F. A question and answer center for staff, membership, and outside inquiries on industry related issues

   G. Coordination of staff and resources

   H. External connection to related professionals from different sectors

II. It provides non-dues sources of income through research-related products and projects

III. It permits external linkages and enhances visibility and credibility

IV. It creates an attitude and awareness about the importance of information within the organization

THE RESEARCH ATTITUDE

A well-coordinated Research/Resource Center combined with a positive "research attitude" can empower an association's staff to move its members into the future. The "research attitude" is the psychological key that separates the trend setters from the reactors, and the

innovators from the adaptors.

Information is the brain-child of the Modern Society, and research and technology are the marriage from which information is born. Association executives must bless this marriage and become facilitators of the union. They msut develop a research attitude in themselves and among staff, and learn to attribute value to the information gathering efforts that will become the backbone of the association.

The success of a centralized research effort requires the cooperation and awareness of the association staff. Staff need to re-think old ways of doing things, and find new ways of combining efforts when the efforts are information/research related. Staff need to encourage members to share their expertise and experiences with the Research Center and to use the information already there.

A Research/Resource Center, while an organizational structure, is a tool for networking staff, members, industry, and academic professionals in co-ordinated information gathering efforts. The coalitions that can be formed through these efforts will be the predecessors of the new interdisciplinary work groups of the future.

FUTURE FORMS

Alexander North Whitehead, a philosopher and scientist, once claimed that knowledge is not enough. What is important is the art of the utilization of that knowledge. Research/Resource Centers run by creative and knowledgeable executives can foster this art, and utilize knowledge for successful planning, decision-making, and the creation of future visions. Research is an emerging force within association management as it responds to the trends and forces that are acting upon its industry. This force can control the industry, or can be controlled by it to the industry's advantage. The Research/Resource Center, while a mechanism for control, is also a facilitator of the creative flow of that research-generated information. It is an appropriate habitation for the data-based dreams of the future. The Research/Resource Center run by a corporate creative could parallel Shakespeare' description of a creative process/product:

> "...the poet's eye in a fine frenzy rolling, doth glance from heaven to earth, from earth to heaven, and, as imagination bodies forth the forms of things unknown, the poet's pen turns them to shapes, and gives to airy nothing, a local habitation and a name."

BIBLIOGRAPHY

Arieti, Silvano. Creativity: The Magic Synthesis. New York: Basic Books Inc., 1976.

Future Perspectives. Foundation of the American Society of Association Executives, Washington,D.C., 1985.

Givens, Paul. "Identifying and Encouraging Creative Processess: The Characteristics of the Creative Individual and the Environment that Fosters Them." Journal of Higher Education, June 1962. pp.295-301

Guilford, J.P. "A Revised Structure of Intellect." A report from a Psychology Laboratory. Los Angeles: University of Southern California, 1957.

Low, James P. "Principals of Partnership: Form an Unbeatable Leadership Team with your Chief Staff Executive." Leadership, The American Society of Association Executives, November 1978.

Naisbitt, John. Megatrends. Warner Books, Inc. 1984.

Osborn, A.F. Applied Imagination. New York: Scribner's, 1953.

Stafford, June. "Association Structures: An Information Central White Paper." Fundamentals of Association Management: The Volunteer. American Society of Association Executives, May, 1982.

Sullivan, Albert J. "The Right to Fail: Creativity versus Conservatism." Journal of Higher Education. Vol. XXXXIV, No.4 (April 1963): pp. 191-195.

Wallas, Joseph. The Art of Thought. New York: Harcourt-Brace, 1926.

Williford, Frederick. "Maintaining Lines of Authority in Board-Staff Relationships". Association Management, August 1977.

SOMEHWERE IN TIME: DEVELOPING AND USING A LONGITUDINAL STUDENT DATA BANK

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The longitudinal file described in this paper is -- or soon will be -- obsolete. Many institutions have sophisticated on-line student data bases that allow them to generate a transcript on demand, or call up to a CRT and change a student's class schedule; such a system was in full operation at the University of Wisconsin at Oshkosh as much as nine years ago. The effort to create an on-line student data base at Rutgers University has had several false starts, but Rutgers is now well on its way to having a data base which will combine information that now exists in several different files (e.g., admissions, registration, and financial aid).

Nevertheless, the problems confronting designers of data base systems also confront anyone who contemplates a less sophisticated longitudinal student file. In addition, the on-line data base to be used at Rutgers will not itself be accessible to statistical packages such as SPSS, so that a more conventional file will still have to be created for research purposes. Thus, this paper contains much that is generally applicable.

Rutgers University enrolls some 45,000 students in about 25 graduate and undergraduate schools and colleges. Thirteen of those colleges are undergraduate, and of those, six are more or less general arts and sciences day colleges, while three enroll evening students, and the other four are specialized (e.g., nursing and engineering). While the day colleges on each campus offer courses through a single set of departments and faculty, the colleges do have different admissions and academic standards, as well as other programs that distinguish them from each other.

On the data processing side, up until the moment a student actually registers for classes, he or she may be found in the admissions system, a fairly specialized hierarchial-type file which is not directly accessible by any data analysis or generalized retrieval package. Once

the student enrolls, he or she is taken over by the registration system and possibly by the financial aid system. The registration system has several large files, including a masterfile, with summary information on all students registered at the University in the last seven years, and an active version of the masterfile, which contains all students registered for a given semester. These files contain summary grade point average information, but no information on courses actually taken or grades received. Such course information is contained on still another file, from which term and cumulative GPA information is calculated (and then passed on to the other registration files).

Given these disparate sources of information, how would one go about producing a report on the academic progress of students who, on the basis of scores on a state test, were placed into a remedial English course which they must complete before enrolling in English Composition? With the lack of continuity in enrollment information, how is it possible to determine one-year and two-yer attrition rates, or to investigate the academic performance of community college transfer students at various points in their careers at Rutgers? The registration system can tell you what school the transfers attended before Rutgers, but only the admission system contains an indicator for the AA degree. The courses the freshmen are enrolled in are on a registration file but placement information comes from lists generated in the Deans' offices.

The general solution to these questions is to create a data file which includes all this information, organized as efficiently and as accessibly as possible, so that it can provide information for large-scale projects as well as for such smaller questions as the cumulative GPA for accouting majors who receive financial aid.

The Rutgers University Institutional Research Office reached this conclusion about 1978 and the Longitudinal Data Bank, or LDB, was inaugurated in 1979. The LDB was designed to be a pool of longitudinal data for research, but was quickly recognized as the only source for such data in the University, so that it is now frequently used in support of policy decisions.

Now comes the hard part of the LDB: answering the who, what, where, when, and why:

-- Who? Freshmen only? First-time freshmen only? Full-time students only? All students entering the University at a given time?

Rutgers defines a "cohort" as all new undergraduate students entering the University in the fall of a given year AND who receive a term grade report at the end of the first semester. This definition excludes students who leave the University within the first few days, but does include students withdrawing later on in the semester. Note that it also excludes students enrolling for the first time in a spring or summer term, with the result that the LDB does not include every undergraduate student enrolled at the University.(1) For research purposes, the small number of students excluded has little numeric impact but the decision to define the cohort in this manner does have operational consequences. For example, the Rutgers LDB cannot be used to provide accurate numbers for budgeting, whereas the percentage of students in any given category is quite reliable.

-- When? What time period is encompassed by the LDB? Should it be organized according to time periods (such as semesters or years)? How long should we continue to add new information? Should we distinguish between students who first enroll in September and those who first enroll in January?

Once the starting point for a cohort has been determined, what should its ending point be? Are students to be followed forever, with the system always alert for years to come to every course a student takes? For obvious practical reasons, some arbitrary limitation must be set, or the size of the file will be completely unmanageable. One answer may be to follow all students through the institution's "statute of limitations" (sever years, for example). This doesn't necessarily mean that all records of the students would be erased seven years after enrollment, merely that no new information would be added to the file. This, in fact, was the original decision at Rutgers, so that the students entering in 1979 would have no new information added to their records after the summer of 1986. The seven-year cutoff point at Rutgers may have to be extended, however, to allow for the much longer time-to-graduation of the largely part-time students in the three evening colleges, of whom only about 12% have graduated within the first six years.

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(1) The physical organization of the Rutgers LDB precludes the easy addition of these students to the cohort.

Notice that the Rutgers LDB only records the student's undergraduate career. This is another decision that will determine the limits of future research: the Rutgers LDB records the simple fact that students in a given cohort did attend graduate school at Rutgers -- within the original seven years -- and/or did earn a second degree -- within the original seven years -- but records no enrollment activity or course and grade information beyond that. (2)

The other aspect of "when" is at what point information is added to the file. Maintenance to an on-line data base can be performed easily and frequently, although it is sometimes desirable to have a version of the file which is frozen at some specified point, permitting the replication of certain numbers (e.g., official enrollment counts) later on. When the longitudinal file is a tape file, however, whose creation involves input from a lot of other tapes, frequent maintenance is not really practical. The optimal frequency of maintenance does depend in part on the kinds of information stored in the file and the ways the file is used.

At Rutgers, each cohort's file is updated at the end of every term (fall, spring, and summer in this case), and, in fact, after grade changes have already been made on the registration system. The LDB currently has no applications which involve a time unit smaller than a single semester, and when it is desirable to look at the cohort at the beginning of a semester (for example, to determine an attrition rate as soon as possible), a temporary version can be created wherein all the fields are present, but only some of them (the semester enrollment indicator, in this example) have actually been updated.

The next question is critical:

-- What? What information should we store: should we record the dollar amount of financial aid received, or only the fact that a student received any? How sould course information be handled? How many sets of SAT scores should be stored? Should the file include a student's campus address for each semester? Should the name of the faculty advisor by sorted? The answers to these questions depend in part on:

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(2) A graduate LDB was investigated at one point, but was abandoned in favor of the planned integrated student data base.

-- Why? Why is it necessary or useful to record certain data elements? How will the information be used? What are the research questions or policy issues which will require these data?

Obviously, this is not the place to list every single variable that should be included on a longitudinal file: the list would be very long, and might not apply to all institutions. Similarly, the research and policy questions considered at one school will surely differ from those of interest to Rutgers. Nevertheless, it is possible to suggest some general categories of questions and data elements.

First, using admissions variables, there is the obvious question of how high school preparation is related to college performance. How is high school preparation measured: grade point average? Number of Carnegie units? Rank in class (actual or percentile)? SAT scores (which ones -- most recent, mean, best set?)? Then, how is college performance measured: at the end of the freshman year? By whether or not the student graduated? By GPA? By credits earned?

While the student in enrolled as an undergraduate, there are myriad kinds of information a longitudinal file can produce: cumulative attrition rates over a four or five year period; graduation rates by ethnicity; enrollment by major; subsequent performance of students who have taken remedial courses; performance of community college transfers compared to that of transfers from four-year colleges or native freshmen; the way students distribute their credits across the various disciplines; and on and on.

Once the student has received an undergraduate degree, an institution could decide to follow them through a graduate degree there. While Rutgers does not carry detailed information on that, the LDB does include the next term, school, and curriculum the student enrolls in after receiving the baccalaureate, and whether or not the student earns a second degree at Rutgers.

Deciding upon the research questions and the appropriate data elements does not end the design task. The operational definition of some variables can become quite tricky. Take, for example, a variable used to indicate a student's enrollment status for a given semester. There might be categories for enrolled, not enrolled, and graduated. But does the last mean graduated prior to that semester or through the

end of that semester (remember, the question may well be asked at the end of the term)? Should there be a distinction between students who withdrew voluntarily and those who were dismissed for academic reasons. Either or both of these questions could be covered by a set of variables, or by a set of different codes for a single variable.

Here is another example of the complexities of some of the issues. How does one store course information? There is at least one school where a student's file includes a bucket for every course offered there; if the student takes the course, the semester of enrollment is entered along with the grade earned and so forth. This approach is not practical at a large university offering thousands of courses, however. At Rutgers, the LDB holds space for ten courses in each semester segment; the program then fills in the course number and other pertinent information for each course the student takes. It is true that very few students take ten courses a semester, but space for them makes it possible to keep track of courses from which the students withdraws -- a piece of information which does come in handy sometimes.

The "semester segment" mentioned above refers to the issue of the organization of the longitudinal file. The question of the physical organization of a longitudinal file is a matter for discussion between the office responsible for the file and its programmers, but ease of use in making the structure decision should definitely be considered. It may be much more efficient from a programmer's point of view to store the data in a certain way, but if that results in a situation where the programmers must intervene every time some statistical information is required, neither the users of the file nor the programmers have gained anything. At Rutgers, the programmers know nothing and care nothing about statistics, so it is in their best interests to set up a file that the Institutional Research staff can use without help.

-- Where? Where will the information be stored? To whom will it be accessible, and in what form? In part, these are technical questions, and in part, they are policy matters. At one extreme, is it necessary that the users be able to enter and change the data directly (thereby conferring upon themselves the power to erase it all)? At the other, will the programmers present them with a neatly wrapped package of data with no assembly required? Rutgers tends toward the latter extreme, specifically to minimize the risk of destroying the file, but

every semester, Institutional Research checks to make sure the numbers look reasonable.

The question of access is definitely a policy issue. To a certain extent, it might be desirable for everyone in the institution to have access to the information in the longitudinal file: 1) it eliminates the creation of lots of other longitudinal files every time a dean or a vice-president wants some numbers; 2) it makes everybody's numbers match; 3) it's a wonderful research tool of which as many people as possible shoud take advantage. On the other hand, the file will include a certain amount of sensitive information (such a grades), so that some care should be taken that access is provided only to those people with a legitimate need for it.

Rutgers has considered all of these issues, and more. Some problems were not foreseen at the time of the development of the LDB, and we would certainly do some things differently were we to start afresh. We cannot claim that we have dealt with the issues in the best way possible, nor that our solutions will work for everyone, but the Rutgers LDB remains an extremely valuable source of data which will not be superseded by the on-line data base for some time to come.

TESTING FOR SELECTION BIAS IN LONGITUDINAL STUDIES: A SUGGESTED TECHNIQUE

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ABSTRACT

Attrition in longitudinal research designs (individuals dropping out of a study for various reasons despite an initial random sample) can result in a nonrepresentative sample. Attempts to estimate population parameters from nonrepresentative samples can produce biased and inconsistent estimates. In such situations, it is important to model the selection process as realistically as possible in order to determine the generalizability of the research findings. The purpose of this paper is to present an analytical technique for testing for the presence of response bias in longitudinal survey data. The proposed technique provides a more rigorous test for selection bias than can be made by examining single-variable distributions. A latent variable model of the causal structure of the influences of the freshman year of college on the student's perceived level of academic growth is developed to model the effects of nonresponse in a longitudinal study of college students in a large Northeastern public university.

INTRODUCTION

Educational researchers often employ mail survey research designs as a cost effective means of gathering information. Although widely used, mail survey designs frequently produce lower response rates than direct interview or telephone polling (Goudy, 1978). The use of mail surveys in longitudinal studies is particularly problematic due to the compounding of non-response over successive administrations of the survey. For example, a panel study that follows entering students over their four years of college, achieving a 75% response rate over each successive year, would result in less than half (42%) of the initial freshman respondents surviving through the senior year. The loss of individuals from the study would have a biasing effect if subjects not retained in the study differed in some important way from those retained. In this case, the internal and external validity of the sample can be called into question (St. Pierre & Proper, 1978).

Because nonresponse may jeopardize the validity of research findings and their subsequent utility and generalizability, it is important that this issue be addressed (Meyers, Rubeck & Meredith, 1983). Frequently, researchers ignore the issue of selection bias entirely (Hawkins, 1975), or assume representativeness based on comparisons of the differences between respondents and nonrespondents on sociodemographic or other single-variable distributions (Goudy, 1978). A growing body of evidence indicates that sample attrition is often related to certain deomgraphic characteristics such as age, sex, occupation, and education. However, more conclusive evidence on nonrespondents has been obtained in studies that have gone beyond the basic demographic variables (Endo, 1975; Goudy, 1978).

A review of the literature by Endo (1975) reveals that two social-psycological variables exert significant effects on an individual's response to survey research: 1) the degree of social integration experienced by the individual, and 2) the subject's interest in the subject matter under study.

For example, Reuss (1943) found that a student's level of integration within the university setting was a salient factor in his/her decision to respond. Hence, Reuss concluded that the exclusion from the sample of subjects who were less integrated socially, who had no particular interests or opinions about certain issues or problems, and who were not interested in the topic under study had important baising effects on the research results. Moreover, the extent of bias due to exclusion of such individuals could not be measured precisely.

Studies of nonresponse bias have rarely examined the relationships among variables which distinguish respondents from nonrespondents (Nielsen, Moos & Lee, 1978). Usually, the patterning of the relationship between two or more variables is of greater interest to the researcher. Those studies that have been conducted have reached conflicting conclusions. For example, Suchman (1962) and Kivlin (1965) reported that return bias did not influence relationships between indicators. Goudy (1976) observed similar results in two of three tests. On the other hand, the work of Lehman (1963) and especially of Mulford et al, (1978) found differences between interim response waves (early vs. late respondents) that affected the conclusions generated from

analyzed relationships.

Hence, selection bias cannot be ruled out whenever nonresponse is present. It is important, therefore, for the researcher to attempt to identify and understand the effects of nonresponse on the conclusions that may be drawn from nonexperimental research data. The critical difference for avoiding bias is not whether the selection process is random or nonrandom, but whether the researcher has knowledge of and can control for any potential biasing effect caused by nonrandom selection (Cain, 1975). The following sections outline an analytical technique for testing for the presence of nonresponse bias in longitudinal survey data.

METHOD

In order to test for the presence ofselection bias, two groups were formed from a single wave of a longitudinal study. The first group was comprised of college freshmen who subsequently responded to a sophomore year follow-up wave (the cooperators). A second group was formed from college freshmen who responded to the freshman year survey but failed to respond to the subsequent sophomore year follow-up (the noncooperators). From these constructed groups, two structural equation models are developed. By comparing the patterning of influences (the structural parameters) for the two groups, inferences may be made about the extent of response of selection bias operative within the study. The critical test is whether or not attrition from the panel study affects substantive conclusions about the relationships between variables of theoretical interest within the study (in this case, the effects of academic and social integration on reported academic skill development).

Design and Sample: The overall study design was longitudinal and ex post facto. During the summer of 1980, freshmen attending five of nine summer orientation sessions at a large public university in the Northeast were asked to complete a locally developed questionnaire. Usable responses were received from 1,105 freshmen who subsequently matriculated at the university (approx. 50% of the freshman class).

In April, 1981, a detailed questionniare asking about their freshman year was sent to the 1,105 summer respondents. After a follow-up mailing, usable responses were received from 723 freshmen (65.4%). Tests indicated that the respondents were representative of the population of freshmen with respect to academic aptitude (combined

SAT scores) and high school achievement (high school percentile rank), gender, and combined parental education.

In April, 1982, a follow-up survey was mailed out to the 723 students who responded to the freshman follow-up survey. After a follow-up mailing, usable responses were received from 463 (64%) students who were now in their sophomore year. Therefore, 260 students can be identified in the original freshman sample of 723 as subsequent drop-outs in the study.

Theoretical Framework: In his model of undergraduate attrition, Tinto (1975) theorizes that students' pre college traits lead to varying levels of goal and institutional commitment. These commitments, in turn, interact with various structural and normative features of the particular college or university, leading to varying levels of integration into the academic and social systems of the institution. According to the theory, the higher the level of academic and social integration, the greater the likelihood the student will remain enrolled.

Terenzini, Pascarella, and Lorang (1982), Terenzini, Theophilides, and Lorang (1983), and Terenzini et al (1984) have successfully adapted the Tinto model to the study of a variety of educational outcomes. Academic and social integration affect students' dropping out, academic achievements (GPA), and academic and personal growth. Specific measures have been developed to assess the processes that affect these institutional outcomes. A brief description of each is contained in Table 1. (See Terenzini, Theophilides, and Lorang (1983) for a more thorough description of the specific indices used in this analysis.)

The Causal Model: Recent advances in mathematical models and methods of statistical analysis, such as causal modeling, allow the testing of relatively complex theories with nonexperimental data. In its general form, a causal model can be represented as a path diagram displaying essential variables, latent constructs, and their interrelations as specified by a substantive theory. Figure 1 schematically represents the theoretical model developed by Terenzini & Pascarella (1982) to represent the causal structure for the impact of institutional influences on student outcomes. The boxes represent the observed variables; the X's are the exogenous variables and the Y's are the endogenous variables. The ovals represent latent constructs that are measured by combinations of the observed variables; the PSIs ( ) are en-

Table 1

Variables		Cooperators (n_1 = 460) $\bar{X}$	SD	Dropouts (n_2 = 263) $\bar{X}$	SD	T-Score
FCSDT	Faculty concern for student development & teaching scale	2.63	.610	2.61	.577	.44
XACTS#	Extracurricular activities	.73	.562	.70	.563	.69
PEERS	Peer relations scale	3.42	.651	3.29	.736	2.37**
FACREL	Faculty relations scale	2.55	.950	2.64	.921	1.24
FACSOC#	Contact with faculty for non-academic purposes	.45	.711	.62	.856	2.71***
SOCACT	Social activities scale	2.98	.657	2.86	.651	2.37**
FACACA#	Contact with faculty for academic purposes	1.97	.583	1.99	.591	.44
CLSACT	Classroom involvement scale	2.50	.487	2.48	.548	.49
ACGRO	Academic skill development scale	2.90	.512	2.87	.520	.75
HIDEG	Highest degree planned	4.13	1.147	4.12	1.194	.11
CHANGE	Probability of changing major	2.32	.839	2.21	.812	1.57
RANK	High school percentile rank	85.70	10.700	83.94	10.220	2.18**

Figure 1

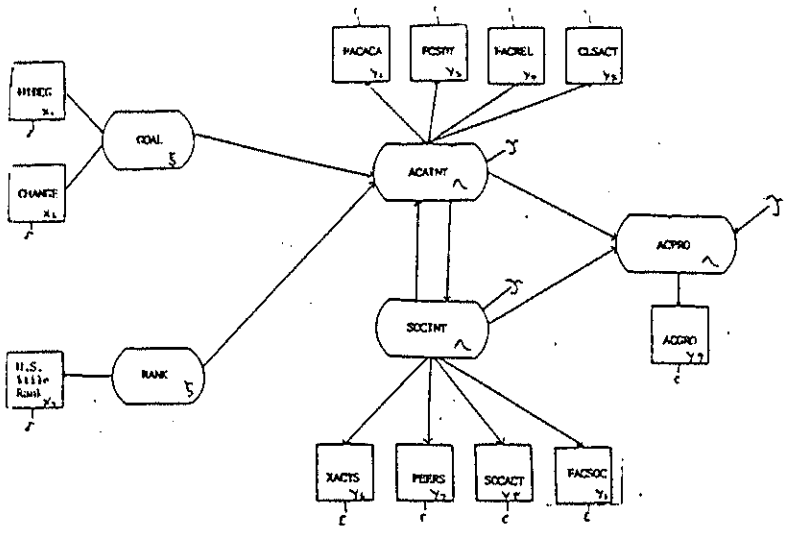

Figure 1
A Priori Theoretical Model

dogenous to the model while the ETAs ( ) are endogenous. The arrows represent causal influences. In this model the two endogenous constructs, Rank and Goal, are indicated by the X1 - X3 variables. The latent construct Academic Integration is indicated by the combination of the Y1 - Y4 variables, while the Y5 through Y8 variables are indicators of the latent construct Social Integration. In a similar fashion, the Y9 variable is an indicator of the latent construct Academic Growth (see Appendix I for a description of the variables used in this study). Measurement error is allowed to enter the model for both observable variables as well as the latent constructs (the latent constructs are imperfectly represented by the combination of observed variables).

The structural model represents the relations among latent constructs. Academic Progress (the ultimate endogenous (dependent) variable of theoretical interest) is thought to be caused by the two latent constructs: Academic (AGAINT) and Social (SOCINT) Integration. The influences of the endogenous constructs: Goal Commitment (GOAL) and Academic Aptitude (RANK) are mediated through Academic Integration. All measurement errors are independent of all other constructs. The errors in the structural model are referred to a errors in equations distinct from errors in measurement.

Modeling Procedure: The LISREL V program developed by Joreskog & Sorbum (1977) allows this diagram to be translated into a system of equations. Standard statistical methods (two-stage least squares and maximum likelihood) are used to determine the best fitting coefficients that represent the strength of the postulated relations among variables and constructs. By alternately fixing (setting a parameter to a predetermined value, usually 1 or 0) and freeing various parameters (allowing the parameter values to be determined by maximum likelihood estimati techniques), the LISREL program converges on the "best fitting" model (as determined by the Goodness-of-Fit Index) that represent the variance-covariance structure of the data.

Two models are specified, one model for the 463 respondents who participated in each of two waves of the study (the freshman and sophomore follow-ups) and a second for the 260 respondents who participated in the freshman follow-up but subsequently failed to respond to the sophomore wave. If selection bias is operative, then we would expect that significant differences would be found between the structure of the

two models. If no selection bias is present, then we would expect the two models to be similar, allowing for minor error variation. Once the best fitting models were specified for the two groups, structural parameters are compared using the method suggested by Snedecor & Cochran (1967, p 391). This test divides the difference between the associated structural parameters of the two respective models by the standard error of the first parameter, thus producing a difference (D) score. A D-score larger than 1 indicates that the observed differences between corresponding parameters of the two models cannot be attributed to chance. Hence, if selection bias is operative, we would expect D-scores greater than one.

