DOCUMENT RESUME

ED 310 654 HE 022 714

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TITLE Recruitment, Retention and Student Flow: A Comprehensive Approach to Enrollment Management Research. NCHEMS Monograph 7.
INSTITUTION National Center for Higher Education Management Systems, Boulder, Colo.
PUB DATE 85
NOTE 34p.
AVAILABLE FROM NCHEMS Publications, P.O. Drawer P, Boulder, CO 80302-9752 ($7.00).
PUB TYPE Information Analyses (070)

EDRS PRICE MF01/PC02 Plus Postage.
DESCRIPTORS College Admission; Dropouts; *Enrollment; Enrollment Trends; Higher Education; *Institutional Research; *Models; *School Holding Power; Student Characteristics; Student Mobility; *Student Recruitment
IDENTIFIERS *Enrollment Management

ABSTRACT

Enrollment management attempts to coordinate and monitor the programs and policies that influence college enrollment. A model is proposed that is designed to guide a comprehensive research framework that will inform enrollment management decisionmaking by including both student recruitment and retention as contributors to a common database. The design requirements for such a research program are discussed, the modeling of longitudinal student flow is illustrated, and the determination of enrollment structure is described. Examples of cases that illustrate the model are given. Several broad guidelines for using the model are also given: (1) look at the "big picture"--develop an appropriate enrollment model; (2) a partially estimated model is better than none; (3) disaggregate enrollment until distinct behavioral patterns emerge; (4) review the results of past research; (5) construct a prioritized agenda for future research; and (6) revisit the model continuously and check the validity of its assumptions. Contains 19 references. (KM)

Recruitment, Retention and Student Flow:

A Comprehensive Approach to Enrollment Management Research

By Peter T. Ewell

1985

NCHEMS MONOGRAPH #7

National Center for Higher Education Management Systems
P.O. Drawer P
Boulder, CO 80302
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Monographs

NCHEMS monographs are directed primarily toward administrators of higher education, and they are useful for researchers in higher education, as well. The monographs are informative studies of a variety of problems and issues that confront college and university administrators, especially in these times of dwindling enrollments and resources. The topics range from how to manage the internal processes of institutions of higher education to how to improve the outcomes of colleges and universities. While the monographs are based on careful research, they offer practical advice and solutions that are relevant for different types and sizes of colleges and universities.

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By Ellen Earle Chaffee

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By Peter T. Ewell and Ellen Earle Chaffee

Case studies drawn from different types of institutions illustrate how information is used for various purposes and with different outcomes depending upon the decisionmaking setting in which it is used. An alternative to traditional models of decisionmaking is proposed—"multiple advocacy"—in which superior decisions result from adopting a conflicting or dialectical decision making process.

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By Peter T. Ewell

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Transformation Leadership for Improving Student Outcomes (1985)

By Peter T. Ewell

This monograph addresses the need for improvement in undergraduate general education, as well as the need for colleges and universities to test student knowledge and ability on a systematic basis. Four obstacles to improved undergraduate effectiveness are pinpointed. Several proven levers which are available to academic leaders to use to implement a campuswide instructional improvement program are then noted.

2BA384 $7.00

Recruitment, Retention, and Student Flow: A Comprehensive Approach to Enrollment Management Research (1985)

By Peter T. Ewell

This monograph proposes a model to guide a comprehensive institutional research program designed to inform enrollment management decisionmaking. It examines the design requirements for a research program, illustrates how to model longitudinal student flow, and discusses the determination of enrollment structure. Case studies provide illustrations of the proposed model.

2BA385 $7.00

The Costs of Assessment (1985)

By Peter T. Ewell and Dennis P Jones

This monograph examines the direct costs of establishing an institutional assessment program as called for in recent national reports. A number of different examples are presented. Estimates of typical incremental costs for establishing and maintaining assessment programs are provided, including costs of test instruments, administration, analysis, and coordination.

2BA386 $7.00

Summary

In this time of constrained financial resources, two concerns of higher education have become imperatives: maintenance of enrollments and improvement of academic quality. In response to these concerns, many colleges and universities, both public and private, are more closely monitoring and shaping the characteristics of their student bodies.

Traditional efforts to cultivate academic quality and maintain enrollment levels include recruitment and retention programs. The problem, however, is that these programs are typically developed and carried out in isolation from one another. The result is often a set of programs and policies that work at cross-purposes with one another.