Statistical Analysis: Analysis of the data occurred in two stages. In the first stage, cooperators and noncooperators were compared across the observable variables within the model using standard univariate statistical techniques (T-tests). In the second stage of the analysis, two structural equation models were developed to determine the patterning of influence the features of the academic and social environment exerted on reported academic progress.

RESULTS

Table 1 reports the group means and standard deviations for all observable variables used in the model (Note: It is not feasible to provide descriptive statistics on the latent variables.).

Table 2 reports the structural parameter estimates (maximum likelihood estimators) and their standard errors, and the overall goodness-of-fit index for each structural model.

Table 2

Parameter (P)	Cooperators (n = 460) Coefficient	SE	Dropouts (n = 263) Coefficient	Inter-Group Comparison (D-Score) $(Pn_1-Pn_2/SE\ Pn_1)$
GAMMA (2,1) (GOAL-ACADINT)	.057	.044	.055	.045
GAMMA (2,2) (RANK-ACADINT)	-.004	.044	.002	-.136
BETA (3,1) (SOCINT-ACPRO)	.094**	.045	.100**	.133
BETA (3,2) (ACADINT-ACPRO)	.180***	.046	.179***	.022
BETA (1,2) (ACADINT-SOCINT)	.134***	.045	.125***	.022
Goodness-of-Fit Index	.983		.983	
Chi-Square	45.61		47.84	
d.f.	49		49	
Probability	.449		.520	

*(p<.10, two-tailed) **(p<.05, two-tailed) ***(p<.01, two-tailed)

* - scales have been logarithmically transformed.

On the basis of tests for significance between the single-variable distributions for the two groups, reliable differences were found. Cooperators are characterized by higher scores on the peer relations and social activities scales while noncooperators score significantly higher on the faculty relations scale and report more contact with faculty for social (non-academic) purposes. Moreover, cooperators tend to be higher academic achievers, with a mean high school percentile rank in class of 85.7 versus 83.9 for noncooperators.

Figures 2 and 3 are the path diagrams for the two structural models. The reader will note that the a priori theoretical structure originally imposed on the data (Figure 1) did not provide an adequate fit (i.e., it could not adequately explain the observed data on the basis of a chi-square goodness-of-fit test between the observed covariance matrix and the one predicted by the causal model.) This necessitated altering the theoretical model. Frequency of contact with faculty for nonacademic (social) purposes (FACSOC) loaded (proved to be a stronger indicator) on Academic Integration rather than Social Integration. Moveover, no evidence could be found for a reciprocal relationship between academic and social integration. Rather, the direction of causal influence is one-way; academic integration affects social integration.

A comparison across the two models (Figures 2 and 3) reveals that their basic causal structures are identical. The test for significant differences between the corresponding structural parameters for the two models (Table 2) indicates that the observed differences between the parameters can be attributed to chance variations (D scores < 1).

DISCUSSION

On the basis of these analyses, we discover selection bias with the one technique - statistically significant differences were found between group means, but fail to find bias with the variance-covariance structure analysis - no differences were found in the covariance structures of the two groups. Specifically, differences were found between the two groups that were consistent with Reuss' (1943) hypothesis - cooperators scored higher on the three indicator variables that measure social integration (SOCINT) than did noncooperators.

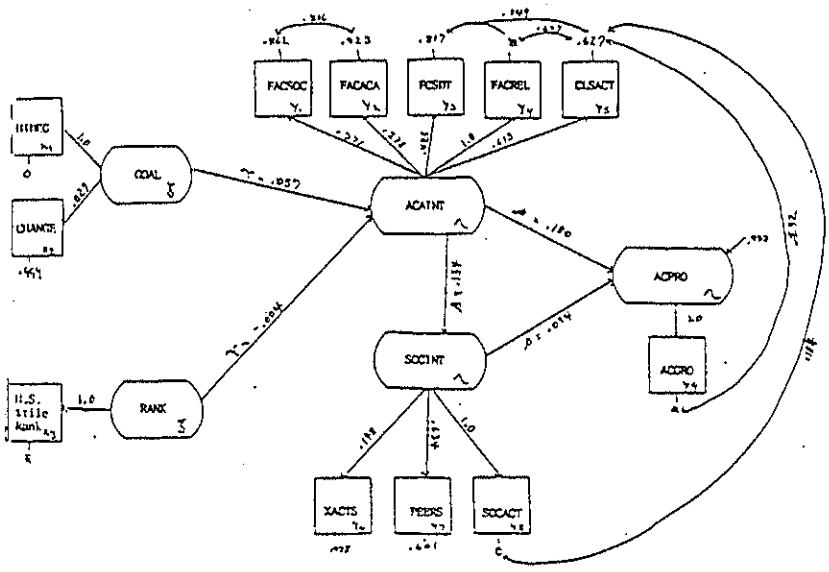

Figure 2

Causal Model for Cooperators

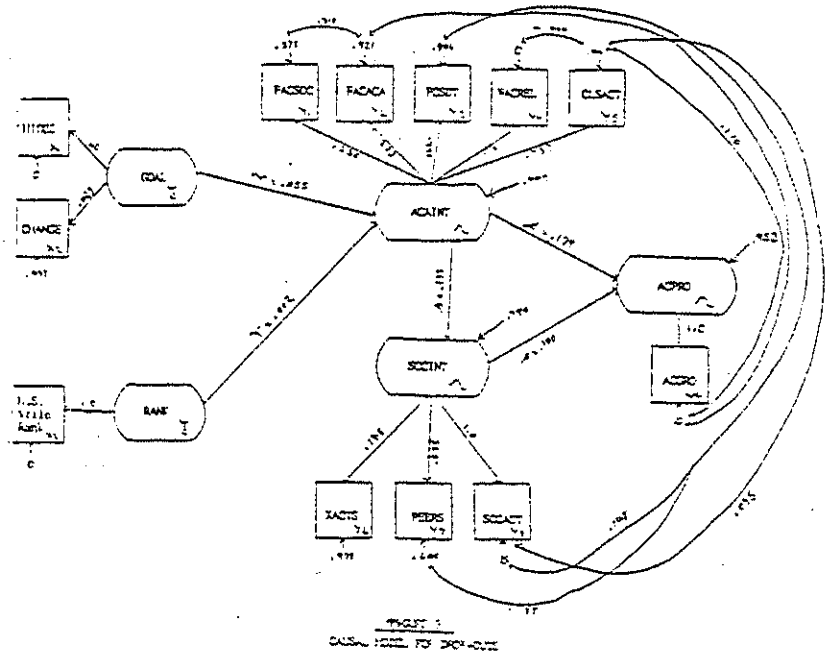

FIGURE 3

CAUSAL MODEL FOR DEFECTORS

Despite these differences in the level of social integration, however, the patterning of relations between the variables remained substantially unaffected. Moreover, the loss of individuals from the study had no affect on the substantive conclusions regarding the impact of academic and social integration on a student's academic growth that can be inferred from the survey data. Hence, it appears that the loss of units from the study did not produce substantial bias in the causal structure of academic growth. Therefore, we can reasonably conclude that the sophomore year analyses will not be biased by the loss of subjects from the freshman year and the substantive findings from these sample data are generalizable to the population under study.

Several limitations of this study are worth mentioning: first, the discovery of substantially lower levels of social integration among non-cooperators indicates that caution is advised when attempting to explain other student outcomes, such as personal growth, that may be more closely related to a student's level of social integration. Attention must be given to these issues on a case-by-case basis. Second, because of the post-hoc nature of this technique, it is not possible to infer anything about the covariance structure of the 382 entering students who did not respond to the freshman year follow-up survey. However, the evidence supports the assumption that the selection process was reasonably random and, therefore, probably non-biasing. Third, the problem of response bias cannot be definitively answered by a single sample. An analytical technique has been proposed for testing for the presence of such bias. This technique needs to be replicated across a variety of research settings before any substantive conclusions can be drawn regarding the nature and impact of non-response on the validity and utility of longitudinal mail survey data.

As long as response rates less than 100% are achieved, one cannot rule out the possibility of response bias and its potential impact on conclusions drawn from sample data. It is incumbent upon the researcher to demonstrate the generalizability (external validity) of his/her sample when attempting to estimate population parameters from sample data.

REFERENCES

CAIN, G. (1975) "Regression and Selection Models to Improve Nonexperimental Comparisons," pp. 297-317 in C. Bennett & A. Lumsdaine (eds.) Evaluation and Experiment, Some Critical Issues in Assessing Social Programs. New York: Academic Press.

ENDO, C. M. (1975) "The Problem of Non-Response in Survey Research," In Fist Fights in the Kitchen: Manners and Methods of Social Research. Lewis (ed.) Palisades, CA: Goodyear Publishing Co.

GOUDY, W. J. (1976) "Interim Response to a Mail Questionnaire: Impacts on Variable Relationships." The Sociological Quarterly 19:253-265.

HAWKINS, D. F. (1975) "Estimation of Non-Response Bias." Sociological Methods and Research 3:461-485.

JORESKOG, K. & SORBORN, D. LISREL. Chicago: International Educational Resources, 1977.

KIVLIN, J. E. (1965) "Contributions to the Study of Mail-back Bias. "Rural Sociology 30:322-326.

LEHMAN, E. C. (1963) "Test of Significance and Partial Returns to Mailed Questionnaires." Rural Sociology 28:284-289.

MEYERS, C., RUBECK, R. & MEREDITH, K. (1983) "An Investigation of Nonresponse Bias in Medical Student Assessment of Instruction." Research In Higher Education, 19:461-467.

MULFOR, J., ET. AL. (1978) "What Return Rate is Necessary When Using Mailed Questionnaires?" Political Methodology 5:

NIELSEN, H., MOOS, R., & LEE, E. (1978) "Response Bias in Follow-up Studies of College Students." Research In Higher Education 9:97-113.

REUSS, C. F. (1943) "Differences Between Persons Responding and Not Responding to a Mailed Questionnaire." American Sociological Review 8:

ST. PIERRE, R. & PROPER, E. (1978) "Identification & Exploration in the National Follow Through Evaluation." Evaluation Quarterly 2:153-165.

SNEDCORE, G. & COCHRAN, W. (1967) Statistical Methods (6th ed.). Ames, Iowa: Iowa State University Press.

SUCHMAN, E. (1962) "An Analysis of 'Bias' in Survey Research." Public Opinion Quarterly 26:102-111.

TERENZINI, P., PASCARELLA, E. & LORANG, W. (1982) "An Assessment of the Academic and Social Influences on Freshman Year Educational Outcomes." Review of Higher Education, 5:86-109.

TERENZINI, P., THEOPHILIDES, C., & LORANG, W. "Influences on Students' Perceptions of their Academic Skill Development During College." Journal of Higher Education, 55:621-636.

TERENZINI, P., ET. AL. (1984) Paper presented to the Annual AIR Forum. Portland, Oregon, May 1985.

TINTO, V. (1975) "Dropout from Higher Education: A Theoretical Synthesis of Recent Research: Review of Educational Research 45:89-125.

SELECTING AND INSTALLING AN INTEGRATED STUDENT INFORMATION SYSTEM: SOME POINTS TO KEEP IN MIND

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INTRODUCTION

As more and more higher education administrators become interested in the concept of integrated student information systems, it is important that the commercial advertising and presentations by software company salespersons be balanced with some practical, non-technical advice from fellow administrators regarding the selection and installation of these complex systems. In an attempt to provide that service, this paper will 1) suggest some steps to be included in the process of selecting an integrated student information system, and 2) review some of the potential tasks, problems, and costs encountered during the installation of such a system. The paper does not attempt to compare the technical aspects of the various student information systems available on today's higher education software market.

An integrated student information systems is built around the concept of many offices sharing data which have been input by several primary sources via one central software system that is supported by a campus mainframe. The various sytems being marketed have differing degrees of complexity, and each commercial system approaches the programmatic integration of campus data in its own way. Some of the systems will produce little visible change in, for example, an institution's admissions, records, and registration procedures. However, the operating scope of some of the larger systems is so comprehensive in their approach to data processing and definition that an institution installing such a system will have the opportunity to make some major procedural changes in the offices that admit, register, and bill students. Regardless of their impact on established procedures, all of these integrated systems seek to offer a product that will move a higher education institution away from stand-alone office data systems.

Most stand-alone systems usually have been developed independently in order to meet the needs of a specific office and are incapable of

communicating directly with each other. In place of these singular systems, an integrated student information system offers a product that has been designed to accomplish data collection and sharing in an atmosphere that views the student information pertaining to admissions, student aid, academic history, billing, etc. as one body of information. Some of the more comprehensive systems go beyond the student information area, in that the vendors provide compatable systems that integrate student data with financial records, alumni data, payroll, faculty activities, etc. These more comprehensive systems can usually be purchased and installed in segments, if desired.

Regardless of the size or mission of the higher education institution and regardless of the complexity and scope of the specific commercial student information systems reviewed, most campus administrators have similar reasons for their interest in an integrated system. They're usually seeking an information system that will offer greater access to accurate student data from primary sources, while minimizing the need for additional long-term labor commitments. The availability of accurate primary source data can obviously be of particular benefit to the institutional research office, especially when the data elements are combined into one integrated file which could be accessible via desk top terminals.

However, the successful implementation and utilization of an integrated system for a specific institution depends upon many factors related to the careful selection of the system to be purchased and the successful installation of that system. This success must be considered in terms of the mechanical sense and in the degree of acceptance of the inevitable changes that the installation of such a system will bring to a campus. The following sections contain guidelines for the institution considering the selection and implementation of an integrated student information system.

THE IMPLEMENTATION COMMITTEE

The first step in selecting and successfully implementing an integrated information system is one of the most critical steps in the entire process. That step, in the time honored tradition of higher education, is forming a committee. This committee should be involved from the very beginning with the task of selecting and implementing the new system. Among the members of this group should be middle management

personnel who have a detailed working knowledge of their offices and also have the authority to implement procedural changes related to the use of a new system. The members of this committee must be able to meet often and carry the additional workload associated with planning for the system implementation in their office. The list of specific offices that should be represented on the committee will vary between systems and campuses, but should generallly include student records, registration, institutional research, admissions, data processing, financial aid, student accounts, and any branch campuses. The committee members will probably also serve as the system "experts" for their particular offices and will play an important role in the training of other office personnel. Upon successful implementation of the selected system, this group should continue in the function of a systems user group with the purpose of insuring that the new system continues to meet the changing campus information needs.

THE COORDINATOR

An overall coordinator of the selection and implementation process needs to be appointed prior to the formation of the implementation committee. This coordinator should also serve as the committee chairperson. This individual should be an administrator who can be temporarily relieved of some routine duties in order to devote at least one-half to two-thirds of each workweek to the system implementation effort. The offices involved with system implementation will continue to be burdened by their routine duties. The primary duty of the coordinator will be to keep the selection and implementation of the system on track. The coordinator, therefore, needs the ability to organize and motivate people, to communicate effectively to groups and individuals, to anticipate procedural and policy problems related to the system implementation, and to be able to get people together to discuss and solve system related problems thay have in common.

The initial sales presentations by some companies may tend to downplay the need for or the degree of involvement by an implementation coordinator employed by the institution. All systems, however, will eventually require the appointment of a coordinator, and the complexity of the coordinator's task will directly reflect the degree of complexity of the purchased system.

Depending upon the organization of the particular institution and the type of system purchased, the campus administration should consider appointing a coordinator who has had some experience with data processing, but not necessarily an individual who is primarily a data processing employee. Frequently, a registrar, director of institutional research, or an assistant to the president woudl also be well suited for the task and have an overall view of campus needs and concerns.

SELECTION OF A SYSTEM

The selection of an integrated student information system should be based on several criteria including 1) the technical compatibility of the software with existing and planned campus hardware, 2) how well the system meets the campus needs, 3) system and screen flexibility, 4) the reputation of the vendor in terms of product, service, and their commitment to the higher education market, and 5) the direct and indirect costs of the system.

1) The hardware-software compatibility issue will be the first hurdle an institution faces during the selection process. Most of the commercial integrated software systems are compatible with mainframes of only one or two manufacturers. The ideal situation for an institution would be to plan for the coordinated purchases of the mainframe hardware and the integrated software, thereby allowing the institution to select the combination that would offer the maximum advantage. If a coordinated purchase is not feasible, and if there is some question about the ability of currently compatible systems to properly serve the institution, administrators may want to delay the purchase of the software rather than settle for an integrated system that is marginally acceptable.

One important part of the compatibility issue is, of course, whether or not the existing mainframe is able to support a new system's demand for increased operating capacity. Most vendors will work with institutional personnel to determine any operating capacity and other compatibility problems.

2) The basic purpose for purchasing an integrated system is to meet the institutional needs for the processing and retrieval of student information. To accurately determine these current and anticipated needs, the implementation committee should survey personnel at all levels in the offices which would use the new system. The survey

results should be the primary criteria for the software selection. As previously noted, the hardware compatibility issue is important, but institutions must avoid the tendency to look at a software system purchase from only a hardware point of view.

3) Flexibility of the system is one aspect that should be approached from several points of review. The first involves the ability of a system to accept currently established data element values. If a system can only utilize data element values pre-set by the vendor, the institution should look elsewhere for a system. An implementation committee will, no doubt, uncover the need to change some of an institution's established data element values, but it should not be placed in the position where it has to accept any generic data element value scheme.

Another type of flexibility centers around the programmatic flexibility of a system. Whether or not an institution is seeking a system that allows it to maintain the basic design of most of its current student data management and processing procedures, or whether the institution intends to undergo extensive revamping of its basic student processing systems, it is important that an institution be able to alter programmatic segments of a software system to make it comply with procedures which the implementation committee has selected and not those selected by the vendor.

Another type of system flexibility that will make an appreciable difference to staff personnel is the ability to redesign screen displays to follow a logical sequence of data input from the forms the staff encounters in their daily work. This ability will aid in the staff acceptance of a new system and in the degree of efficiency realized from that system.

4) The reputation of the company for product, service, and commitment to the higher education market needs to be closely investigated. An institution should request a complete customer list from each vendor and call several representative institutions in an attempt to learn more about a system from a consumer's point of view. After narrowing down the number of potential vendors, committee members should visit several campuses and talk to employees utilizing the systems at all levels of operation. Quality of the product, company service, and the availability of quick access to company computer analysts are among the impor-

tant considerations to discuss during these visits.

5) The cost to purchase software and associated maintenance agreements is readily available from vendors. The cost of associated peripheral equipment such as terminals, printers, wiring, modems, etc. can be estimated by using data from the implementation committee's needs analysis survey. Some new multi-part forms will probably have to be printed, and approximately one week of consulting time should be budgeted. There are also the less direct costs of the corrdinator's time, release time for staff training sessions, and the disruptive effect of changing operating systems.

IMPLEMENTATION OF THE SYSTEM

There are several maxims that apply to the implementation of an integrated student information system, and two of them are:

Maxim #1: An institution needs to carefully plan for the allocation of the time, effort, and money required to implement the new system.

Maxim #2: Implementation of the system will require more time, effort and money than an institution plans for.

Unfortunately, there is no way to avoid the truths of these maxims. The implementation committee can, however, take several steps to reduce the additional burdens from becoming unmanageable.

Immediately after a system has been selected and purchased, the committee should set a target implementation date and then establish a master calendar that schedules all implementation activities to point towards that date. Implementation at the beginning of a summer session has the advantage of providing an on-line "shake down cruise" for the system under a period of nominal enrollment stress. The calendar should allow for last minute problems that threaten to delay the actual installation of the system. Advice from the vendor and outside consultants can keep these surprises and delays to a minimum, but some last minute problems will occur. During the final weeks of implementation, the committee members need to be available for several meetings each week to resolve these problems.

An important part of the total implementation schedule involves the specific training dates. Some companies offer extensive training sessions for personnel from all offices scheduled to use the new system, while other companies train only data processing personnel and leave it

to the institution to train its other employees. If the training involves visits by company representatives to the campus, the training schedule must consider the representatives' available dates and travel time. The coordinator should arrange for the audio or video taping of the training sessions. These tapes could later be utilized in the training of new or dislocated employees.

The administration should have been keeping the campus community aware of the progress of the search for a new system. As soon as the selection of a system has been made, the president should announce the selection and make a very strong statement of support for the implementation committee's task. Since a system often impacts offices under several vice-presidents, the importance of this statement of support cannot be overemphasized.

Another task that the committee should address early in the implementation process is the design and ordering of office forms needed to support the processing activities of a new system. This could be an opportunity to review all campus forms with the intent of establishing a uniform design and numbering system for system input and output forms.

Efficient operation of a new system will most likely require that additional access hardware be purchased and placed in campus offices. Prior to the initiation of the training sessions, the implementation committee should work with each office to determine the number and type of system access equipment that will be available for office personnel. This equipment needs to be ordered and installed in time for the staff to practice the skills and procedures taught during the training sessions.

Early in the implementation process, the committee should make contact with one or more consultants to help guide them through the various stages of the process. The training offices from some of the vendors have the ability to serve as consultants to assist in the general implementation of the system and any new procedures, but this service is usually only offered at an additional cost that may approach one thousand dollars per day for labor, travel, and related fees. Institutions will need some consulting help to set up the implemtation process and to discuss procedural problems encountered during training and actual implementation. These consultants could be vendor employees or they could be personnel from institutions already using the system.

Either way, the committee should budget for this expense.

Throughout the implementation process, the coordinator should insure that all faculty, staff, and student groups receive updates on the progress of the system implementation. The coordinator needs to insure that the campus community is well informed of the potential impact the new system will have on their jobs. Staff personnel may be especially wary of a new system and the changes it might bring to their work routines. Since many of the integrated systems enable the institution to reduce labor needs in some areas, these concerns may be well founded. Usually, however, a new system enables the institution to eliminate some routine tasks while creating higher level tasks for which displaced employees can be trained. If staff employees are closely involved in the planning and implementation of a new system, and if they are kept fully informed of the capabilities and impact of the system, the institution will avoid some of the fears and rumors that can impede the acceptance of a system. For the same reason, faculty and student groups should also be made aware of the potential of a new system and of the procedural changes which may occur because of its implementation.

The implementation of a new data system will create certain expectations pertaining to improvements in data availability and sophistication. These expectations will create an additional burden on the staff of the computer center. Institutions should anticipate and prepare for this additional workload well in advance of the implementation. Without adequate computer support personnel, the post-implementation period could prove to be a very frustrating experience for system users, thereby creating a less-than-positive attitude towards the new system.

The total implementation effort required for some of the more comprehensive systems on the market may take six to twelve months. The coordinator shoud insure that office directors develop specific procedures and schedules to encourage staffs to reinforce the training which offices received during the early months of the implementation effort. One of the methods of doing this is to have the data processing personnel create a "look-alike" version of the actual software system slated for implementation. This look-alike version can be supplied with bogus student records and data element values that will permit the staff to practice their imnput and recall processing skills taught during the training sessions. Offices can schedule mock registration sessions,

information recall requests, etc. that will prepare the faculty and staff for the actual operation of a new system. The same practice version of the system can be maintained even after full implementation for the purpose of training new employees.

Another training aid the committee coordinator may want to consider for the employees is a manual that would be developed by the institution detailing the system access, use, and exit procedures for the various campus offices slated to use the new system. The development of such a series of manuals is an excellent way to involve the staff with the implementation of the new system. These manuals could include practice exercises for the employees to complete after their training sessions. The implementation coordinator should also establish a complete reference library of the various training and information manuals supplied by the vendor or developed by the institution. This reference library should include copies of the tapes of the training sessions.

Most integrated student information systems include programmatic routines which an institution can use to establish adequate security procedures to protect against unauthorized system access. Some systems restrict access at the screen level, while other systems permit more sophisticated security procedures that restrict access based upon specific elements on each system screen. Regardless of the type of security system provided, establishing and montoring the levels of security clearances for campus offices should be one of the tasks of the implementation committee.

LIFE AFTER IMPLEMENTATION

Maxim #3: When an institution integrates its data systems, it integrates its policies, procedures, and problems.

This maxim refers to the fact that under stand-alone systems, a system procedure or problem would usually only impact one office. Under an integrated student information system, however, several offices could be affected by a system problem or procedural change occurring in one of the user offices. The same concept applies to calendar changes. Under an integrated system, the personnel in each user office must realize that procedural changes, work calendar adjustments, modifications of forms, etc., should not be made without considering the ramifications to other user offices. This post-implementation fact of life mandates the establishment of a group to review, approve, and coordinate any policy,

procedural, or forms changes in user offices that might possibly affect the integrated information system. It is suggested that the implementation committee continue as a "users committee" charged with these general system coordination functions.

The chairperson on this users committee needs to have sufficient authority to solve the inter-office problems that will occur, especially as a new system goes through a predictable period of "fine-tuning" during the initial academic year of use. A previously mentioned, the implementation of most comprehensive integrated systems will mandate some changes to basic procedures related to admissions, registration and/or billing systems. Institutions installing these major systems should anticipate a larger number of implementation problems. Some areas of adjustment, however, will surface during the initial use of even the smaller, less comprehensive integrated systems. These areas may include the shifting of staff labor resources, modifications of some system forms, redisigning or generating new institutional reports, and modification of some minor processing procedures.

CONCLUSION

The usefulness of an integrated student information system depends upon 1) the selection of the best system for the institution based upon well defined needs and goals, 2) the proper installation of the system, including extensive planning, communication, training, and development of management procedures, and 3) the establishment of a group to review and coordinate any post-implementation system changes. One or two semesters after implementation, the payoff from the installation of such a system will become apparent to campus staff, faculty, and administrators. The accuracy and consistency of basic student data will markedly improve, and the processing of student admissions, records, registration and billing will become more efficient. Students and faculty will encounter fewer hassles related to conflicting records, lists, and procedures, and the administration will see a greater efficiency in the use of staff personnel.

These benefits will materialize, however only after a year or more of hard work and proper coordination of the pre- and post-implementation activities. Personnel charged with selecting, implementing and operating such a system must have a healthy mix of patience and determination to make the new system a success.

FUND-RAISING COSTS AND STAFFING: A COMPARISON OF TEN PRIVATE UNIVERSITIES, 1985

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ABSTRACT

A review of the costs and staffing of fund-raising operations at ten selective private universities in 1984-85 shows that, while the institutional share many characteristics,they differed significantly in the resources dedicated to fund-raising and in the "productivity" of those resources. Spending on development averaged 1.9% of educational and general budgets, but ranged between .5% and 3.5%. On average, the universities employed 77 professional and support personnel on development work, but the totals ran from 27 to 130 people. The ten institutions also differed widely in the ratios of support to professional staff, in expenditures per fund-raising staff member, and in the ratio of fund-raising expenditures to proceeds.

PURPOSE AND METHODOLOGY

The aim of the study was to compare data on the costs, staffing, and organization of fund-raising operations of similar institutions to help Tufts in its planning for a new capital campaign.

In March, 1985, we asked seventeen institutions to complete our questionnaire: Brandeis, Brown, Carnegie Mellon, Case Western Reserve, Columbia, Dartmouth, Emory, Johns Hopkins, Princeton, Stanford, Syracuse, Tufts, Tulane, University of Pennsylvania, Rochester, Vanderbilt, Yale, and Washington University (St. Louis). These universities were selected as being sufficiently similar in their institutional characteristics and aspirations, history, and alumni relationships that the results would be informative. A total of ten usable responses was received. Because of the sensitivity of some of the data, the names of the respondents are not given in this summary report. A copy of the questionnaire is available on request.

Responses were summarized and sorted, and graphs prepared, using Lotus 1-2-3. Several numbers which appeared unlikely to be correct were double-checked with the institution involved, but no independent attempt was made to verify the data the institutions reported.

FINDINGS

Institutional Characteristics: While the ten universities share independent governance, admissions selectivity, a substantial volume of research activity, and a dedication to graduate and professional as well as undergraduate education, they differ significantly in such other basic characteristics as enrollment, endowments, operating budgets, and alumni body size. (Table 1)

Table 1: Institutional Characteristics

Grand Tot. Supt.			Total	E & G			
		Total	Endow-	Expend-	Alumni		
CFAE 83 ($000)	CFAE 84 ($000)	Enroll-ment	ment ($000)	iture ($000)	Total	U/G	Date Found.
25,408	26,240	7,213	181,921	112,801	51,249	43,708	1764
13,634	21,705	6,062	162,508	60,089	44,190	35,000	1905
28,428	25,751	8,544	182,201	141,052	80,868	36,428	1826
50,982	60,036	22,017	329,436	401,809	180,711	79,732	1740
58,219	58,164	6,136	1,288,000	162,389	50,518	40,297	1746
19,772	25,789	8,865	600,178	189,325	56,399	39,206	1850
9,227	11,400	20,395	80,183	169,814	120,994	89,501	1873
13,982	15,470	7,074	58,747	121,107	57,404	39,769	1852
25,623	37,794	10,397	119,548	87,114	74,957		1834
41,060	42,322	11,266	330,509	331,119	65,000	25,000	1876
28,634	32,467	10,797	333,323	177,662	78,229	47,627	

Note: Institutional names have been omitted to protect sensitive information in other sections.

There are some revealing relationships between the various characteristics on this table. First, there is a reasonably high rank order correlation between the total support figures for 1983 and 1984, and the number of years since founding (.672 and .612, respectively). Endowment and year since founding show a rank-order correlation of .745. On the other hand, fund-raising support for 1984 and number of alumni show no

relationship (correlation of -.04). And years since founding shows only a weak negative relationship (-.15) with the ratio of fund-raising expenditures to total proceeds. (Table 5) Speculating somewhat, we conclude that:

- o The number of alumni has little to do with fund-raising results
- o The longevity of the institution has little to do with how cost effective its fund-raising is; but
- o The longevity of an institution is significantly related both to endowment size and fund-raising results; and
- o The high correlation of endowment and fund-raising results indicated that good fund-raising over time has built up the endowments, and/or that there is a history of wealth in the alumni that contributes to success in both.

Staffing: We asked institutions to report their staffing by function (annual fund, deferred gifts, research etc.). Not surprisingly, the internal classification systems differed among respondents; the results should be viewed with caution. To minimize confusion, we aggregated related functions into three groups:

- Annual fund
- All other fund-raising (major gifts, corporations, foundations, deferred giving, divisional or school-specific fund-raising)
- Administration and support activities (research, administration, DP, acknowledgements, records, donor relations, etc.)

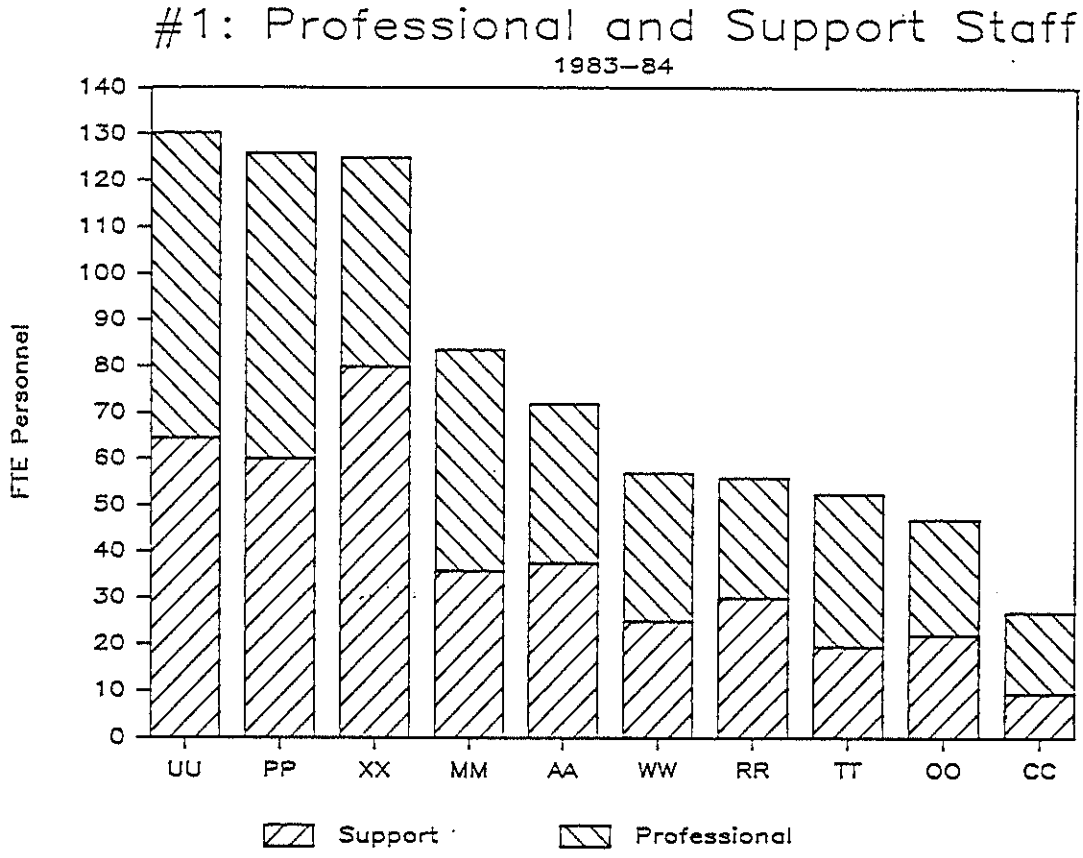
Total fund-raising staffing ranged from a low of 27 people at CC to highs of 130 at UU, 126 at PP, and 125 at XX. The mean staff level was 77 FTE. Table 2 and Graph 1 display the professional and support staff counts for these universities.

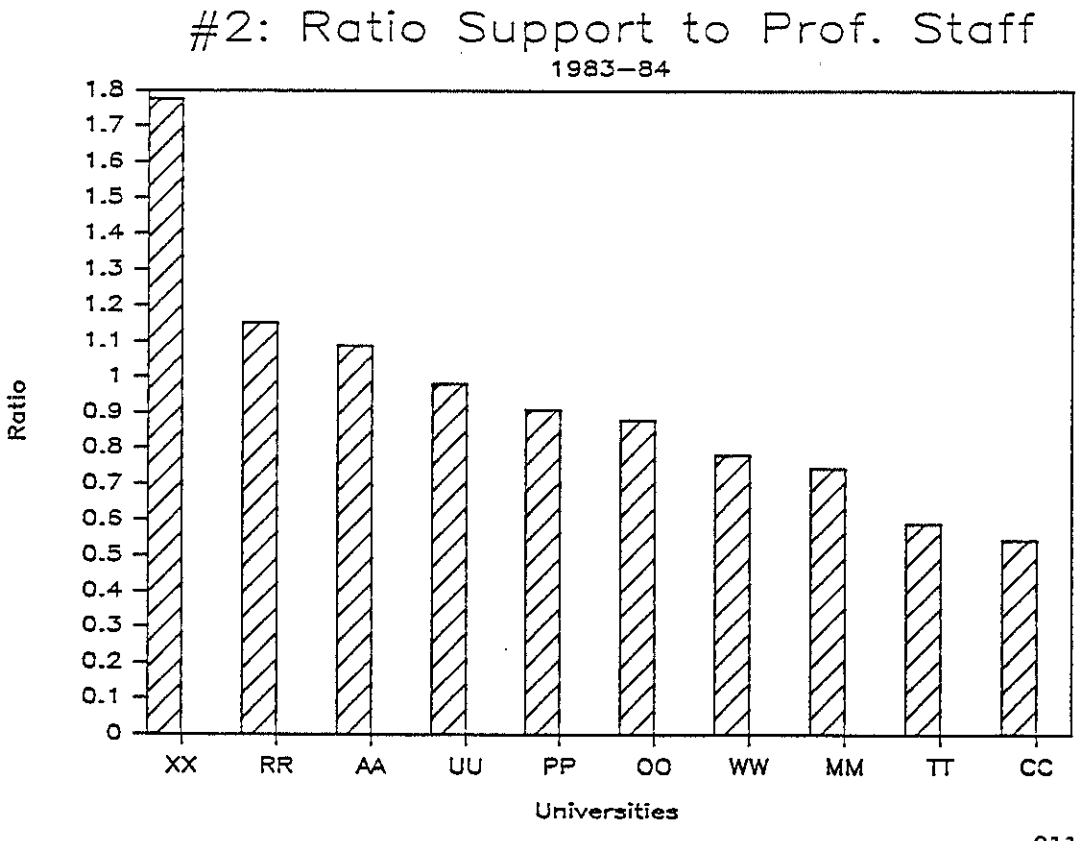
Summing the data for all the respondents, one can see that, on average, 15% of the professional staff worked on annual funds, 52% on other fund-raising, and 32% on administration. The support staff tended to more heavily concentrated in "administrative" functions, so the distribution for all professional and support staff was 16% on annual fund, 48% on other fund-raising, and 36% on administration.

TABLE 2: PRIVATE FUND-RAISING FTE PROFESSIONAL AND SUPPORT STAFF

INSTITUTION	TOTAL	ANNUAL FUND	OTHER FUND-RAISING	ADMINISTRATION
	Professional staff			
AA	35	7	16	12
CC	18	3	9	6
RR	26	7	14	5
PP	66	14	32	20
UU	66	11	39	16
OO	25	5	11	9
WW	32	2	24	6
MM	48	3	14	32
TT	33	7	10	16
XX	45	2	35	8
Mean	39	6	20	13
% of total	100%	15%	52%	32%
	Support staff			
AA	38	8	11	19
CC	10	2	5	3
RR	30	8	17	5
PP	60	12	24	24
UU	65	14	26	25
OO	22	4	6	12
WW	25	2	10	13
MM	36	3	18	15
TT	20	5	3	12
XX	80	8	48	24
Mean	38	7	17	15
% of total	100%	17%	44%	39%
	Total Professional And Support Staff			
AA	72	15	27	30
CC	27	5	13	9
RR	56	15	31	10
PP	126	26	56	44
UU	130	25	65	41
OO	47	9	17	21
WW	57	4	34	19
MM	84	6	32	46
TT	53	12	13	28
XX	125	10	83	32
Mean	78	13	37	28
% of total	100%	16%	48%	36%

Note: Figures rounded to nearest whole number.


#1: Professional and Support Staff
1983–84
FTE Personnel
140
130
120
110
100
90
80
70
60
50
40
30
20
10
0
UU
PP
XX
MM
AA
WW
RR
TT
OO
CC
Support
Professional


#2: Ratio Support to Prof. Staff
1983–84
Ratio
1.8
1.7
1.6
1.5
1.4
1.3
1.2
1.1
1
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0
XX
RR
AA
UU
PP
OO
WW
MM
TT
CC
Universities

On average, these institutions employed 13 people (6 prg., 7 supt.) on annual fund work. They used 37 people (20 prof., 17 supt.) on other fund-raising. And they had 28 people (13 prof., 15 supt.) working on administrative duties. There was significant variation among institutions on these distributions.

The universities differed significantly in the proportions of professional and staff people they used. CC and TT employed .54 and .59 support people for each professional, respectively, whereas most institutions were closer to a one-to-one ratio, and Institution XX reported using 1.78 staff for each professional. Graph 2 displays these ratio data, and Table 2B presents them.

TABLE 2B: RATIO OF FTE SUPPORT STAFF TO FTE PROFESSIONAL STAFF

INSTITUTION	TOTAL	ANNUAL FUND	OTHER FUND-RAISING	ADMINIS-TRATION
AA	1.09	1.14	0.69	1.61
CC	0.54	0.67	0.53	0.50
RR	1.15	1.14	1.21	1.00
PP	0.91	0.86	0.75	1.20
UU	0.98	1.27	0.66	1.54
OO	0.88	0.80	0.55	1.33
WW	0.78	1.00	0.42	2.17
MM	0.74	1.00	1.35	0.46
TT	0.59	0.71	0.30	0.72
XX	1.78	4.00	1.37	3.00
Mean	0.94	1.26	0.78	1.35

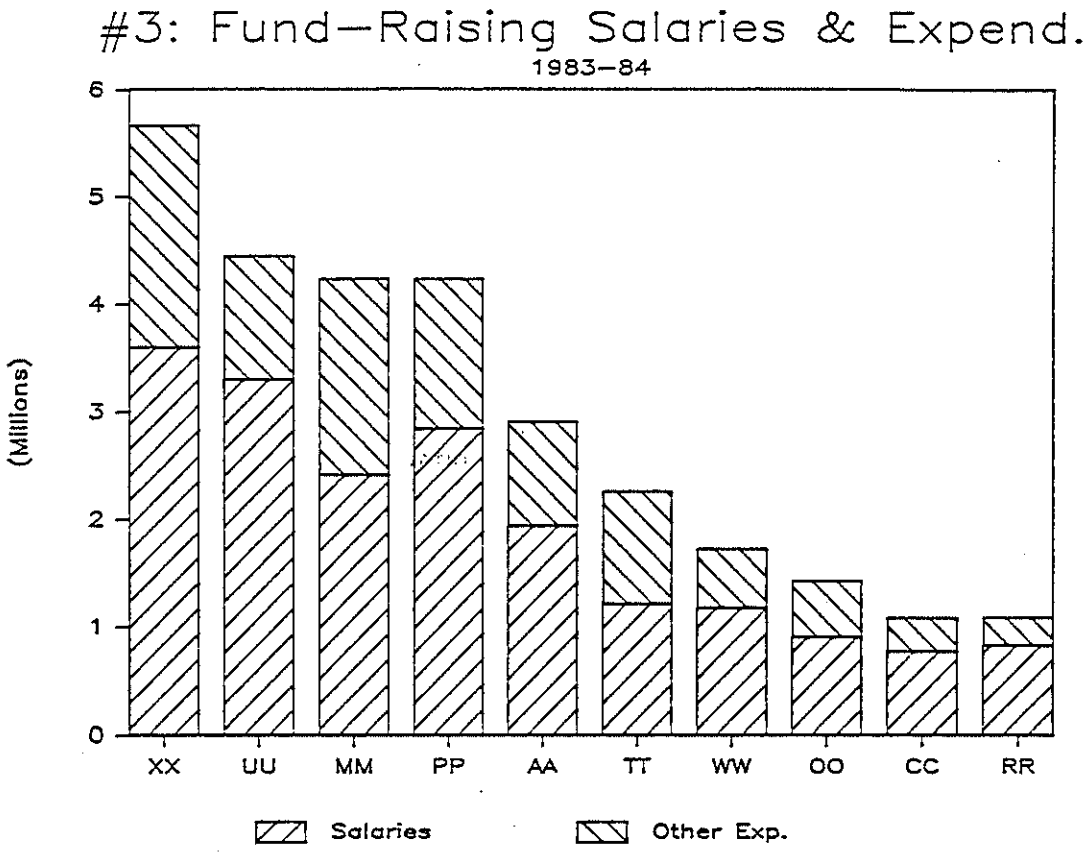
Salaries and Expenditures: Total expenditures ranged from a low of $1,166,078 (CC) to highs of over $4,000,000 for UU, MM, and PP, and over $5,600,000 for XX. The mean for the group was $2,913,034. Table 3 displays these data and Graph 3 reports them.

We aggregated reported expenditures for salaries and for all other development costs in the same annual fund, other fund-raising, and ad-

TABLE 3: PRIVATE FUND-RAISING - TOTAL SALARIES AND EXPENDITURES

INSTITUTION	TOTAL	ANNUAL FUND	OTHER FUND-RAISING	ADMINISTRATION
	Total Salaries			
AA	1,941,600	366,000	892,900	682,700
CC	772,217	119,040	382,457	270,720
RR	831,387	86,243	432,849	312,295
PP	2,841,400	519,825	1,450,650	870,925
UU	3,300,465			
OO	905,479	167,860	366,486	371,133
WW	1,177,319	96,900	840,161	240,258
MM	2,415,823	247,929	1,066,456	1,101,438
TT	1,209,517	231,944	374,753	602,820
XX	3,602,736	262,247	2,514,439	826,050
Mean	1,899,794	233,110	924,572	586,482
% of total except UU	100%	13%	53%	34%
	Total Salaries and Expenditures			
AA	2,909,700	567,200	1,365,500	977,000
CC	1,166,078	231,090	582,414	352,574
RR	1,149,014	157,243	496,421	495,350
PP	4,242,621	971,320	2,125,680	1,145,621
UU	4,456,824			
OO	1,294,649	407,126	466,286	421,237
WW	1,727,785	96,900	1,292,161	338,724
MM	4,247,116	700,418	1,698,136	1,848,562
TT	2,262,721	434,857	479,753	1,348,111
XX	5,673,835	444,045	4,177,130	1,052,660
Mean	2,913,034	445,578	1,409,276	886,649
% of total except UU	100%	16%	51%	32%

Graph 3



ministrative categories. For the group as a whole, 13% of total salaries went into annual fund work, 53% into other fund-raising, and 34% into administration. When other fund-raising expenses are added to salaries, the figures change only a little: 16% went for annual funds, 51% for other fund-raising, and 32% for administration.

The ratio of total expenditures to FTE staff shows that expenditures per staff member ranged from a low of $20,518 at RR (a figure which is so low as to make one believe it is non-comparable) to a high of $50,712 at MM, with a mean at $36,911. (Table 3A)

Dividing total salaries and other expenses by FTE staff shows that five of the universities (MM, XX, CC, AA, and UU) are very similar in their average salary expenditures. Salary expenditures for the others appear materially lower (Table 3B, Graph 3A) Caution should be used in drawing conclusions from these data. For instance, institutions MM and CC have a lower ratio of support to professional staff than does XX.

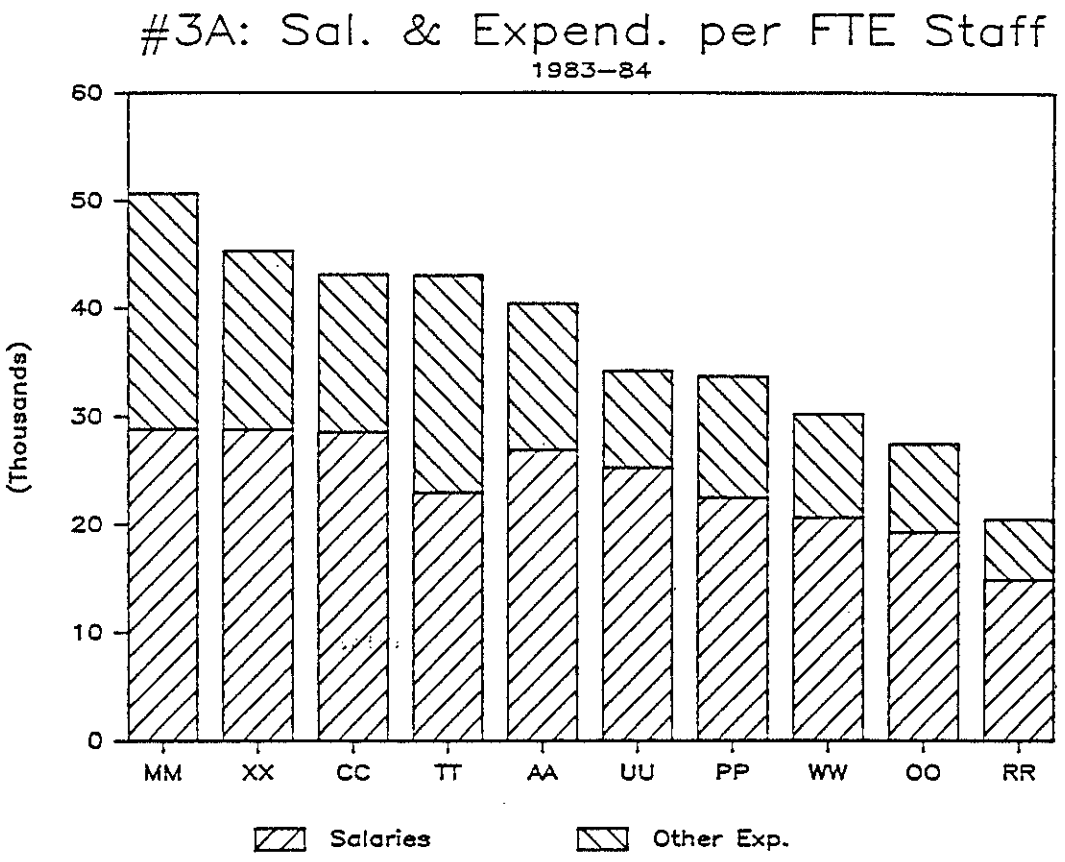
TABLE 3A: TOTAL FUND-RAISING EXPENDITURES INCLUDING SALARIES, PER FTE STAFF MEMBER

INSTITUTION	TOTAL	ANNUAL FUND	OTHER FUND-RAISING	ADMINIS-TRATION
AA	$40,413	$37,813	$50,574	$32,567
CC	$43,188	$46,218	$44,801	$39,175
RR	$20,518	$10,483	$16,014	$49,535
PP	$33,672	$37,358	$37,959	$26,037
UU	$34,204			
OO	$27,604	$43,311	$27,031	$20,802
WW	$30,312	$24,225	$38,005	$17,828
MM	$50,712	$116,736	$53,485	$40,186
TT	$43,099	$36,238	$36,904	$49,022
XX	$45,391	$44,405	$50,327	$32,896
Mean	$36,911	$44,088	$39,455	$34,227

TABLE 3B: SALARIES AND EXPENDITURES PER FTE FUND-RAISING PERSONNEL

INSTITUTION	TOTAL SALARIES	OTHER EXPEND.	SAL. & EXPEND.
AA	26,967	13,446	40,413
CC	28,601	14,587	43,188
RR	14,846	5,672	20,518
PP	22,551	11,121	33,672
UU	25,330	8,875	34,204
OO	19,266	8,280	27,546
WW	20,655	9,657	30,312
MM	28,846	21,866	50,712
TT	23,038	20,061	43,099
XX	28,822	16,567	45,391
Mean	23,892	13,013	36,906

Since their average salary expenditures are similar, this may mean in fact that XX has a wider spread between support and professional salaries than do CC and MM. The universities differ widely in their other expenditures per FTE staff.



Relationship of fund-raising expenditures to total operating budgets and to grand total support: As a percentage of total operating budgets, institutional expenditures on fund-raising ranged from .05% in the case of OO to 3.5% for MM, with a mean of 1.9%. (Graph 4 and Table 4) Expressed as a percentage of grand total support received, those expenditures represented between 5.0% at OO to 27.5% in the case of MM. The mean for the group was 10.4%. (Graph 5 and Table 5)

It should be remembered that the "grand total support" reported to CFAE includes only the proceeds actually received, whereas the expenditures reported in this survey relate to the level of fund-raising activity, which generates both pledges and cash. Further, institutions with "mature" development activities - a high steady flow of cash due to decades of on-going development effort - will tend to look more cost-effective than those that are spending heavily as they start up serious fund-raising activity.