Enrollment management attempts to coordinate and monitor the programs and policies which influence enrollment. However, few models exist to guide decisionmaking about enrollment management. This monograph proposes and illustrates a comprehensive research framework that is designed to include both student recruitment and student retention as contributors to a common data base that can be used to inform decisions about enrollment. A primary virtue of this approach is that it organizes the research effort and allows scarce analytical talent and research resources to be directed at priority problems.

After the design requirements for a research program are noted, a model of longitudinal student flow is explored. Enrollment structure is then analyzed, and some examples of institutional practice are presented. This monograph concludes with several broad guidelines for implementing a comprehensive research effort to support enrollment management.

Recruitment, Retention and Student Flow: A Comprehensive Approach to Enrollment Management Research

By Peter T. Ewell

In an era of constrained financial resources, the maintenance of enrollment has become increasingly important for colleges and universities. For public institutions whose funding base rests directly or indirectly upon a calculation of enrolled FTE, knowledge about and control over total enrollment levels is naturally a major concern. For many private institutions whose major source of income is tuition revenue, enrollment maintenance can be a matter of life or death. Equally pressing for many institutions is the recent public concern about improving the quality of higher education (NIE 1984).

In response to these concerns, many colleges and universities, both public and private, are devoting increased attention to monitoring and shaping the characteristics of their student bodies. Recruitment programs are being more carefully targeted to increase the probability of successful completion of a program once a student has enrolled. Retention programs are being developed with much greater sensitivity about the need to develop different kinds of assistance and advisement for

different kinds of students. Both types of programs emphasize that factors that contribute to the achievement of quality in undergraduate education include understanding and influencing the way enrollments at a given institution are configured (Litten 1984).

College and university administrators are increasingly using the term "enrollment management" to describe their efforts to build and maintain an institutional enrollment profile of given size and shape (Zemsky and Associates 1980, Kreutner and Godfrey 1981, Kemerer, Baldridge, and Green 1982, Hossler 1984, Lonabocker and Halford 1984). When regarded as a sum of its parts, enrollment management is really nothing new. Institutions have recruited, admitted, tested, enrolled, advised, promoted, dismissed, and graduated students since their inception; and most have developed elaborate and well-thought-out mechanisms for accomplishing each of these activities. The problem is that they have tended to develop each of these mechanisms in isolation--locating each in a different office, subjecting each to different regulations and policies, and judging each successful or unsuccessful in terms of a different set of criteria. The result is often a set of programs and policies which work at cross-purposes with respect to overall institutional enrollment goals.

Enrollment management attempts to coordinate all programs and policies that influence enrollment and monitor their effects. In its strongest construction, this coordination function rests with a specially created office or position reporting to a high-level administrator, usually the institution's chief academic officer. In its weaker forms, the function involves regular communication and the establishment of common goals among the various offices responsible for different parts of the total enrollment picture. Under both scenarios, argue the proponents of enrollment management, good research about enrollment is crucial (Hossler 1984, Zammuto 1985).

Despite its importance, however, few models exist to guide conceptually a comprehensive institutional research program designed explicitly to inform decisionmaking about enrollment management. Granted, institutional researchers have often been called upon to undertake studies of student retention--an important aspect of enrollment management. Somewhat less often, they have been involved in designing and implementing market research studies directed toward improving student recruitment. Rarely, however, have these two kinds of research been directly linked as aspects of the same institutional policy problem. Still more rarely have such studies been designed from the outset to contribute to a common data base that informs strategic enrollment management decisions.

The primary purpose of this monograph is to propose and illustrate a common research framework for enrollment management. The need for such an approach is described, as are the models which comprise it, and the kinds of data required to make it work. The approach is illustrated by means of a few short case examples which are drawn from a pool of institutions currently being assisted by the National Center for Higher Education Management Systems (NCHEMS) in the development of research about student flow and enrollment management.

Like the concept of enrollment management itself, institutional research practitioners are familiar with the primary ingredients of the proposed framework. Studies of student flow, enrollment projection models, sensitivity testing of various policy alternatives, college choice surveys, and withdrawal studies are all part of the everyday stock-in-trade of the institutional researcher. But like enrollment management itself, it is the relationships among these various activities that are important. As the institutions which have experimented with the concept can attest, a primary virtue of this approach is that it organizes the research effort. Scarce analytical talent and research resources can be directed at priority problems.