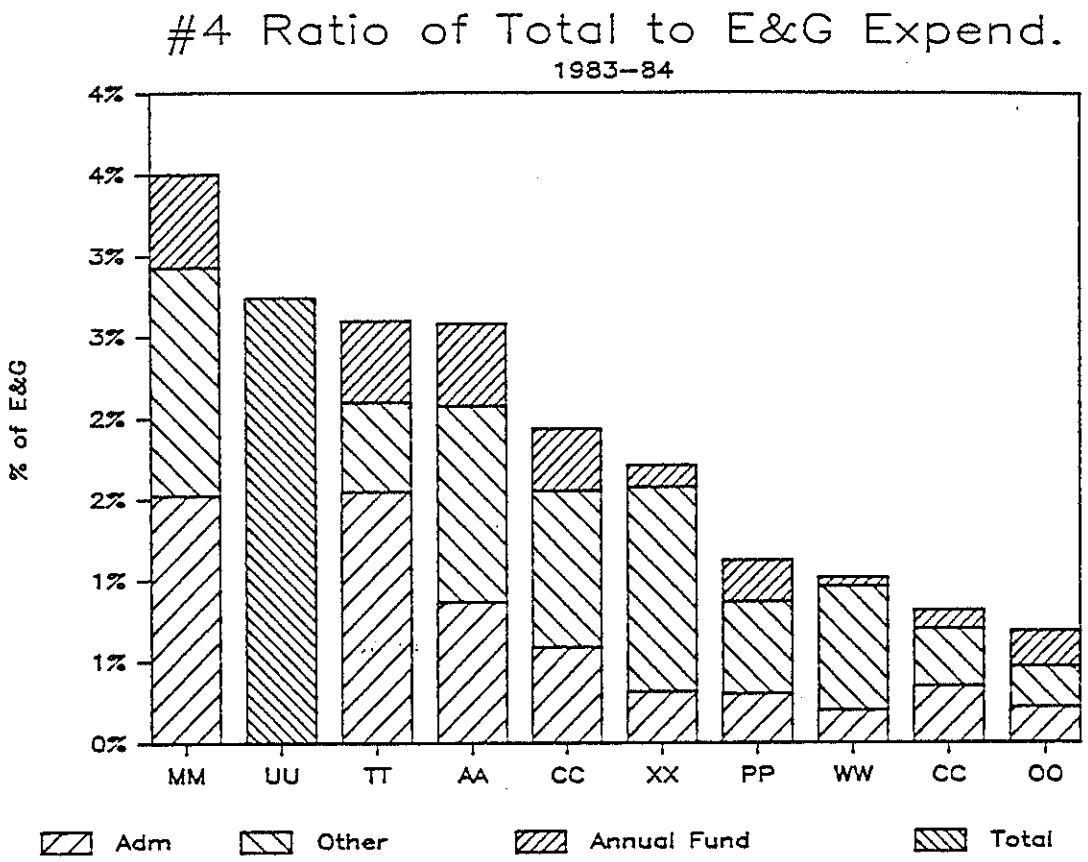


TABLE 4: TOTAL FUND-RAISING EXPENDITURES AS PERCENT OF TOTAL EDUCATIONAL AND GENERAL EXPENDITURES

INSTITUTION	TOTAL	ANNUAL FUND	OTHER FUND-RAISING	ADMINISTRATION
AA	2.6%	0.5%	1.2%	0.9%
CC	1.9%	0.4%	1.0%	0.6%
RR	0.8%	0.1%	0.4%	0.4%
PP	1.1%	0.3%	0.6%	0.3%
UU	2.7%			
OO	0.7%	0.2%	0.3%	0.2%
WW	1.0%	0.1%	0.8%	0.2%
MM	3.5%	0.6%	1.4%	1.5%
TT	2.6%	0.5%	0.6%	1.5%
XX	1.7%	0.1%	1.3%	0.3%
Mean	1.9%	0.3%	0.8%	0.7%

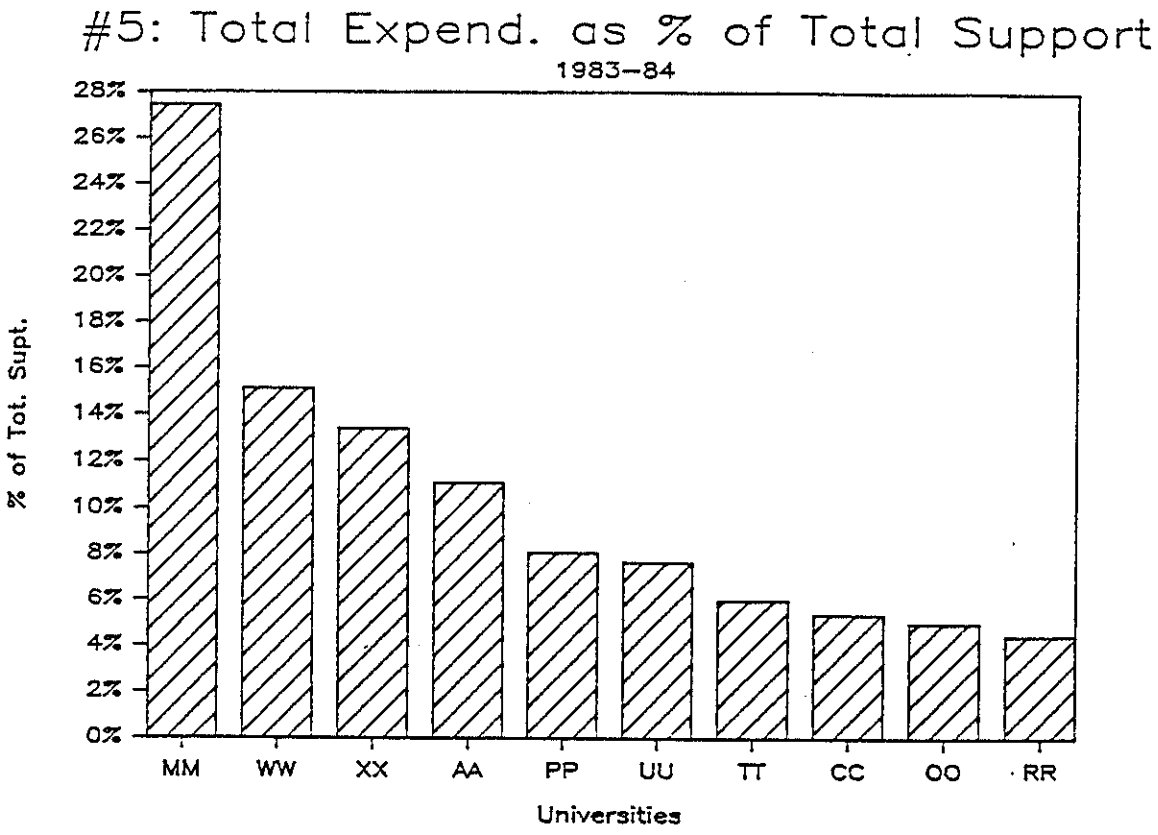


TABLE 5: TOTAL FUND-RAISING EXPENDITURES AS PERCENT OF GRAND TOTAL SUPPORT RECEIVED

INSTITUTION	TOTAL	ANNUAL FUND	OTHER FUND-RAISING	ADMINIS-TRATION
AA	11.1%	2.2%	5.2%	3.7%
CC	5.4%	1.1%	2.7%	1.6%
RR	4.5%	0.6%	1.9%	1.9%
PP	8.1%	1.9%	4.1%	2.2%
UU	7.7%			
OO	5.0%	1.6%	1.8%	1.6%
WW	15.2%	0.8%	11.3%	3.0%
MM	27.5%	4.5%	11.0%	11.9%
TT	6.0%	1.2%	1.3%	3.6%
XX	13.4%	1.0%	9.9%	2.5%
Mean	10.4%	1.7%	5.5%	3.6%

We also charted expenditures on components of the fund-raising program against the relevant portions of cash proceeds. The results of this analysis are shown on Table 5A. In general, annual fund expenditures amounted to 106% of annual fund proceeds; expenditures on other fund-raising activities amounted to 6.5% of all proceeds except annual; and administrative costs amounted to 3.5% of all proceeds.

TABLE 5A: EXPENDITURES OF FUND-RAISING COMPONENTS AS PERCENT OF RESPECTIVE REVENUES

INSTITUTION	ANNUAL FUND	OTHER FUND-RAISING	ADMINISTRATION
AA	12.5%	6.3%	3.7%
CC	6.1%	3.3%	1.6%
RR	5.3%	2.2%	1.9%
PP	10.2%	5.0%	2.2%
UU			
OO	14.1%	1.5%	1.2%
WW	6.3%	13.1%	3.0%
MM	19.6%	14.3%	11.9%
TT	13.6%	1.4%	3.6%
XX	7.5%	11.5%	2.5%
Mean	10.6%	6.5%	3.5%

Organizational Issues: We asked each institution to describe their internal organization, any relationship they had with other support organizations, their use of volunteers, use of paid student callers, and their current capital campaign status. These questions can have a significant effect on costs, but for the sake of brevity, only a summary of the responses is included here.

Most of the universities reported that they are gearing up for a capital campaign, are in the middle of one, or are pursuing mini-campaigns as an alternative approach or a respite. Less than half of the schools use paid student volunteers. Most schools make extensive use of volunteers. One reported using them "in every conceivable manner," a sentiment shared by most though not always expressed that way. Five universities reported relationships with other organizations providing financial support to their institutions. Organizationally, most universities had a substantial central staff supplemented by fund-raising personnel in the component schools.

FUTURE RESEARCH

The universities that participated in this survey have agreed to meet this winter to plan for a more extensive and specific continuing review of costs, staffing, organization, and results. Fruitful areas for further exploration would include examination of salary levels, degrees of automation, prospect research activities, and travel and entertainment budgets.

MODELLING ALUMNI/AE ANNUAL FUND PARTICIPATION: A PARTIAL SUCCESS AT A LIBERAL ARTS COLLEGE

John A. Dunn, Jr.
Vice President, Planning
Tufts University

ABSTRACT

This paper reports the development and use of a computerized model for tracking and projecting the annual fund giving patterns of the alumni and alumnae of Wesleyan University, a liberal arts college. The model is based on decade groupings of alumni and uses data on participation rates and average gift amounts in four gift size ranges. Experience indicates that the model is of greater value in illustrating major strategies and in training volunteers than it is in detailed fund-raising planning.

PURPOSE

Annual fund-raising from alumni would seem to be an ideal candidate for computer modelling and projection. It is a repetitive exercise on which historical data can be gathered and trends plotted; enough alumni are involved that statistical techniques can be used; and new targets need to be set each year for the institution's budget planning.

The author, who had been involved in Wesleyan fund-raising as a volunteer, and Cynthia Gelhard McCaskey, then Wesleyan's director of annual giving, undertook the modelling exercise in 1982 as an experiment. In 1970, 41% of Wesleyan's alumni contributed, and the annual fund totalled $300,000. (Note: the annual fund total, though mainly from alumni, also contains gifts from parents, friends, and others.) A dozen years of intense effort raised participation to 57.2% by 1982, and the annual fund total to $2,000,000. That year, Wesleyan announced a major fund-raising campaign which called for increasing the annual total to almost $4,000,000 by 1987. We wanted to see what changes in alumni giving patterns would be needed to achieve that result. In order to report usefully on this experiment but to protect sensitive information, Wesleyan is correctly cited as the institution involved, but the data are purposely clouded, altered, or approximated.

The author owes thanks to the succeeding annual fund directors at Wesleyan, James Flynn, Jr., and Matthew McCreight, for their willing support ofthe project.

DESCRIPTION OF THE MODEL

The model we developed makes the simplifying assumption that alumni/ae can be dealt with in decade groups - all alumni of the 1950's, those of the 1960's, etc. We know the number of graduates from each decade, and can estimate the effects of mortality on the older classes and of new graduates in the most recent decade.

The alumni fund office provides the three essential data inputs: the numbers of alumni/ae in each decade group; the number in each decade making gifts at each giving level (up to $99, $100-249, $250-999, and $1,000 and up); and the total dollars donated in each giving category in each decade. From these data, the model calculates the participation rate and the average gift at each giving level, for each decade (e.g., 15.5% of all alumni in the 1930's gave in the range of $100-249, and the average gift for them was $310.)

We then use the derived participation rates and average gift sizes, together with estimated changes in the alumni population, to project future alumni donations. For instance, we might assume that the population of the 1940 graduates would shrink by 1.5% per year, and we could raise participation at the $250-999 level from 9% to 13% and hold the average gift size in that category constant despite the increased number of gifts.

The model was initially constructed using EFPM, a modelling system available through EDUCOM. It was subsequently transferred to Lotus 1-2-3, and is run on a Z-100 microcomputer with the Hewlett Packard 7470A plotter.

USE OF THE MODEL

We have updated the model each year since 1982, tracking annual performance and estimating what participation and gift level targets would be needed in future years if the ever-increasing goals are to be met.

The Wesleyan annual fund office plans its fund-raising tactics in much finer detail than is suggested by this model. Class by class and prospect by prospect analyses are performed by the professional staff and alumni volunteers, and targets are set on the basis of that research. The model does not add significantly in that work.

The model has proven helpful, however, in documenting trends which are sometimes hard to see in the fine detail of individual contri-

butions, and is demonstrating numerically and graphically the need for the major strategies that have been evolved: get the young alumni involved, even if the average gift is small; and increase the number who are giving in the higher categories.

The author and others have used data and graphs from the model on several occasions to bring these points home, especially to the alumni volunteer leadership.

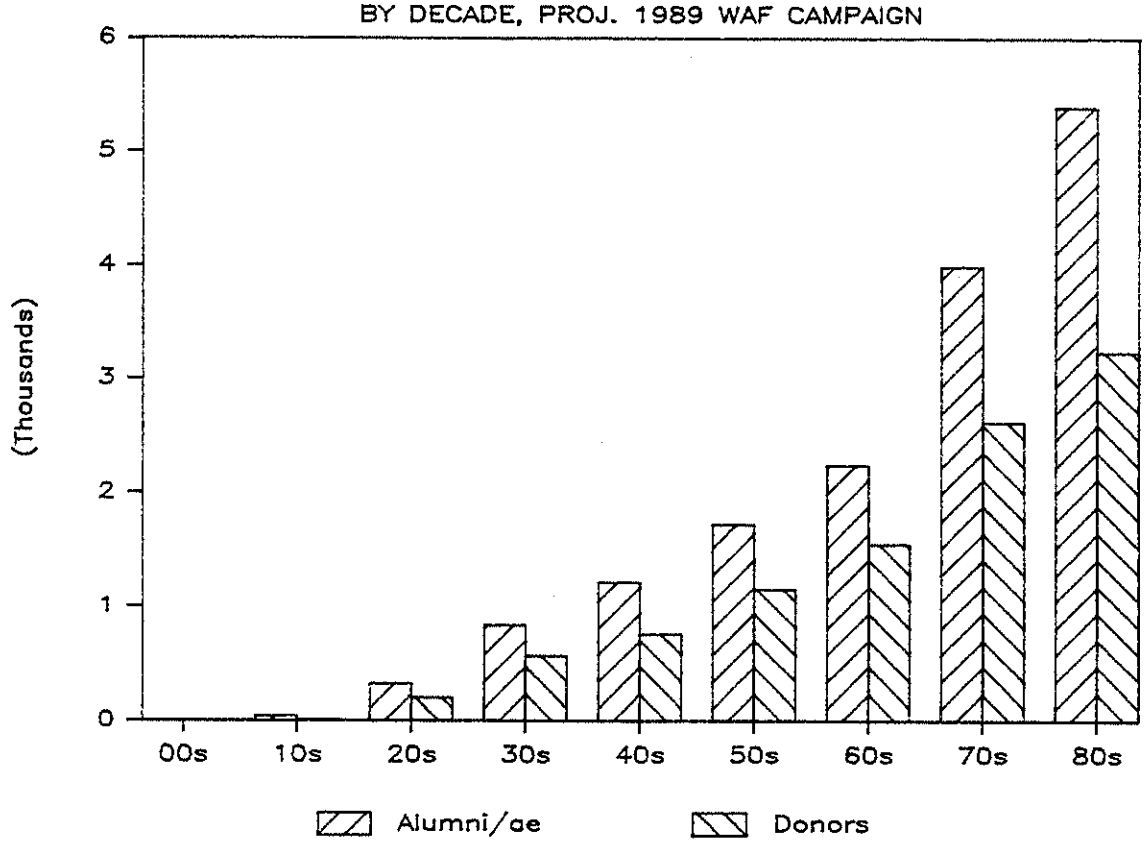
A SAMPLE APPLICATION

The model projects that the total number of alumni will continue to grow at 3.0-3.5% per year. The older decade groups are of course shrinking in numbers, but that decline in more than offset by large new classes of graduates.

Wesleyan increased its class size dramatically in the last fifteen years. The alumni body is heavily weighted with young people whose mobility makes them hard to solicit and whose present incomes and financial commitments make them modest donors. (Graph 1) Instead of giving up on these prospects because of the low cost-effectiveness of soliciting them, Wesleyan has put extraordinary efforts into tracking and involving them. This heavy investment in alumni loyalty should pay off in future decades as the giving potential of these individuals matures.

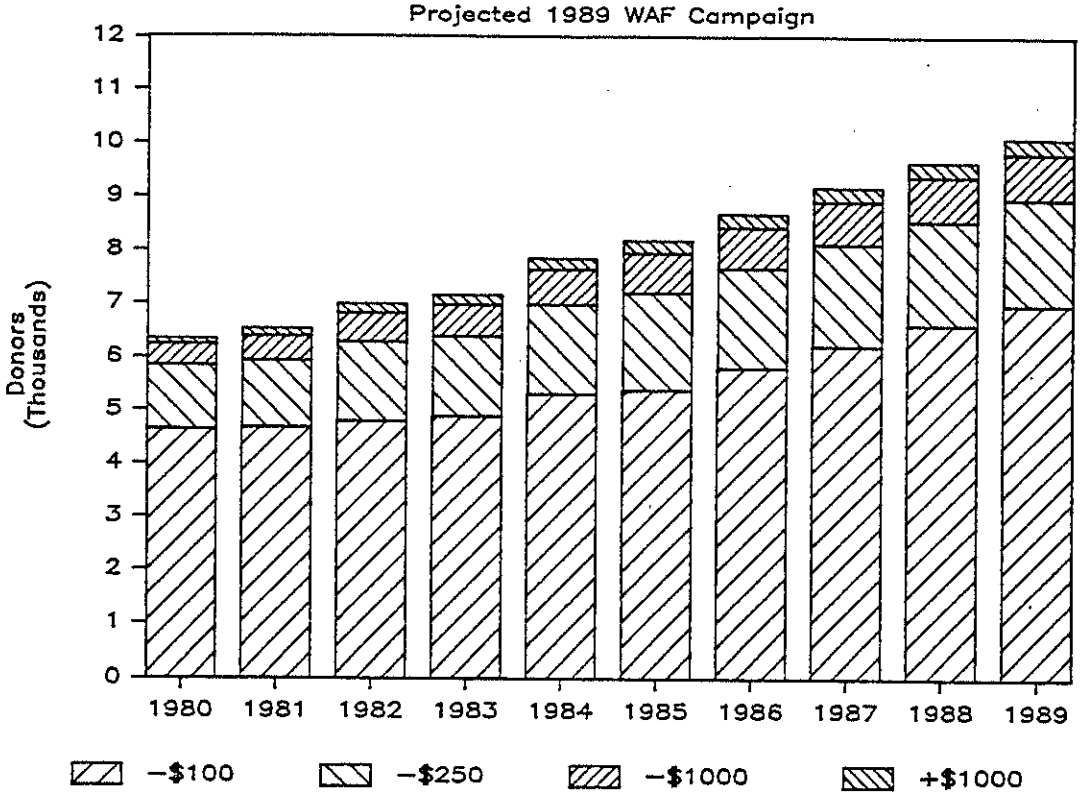
#1: ALUMNI/AE AND DONORS

BY DECADE, PROJ. 1989 WAF CAMPAIGN

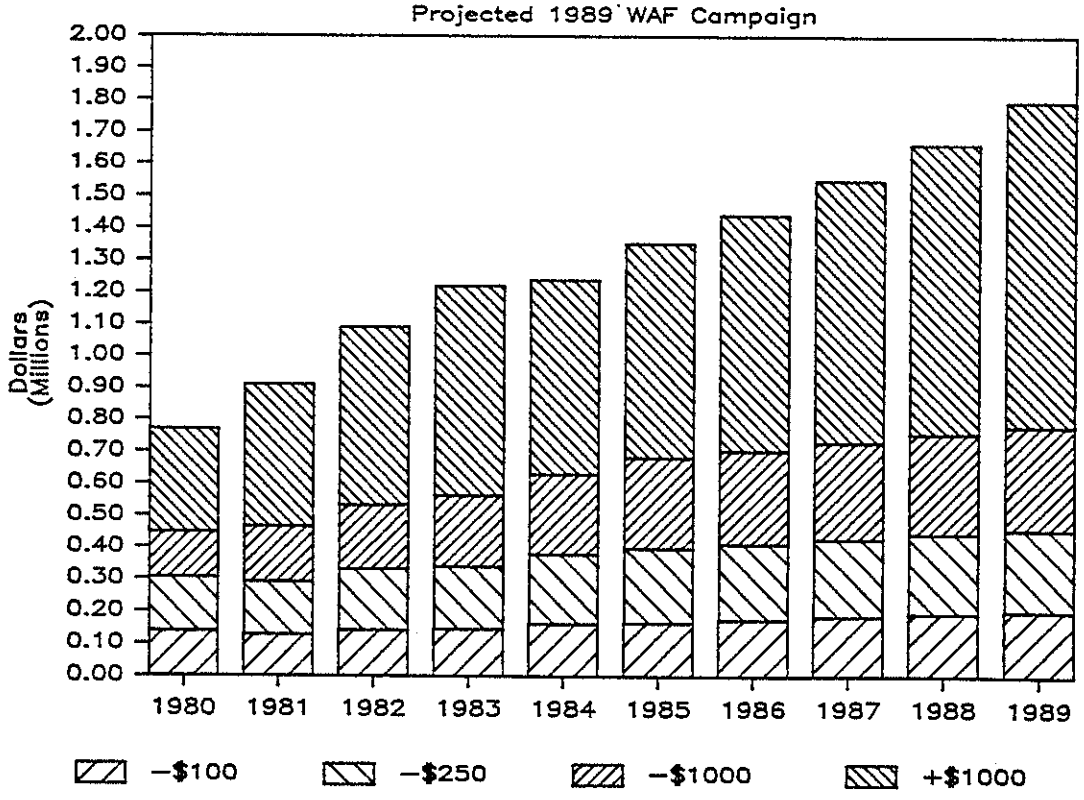


An analysis of the number of dollars and the number of donors by gift size (Graphs 2 and 3) shows dramatically how few people give at the $1,000+ level, but how important those big gifts are to the total.

#2: ALUMNI DONORS BY GIFT SIZE



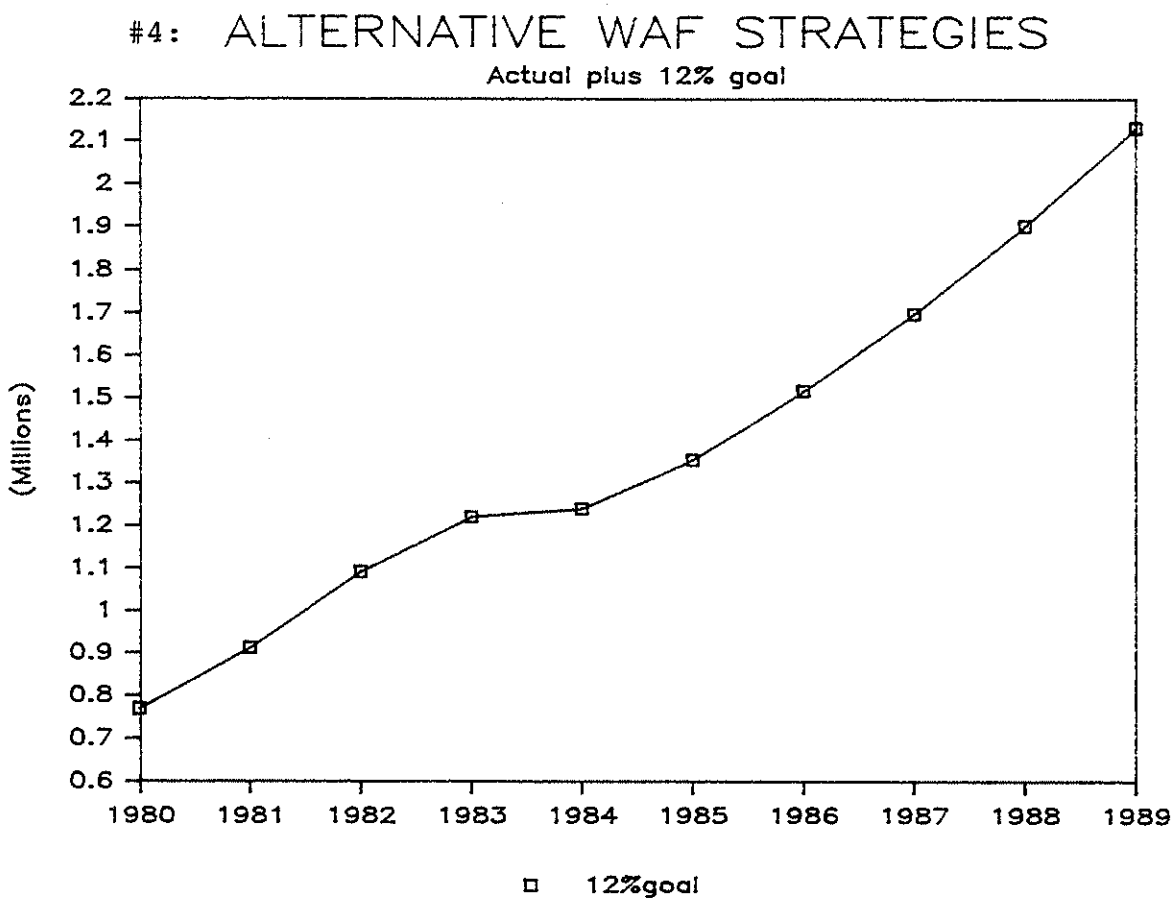
#3: ALUMNI DOLLARS BY GIFT SIZE



To see how the model works, let us arbitrarily set a goal of 12% annual growth in dollars contributed, from 1986 through 1989. (Graph 4)

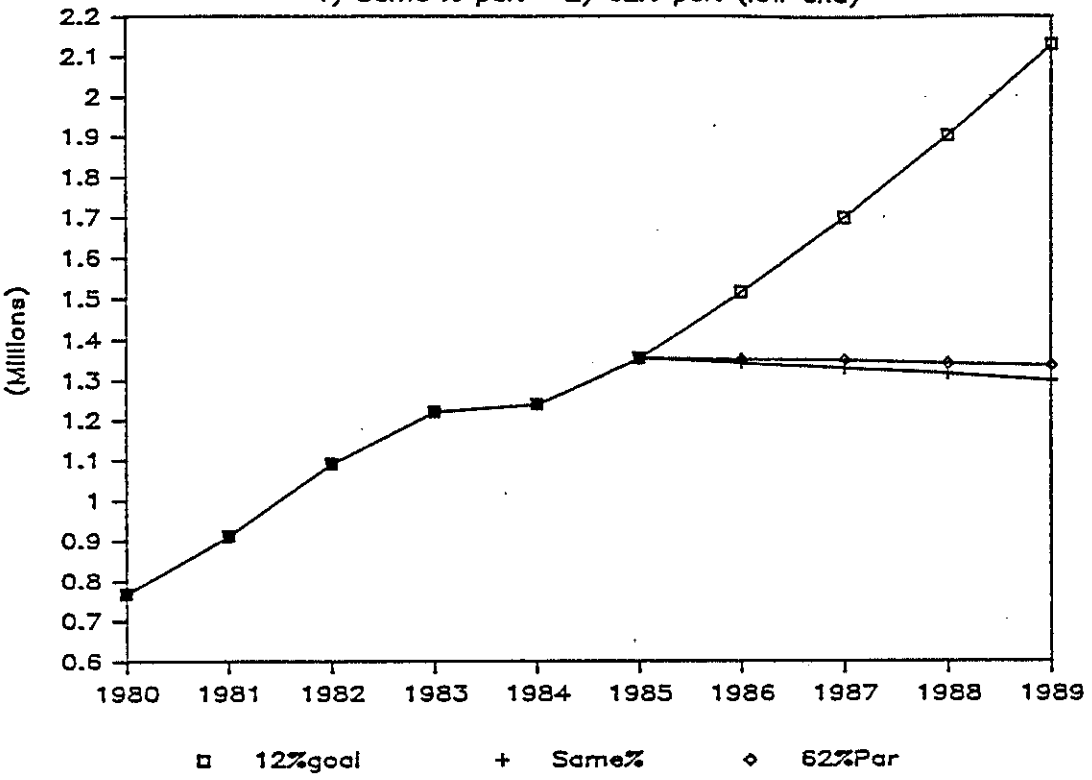
First, what happens if we simply maintain the present rates of participation at each giving level, and the same average gift size? The model shows the surprising result that holding steady, even with a growing alumni body, yields a reduced rather than increased totals. The higher number of small gifts from new alumni do not compensate for the loss of fewer but larger gifts from older alumni. (Graph 5)

A second trial is to test the effect of increased participation - get more alumni to give, even if they cannot give much. If we raise total alumni participation rates about one percent per year for the four year period (a substantial accomplishment), but if most of the new gifts are in the $0-99 and $100-249 categories, we still fail even to raise the same dollar amount as in 1985. (Graph 5)



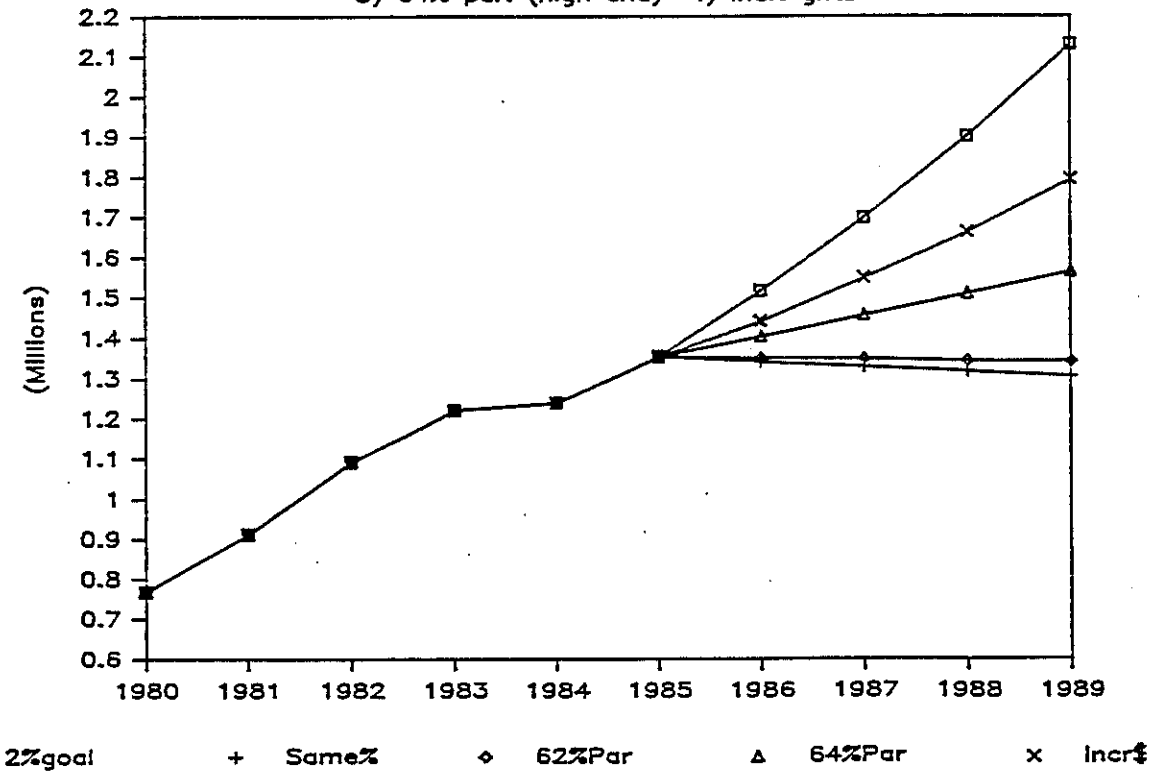
#5: ALTERNATIVE WAF STRATEGIES

1) Same % par. 2) 62% par. (low end)



#6: ALTERNATIVE WAF STRATEGIES

3) 64% par. (high end) 4) Incr. gifts



A third step is to see what would happen if the participation rates in the higher gift categories could also be raised - if more people could be induced to give at the $250-999 and $1,000+ levels. Running a further set of data through the model produces a result that, while not satisfactory in terms of the goal, at least represents an improvement over present performance. (Graph 6)

A fourth step involves a recognition that we may not be able to increase the number of alumni who give at the higher levels, but we may be able to increase their average gift size. Those who are already generous may be able to be even more so. (Graph 6)

As we go through these scenarios with the annual fund professional staff and the volunteer leadership, it becomes clear to all involved that simply replicating this year's achievements is not adequate. In fact, even the multi-tiered strategy articulated above is still not adequate to achieve the 12% annual growth rate. At this point, those planning the campaign can try out other strategies until a satisfactory plan in evolved.

FURTHER DIRECTIONS TO EXPLORE

This model has the virtue of relative simplicity and comprehensibility. However, it is not sufficiently detailed to be helpful in the class-by-class planning at the heart of the actual fund-raising operation. A more refined approach might help. The model incorporates simplifying assumptions about decade-group similarities and uses participation rates and average gift sizes as drivers. Only four gift size categories are used, a problem where the presence or absence of a few five-figure gifts may make or break a campaign. Models built on other assumptions should be tried.

REFERENCES

McCaskey, Cynthia Gelhard, and Dunn, John A. Jr., "Look into my crystal cathode ray tube: computer models make annual giving predictions easy." CASE Currents, March, 1983.

AN INTERACTIVE MICROCOMPUTER PROGRAM FOR THE ANALYSIS OF EDUCATIONAL DEBT LEVELS

Jack R. Pogany
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A quick overview of student financial aid in the mid-1980's shows several trends emerging. External sources of student aid grants are contracting. An increasing proportion of students require financial aid as tuition increases outpace available student resources. Interest rates on student loans, once comparatively low, now approach market levels. Educational loans comprise a growing percentage of a typical student's financial aid package. One of the primary consequences of these trends is that an increasing number of students face what many would consider to be onerous debt burdens.

As educational debt burdens rise, it is imperative that financial aid officers evaluate as precisely as possible the implications of an individual student's loan commitments. This responsibility should be carried out in the context of long range cash flow planning with the student, where the student estimates all income sources over a period of 10, 20, or even 30 years. In most cases, such a detailed financial projection would be a new experience for the student--and might well be resisted. Nevertheless, the exercise should be conducted in the interest of presenting as full and realistic a picture as possible of a student's debt structure.

A number of factors must be identified in calculating student debt levels. The defining characteristics of each loan must be evaluated together with the anticipated future earnings and cash flows of the student borrower. The major loan considerations include:

* The amount of principal
* The interest rate level
* The length of the repayment term
* Whether the interest rate is fixed or variable
* When the repayment period begins relative to graduation
* Whether the interest incurred while in school is paid, capitalized, or subsidized
* Projected annual income levels
* Projected tax brackets

In an effort to provide the means for students and financial aid officers to analyze educational debt levels, the author developed an automated, interactive computer program currently in use at Georgetown University in the law and medical schools. The Georgetown Student Loan Planner first guides the students or the financial aid officer user through each step of each student loan and projected annual income stream, then calculates automatically all repayment obligations, future income levels, and after-tax payments across different tax brackets. The features of each loan are presented to the user on separate pages, a single "grand total debt" page is printed, and a final summary report is produced which relates the student's total loan burden to the student's projected income level.

The Georgetown Student Loan Planner uses the "macro system" of Lotus 1-2-3. It requires the Lotus 1-2-3 system disk and an IBM PC compatible computer with a minimum memory of 256K.

The following pages present sample portions of the Student Loan Planner exercise as the user sees them on the computer monitor screen. These examples are taken from the version used in the medical school. Pages which are automatically printed out are so noted at the top.

WELCOME to the Georgetown Medical School Student Loan Planner! The purpose of this exercise is to provide you with some perspective on the educational debt you're now building in financing your medical education through your various student loans.

We will work together to show you what your future payments will be on each student loan you take. After you give me the data on your loan principals, interest rates, and number of deferment & repayment years, I'll do all the required calculations and print a "hard copy" (that's computerese for "give you a sheet of paper") for each loan to chart your future payment levels. The information will be presented year by year, and will include annual payment figures expressed with and without consideration for income tax deductions. I'll also produce two summary sheets which will total all your educational debt obligations, project your estimated starting salary level and future earnings increases, and express your annual loan repayments as a percentage of your future annual earning levels.

Now, be sure your printer is -ON- and has paper in it. When you're ready, press the "ENTER" key.

HAVE FUN!
-{CURSOR}-

----{END OF SCREEN}----

The first thing we must do is to divide your medical school loans into three groups. One category will be your "SUBSIDIZED" loans; that is, loans for which the government (or some other third party) pays the interest WHILE YOU ARE IN SCHOOL. On these loans, the amount that you owe when you begin repayment after graduation (and, perhaps, further training) is exactly the same as the amount you borrowed. This loan category would include such popular loans as the GSL (Guaranteed Student Loan) and the NDSL (National Direct Student Loan).

Another medical school loan category will be "UNSUBSIDIZED DEFERRED" loans; that is, loans for which interest is charged to you during the period that you are in school (and further training), but on which repayment begins AFTER graduation and training. Such loans are found in the HEAL program and in most ALAS program loans made in the D.C. area.

(Press "ENTER" to continue)
-{CURSOR}-

----{END OF SCREEN}----

The third loan group might be called "REGULAR NON-DEFERRED" loans. A common consumer loan and a supplemental education loan are typical examples. These are loans in which installments usually begin 30 to 60 days after receipt of the loan proceeds. Of course, this kind of rapid commencement of repayment can be quite difficult for a student to manage alone during medical school and even residency years. Nonetheless, such loans are being used more often for medical school financing in the form of supplemental bank loans, where parents or spouses often help with early repayments. Common consumer loans can be used for the same purpose, but typically carry higher interest rates than supplemental education loans.

(Press "ENTER" to continue)
-{CURSOR}-

----{END OF SCREEN}----

----{EXAMPLE OF A DATA ENTRY SECTION--HERE, A "HEAL" LOAN}----

Your HEAL loan is a specific example of one type of loan in the general loan category we've called "UNSUBSIDIZED DEFERRED". You could have other loans of this type in a private arrangement with a bank.

A few words of explanation are in order here, for the HEAL loan has some facets which you may find perplexing at first. For example, the interest rate on your HEAL loans can vary from one three month period to the next, as it is a "variable" rate tied to a treasury bill index. Thus, it is highly unlikely that the initial interest rate would remain the same throughout the life of the loan. So when you are asked (in a minute) to "estimate an annual interest rate as well as you can," you might want to consider using the initial interest rate, or you might want to raise or lower the initial interest rate somewhat to reflect your anticipation of generally higher or lower rates in the future. In any case, the estimated rate which you enter for each HEAL loan will be used for calculations throughout the life of that loan. Your estimate will produce a reasonable approximation of your future HEAL loan obligations--and will certainly be accurate enough for this exercise.

Press "ENTER" to continue
-{CURSOR}-

----{END OF SCREEN}---

You'll also be asked to enter a "monthly defrayal payment." This payment is simply an OPTIONAL monthly amount which you can pay during school and residency training (i.e., your deferment period). The more you are able to pay here, the less your final loan principal will be when you finally begin regular repayments. Your final loan principal will be "defrayed" by this payment in that you'll prevent some interest from capitalizing into principal and generating added interest charges during the deferment period. On the other hand, defrayal payments made while on a low student income usually produce very low tax deductions in comparison to tax deductions produced by interest payments made when in a high income tax bracket typical of a physician.

Remember, this defrayal payment is optional and is NOT generated by the estimated interest rate that you enter. The HEAL loan principal will compound to its maximum possible amount during your deferment period if you choose to make no monthly defrayal payment.

Press "ENTER" to continue
-{CURSOR}-

----{END OF SCREEN}---

Finally, you will be asked to enter the number of anticipated deferment years for each HEAL loan you take. This simply requires that you count the number of years of medical school remaining ahead of you when you receive the loan and add the number of additional years of residency training that you anticipate. This will constitute your deferment period, during which time you will not be required to begin the normal repayment of your HEAL loan.

For example, if you take out a HEAL loan for some expenses in your first year of medical school, you have FOUR years of medical school ahead of you plus your residency years--say FIVE, perhaps--for a total of NINE deferment years. If you take out a HEAL loan for your fourth year of medical school as well, the number of deferment years for this second HEAL loan would be SIX.

O.K, here we go . . .

Press "ENTER" to continue
-{CURSOR}-

----{END OF SCREEN}---

Enter principal of your 1st year HEAL loan (and ONLY the 1st year) as a whole number, WITHOUT a "$" or a
$4,000 <-- "," (EXAMPLE: "$8,550" is entered as "8550"). I'll
-{EXAMPLE}- properly format your entry. If you've not taken or won't take a 1st year HEAL loan, simply enter "0".

Estimate an ANNUAL INTEREST RATE here as well as you
12.5%<-- can; be sure to place a decimal point first, and DO
-{EXAMPLE}- NOT use a "%" sign (EXAMPLE: 14.25% is .1425).

Enter your PROPOSED MONTHLY "DEFRAYAL" PAYMENT as
$25 <-- a whole number, WITHOUT a "$" or ",". While this
-{EXAMPLE}- may well be "0", you should remember that all your unpaid interest will be added to your principal.

Enter the number of your ANTICIPATED DEFERMENT YEARS
8 <-- here (the period of time you have after receiving
-{EXAMPLE}- the loan money before you BEGIN the normal repayment of BOTH PRINCIPAL AND INTEREST).

----{END OF SCREEN}---

----{THREE SCREENS FOLLOW HERE FOR 2ND, 3RD, AND 4TH YEAR HEAL DATA}----

{COMPUTER = Final FIRST YEAR HEAL principal when repayment begins.
CALCULATES = Final SECOND YEAR HEAL principal when repayment begins.
AND PRINTS = Final THIRD YEAR HEAL principal when repayment begins.
4 FIGURES} = Final FOURTH YEAR HEAL principal when repayment begins.
=========
{4YR HEAL $} = GRAND TOTAL YEAR HEAL principal when repayment begins.

"UNSUBSIDIZED DEFERRED" Loan: HEAL

----{END OF SCREEN}----

----{COMPUTER CALCULATES AND PRINTS THIS PAGE AUTOMATICALLY}----

Name of Loan: ----{LOAN NAME}---- (MO & YR)

AMOUNT OF PRINCIPAL: $18,500
ANNUAL INTEREST RATE: 13.75%
NO. OF REPAYMENT YEARS: 15
MONTHLY PAYMENT: $243
ANNUAL PAYMENT: $2,919

Summary

YEAR	ANNUAL PAYMENT	ANNUAL INTEREST	ANNUAL PRINCIPAL	BALANCE NEXT YEAR	AFTER-TAX PAYMENT IN ___% TAX BRACKET 25%	35%	45%
				$0			
SCHL1	$0	$0	$0	$0	$0	$0	$0
SCHL2	$0	$0	$0	$0	$0	$0	$0
SCHL3	$0	$0	$0	$0	$0	$0	$0
SCHL4	$0	$0	$0	$0	$0	$0	$0
RES1	$0	$0	$0	$0	$0	$0	$0
RES2	$0	$0	$0	$0	$0	$0	$0
RES3	$0	$0	$0	$0	$0	$0	$0
RES4	$0	$0	$0	$0	$0	$0	$0
RES5	$0	$0	$0	$0	$0	$0	$0
RES6	$0	$0	$0	$0	$0	$0	$0
RES7	$0	$0	$0	$18,500	$0	$0	$0
PRAC1	$2,919	$2,519	$400	$18,100	$2,289	$2,038	$1,786
PRAC2	$2,919	$2,461	$459	$17,641	$2,304	$2,058	$1,812
PRAC3	$2,919	$2,393	$526	$17,115	$2,321	$2,082	$1,842
PRAC4	$2,919	$2,316	$603	$16,512	$2,340	$2,109	$1,877
PRAC5	$2,919	$2,228	$691	$15,821	$2,362	$2,139	$1,917
PRAC6	$2,919	$2,127	$793	$15,028	$2,388	$2,175	$1,962
PRAC7	$2,919	$2,011	$909	$14,120	$2,417	$2,216	$2,015
PRAC8	$2,919	$1,877	$1,042	$13,078	$2,450	$2,262	$2,074
PRAC9	$2,919	$1,725	$1,195	$11,883	$2,488	$2,316	$2,143
PRAC10	$2,919	$1,550	$1,370	$10,514	$2,532	$2,377	$2,222
PRAC11	$2,919	$1,349	$1,570	$8,943	$2,582	$2,447	$2,312
PRAC12	$2,919	$1,119	$1,800	$7,143	$2,640	$2,528	$2,416
PRAC13	$2,919	$855	$2,064	$5,079	$2,705	$2,620	$2,534
PRAC14	$2,919	$553	$2,366	$2,713	$2,781	$2,726	$2,670
PRAC15	$2,919	$206	$2,713	$0	$2,868	$2,847	$2,826

----{END OF SCREEN}----

----{COMPUTER CALCULATES AND PRINTS THIS PAGE AUTOMATICALLY}----

Summary: GRAND TOTAL

(MO & YR) YEAR	ANNUAL PAYMENT	ANNUAL INTEREST	ANNUAL PRINCIPAL	BALANCE NEXT YEAR	AFTER-TAX PAYMENT IN ___% TAX BRACKET 25%	35%	45%
				$0			
SCHL1	$0	$0	$0	$12,000	$0	$0	$0
SCHL2	$1,947	$1,700	$247	$11,753	$1,522	$1,352	$1,182
SCHL3	$1,947	$1,663	$284	$11,469	$1,531	$1,365	$1,199
SCHL4	$1,947	$1,619	$328	$11,142	$1,542	$1,380	$1,218
RES1	$1,947	$1,569	$378	$10,764	$1,555	$1,398	$1,241
RES2	$1,947	$1,511	$435	$10,328	$1,569	$1,418	$1,267
RES3	$1,947	$1,445	$502	$9,827	$1,586	$1,441	$1,297
RES4	$1,947	$1,368	$579	$0	$1,605	$1,468	$1,331
RES5	$0	$0	$0	$0	$0	$0	$0
RES6	$0	$0	$0	$0	$0	$0	$0
RES7	$0	$0	$0	$27,748	$0	$0	$0
PRAC1	$4,866	$3,799	$1,067	$26,681	$3,916	$3,536	$3,157
2	$4,866	$3,639	$1,228	$25,453	$3,956	$3,593	$3,229
3	$4,866	$3,454	$1,412	$24,041	$4,003	$3,657	$3,312
4	$4,866	$3,241	$1,625	$22,417	$4,056	$3,732	$3,407
5	$4,866	$2,997	$1,869	$20,548	$4,117	$3,817	$3,517
6	$4,866	$2,716	$2,150	$18,397	$4,187	$3,916	$3,644
7	$4,866	$2,392	$2,474	$15,924	$4,268	$4,029	$3,790
8	$4,866	$2,020	$2,846	$13,078	$4,361	$4,159	$3,957
9	$2,919	$1,725	1195	$11,883	$2,488	$2,316	$2,143
10	$2,919	$1,550	1370	$10,514	$2,532	$2,377	$2,222
11	$2,919	$1,349	$1,570	$8,943	$2,582	$2,447	$2,312
12	$2,919	$1,119	$1,800	$7,143	$2,640	$2,528	$2,416
13	$2,919	$855	$2,064	$5,079	$2,705	$2,620	$2,534
14	$2,919	$553	$2,366	$2,713	$2,781	$2,725	$2,670
15	$2,919	$206	$2,713	$0	$2,868	$2,847	$2,826

----{END OF SCREEN}----

Now let's try to estimate what your future income levels might be. Then we'll be able to see approximately what percentage of your income will be needed to service your education loans.

Let's start with your estimate (even if it's only a rough guess) of your annual salary in the 1ST YEAR of your internship/residency training period. Assume that this salary will increase annually at approximately the rate of inflation during the internship/residency years.

Typical starting salaries for internship/residency training range between about $18,000 to $20,000 annually.

-{CURSOR}-<-- $19,000 -{EXAMPLE}-

Enter your estimate as a WHOLE number, WITHOUT A "$" OR A ",". For example, "$19,500" is simply "19500", followed by "ENTER". I'll then properly format your entry.

----{END OF SCREEN}----

Now let's estimate your 1st year net practice income.

It may be helpful in developing some perspective to know that in 1983, the median net practice income of ALL types of physicians IN PRACTICE FOR LESS THAN FIVE YEARS was $82,700. Furthermore, across ALL M.D.s, surgical specialists realized about one-third more annual net income than those M.D.s in non-surgical areas.

-{CURSOR}-<-- $70,000 -{EXAMPLE}-

OK, now enter your best guess of what your annual income might be in the FIRST year of your medical practice (following residency). Again, enter a WHOLE number, WITHOUT A "$" OR A ",".

----{END OF SCREEN}----

Now we'll try to estimate an annual income increase factor so we can project your earnings with some accuracy over several five year periods. So now . . . stretch a bit and give some thought to how your initial income figure will be likely to increase. Typically, one's income will begin to rise at a rate above the general inflation rate. Further, one's income tends to rise more rapidly in the earlier career years than in the later ones. With these two thoughts in mind, consider for a moment how your income is likely to rise IN TERMS OF PERCENTAGE POINTS ABOVE INFLATION for each of the six 5 year periods following your initial annual net practice income. So now, while you try to project your practice practice for the next 30 years, . . .

. . . press —> "ENTER" <—
-{CURSOR}-

---{END OF SCREEN}----

For example, one possible set of annual income increase factors might be the following:

1st 5 years: 5% average increase above inflation.
2nd 5 years: 3% average increase above inflation.
3rd 5 years: 2% average increase above inflation.
4th 5 years: 1% average increase above inflation.
5th 5 years: 0% average increase above inflation.
6th 5 years:-2% average increase above inflation.

Now, think again for a bit and enter six annual income increase factors as discussed. Enter them as WHOLE NUMBERS, followed by "ENTER". DO NOT use a "%" sign--I'll handle it later.