Design Requirements for a Research Program

The best way to begin the development of an integrated enrollment management research program is to consider carefully what it needs to accomplish. Minimally, the following requirements are necessary:

- The program must be able to link conceptually all processes which contribute to the institution's overall enrollment profile. These include admissions activities, transfer, withdrawal, dismissal, reenrollment, and program completion. In other words, this requirement demands that student enrollment be modeled from the outset as the product of a specified longitudinal process, a process that begins with a student being identified as a member of a defined and targeted recruitment population, and ends with an unambiguous withdrawal or program completion.

- The program must be able to identify and distinguish the behaviors of different types of students enrolled. National reports are now proclaiming what is already clear on many college and university campuses: institutions of higher education are made up of significantly different types of students that behave in quite different ways. An effective research program should be able to identify, first, how many distinct behavioral groups of students exist at the institution, second, how large they are, and, third, how they respond differently to different external conditions and policy changes.

- The program must be able to estimate the effects of proposed policy alternatives on total enrollment and the distribution of enrollment. What are the merits of increasing the application rate within a particular, identified pool of potential recruits versus improving the overall

matriculation rate? What are the merits of an increase in admissions-yield versus a proposed program that promises to increase the retention rate of students with lower ability? How will a proposed academic good-standing policy affect total enrollments and the distribution of enrollment across different behavioral groups? The model should allow easy identification of these kinds of policy choices, as well as make it possible to estimate their consequences. For such purposes, microcomputer-based sensitivity testing is a strong requirement.

- The program must make it possible to integrate into policy choices the findings of existing research about students, as well as allow creation of an agenda for future research which directs analytical efforts toward answering questions with high-potential payoff. Much institutional research on enrollment structure and student success consists of discrete studies carried out for particular purposes, the results of which are never again used. Such studies are generally reported and archived in terms of the data-collection effort itself, rather than the problem or decision which the research was meant to inform. A major requirement for enrollment management, as a result, is a framework of analysis that allows the results of many discrete research efforts to be related in terms of a common problem or phenomenon.

Each of these requirements is easy to state but difficult to put into practice. Minimally, however, two activities are required: (1) construction of a Markov model--a comprehensive model of student flow that can show how students move into, through, and out of the institution, and (2) identification of a minimum number of distinct behavioral groups which constitute the institution's enrollment. These are discussed in the following sections.

Modeling Student Flow

An important first step in building a comprehensive research program to support enrollment management is to model longitudinal student flow, from application to program completion, as a continuous process of linked events and decisions (Ewell 1984). Over the years, many approaches have been developed for estimating student flow through the institution as a whole or through a program in the institution (Kraetsh 1979-1980, Rumpf 1978, Wing 1974). Most of these approaches are intended for enrollment projection. They are built in order to enable decisionmakers to estimate total enrollment several years in advance as an aid to budget decisionmaking. Many of them have their roots in Markov or cohort-survival models.

The essence of a Markov model is a set of transition probabilities that determine the distribution of a particular population among various defined states over a set of discrete time periods (Stokey and Zeckhauser 1978). In the case of a student cohort survival model, the states can be defined in many different ways, including active enrollment, nonenrollment through graduation, academic probation, and so forth. In its pure form, a model of this kind can be used to estimate the distribution of a given student population among the defined states at some future time, usually measured by lapsed terms or years.

There are two major limitations of these models in their pure form. First, estimates of the transition probabilities themselves must rest upon historical data and are consequently sensitive to particular conditions that might have existed at the time the data were collected. This argues for considerable sensitivity testing when using these models to determine how changes in the transition probabilities at different points affect the total distribution of the cohort. Second, different student subpopulations can experience significantly different transition probabilities because of the differences in their characteristics or behavior.

This suggests the need to disaggregate the student body into behavioral groups before attempting analysis that uses these kinds of techniques. Despite these difficulties, however, use of a modified Markov model is attractive because it allows the effects of different proposed policy changes to be estimated using manipulations similar to sensitivity testing and, additionally, because it is an important way of conceptually organizing additional research questions in the context of a comprehensive enrollment management program.

Figure gives a conceptual overview of a modified Markov progression model for a cohort comprising a specified population of students. The model contains distinct components for both admissions and student persistence, but the two are linked in order to investigate the respective or simultaneous impacts of policy changes in each of these areas. Some important aspects of the model are that it explicitly identifies a sequence of discrete decision points through which a student must pass and it allows classification of the decision points into those that are directly manipulable through institutional policy and those that must be influenced more indirectly. For example, in order to become enrolled at an institution, a prospective student must pass through three such decision points. He or she must successively seek application, be accepted by the institution, and actually decide to enroll. Similarly, students encounter additional decision points as they progress through the institution from year to year or from term to term, and these can be modeled in various ways. Together, these two types of decision points constitute a complete chain of events that, when operating in concert with similar processes for other student subpopulations, determine total enrollment at any particular point in time.

Some decision points in this chain are directly manipulable by institutional policy, including the decision that must be made about how many students to accept with what minimum qualifications. Various

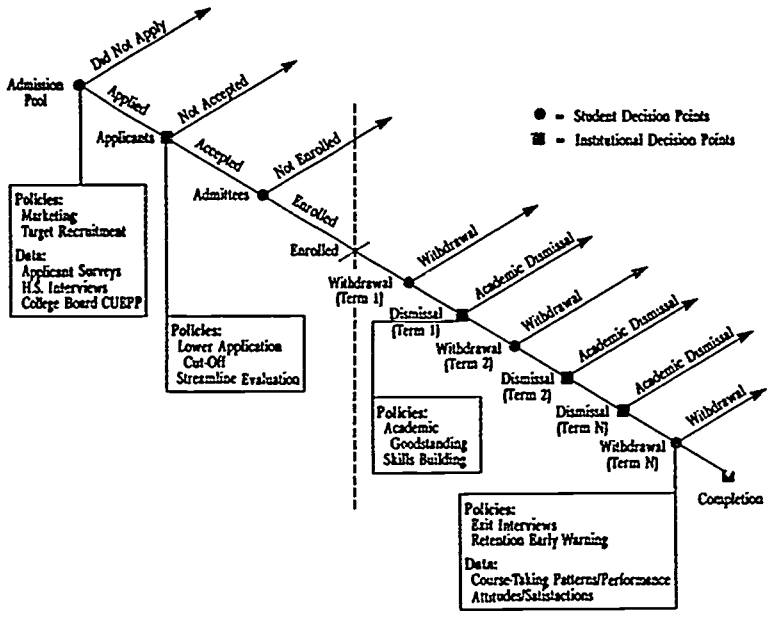


Figure 1. Conceptual Model of Student Flow Process

academic good-standing policies can also directly affect the rates of academic dismissal and program completion. Other decisions are outside the direct control of the institution, but can be influenced by one or more methods that the institution has at its disposal. For example, rates of application can be indirectly influenced through marketing and recruitment efforts; matriculation rates can be influenced by financial-aid strategies; and voluntary withdrawal can be influenced by a range of student-retention programs. Some institutional policies can have multiple ramifications. For example, a policy of academic good standing can directly influence dismissal and indirectly influence voluntary withdrawal.

A conceptual model of enrollment flow of this kind thus serves two important purposes in the context of an enrollment management program. First, once operationalized and estimated, the model is an important tool for devising broad strategies aimed at increasing or maintaining enrollment among particular student populations. For some types of students, the analysis might reveal that the biggest

problem is the proportion of applications generated from a particular target market, and the greatest leverage on total enrollment for this population can be exerted by changing the application rate. This argues for allocating scarce resources to a special marketing effort directed at this population rather than, say, setting special admissions standards to accommodate the desired group. For other student populations, the analysis might reveal that the greatest relative gains can be achieved through a retention-based strategy.

Once operationalized, the model also makes decisionmakers aware that changing the parameters of any one decision point can profoundly influence decisions down the line. For example, a decision to lower minimum standards of admission in order to maximize enrollment for a particular student population can, at the same time, increase the proportion of students who experience academic difficulty and withdraw in the first year. Operationalization of the model is vastly facilitated by using a microcomputer spreadsheet. Figure 2 illustrates a portion of the model currently being implemented through the NCHEMS Decision Support System (DSS) Project (Tetlow and Brinkman 1984) on an IBM-PC compatible computer using Lotus 1-2-3.