-{CURSOR}- <--- 1st 5 years: percentage points above inflation
-{CURSOR}- <--- 2nd 5 years: percentage points above inflation
-{CURSOR}- <--- 3rd 5 years: percentage points above inflation
-{CURSOR}- <--- 4th 5 years: percentage points above inflation
-{CURSOR}- <--- 5th 5 years: percentage points above inflation
-{CURSOR}- <--- 6th 5 years: percentage points above inflation

----{END OF SCREEN}----

```
--{EXAMPLE OF   6 <--- 1st 5 years: percentage points above inflation
  ONE SET OF    3 <--- 2nd 5 years: percentage points above inflation
  POSSIBLE      1 <--- 3rd 5 years: percentage points above inflation
  RESPONSES     1 <--- 4th 5 years: percentage points above inflation
  IN SCREEN     0 <--- 5th 5 years: percentage points above inflation
  ABOVE}--     -5 <--- 6th 5 years: percentage points above inflation
```

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PROJECTIONS

{*} YR.	LOAN PAYMENT	{*} SC = medical school year {*} RS = residency year {*} P = practice year			(MO & YR)		
SC1	$0						
SC2	$1,947	ANNUAL INCOME LEVEL ASSUMING			INCOME % TO DEBT SERVICE		
SC3	$1,947	3%, 5%, & 7% INFLATION RATES			UNDER 3 INFLATION RATES		
SC4	$1,947	3.0%	5.0%	7.0%	3.0%	5.0%	7.0%
RS1	$1,947	$19,000	$19,000	$19,000	10.25%	10.25%	10.25%
RS2	$1,947	$19,570	$19,950	$20,330	9.95%	9.76%	9.58%
RS3	$1,947	$20,157	$20,948	$21,753	9.66%	9.29%	8.95%
RS4	$1,947	$20,762	$21,995	$23,276	9.38%	8.85%	8.36%
RS5	$0	NA	NA	NA	NA	NA	NA
RS6	$0	NA	NA	NA	NA	NA	NA
RS7	$0	NA	NA	NA	NA	NA	NA
YRS	1 TO 5	6 point salary increase above inflation					
P1	$4,866	$70,000	$70,000	$70,000	6.95%	6.95%	6.95%
P2	$4,866	$76,300	$77,700	$79,100	6.38%	6.26%	6.15%
P3	$4,866	$83,167	$86,247	$89,383	5.85%	5.64%	5.44%
P4	$4,866	$90,652	$95,734	$101,003	5.37%	5.08%	4.82%
P5	$4,866	$98,811	$106,265	$114,133	4.92%	4.58%	4.26%
YRS	6 TO 10	3 point salary increase above inflation					
P7	$4,866	$104,739	$114,766	$125,546	4.65%	4.24%	3.88%
P8	$4,866	$111,024	$123,947	$138,101	4.38%	3.93%	3.52%
P9	$4,866	$117,685	$133,863	$151,911	4.13%	3.64%	3.20%
P9	$2,919	$124,746	$144,572	$167,102	2.34%	2.02%	1.75%
P10	$2,919	$132,231	$156,138	$183,813	2.21%	1.87%	1.59%
YRS	11 TO 15	1 point salary increase above inflation					
P11	$2,919	$137,520	$165,506	$198,518	2.12%	1.76%	1.47%
P12	$2,919	$143,021	$175,437	$214,399	2.04%	1.66%	1.36%
P13	$2,919	$148,742	$185,963	$231,551	1.96%	1.57%	1.26%
P14	$2,919	$154,692	$197,121	$250,075	1.89%	1.48%	1.17%
P15	$2,919	$160,879	$208,948	$270,081	1.81%	1.40%	1.08%
YRS	16 TO 20	1 point salary increase above inflation					
P16	$0	$167,314	$221,485	$291,687	NA	NA	NA
P17	$0	$174,007	$234,774	$315,022	NA	NA	NA
P18	$0	$180,967	$248,860	$340,224	NA	NA	NA
P19	$0	$188,206	$263,792	$367,442	NA	NA	NA
P20	$0	$195,734	$279,619	$396,838	NA	NA	NA
YRS	21 TO 25	0 point salary increase above inflation					
P21	$0	$201,606	$293,600	$424,616	NA	NA	NA
P22	$0	$207,654	$308,280	$454,339	NA	NA	NA
P23	$0	$213,884	$323,694	$486,143	NA	NA	NA
P24	$0	$220,301	$339,879	$520,173	NA	NA	NA
P25	$0	$226,910	$356,873	$556,585	NA	NA	NA
YRS	26 TO 30	-5 point salary increase above inflation					
P26	$0	$222,371	$356,873	$567,717	NA	NA	NA
P27	$0	$217,924	$356,873	$579,071	NA	NA	NA
P28	$0	$213,566	$356,873	$590,653	NA	NA	NA
P29	$0	$209,294	$356,873	$602,466	NA	NA	NA
P30	$0	$205,108	$356,873	$614,515	NA	NA	NA

----{END OF SCREEN AND EXERCISE}----

INSTITUTIONAL RESEARCHERS AND DECISION SUPPORT: NEW ROLES AND FURTHER EROSION OF IR TRADITIONS

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It long ago became cliche to suggest that America is shifting from an industrial to an information society. Futurists have devoted many pages to telling us what the exponential growth of knowledge, the increased rate of change, and our enhanced data processing and communications capabilities will mean for our social system and institutions. One corollary for these transformations within higher education institutions is distributed data processing enhanced by decision support systems (DSS) and supported by information centers (IC). DSS and IC, as described in the literature, are pervasive innovations that will have profound effects on the roles of all those charged with maintaining and analyzing institutional data. IR obviously falls within this realm. In this paper, I examine literature on the traditions and history of Institutional Research (IR), the new roles that DSS and IC may create for IR professionals, and the future structures and data management needs of organizations in order to develop some suggestions about the megatrends of our profession.

IR TRADITIONS

Peterson's (1985) and Fincher's (1985) recent reviews of the IR profession trace its development from focused research on specific institutional concerns to a more comprehensive and management oriented focus that included the development of management information systems. Through these first two phases, IR has stood as a staff function designed to provide data in support of decisionmaking. Saupe (1981) describes the nature of IR as it grew from that tradition:

> Institutional Research, like other types of research, should be objective, systematic, and thorough. It should be as uninfluenced as possible by matters of personal philosophy, political considerations, or desired results. The information provided by IR is combined with academic and professional judgment in planning and other decision-making processes. Almost never is the final decision based solely on the findings of the research, nor should it be. (p. 2)

Further, Saupe makes the reason behind the tradition clear: "Just as the results of the research will seldom be the sole determinant of the decision, so the desired decision cannot be allowed to bias the nature of the research." (p. 8) Supported by that tradition, institutional researchers, although increasingly associated with the central management team of an institution, continued to avoid aligning themselves in internal political fights, and to maintain their independence from final decision making.

More recently, however, IR has become more organizationally parochial and its traditional claim to independence can be called into question. Peterson (1985) has noted that recent pressures of internal resource reallocation, of decentralized access to information, and of subunits' abilities to analyze data have "often caused several competing units to conduct institutional research studies of their own." (p. 12) It is particularly this increased need and ability to do distributed data processing on which I want to focus.

NEW ROLES OF IR PROFESSIONALS

As recent AIR Forums and publications have focused on the development and status of institutional research, observers and practitioners such as Paul Jedamus, Bernard Sheehan, and Michael Stadman, have suggested that the IR office is the natural location for an IC and for the management of DSS. These and other commentators typically describe three overlapping roles the IR professional can play in decision support: the decision support technologist, the decision support facilitator, and the decision support manager.

The DS technologist's tasks include monitoring developments in computer hardware and software, educating and servicing the users of computers, overseeing the integrity of the databases, developing new tools for decision support to users' specifications, and, where necessary, running models and producing computer-based results. This role combines the technical services of a data processing department with the consulting skills to encourage the growth of end users' computing skills (See Sheehan, 1985; and Stadman and Litaker, 1985).

The DS intermediary assists the decision maker in making use of decision support systems. This includes operating a computer and producing results, especially when working with less computer proficient managers. The DS intermediary will also facilitate the communication

between the technical expert and the decision maker in constructing specific decision support systems and aid the decision making process by helping to identify issues, clarify questions, generate alternative solutions, evaluate the alternatives, and monitor the impacts of decisions made. This role combines a general proficiency in the technical realm of DSS with an understanding of the information needs for processes such as policy analysis and strategic planning (See Jedamus, 1984; and Sheehan, 1985).

The DS manager is the least well-defined of these three decision support roles. The purpose of the role is to provide integration in the face of distributed data processing. The tasks ascribed to such an individual include maintaining communication and cooperation throughout the organization, maintaining internal data definitions, and judging the quality of external data bases and software. The DS manager must combine an understanding of many technical and non-technical components: the capabilities of the new technologies; the tools of management science, operations research, policy analysis, and etc.; theories of organizational behavior, organizational design, and decision theory; the structure, traditions, actors, and modes of decision making in the organization; and planning, resource allocation, and budgeting within higher education (Jedamus, 1984; and Norris and Mims, 1984).

The proponents of each role contend that they remain within the traditional conception of the IR professional as an objective investigator supporting, but removed from, the decision making process. The technologist provides the tools and consultation that allow decision makers to access the information needed for decision making. The DS facilitator uses knowledge of data analysis and decision makers' needs to present alternatives for planning and policy formulation. The DS manager coordinates an integrated system of DS that allows communication and cooperation among decision makers. It is true that all three are support roles that facilitate the application of data to decision making. However, to evaluate these roles and their applicability to the IR profession requires an understanding of the structure and processes of organizations in the information age.

ORGANIZATIONS OF THE FUTURE AND IR ROLES IN THEM*

The environment that institutions must function within will be characterized by more and increasing knowledge, more and increasing complexity, and more and increasing turbulance. Within institutions, these traits promise stronger pressure from external environments, faster rates of innovation and change, and greater use of computer and communications technology. Decision making will be more frequent, faster, and more complex. Information to support those decisions must be acquired and analyzed more often and must cover a greater range of topics, but must still be accumulated and presented in ways that avoid information overload. Computer and communications technology will, of course, aid in acquiring and analyzing information, but it will also cause the number of contributors to decision making to be less well-defined. In effect, organizations will manifest less hierarchial controls, greater decentralization, and more participatory decision making. With more autonomous units and ambiguous decision making processes, future organizations will come to resemble, even more closely, the descriptions of organizations as loosely coupled systems (Weick, 1976) or organized anarchies (March and Olsen, 1976).

What do the organizational structures and processes of the future mean for the DS facilitator, the role Sheehan (1985, p. 90) suggests would most associate with the IR professional? One can see the DS facilitator role as a good description of a relatively objective decision support role if it operates from a centralized location in the organization. However, if subunits are to have greater input into decision making and to make use of distributed data processing and decision support systems, then the role of DS facilitator will become located in the organizations' subunits. It is there that the information technology will be applied to decision making. At the subunit level, however, the objectivity of the institutional research will not be as highly valued. Instead, facilitators will produce analyses and interpretations that represent a particular viewpoint. These must then compete within the participatory decision making process with the

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* Huber (1984), in particular, has given serious thought to the nature of post-industrial era organizations and his descriptions provide the basis for many of the arguments in this section.

analyses and interpretations of other subunits. With alternatives offered from different parts of the institution, the traditional IR role that a centrally located DS facilitator could play in the decision process is already served. Peterson (1985) suggests that this is already occurring within the profession and that in these circumstances, IR assumes "an advocacy approach defending its own position rather than striving for detached, objective analysis." (p. 12) Conducting applied research and planning within organizational subunits is not new and perhaps not even more broadly applied today. It is different, however, because these units a) will be capable of more extensive use of databases and computer based analytical techniques and, b) will have growing influence in organizations as they become less hierarchial and decision making becomes more participatory.

Peterson also points out that the decentralization of IR roles not only challenges the profession's traditions, but also reverses the earlier trend toward centralized and coordinated IR activities in institutions. However, the DS technologist does represent a centralized, coordinating role functioning within the traditions of institutional research. Professionals in such a role would promote coordination through the selection of hardware and software and the maintenance of the internal database. In addition, the DS technologist could serve central decision makers by verifying the analyses of subunit DS facilitators. The technologist could audit the data use, which involve re-running statistical routines on the institutional database to check veracity and "certifying" that the subunit DS facilitators have used the data properly and applied the proper statistical techniques for the questions asked. (This would, however, be a transitional role later accomplished through expert systems.) The technologist's tasks suggested above, however, are more limited than many current IR roles. They serve only to provide the basis for decision making and do not incorporate many of the skills in policy analysis and strategic planning support that IR professionals have cultivated in the past decade.

Jedamus (1984) and Norris and Mims (1984) are also concerned about the need for coordination and integration of decision support, and they suggest an alternative more far-reaching than technical support. They rather broadly define the DS manager role, which combines technical skill in computerized data analysis with knowledge of organizational

behavior and the requirements for and analytic tools of decision making. However, a more concrete description of the DS manager role is possible if we follow a hint Jedamus provides: "I believe that (DS management) must be participative and that it must emphasize human relations and the needs and perspectives of all parties involved." (p. 83) Huber outlines more specifically, developments within organizations that fit Jedamus' vision. In particular, Huber discusses decision group technologies and decision-process management (Huber, 1984, pp. 936-939). Future organizations' more fluid participation in decision making and needs to exchange greater amounts of information necessitate the use of decision making groups. However, the speed and complexity required for those decisions is inconsistent with common traits of group decisions. Thus, organizations will have to develop means to more formally manage group decision making. Huber cites many techniques to increase the efficiency and effectiveness of meetings, and he projects "the development and use of technologies specifically designed for decision-process management." (p. 938)

It is quite conceivable that many IR professionals could assume the role of decision process manager. It is a logical extension of tasks such as staffing evaluation and planning commmittees, or facilitating planning retreats. The tasks of the decision process (or support) manager would be to facilitate commuunication among members, to make sure the proper constituencies and expertise are represented and the relevant issues raised in the decision groups, to conduct the group process techniques and operate the technical systems employed to aid the group, and to improve the participation, integration, and creativity of the group. From a current viewpoint, the role may appear too "touchy-feely" to appeal to most IR professionals, but as group decision making processes become more formal, individuals with skills similar to today's IR professionals will find themselves comfortably performing this decision support manager role.

CONCLUSION

The future of organizational structures and IR roles portrayed here is admittedly some time away. The IR role will not change overnight, but our own excursions into DSS and IC's will accelerate its arrival at our institutions. We have already seen a slow drift away from objective analysis and toward support of specific planning, evaluation, and policy

decisions. The DS intermediary, as portrayed here, will be a directly active supporter of decision making, but in a role that will be played at the subunit level and without the traditional objectivity of the IR professional. Insofar as IR professionals seek to fill this role, they risk their long-cultivated professional traditions as well as their more recent accomplishments in establishing themselves as coordinators of institution-wide information resources. The DS technologist will remain an objective, centrally located supporter of decision making, but the role will be more foundational and does not incorporate many of the skills currently associated with IR professionals. Finally, the DS manager can also serve as an objective supporter of decision making by providing coordination and integration to group decision making. It is a role that provides some hope for managing the ambiguous decison processes that will be prevalent in future organizations.

BIBLIOGRAPHY

Fincher, Cameron. 1985. The Art and Science of Institutional Research. in M. Corcoran and M. Peterson (Eds). Institutional Research in Transition. New Directions for Institutional Research. 46: 17-37.

Huber, George. 1984. The Nature and Design of Post-Industrial Organizations. Management Science. 30: 928-951.

Jedamas, Paul. 1984. The Case for Decision Support Management. in W. Tetlow (Ed). Using Microcomputers for Planning and Management Support. New Directions in Institutional Research. 44: 77-85.

March, James G., and Johan Olsen. 1976. Ambiguity and Choice in Organizations. Bergen: Universitetsforlaget.

Norris, Donald, and R. Sue Mims. 1984. A New Maturity for Institutional Planning and Information Management. Journal of Higher Education. 55: 700-718.

Peterson, Marvin. 1985. Institutional Research: An Evolu tionary Perspective. in M. Corcoran and M. Peterson (Eds). Institutional Research in Transition. New Directions for Institutional Research. 46: 5-15.

Saupe, Joe. 1981. The Functions of Institutional Research. Tallahassee, FL: The Association for Institutional Research.

Sheehan, Bernard. 1985. Telematics and the Decision Support Intermediary. in M. Corcoran and M. Peterson (Eds). Institutional Research in Transition. New Directions for Institutional Research. 46: 81-97.

Staman, E. Michael, and R. G. Litaker. 1985. Developing an Information Center. Presentation at the 25th annual forum of the Association of Institutional Research, Portland, OR.

Weick, Karl. 1976. Educational Organizations as Loosely Coupled Systems. Administrative Science Quarterly. 21: 1-19.

MANAGEMENT IN TRANSITION: EDUCATIONAL MANAGEMENT AND RESOURCE ALLOCATION

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John Jay College of Criminal Justice is a full-service liberal arts college with the specialized mission of teaching practitioners already engaged in a justice field, and to introduce and/or prepare non-service students to the depth and breadth of the field. The College became a free-standing senior college of the City University of New York in September, 1964. As such, it has had the growing pains of a young collegiate institution as well as that of an emerging academic field, Criminal Justice (Moran, Berger, and McKenzie, 1978). The latter, while around since the early part of this century, has not attracted much attention until 1960. Between 1960 and 1968, the number of institutions offering concentrations in this field grew from less than 20 to about 100. The onset of the Law Enforcement Education Program in 1968, which underwrote many of the costs of higher education for in-service police officers, helped the visibility and demand for such programs, and by the mid 1970's, the number of programs in this field grew to over 1,000 (United States Government, 1968). Moving into the 1980's, the field of Criminal Justice, as with higher education generally, experienced an enrollment decline.

John Jay, which underwent declines in enrollment from 1977 to 1981, underwent a dramatic reversal in this area. In fact, in 1982-83 the numbers of incoming students at the College increased by 12.5 percent over the previous year. Thus, when submitting enrollment projections from 1982 to 1995, the College has projected a 20 percent overall increase in the size of the student population. This information conflicted sharply with the University's predictions, which were contained in the Master Plan. While the succeeding year's increases have not been as dramatic as those in 1982, the trend was strongly established, and the University administrators responsible adopted the John Jay projections, one of the very few times such a change in the Master Plan has ever been made.

PRESSURES

As a young and developing college during this period, the management style of choice was an informal one. As a special purpose school, where everyone seemingly knew everyone else, a formalized complex administrative structure was neither desired nor necessary. In the past few years, however, both external and internal pressures have impelled the President and senior administrators to consider certain basic changes, as the informal model appeared to have become less appropriate. In its stead, the President began considering moving to a more formal bureaucratic model.

Externally, as the enrollment of the University generally declined, a "resizing" plan was announced and full-time lines were withdrawn from each college in the system. As of the end of the 1984-85 academic year, John Jay had lost about 30 full-time lines, in spite of the increasing enrollments experienced by the College. Also, as part of the last collective bargaining agreement entered into by the University and the instructional staff, the decision of a federal arbitrator was sought on the issue of annual workload for those in the professorial ranks (assistant, associate, and full professor). The arbitrator decided that the University was to lower the annual contractual teaching responsibility from 24 to 21 hours over a three year period. As a result, John Jay has lost approximately 120 courses worth of teaching time from its full-time faculty. In addition, rather than supplementing the annual adjunct budget to assist the College in being able to mount its courses, the University has lowered this year's adjunct budget by over 21 percent.

Internally, pressures were being exerted on the President and senior administrators to fill lines in the various academic departments and to increase the numbers of adjunct faculty deemed necessary by the department heads and their personnel and budget committees to present their desired academic programs. While some of thie internal pressures were part of the usual "turfdom" which goes on, a substantial amount of the pressure exerted was based on increasing enrollments and decreasing numbers of teaching staff to adequately cover the courses projected. Also, the academic department heads began to act in concert on certain issues through the Council of Chairpersons rather than as independent agents. As a result of the greater cohesion and interaction, they began

to demand how, where, and why budgetary decisions were being made. In response to these pressures, changes to the more formal style of management began to occur.

RESPONSES

Following a year of self-study resulting in institutional accreditation, the President began altering the senior administrative structure. What began to emerge was a more formal, functionally-oriented, bureaucratic structure. Three vice-presidential positions were created where only one had existed previously. The vice-presidencies are: academic affairs; administration and management; and, public affairs and public relations. The responsibilities of each were clearly focused, with the intent of strengthening management.

The new administrative team of the President and the three vice-presidents recognized that the problems facing the College required a major revision in the way information was collected, stored, retrieved, analyzed, and presented for use. With these factors in mind, the Vice-President for Academic Affairs instructed the Director of Institutional Research to analyze the situation and present ways in which it could be improved. It was decided that computerized information systems would rectify many of the problems, and Institutional Research as assigned to develop and maintain many of these, as well as create a number of practical but analytical report formats.

To that end, IBM's ADRS (A Departmental Reporting System) was adopted (IBM, 1981). This system was selected because of its ease of use, flexibility, ability to handle both alphabetic and numeric entries, and the ease of creating report formats which would eliminate the appearance of unnecessary and duplicative information. In addition, it would incur the College no additional cost, since it was available through the University's Computer Center.

In addition, ADRS allowed the maintenance of report formats, which could be called on instantly if needed. It had a powerful computational component, which could be utilized in a straightforward, non-convoluted manner. Also, any calculations devised to assist in analyzing the stored information could be maintained in the system for use whenever needed.

RESOURCES

As the budgetary and related problems began to increase, it became clear that a more complete and detailed accounting of the College's resources was going to be needed. This was to include information about: full- and part-time teaching and support personnel, the financial requirements of such positions, their contractual workloads, and concommitantly the amount of release time and leave which had been incurred; also, information was needed on the status of funds available for use in areas other than in personal services. As discussed above, such data were collected and placed into the College's new information system.

One database contains information on the full-time employees on both the professional and supports staffs. It is a wide-ranging base, which includes data on professional, budgetary, demographic, workload, and employment information. These data have been used heavily during the year in which the file has been active, and have supplied data for workload analyses, affirmative action reports, retirement projections, staffing pattern analyses, and budgetary analyses. Information has also been drawn from the file to project personnel availability for reappointment and tenure considerations, and for background information in legal proceedings (Bulkeley, 1985).

A second database focuses on the adjunct faculty and contains information on professional, budgetary, and demographic areas. It has been used continuously in tracking adjunct budgetary expenditures, in projecting availability for step increases in salary, in reviewing costs of academic program delivery, in affirmative action reports, and in reviewing professional backgrounds of the adjunct teaching cadre.

A third file concerns semester class schedule data. Aside from the names and codes of courses offered, it contains student information such as credits, hours, and totals. Faculty information is also available including the names, home and teaching departments, and whether or not the courses taught are categorized as graduate or undergraduate. Information from the file is used to prepare: mandatory and voluntary external reports for City University of New York; the city, state, and federal governments; for curricular planning; and for staffing analyses.

A fourth contains information about the part-time staff and includes professional, demographic, and budgetary information. It is

used for budgetary analyses and preparation, as well as personnel allocations within the College.

Finally, there is a management database which is comprised of material summarized from other files, plus additional information. It contains personnel, budgetary, and workload information, and is used in assessing budgetary needs and resource allocations. In addition, it not only indicates the number of those in tax levy positions who report to department heads, but also those available through grants and contracts. This data base is currently being tested, with its contents being used to assess the financial costs, workload potential, and personnel availability for each of the academic departments. The picture gained from analyzing the data will aid in personnel and budgetary allocations for each of the affected departments. In addition, it will be an invaluable resource in preparing the next annual budget.

RESOURCE EXAMINATION AND ALLOCATION

One example of how the databases have assisted the administrators pertains to the allocation of full-time faculty lines to the academic departments. Although the College has lost teaching lines, positions were available due to the retirements, resignations, and untimely deaths of members of the full-time faculty. Aside from the practical decisions which were required on where to locate the incoming personnel, information was needed on precisely who was teaching in each department, their rank, tenure status, annual salary, and annual teaching load. In addition, the administrators needed to know: whether or not these faculty members had been granted any release time (if so, why, how much, and during which terms); whether or not they were on leave (if so, what kind, and whether or not they received any proportion of their pay during their leaves); for which term the leave had been granted, and for how many teaching hours it was equated. Further data were needed on which faculty had multi-departmental appointments and the proportion of their time in each department, as well as how many were teaching in departments other than their own, and for how many hours. Lastly, the administrators needed to identify those faculty on leave without pay, because of budgetary consequences involved in this area. An example of one report which met many of the above requirements may be seen in Figure 1. The information was provided to the Vice-Presidents and the

Figure 1. Sample Report.

FULL TIME FACULTY REPORT REGARDING RELEASE TIME - LEAVE - AND AVAILABILITY FOR TEACHING

CREATED BY: J. BERGER & M. NAMPIAPARAMPIL 10/17/85

(1)	(42)	(43)	(44)	(45)	(46)	(39)	(40)	(59)	(60)	(41)	(47)
NAME	RLSE TIME FALL	REASON FOR RELEASE TIME FALL	RLSE TIME SPR	REASON FOR RELEASE TIME SPRING	TOTAL RELSE TIME YRLY	LEAVE STATUS	LEAVE DATES	FALL TCHNG LOAD	SPRNG TCHNG LOAD	WORK LOAD	WORK-LOAD (MINUS RELEASE TIME & LEAVE)
**DEPT: HISTORY **											
CANNETT,J	5.25	DEPT HEAD	5.25	DEPT HEAD	10.50			12.00	9.00	21.0	10.50
COOK,M	.00		.00		.00	LV OF AB-MED	9/85-1/86	9.00	12.00	21.0	12.00
FABER,E	3.00	CJ101 COORD	3.00	CJ101 COORD	6.00			9.00	12.00	21.0	15.00
GASMAN,D	.00		.00		.00			12.00	9.00	21.0	21.00
GIBSON,M	.00		.00		.00			12.00	9.00	21.0	21.00
GROVEMAN,C	6.00	GSUC/TSP	.00	TSP	6.00			12.00	9.00	21.0	15.00
JACOB,J	.00		.00		.00			9.00	12.00	21.0	21.00
LEWIS, G	.00		.00		.00			9.00	12.00	21.0	21.00
MARKOWITZ,G	5.25	DEPT HEAD TSP	5.25	DEPT HEAD TSP	10.50			12.00	9.00	21.0	10.50
ORTIZ,A *	.00		.00		.00			6.00	4.50	10.5	10.50
O'BRIEN,J	.00		.00		.00	FELLOWSHIP	9/85-8/86	.00	.00	21.0	.00
PHILLIPS,G	.00		.00		.00			12.00	9.00	21.0	21.00
ROSENFIELD,I	.00		.00		.00			12.00	9.00	21.0	21.00
SHERMAN,D	.00	TSP	.00	TSP	.00			9.00	12.00	21.0	21.00
SILVER,I	.00		.00		.00	FELLOWSHIP	9/85-8/86	.00	.00	21.0	.00
UMANSKY,H	.00		.00		.00			12.00	12.00	24.0	24.00
WALLACE,M	.00		.00		.00			9.00	12.00	21.0	21.00
TOTAL 10*	19.50		13.50		33.00			156.00	151.50	349.5	265.50

Associate Provost, who studied it, compared it with similar information generated by those in the Budget Section of the Business Office, and after seeing that the information was consistent in both, reported their findings and recommendations to the President.