The second purpose of a comprehensive student-flow model is to provide a systematic analytical framework for organizing additional data gathering. Each transition point in the model raises important research questions about the factors historically responsible for the result and, consequently, the extent to which these factors might be changed by means of institutional policy. For example, as noted in figure 1, the decision to apply to the college or university can be the result of many different factors, including institutional visibility within a particular market, perceived academic quality, proximity, perceived program array, and the kinds of competition provided by other institutions. If prior analysis had determined that the greatest gains in enrollment for a particular student population could be realized by

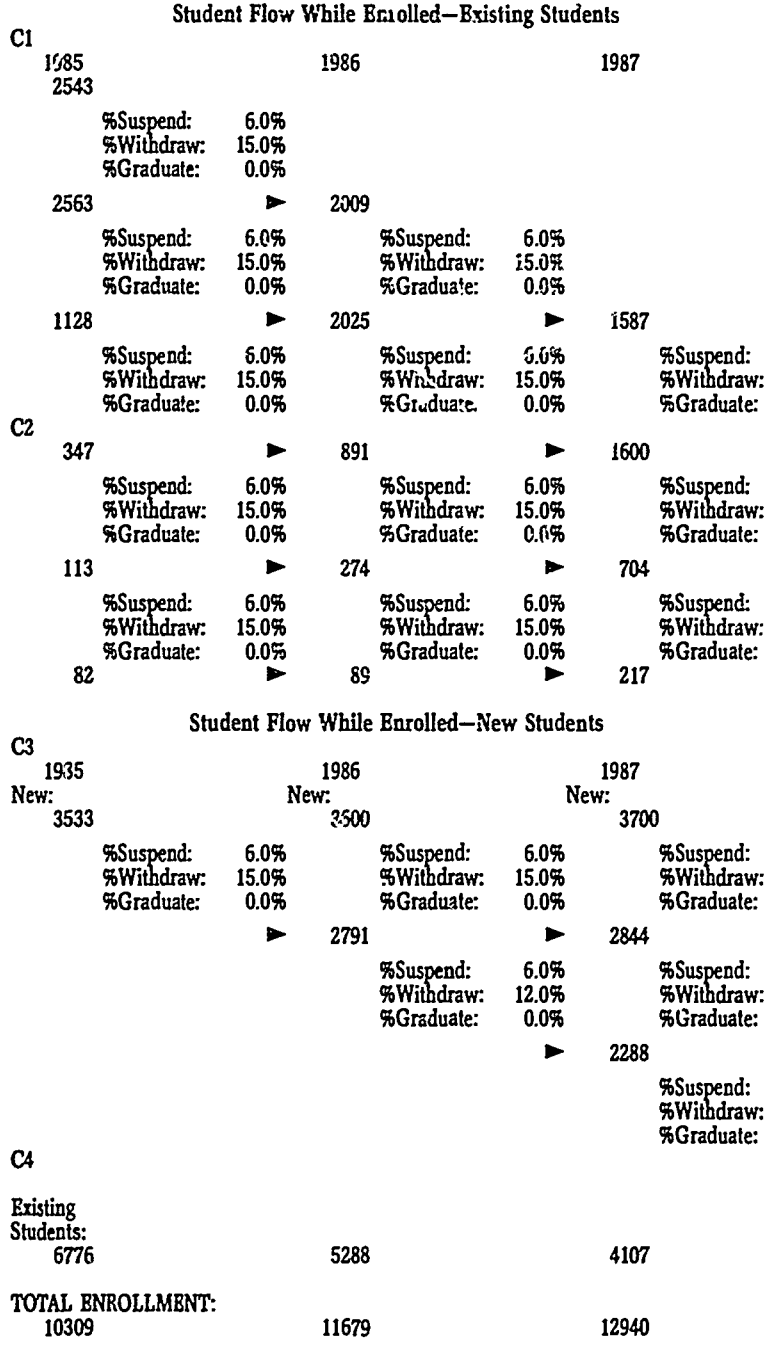


Figure 2. Student Flow While Enrolled—Existing and New Students

raising the proportion of potential applicants who apply, research questions might center on, first, discovering the extent to which these factors were present and influenced the decision and, second, determining the proportion of potential applicants who might change their behavior if the institution made changes in policy or practice.

Additional data collection of this kind can take familiar forms, including population surveys, marketing surveys, and demographic analyses. There are two gains realized by using the conceptual scheme however. First, the scheme allows studies such as these to be put into a policy context. A market segmentation analysis such as that described by Zemsky and his colleagues (Zemsky and Oedel 1983), for example, might indicate that the proportion of students applying to a given institution in a particular market area is not likely to rise above a certain limit regardless of what the institution does. With this information in hand, enrollment managers can estimate the relative benefits of achieving this proportion versus the benefits obtained by an alternative allocation of resources that is aimed at influencing a different segment of the enrollment chain. This leads to the second advantage of such a scheme, namely, that otherwise unrelated student studies can be directly compared to one another in terms of their contribution to overall knowledge about the determinants of student flow. A major barrier to the effective use of student research in most institutions is that it is generally seen as noncumulative. A retention study is requested and the findings are used only in the context of a particular, often short-term, institutional problem. At the same time, a marketing survey is commissioned from an outside vendor in order to investigate a perceived problem in the institution's admissions yield rate. Rarely are the findings of studies as organizationally and methodologically distinct as are the findings of studies which are related to one another in a useful way. Use of a student-flow model to organize research results is an important way of overcoming this familiar problem.