Another example of how the databases have been used concerns the adjunct faculty. This has become a critical area because of the reduction in full-time faculty teaching hours and the adjunct budget. Both administrators and academic department heads have been the recipients of this information. The data needed have included: adjunct ranks, rates of pay per hour, total hours employed per term, courses taught, and number of consecutive terms at the same pay rate. The last item is important, because after working six terms during a three year period, an adjunct receives a one-step increase in pay.

Of the reports generated since this file was constructed, the one most frequently requested calls for a listing of adjuncts by department, the average cost per course, and actual expenses encumbered by department. Once the policy-makers have determined the annual allocation per department, they use such reports to track expenditures throughout the year. Since a similar file is maintained by the Budget Section of the Business Office, a constant cross-check is maintained, thereby assuring continual accuracy in this area.

Finally, the department heads receive copies of these reports periodically, and use the information to keep track of their expenditures and to plan their academic schedules. That is, they know approximately how many courses they may offer based on both their budget and the salaries of those they intend to hire.

IMPACT AND SUMMARY

As recently as 18 months ago, information was segmented and disbursed throughout several paper files. Since then, the beginnings of a comprehensive computerized information system has been constructed. While many administrators entered this "information system era" with trepidation, happily the utility of the new system won quick converts. The speed with which accurate data could be retrieved aided a number of them in solving problems. It also allowed for "hot spot" analysis, developing data on unanticipated problems (Baldridge, and Tierney, 1979). This kind of flexibility would have been considered a luxury only 18

months ago. It has also allowed for the clearer definition or redefinition of problems facing the institution (Ziegler, 1969). Today, managers have become so accustomed to having the data available at a moment's notice that they have forgotten that the databases and new mode of report generation have existed for only 18 months.

While much evolution is still in progress, reliance on the previous manner of manual preparation of information by cadres of part time aides is a creature of the past. At this time, a formal, bureaucratic model of management utilizing the tools of modern technology and analysis is emerging.

Author Notes

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REFERENCES

Balderston, F.E. Managing Today's University. San Francisco: Jossey-Bass Publishers, 1978.

Baldridge, J.V., and Tierney, M.L. New Approaches To Management. San Francisco: Jossey-Bass Publishers, 1979.

Bulkeley, W.M. (1985, September 18). The Fast Track: Computers Help Firms Decide When to Promote. Wall Street Journal, p. 33.

Hamelman, P.W. (Ed.). Managing the University: A Systems Approach. New York: Praeger Publishers, 1972.

I.B.M. Corporation. ADRS: A Departmental Reporting System, Version II, Users Guide (3rd ed.). Irving, Texas: Auther, 1981.

Moran, T.K., Berger, J.C. and McKenzie, J.R. The Development of Criminal Justice Educational Curricula. In R.H. Fenske and J. Staskey (Eds.). Research and Planning for Higher Education: Proceedings of the 17th Annual Forum. Tallahasee, Florida: Association for Institutional Research, 1978.

Pearson, R., Moran, T.K., Berger, J.C., et al. Criminal Justice Education: The End of the Beginning. New York: The John Jay Press, 1980.

United States Government. Omnibus Crime Control and Safe Streets Act of 1968. Public Law 90-351. Washington, D.C.: Author, 1968.

Ziegler, M.L. The Organization, Economics and Allocation of Resourses to Administrative Systems Analysis. In C.B. Johnson and W.G. Katzenmeyer (Eds.), Management Information Systems in Higher Education: The State of the Art. Durham, North Carolina: Duke University Press, 1969.

DEVELOPMENT OF GRAPHICS USE IN SYSTEM-WIDE PUBLICATIONS

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INTRODUCTION

Computer graphics applications in the Office of Institutional Research at the Central Administration of the State University of New York (SUNY) became a part of standard operating procedure during the 1980-81 academic year. Incorporation of graphic displays of system-wide data into standard publications came about rather quietly and as part of a fresh approach to existing operations. This is rather an important point for graphic acceptance. The organization, its staff, reports, and publications were studied and low-key decisions were made on how to best work with them and for them.

The graphic displays described in this paper were intended as an aid and were developed with an appreciation of the political climate, people's investment in existing publications, needs of the University community, resource levels, etc. To succeed in implementing change, all aspects of the internal and external environment must be considered. Hopefully, this case study will provide insights on approaches that worked, pitfalls to avoid, and future goals to work toward in making graphics applications part of on-going operations.

HISTORY

Upon joining Central Administration in late summer of 1979, I inherited an existing system-wide publication called the STATISTICAL ABSTRACTS. Generated from SUNY's faculty instructional workload system (CASA), the ABSTRACTS was a well conceptualized and developed series of statistical tables describing faculty and student instructional workload in terms of 19 broad discipline groupings. Hundreds of HEGIS codes used in coding course content were collapsed into 19 discipline groups. Such variables as FTE faculty, FTE workload, student credit hours, faculty and student contact hours, salary costs, support costs, etc. were displayed in the tables. Many compelling reasons existed for maintaining the existing version of the ABSTRACTS including:

Political Climate: Both SUNY and the New York State Division of the Budget used data from the tables in developing a recommended or modeled number of faculty for the next budget year. Consistent data must continue to be provided to important audiences and users.

Needs of the University Community: Recognition that subsequent editions of an accepted report series promote trend studies, modeling applications, wide dissemination, etc.

People's Investment in Existing Publications: Healthy respect for the quality and types of ABSTRACTS data. They are excellent for analysis, evaluation, budgeting, and planning.

Resource Levels: New reports and summaries of a system-wide nature frequently require large commitments of computer programming resources which in all likelihood would not be forthcoming. Also, if something is working well and fulfilling its function, scare resources should instead be devoted to problems or areas of new development and need.

Other Considerations: Based upon my experience at the campus level, and recalling conversations with directors of institutional research from various SUNY institutions, I realized that some changes and enhancements should be made to further the use and understanding of this important document. Some comments about the difficulty of leafing through enormous numbers of tables had been received, as had comments about tables not visibly showing the impact of significant swings in workload, the inconvenience of having to consult several past editions for information on the immediate past few fall semesters, etc. Some reorganization, a fresh approach, and graphics would be beneficial.

OVERVIEW OF ACTION STEPS

The organization of the publication was changed to facilitate its use by executive level management and yet retain the in-depth data required by analysts. This was accomplished by developing three discrete sections:

I. Narrative section containing the introduction, history, overview, and description of reports and graphs

II. Summary reports containing workload data for all disciplines combined

III. Data displays of workload by the 19 different discipline groupings were placed in Secion III. These were the detail reports required by SUNY and DOB analysts.

While such changes in the organization of the publication made the tables easier to access and use, they still did not help convey visually the impact of significant swings in workload over time. To convey a comprehensive picture of trends in faculty and student workload, three additional changes were made:

1. Expansion of the amount of trend data included. Consecutive fall semesters from 1975 to date are now included in every edition.
2. While additional years of data became very useful, they had the potential of making the publication unwieldy because of its size. A SUPPLEMENT was developed so that analysts need refer to just one document for discrete trend data to use in modeling
3. Graphs were added to the publication on the two most important variables used by SUNY in studying instructional effort: FTE workload and FTE faculty by discipline groupings.

Efforts to promote expanded use and understanding of an existing system-wide publication resulted in graphic summaries of data becoming widely accepted and part of on-going operations. They have become the modus operandi not only in the ABSTRACTS but in such other office publications as UTILIZATION OF RESIDENCE HALLS and TRENDS IN TUITION AND OTHER BASIC STUDENT CHARGES.

ORGANIZATION'S EXPERIENCE WITH IMPLEMENTING GRAPHICS

Graphic displays of data have long been recommended as aids in presenting results of studies, surveys, or complex statistical analyses in easy-to-understand, every-man's language; conveying large amounts of information easily, quickly, and in relatively small amounts of space; facilitating comparisons between groups or facilitating trend studies of performance of the same group over time. The STATISTICAL ABSTRACTS represented the perfect vehicle for a graphics application. It contained vast amounts of data. Some shifts in workload were not very apparent from just the tables, and a perponderance of "numbers" was a turn-off to some people.

Tektronics 4010 Terminal:

Permission and a small amount of funds were requested and received to develop graphics applications for the ABSTRACTS. Nineteen discipline groups on FTE workload and FTE faculty for 30 institutions were involved. Given the large number of records in the data base, we did

non want to implement a manual approach for summarization. Not did we want to rely on hardcopy reports from which to manually transfer summary data into some stand-alone computer. Inasmuch as CASA was a well defined, automated computer system, our goal was to access it by computer and then graphically plot selected summaries.

Working with data for the Fall 1980 ABSTRACTS, a mini-file was created from the 63,198 records on the CASA Master File. Specific fields, identified as necessary for plotting, were "Selected" from the Master File using an IBM utility and became the source for the creation of the mini-file. Whereas each record on the full Master File contains about 200 fields and is 1,100 characters long, just a couple dozen key fields became part of each 80 character record on the mini-file. The file was created in SPSS format, and we conducted various condescriptive runs against it including mean, variance, range, standard error, kurtosis, minimum, standard deviation, skewness and maximum to help verify data accuracy. The Aggregate package in SPSS was then used to reduce the 63,000 records down to a few hundred.

The file was resident on tape and could be accessed by the graphics Tektronics 4010 terminal. Various pie charts, line graphs and bar charts were produced. The samples included with this paper are labeled Figures 1 and 2. Throughout the course of this pilot project, we were working primarily with the Computer Center at the SUNY-Albany campus because Central Staff had no computerized graphics packages. The expertise, cooperation, and cordiality they extended was most noteworthy and helped make our introduction to computerized graphics educational and worthwhile. Overall, however, the project was somewhat of a failure because the computer-generated graphs were not included in the publication. What happened?

One of the key variables needed for plotting was not resident in the mini-file. Due to the absence of user-oriented, narrative documentation on CASA, we did not realize that the only field existing on FTE faculty did not contain what we thought it did. The FTE value resident in the data field was a summary value. This was used by our COBOL programs during report generation time to calculate assignable FTE faculty to all records for which that faculty was listed as the instructor of record. The appropriate FTE faculty value for each record had to be calculated and this would have meant an extra charge for pro-

Figure 1

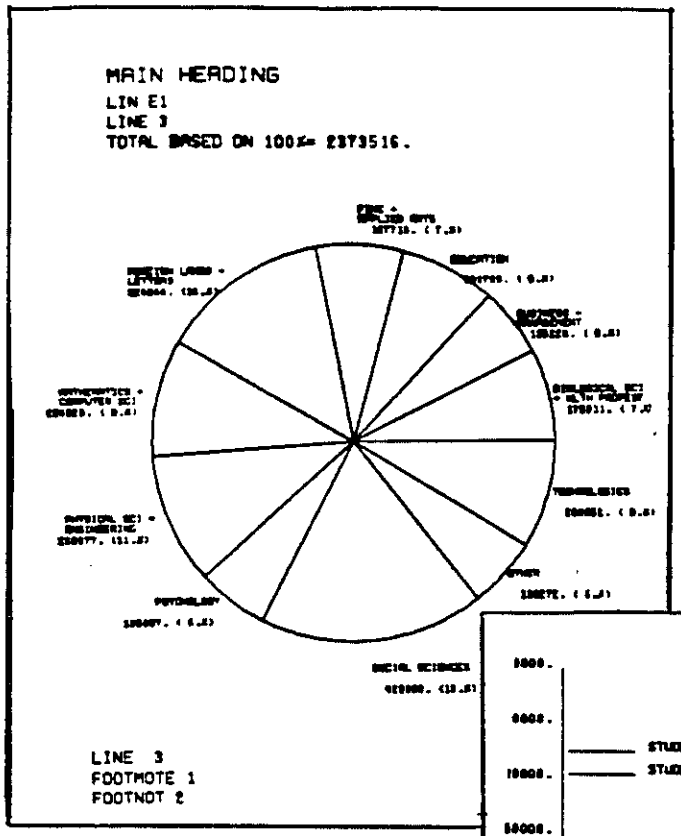


Figure 2

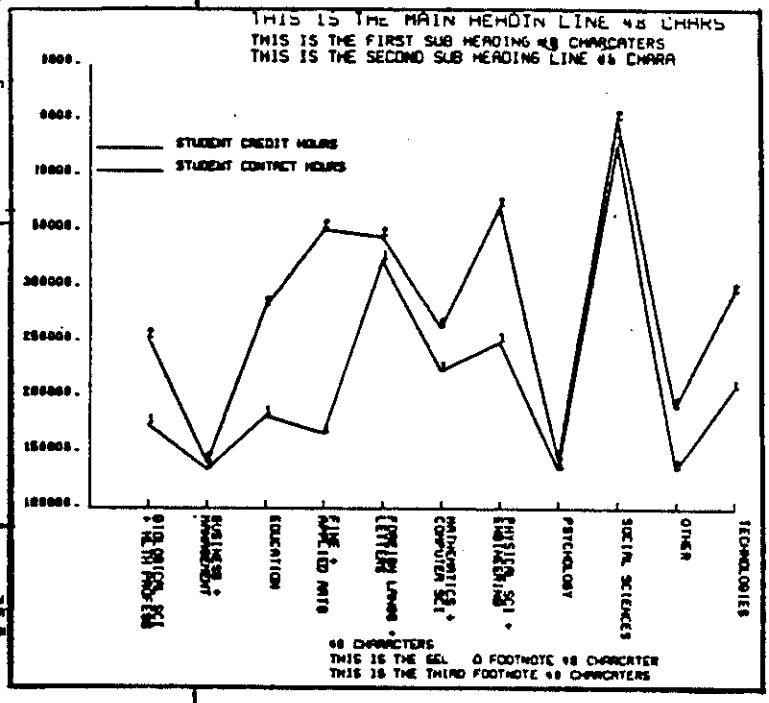
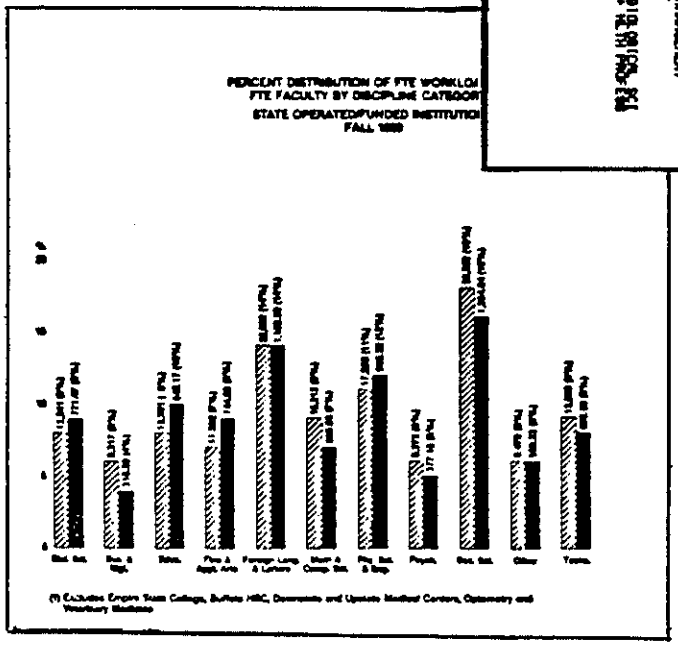


Figure 3



gramming services. Time was short and we did not want to wait until resources at SUNY-Albany became available for this extra bit of work. Even after the programming was done, graphs had to produced at the campus and not at Central Administration, which demanded travel time back and forth. When things had to be changed, it meant another trip uptown. We decided to follow a manual approach and had graphs prepared by an in-house Graphics Office for the 1980 publication. This took about another four weeks. A copy of one of the 13 bar graphs they produced is also included and is labeled Figure 3.

Lessons to be learned include the necessity of securing adequate documentation on computerized files that will be used. It's also a good idea to prepare rough manual drafts of two or three prototype graphs. Present these to the director of the office and get his input early on variables used, style of presentation (e.g., percent versus numerical values), title, labels, etc. We prepared many rough graphs for review by the head of our office including line graphs, pie charts, and bar charts on such variables as student credit hours and student contact hours.

Although the graphs were automatically produced by computer with very little manual effort, some travel time was involved which could have been spent on other activities. Bosses may not want their staff gone from the office on numerous trips to a remote facility. Also, it is important to attempt to foresee what problems could arise when student assistants work on the project when they don't fully understand the data with which they work. Questions could arise which need immediate answers. Finally, the machine produced graphs which were not as visually attractive as those produced by the Graphics Office. Management was receptive to our plight and decided that another approach was needed if graphs were to become an ongoing part of system-wide publications.

PRESENT COMPUTER GRAPHICS ENVIRONMENT

Tektronix 4050 Series Graphic Computing System

This stand-alone graphic computing system was purchased approximately four years ago at a cost of about $35,000 for a 4052 computer and CRT, 4907 file manager (deck unit), 4631 hard copy unit, and 4662 digital plotter. The system came with four manuals of documentation, various reference cards and looseleaf materials, and two preprogrammed

tapes. Additional tapes have been purchased, as have various floppy disks to record data for plotting. Its programming was written in BASIC. Most of the bar charts used in the STATISTICAL ABSTRACTS and other publications have been produced using "Stroked Data Graphing" software. While not the most friendly in the world, this software package is not too difficult to learn and affords the ability to produce high quality line graphs, bar charts, or pie charts upon a moment's notice. Fifty-seven bar charts are now produced for each year's edition of the ABSTRACTS using this graphics computer. All the graphs are produced in-house and within a relatively short period of time by student assistants. Please refer to Figures 4 and 5 which are representative of the content and appearance of all 57 graphs now included in the State-wide publication.

Generating these graphs is no small task, however, as approximately 1,100 data values were required for the Fall 1984 edition of the ABSTRACTS. Using some of the more advanced features of the software, data for prior years had been pre-recorded and saved on a floppy disk. When the 1984 figures became available, we thought it would be a simple matter to simply add them as the tenth year. This approach could have saved quite a bit of time. In attempting this operation, we uncovered another problem with the software. While data may be recorded, saved on disk, brought back and plotted, another year's worth of information could not be added. We ended up having to record all years from 1975 through 1984: 1,140 data values. It was very time consuming and frustrating. There is no straight-forward clue in the documentation on how to accomplish such editing and re-saving operations.

The software opens with a Master Menu that prompts the user to create a graph by simple pressing the "return" key. Twenty options including the following may be chosen by pressing a "User Definable Key" in the upper left quadrant of the keyboard:

#	
1	To change data values (useful if you've made a mistake)
2	To change text (heading and footnote changes)
3	To change graph parameters (title, labels, grids, etc.)
4	To change the number of Y-axis divisions (for more points)
6	To redraw on screen (to view graph before printing)
13	To add another curve (e.g., to view both undergrad and grad tuitions, in- and out-of-state on the same graph = 4 curves)

TRENDS IN PERCENT DISTRIBUTION OF FTE WORKLOAD AND
FTE FACULTY BY DISCIPLINE GROUPINGS
FALL 1975 THROUGH FALL 1984

Figure 4

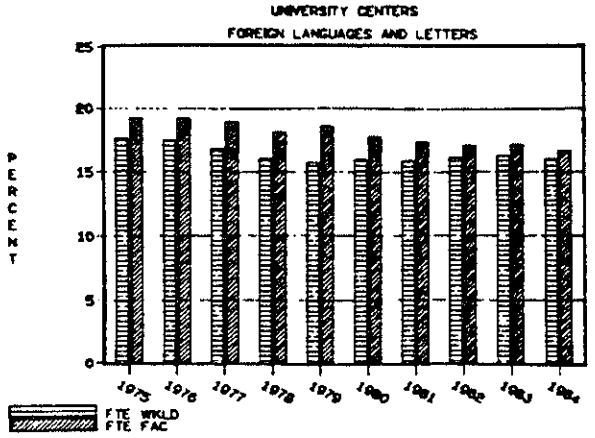


Figure 5

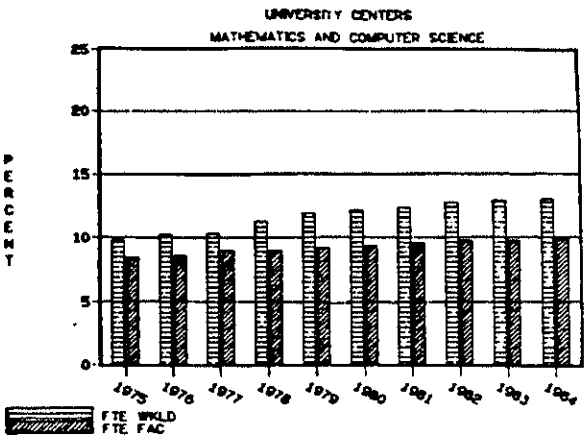


Figure 6

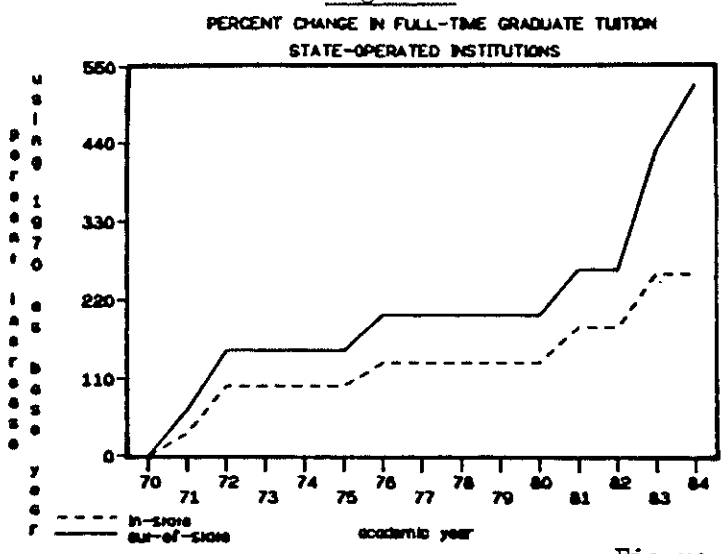


Figure 7

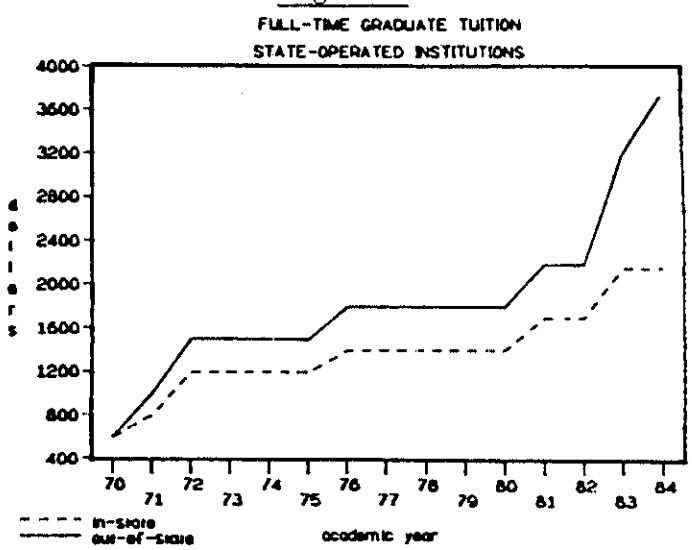
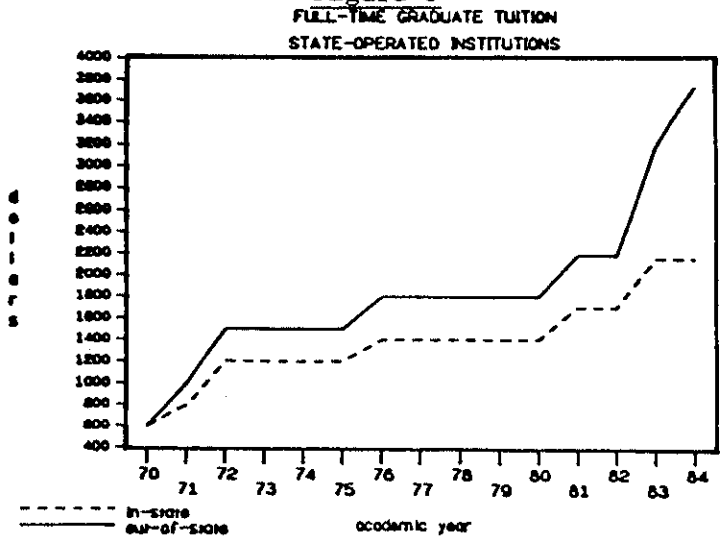


Figure 8



14 To list data (for documentation)

20 To draw the graph (must press to create graph from data)

The user is queried as to the number of values for the X-axis. Since a number of colleges may not have the same type of data SUNY has on faculty instructional workload, quoted examples draw upon data assembled from our computerized file on tuition, required fees, and basic student charges from 1970-71 through 1984-85. Because most institutions charge tuition, the following constitutes a universal example. We chose a 15 year time frame so the number of values for the X-axis is 15. The system then requests labels for each of the X-axis values. We've labeled them 70, 71 ... 84 as may be seen from the line graphs produced from the system (Figures 6, 7, and 8).

Three sample figures are included to illustrate the ease with which data, titles, labels, etc. may be changed and the graph redrawn. Figure 6, which shows percent change from 1970-71 to 1984-85 using 1970 as the base year, was a first effort. On reviewing this figure, the director requested that dollars be used instead. Figure 7 represents the results of that change. The final product in Figure 8 illustrates the increased number of divisions requested for the range. The Tektronix makes it easy to accommodate such changes.

Up to five curves may appear on a single graph, and the number must be specified. Our project required two: n curves = 2. The system then requested the name of the first curve: IN-STATE. The next item asked how the data would be created:

1. From keyboard data
2. Sum of all previous curves
3. Average of all previous curves
4. Cumulative sum of previous curves
5. Least square fit of previous curve
6. Data on data file

Since our graph is relatively simple, we chose #1 and keyed in the percent increses (in which 1970 was used as the base for all calculations) and actual tuition dollars for the past 15 years. The percents were used to generate Figure 6 while tuition dollars were used for Figures 7 and 8.

Returning to the prompts for curve 1, we were then asked if we wanted the system to record the data in a data file. We answered no.

The type of curve then had to be specified from the following: BAR, SOLID, PHANTOM, OR DASHED. We chose "Dashed" and next selected the type of dashed curve desired from a menu displaying nine types of dashes. A couple more prompts concerning the dashing then appeared, followed by the same procedure for the second curve: name, source of data, type of curve, etc.

The next major item requests the title and sub-title of the graph. As may be seen from Figure 6, the main title is "PERCENT CHANGE IN FULL-TIME GRADUATE TUITION" and the sub-title is "STATE OPERATED INSTITUTIONS." Two labels could then be specified for the X-axis. We simply recorded "ACADEMIC YEAR" under the first label. Another two labels may be recorded for the Y-axis and horizontal grids may be requested. Our first Y-axis label was "PERCENT INCREASE" and the second was "USING 1970 AS BASE YEAR." We elected not to have horizontal grids. The user also has control over the range nimimum, maximum, and number of divisions (default number of divisions is five).

Using the Tektronix is relatively straightforward for simple applications, and basic skill may be attained within a short time. The computer has many advanced features but these take much more time to learn. The benefits of having this equipment are several and include:

a. Quick, automatic generation of quality-looking graphs
b. Total control over data input
c. Complete control over appearance
d. Ability to change one's mind and generate revision quickly

Ther are drawbacks to the unit, however, and these include:

a. Stand-alone unit requires manual input of data. It's not linked to the mainframe and we do not yet know how to download or transfer data from PC LOTUS files for plotting.
b. The documentation was rather poorly written, is difficult to understand, and appears to have gaps.
c. Some of its BASIC software was a "gift" and hence is unsupported. Some bugs have still not been resolved.
d. Some advanced features are underutilized or unused due to complexity of documentation and amount of time required to learn them.

Overall, the configuration did represent a step forward at a time when large number of graphs were beginning to become standard portions

of State-wide publications. The unit, however, has some as yet unexplored capabilities which represent a challenge to new staff members with BASIC experience.

THE FUTURE

Given the dramatic increase in the number of types of capabilities now available on personal computers, it is recommended that the following be explored:

1. Routine downloading of key faculty and student workload variables from mainframe systems and files to PC LOTUS files for spreadsheet analysis. ENABLE should be fully explored as a first effort.
2. Communication linkages between PC and the Tektronix graphics computer should be developed for routine production of graphs now included in standard publications.

The future has always held the promise of excitement, and recent improvements and innovations in modern technology have made that future even more challenging. As professionals in higher education, we should contribute to management's understanding of organization data and information. Graphics are a form of universal communication whose time has arrived with the introduction of the new technology that facilitates their production. Reliance on computers has become part of daily operations; one must learn and use all their capabilities. We cannot afford not to take the time. Everyone stands to benefit.

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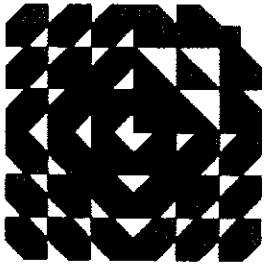

North East Association for Institutional Research

Twelfth Annual Conference

Institutional Research: Getting to the Core

The Parkview Hilton, Hartford, CT

October 20-22, 1985

Sunday, October 20

11:15 AM - 12:45 PM	President's Brunch	Glasshouse
12:00 AM - 5:00 PM	Registration	Lobby

Steering committee, conference workers, and workshop presenters.

1:00 - 4:00 PM **WORKSHOPS**

DSS for Enrollment Management — Colt - A&B
Robert H. Glover, University of Hartford

[30 persons maximum.] This workshop will outline the Decision Support Systems building strategy at a private, comprehensive university. Included will be a demonstration of enrollment management applications using specific ADDS III features with integration of dBase III on the IBM/PC.

Newcomers to Institutional Research — Elizabeth
Robert E. Grose, Amherst College

[Maximum enrollment 36, 15-18 per session.] This is an "in-box" workshop for newcomers to the field. There will be handouts, separate work, then debriefing and discussion on Monday, October 21, 10:15 - 11:45 AM.

Strategic Planning — Capital
Greg Lozier, Pennsylvania State University

This workshop is designed to aid those with responsibility for initiating or reformulating an institution's planning process. It will include conceptual and "hands-on" activities.

Computing Cost-of-Living Measures — Colt - C
Paige Ireland, Cornell University

This workshop is designed to identify the appropriate data series for computing comparative cost-of-living measures. In addition, an overview and discussion of national statistics suitable for specific cost comparisons will take place.

Sunday, October 20

4:00 - 5:00 PM **WORKSHARES**

Preregistration required. Workshares are informal discussions and sharing of work-in-progress. Each participant is expected to share insights and/or samples of work for the workshare topics listed below.

Factbooks as Management Information — **Elizabeth**
Convener: Paige V. Ireland, Cornell University. Discussion will center around the provision of management information with all forms of management information discussed and shared. Presentation and sharing of fact books, management indicators, and computerized executive information systems will take place.

Quality of Student Life Indices — **Elizabeth**
Convener: Robert E. Grose, Amherst College. Discussion will revolve around ways to measure quality of student life. Topics will include survey instruments, other techniques for measuring quality of life, new views on the issues and sharing of work-in-progress.

Financial Aid Issues — **Bushnell**
Discussion will center on the application of institutional research to financial aid issues. Participants will share their current work in this area.

Computer Configurations for IR Offices — **Bushnell**
Convener: Richard C. Heck, Colgate University. Discussion will include types of equipment, methods of linking hardware, capabilities and limitations. Particular attention will be devoted to relating these items to office management and IR operational issues.

Enrollment Planning — **Bushnell**
Convener: Jennifer B. Presley, Conn. Dept. of Higher Education. Discussions will be centered on evaluating the success of current projection models at program, institution, and statewide levels; methods of anticipating environmental changes (e.g. unemployment, employer demand, costs, and financial aid); institutional strategies for modifying enrollment patterns in response to planning goals.

5:00 - 6:00 PM Social Hour Ballroom Mezzanine

6:00 - 8:00 PM Dinner & Keynote Speech Ballroom North

Stephen Joel Trachtenberg, President, University of Hartford

8:00 - 11:00 PM Social Evening Capital

Cash bar, complimentary soft drinks.

N O T E S

Tuesday, October 22

10:15 - 11:45 AM | Instructional Measures | Colt - C

Moderator: Larry Kojaku, SUNY Albany

Estimating Student Demand for Individual Courses and Academic Departments under a New Set of General Education Requirements
Norman D. Aitken, University of Massachusetts

Many institutions of higher education are in the process of revising their general education requirements, which will result in significant changes in student demand across both individual courses and academic departments. This session will (1) present a model for estimating a change in demand by course and (2) will present some empirical results for a large state university which is in the process of changing its general education requirements.

Measuring Instructional Activity at a Major Research University
Victor M. H. Borden, Robert J. DeLauretis
University of Massachusetts - Amherst

A management-focused information system that characterizes instructional activity at a major research university will be described. This system views instruction in the context of the full range of faculty activity, including research, service and other scholarly and creative activities. The system provides information to assist planning and allocating functions.

Monday, October 21

7:00 AM	2nd Annual NEAIR Fun Run	Meet in Lobby
7:30 - 8:30 AM	Coffee and Danish	Lobby
8:00 - 11:30 AM	Registration (cont'd)	Lobby
8:30 - 10:00 AM	Enrollment-1	Bushnell

Moderator: Paul Wing, The Albany Medical College

Demographic Decline: The Slide for Life
John Kraus, University of New Hampshire

The much heralded decline in available high school graduates has seemingly not materialized. A variety of factors may be contributing to that circumstance. Discussion will focus on the certain arrival of decline and what it may mean for the interlocking markets in New England.

Re-Examining the Relationship of High School Graduates and Postsecondary Enrollment in the Northeast
Norman Kaufman, SUNY Binghamton

The two sets of projections of High School Graduates published by the Western Interstate Commission for Higher Education (WICHE) in 1979 and 1984 have been extremely influential in shaping the perceptions of key higher education decision makers with respect to future enrollments in higher education. This presentation, by the co-author of the 1984 study, compares recent high school graduate trends in the northeast with postsecondary enrollment trends and speculates on the permanent realignments that are underway.

8:30 - 10:00 AM | Student Outcomes-1 | Colt - A

Student Outcomes Research: Lessons from the Albany Experience
Patrick T. Terenzini (*Chair*), SUNY Albany
Wendell G. Lorang, Thomas M. Wright, SUNY Albany
Robert F. Grose (*Commentator*), Amherst College
Thomas T. Judd (*Commentator*), Rockland Community College

SUNY Albany has been engaged in an evolving, student-outcomes project over the past seven years. This symposium will explore what has been learned about outcomes research designs, approaches, costs, data base development and management, dissemination techniques, and politics. Successes and failures will be reviewed.

Monday October 21

8:30 - 10:00 AM Fundraising-1 Colt - C

Development Expenditures
John A. Dunn, Jr. (*Chair*), Peter McKenzie, Tufts University
Larry Litten, Consortium on Financing Higher Education
Burton Sonenstein, Wellesley College
Jeffry Paton, University of Rochester

The question which immediately follows a discussion of fund-raising results is what the institutions spent to achieve those results. This panel discusses what institutions are currently spending, what they should be spending, and how overall institutional planning affects expenditures and the ways they are financed.

8:30 - 10:00 AM Accreditation Elizabeth

Accreditation: Report on the COPA Data Base Project
Charles M. Cook, New England Association of Schools and Colleges

The Director of Evaluation for the Commission on Institutions of Higher Education (NEASC) will describe the proposed accreditation data collection forms that have been developed through the COPA Data Base Project. Reactions to these proposals will be invited from campus institutional researchers and others who will be using the newly developed data definitions.

10:15 - 11:45 AM Fundraising-2 Colt - C

Research and Planning Topics in Fundraising
John A. Dunn, Jr., Dawn Terkla, Tufts University
Rene Blanchette, Michael Connolly, Wesleyan University
James A. Flynn, Jr., New York University

Development activities are of increasing importance to both public and private institutions as pressures on other funding sources increase. This series of short presentations on comparative performance studies, assessment of giving potentials, and annual fund planning is intended to suggest ways institutional researchers can helpfully be involved.

10:15 - 11:45 AM International Enrollment Colt - A

International Students -- Are They the Solution to a Dwindling Application Pool?
Jeffrey A. Lang, Beverly A. Joyce, Long Island U./C.W. Post Campus
Basil Lipachak, L.I.F.E.; Gigi Lamens, New York Polytechnic Institute

This panel will discuss, through its representatives, the international student market -- its potential and drawbacks.

Tuesday, October 22

10:15 - 11:45 AM Enrollment-3 (Cont'd) Bushnell

Influencing Matriculation Decisions: Pilot Study Results
David L. Rumpf, Ronald F. Perry, Gustavo De la Piedra
Northeastern University

During the Spring of 1985, an attitude survey was mailed to 1000 accepted students. Based on the results of previous studies, the respondents likelihood of matriculation was classified as high, medium or low. A quasi-experimental design evaluated the accuracy of the prediction and the effect of interventions.

10:15 - 11:45 AM Student Climate & Outcomes Colt - A

Moderator: Nancy Neville, Rochester Institute of Technology

What Happens to Gifted Black Students?
Kathryn Abels Stratton, Indiana University of Pennsylvania

A recent study by NIE reports that one in eight "high ability" high school Seniors declines college. Of the seven who go, HALF never graduate. Research by the PROGRAM FOR SCHOLARS at Indiana University of Pennsylvania gives insight into what happens to the "gifted" Black student.

Surveying the Campus Environment: Are We Getting to the Core?
William H. Weitzer, Joyce D. Clark, Clifford H. Donath
University of Massachusetts

Eleven years of experience with a campus environment survey is the basis of a critique for this type of research. Three areas of concern and improvement emerge: historical precedence, technical issues in data manipulation, and general issues of usefulness. The focus is on getting the most from a single survey.

A Survey of Health Care Services at Postsecondary Programs in a Seven State Region
Philip P. Kerstetter, Edinboro University

The study reports on a special survey of health care services provided at 60 programs in a seven state region. The programs were selected using a random sample, stratified on the basis of size, location, and control. Data collected and analyzed include size of facility, staffing patterns, estimated revenues and expenses, and proximity to primary care facilities.

Tuesday, October 22

8:30 - 10:00 AM Computer Demonstrations Elizabeth

Moderator: Sue Bollman, University of Rochester

An Interactive Planning Exercise for Analyzing a Student's Level of Educational Debt
Jack Pogany, Georgetown University

An automated, interactive student loan planning program will be demonstrated. The planner automatically projects income levels, loan repayment commitments, and after-tax payments across different tax brackets. Each student loan is summarized and a final report relates total loan burden to projected income levels.

Using the Electronic Spreadsheet for Institutional Self-Assessment
Thomas J. Abdella, Tufts University

The electronic spreadsheet has provided a rich medium for data analysis. Tufts University and EDUCOM have been developing tools for institutional self-assessment using the LOTUS 1-2-3 spreadsheet environment. On hand will be a microcomputer and examples of these new spreadsheet tools for conference attendees to "test drive."

10:15 - 11:45 AM Enrollment-3 Bushnell

Moderator: John Kraus, University of New Hampshire

Trends in Competitive Market Shares: A Geographic Analysis of SUNY Freshmen in the 1980's
Lou Spiro, Jill Campbell, SUNY College at Brockport

New York State has, and will continue, to experience declines in traditional student populations. A microcomputer geographic marketing package has been used to examine competitive shares of high school graduates within the SUNY system. Patterns emerging from this analysis aid in the selection and targeting of specific geographic student markets.

Length of Stay as a Factor in Enrollment Size
Gerard G. Walter, Rochester Institute of Technology

The purpose of this paper is to document the relationship between length of stay in a higher education environment, number of admits and enrollment levels. The findings will provide institutional planners with insights concerning the effects of changing student mixes on overall enrollment size.

Monday October 21

10:15 - 11:45 AM Beyond Institutional Research Bushnell

Moderator: Eric Straumanis, Director of Enrollment Research, Suffolk U.

A panel of professionals who have moved from academic and institutional research positions into other roles will discuss what they have learned from their experiences and explore options "beyond institutional research."

Lloyd Suttle, Dean of Students and Administration, Yale College
Beverly K. Firestone, Director of Research, P.M. Haeger & Assoc., Inc.
Lorna Miles, Vice President, Admissions Marketing Group, Inc.

10:15 - 11:45 AM Decision Support Systems-1 Elizabeth

Beyond the BUZZwords: The Policies and Politics of Managing Decision Support Distributed Data Processing
Michael Mills, Robert H. Glover, Richard Whiteside
The University of Hartford

Panel members will discuss issues and politics faced and the policies adopted in their University's move to an Information Center concept and micro-based distributed processing.

10:15 - 11:45 AM Workshop Debriefing Capital

Newcomers to Institutional Research
Robert F. Grose, Amherst College

Second session of Newcomers to Institutional Research Workshop. Debriefing of "homework" and discussion.

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12:00 - 1:15 PM Luncheon Ballroom North

Monday, October 21

1:30 - 2:30 PM **Attrition & Retention** Bushnell

Moderator: Jeffrey E. Dutton, SUNY Albany

Undergraduate Profiles: Dropouts, Prolongers and Completers
Dawn Geronimo Terkla, Tufts University

The primary objective of this paper is to present descriptive profiles of three groups of undergraduates: dropouts, completers, and prolongers. Findings show that differences exist between dropouts and non-dropouts, based on measures of scholastic aptitude, high school program and educational aspirations.

Modeling Attrition Effects in Longitudinal Databases
Thomas M. Wright, SUNY Albany

This paper presents an analytical technique for testing for the presence of selection bias induced by attrition in longitudinal survey designs. This analytical technique provides for a more rigorous test than standard univariate statistical procedures. Moreover, a latent variable analysis of academic progress is presented.

1:30 - 2:30 PM **Student Outcomes - 2** Colt - A

Moderator: Nancy Neville, Rochester Institute of Technology

Characteristics of College Seniors Who Plan to Enroll in A&S Graduate or Professional Schools in the Fall after Graduation
Elizabeth S. Johnson, Larry Litten
Consortium on Financing Higher Education

Seniors at 22 private colleges and universities (COFHE members) were surveyed regarding their post-baccalaureate plans. Data from the 9 highest response institutions (75%) are included in the analyses which focus on respondents who expected to enroll in A&S graduate or professional schools in the fall after graduation.

A Longitudinal Study of College Impact: Freshmen to Alumni
Jean Morlock, Diana Green, SUNY Plattsburgh

A longitudinal cohort was surveyed while undergraduates and as alumni. The same students were asked the same questions as freshmen, seniors, and alumni, forming the basis for a panel study. The items were designed to measure college impact and importance of various abilities. Significant gains were reported during, but not after, the college years.

Tuesday, October 22

7:30 - 8:30 AM **Coffee and Danish** Lobby

8:30 - 10:00 AM **Financial Aid** Colt - C

Current Issues in Financial Aid
Jack Joyce (*Chair*), SUNY Stonybrook
Ann Zartarian, Trinity College; Peter Gibson, Quinnipiac College
Larry Litten, COFHE; Beth Wright, Wheaton College

Recent proposals and continuing debate over the federal budget raise several issues which concern aid administrators and institutional researchers. This panel will outline shifts in national educational policy and philosophy and the challenges they present to recruitment and retention research. Topics will include: the growing need for financial aid research and links to the Congress; the impact of student indebtedness; implications of employment on enrollment; and strategies of pricing. Audience interaction will be encouraged.

8:30 - 10:00 AM **The IR Role** Bushnell

Moderator: Beverly K. Firestone, P.M. Haeger & Associates, Inc.

Educational Decision Making: Rationality, Politics or Organized Anarchy?
Michael F. Middaugh, University of Delaware

This paper examines the literature in organization theory to evaluate and test three paradigms for the decision making process in higher education. The analysis offers alternative explanations for the motivation and momentum behind choices, and offers the institutional researcher a variety of ways of asserting a major role in the making of major institutional decisions.

The Planner as Politician: A Leadership Role in Guiding Change
G. Jeremiah Ryan, Monroe Community College

Institutional researchers should adopt a more forceful political role in the collection, distribution and marketing of information for decision making.

The Role of Institutional Research in Changing the University
Richard Lovely, Yale University & John Jay College, CUNY

Analysis of the role of institutional research and the institutional researcher in organizational change within the university. What is an appropriate role for an institutional research office as a source of change initiatives given the organizational position of the office? When change issues arise, what role conflicts likely face institutional researchers if they act as change agents, catalysts for change, or resistors to change?

Monday, October 21

2:45 - 3:45 PM Student Databases Elizabeth

Moderator: John A. Dunn, Jr., Tufts University

Somewhere in Time: Developing and Using A Longitudinal Student Data Bank
Ellen Kanarek, Rutgers University

The evolution of a Longitudinal Data Bank of most student records at Rutgers University is described: its inception; its value as a research tool; unforeseen growth in its administrative uses; its changing contents; its future.

Selecting and Installing an Integrated Student Information System: Some Points to Keep in Mind
Thomas E. Gusler, Clarion University of Pennsylvania

This presentation offers some practical advice to institutional research personnel from campuses considering the purchase of a commercially prepared integrated student information system. This non-technical discussion will focus on system selection criteria and the process of coordinating the installation of an integrated system.

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4:00 - 5:00 PM Annual Membership Meeting Capital

5:30 PM New England Clambake Adam's Mill

Special evening: Sunset tour of Hartford, then on to dinner, music, and the opportunity to visit with other conference participants. Bus transportation available.

Monday, October 21

1:30 - 2:30 PM Student Outcomes - 2 (Cont'd) Colt - A

Success Stories: The Regents College Degrees as a Credential
Elizabeth Taylor, Regents College Degrees & Examinations

This paper discusses the development of a data base for graduates of a non-traditional college setting. Approximately 4800 graduates of Regents College Degrees were surveyed to find out whether their degrees aided them in their pursuit of graduate study or change in occupational status.

1:30 - 2:30 PM IR Techniques Colt - C

Moderator: Richard Lovely, Yale University & John Jay College, CUNY

Management in Transition: Educational Management & Resource Allocation
James C. Berger, John Jay College of Criminal Justice, CUNY

Among the issues facing John Jay College are the conflicting problems of increasing enrollments and no growth budgets. In order to address these, administrators are changing their approaches from traditional ad hoc styles of management to modern ones utilizing computer generated reports, and budgetary and other empirical data analyses.

A Picture is Worth 1000 Numbers: Computer Graphics Applications in Institutional Research
Lou Spiro, Jill Campbell, SUNY Brockport
Kathy Kopf, SUNY Central Office
Michael F. Middaugh, University of Delaware

This panel examines the use of computer graphics in Institutional Research. Perspectives include geographic marketing applications, the reporting of system-wide data, and presentations to Executive Level management. The flexibility of analysis, widespread availability and the need to communicate succinctly with decision makers makes computer graphics an excellent medium.

1:30 - 2:30 PM Decision Support Systems-2 Elizabeth

Moderator: Paige V. Ireland, Cornell University

Institutional Researchers and Decision Support: New Roles & Further Erosion of IR Traditions
Michael Mills, The University of Hartford

Outlines the Decision Support roles most commonly suggested for IR professionals and relates those to the organizational structures futurists suggest will accompany the information revolution. Suggests that one role, the DS facilitator, will not be consistent with the traditional objectivity associated with the IR roles.

Monday, October 21

1:30 - 2:30 PM DSS-2 (Cont'd) Elizabeth

Information Management and Decision Support: New Demands on Institutional Research
Edward L. Delaney, Southern Connecticut State University

Information technology, particularly low-cost microcomputing, is making major and innovative impacts on the manner in which colleges and universities manage information for planning, decisions and reporting. This presentation will discuss administrative adaptations to these developments for institutional research.

2:45 - 3:45 PM Student Outcomes-3 Colt - A

Moderator: Darryl F. Bullock, Mercy College

Can a High School Profile Predict Success in College for the Older Student?
Yvonne Freccero, Sandra Price, Smith College

This study will compare the high school profiles of two groups of women who graduated from a highly selective college: one group had interrupted their education for a number of years and were selected on the basis of recent accomplishments, the other groups were selected on the basis of their high school achievements.

Students' Academic Growth in the First Two Years of College
Patrick T. Terenzini, Thomas M. Wright, SUNY Albany

This paper summarizes results of a LISREL analysis of a causal model derived from Tinto's theory of college student attrition, but applied to reported academic skill development in the freshman and sophomore years. These results are contrasted with those obtained using ordinary least-squares regression analysis.

College Student Experiences and Outcomes: An Exploration
Robert F. Grose, Amherst College

In alternate years Amherst College students have four times reported frequencies of certain campus experiences, judged aspects of the college environment, and shared appraisals of what they have gained from college. These data allow exploration of the relations among (a) student characteristics, (b) student experiences, and (c) "value-added" outcomes.

Monday, October 21

2:45 - 3:45 PM Enrollment-2 Bushnell

The "Jobs for Connecticut's Future" Project and Its Relevance for Higher Education Planning
Jennifer B. Presley (*Chair*), Conn. Department of Higher Education
Hilary Pennington, Jobs for Connecticut's Future

"Jobs for Connecticut's Future" provides a novel approach to assessing the State's long-range employment demand and related educational supply. The approach and findings will be presented together with a critique of the project's relevance for higher education planning.

2:45 - 3:45 PM Community College IR Colt - C

Moderator: Wendell G. Lorang, SUNY Albany

A Conceptual Model of the Institutional Researcher as Initiator, Facilitator and Resource in a Four Phase Marketing Process
Robert M. Karp, North Country Community College

This paper will examine three functions of the institutional researcher in a four stage integrated cyclical marketing management process for a regional distinct two year college. Discussion will focus on the generation, interpretation and presentation of demographic and research data ranging from preparing for the process to evaluating its outcomes.

Developing Decision Support: A Case Study in Working Relationships
Tom Wickenden, James Spear, Tompkins Cortland Community College

The purpose of this paper is to describe the development of decision support systems in an institutional research office through interaction with the chief academic officer and other top administrators. It is based upon a case study conducted at Tompkins Cortland Community College in 1984-85.