Determining Enrollment Structure

Student-flow models like the one described above are of limited value if they do not take into account the different kinds of students typically found in an undergraduate student population. Different kinds of students systematically behave in different ways, and it may be necessary to build distinct tracking models for each distinct component of the population. But how are distinct components to be identified? What kinds of differences are important? Answers to these questions must be developed on an institution-by-institution basis. Nonetheless, there are several common principles that can be applied.

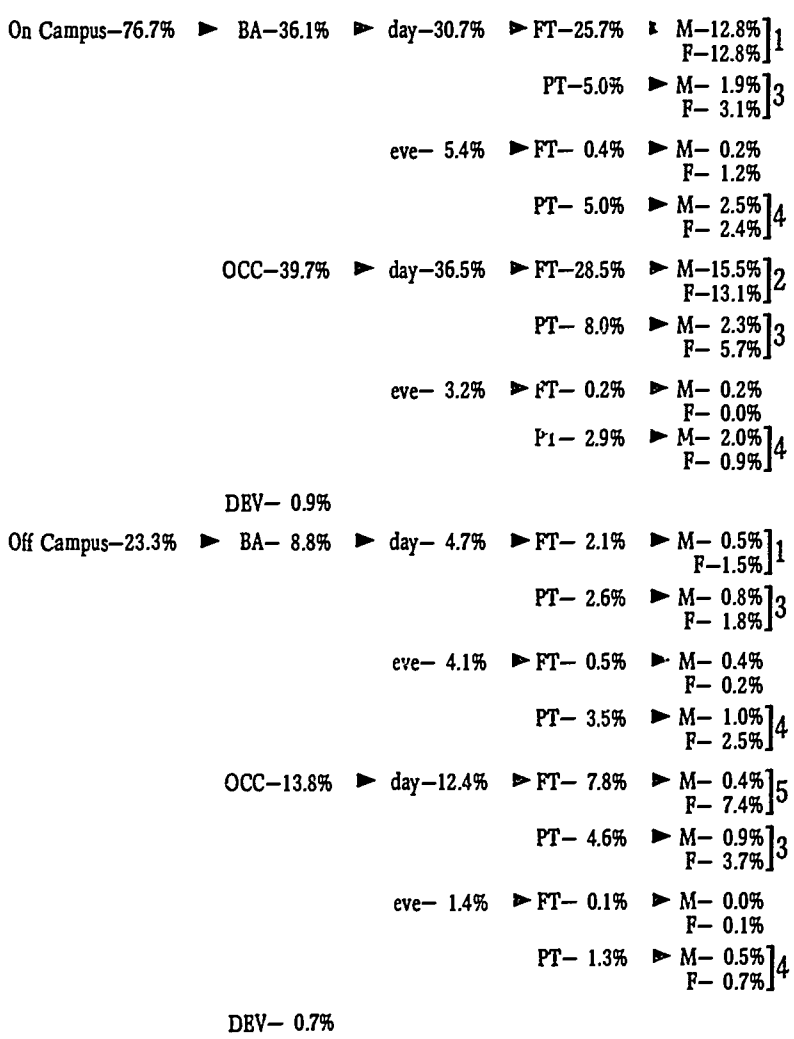
Institutional researchers traditionally break down student populations in two ways--demographically and by program area. Each is important, but neither one isolates the distinct behavioral groups that comprise a student population. Demographic factors, for example, are generally treated one at a time. Separate tracking analyses, for example, are commonly conducted for (1) the male and female portions of a cohort, (2) the older and younger group, (3) the ethnic majority and minority populations of the cohort, and so on. While this approach provides some insight, student behavioral groups generally consist of particular combinations of such factors. A black male who is 18 to 21 years old and seeking entry-level occupational education, for example, systematically behaves in different ways than a white, female, liberal arts student who, in turn, behaves in different ways than an adult, evening, part-time student who is seeking skills to upgrade her current job situation.

Appropriate tracking groups are therefore best identified by disaggregating total enrollment so that the different behavioral components are apparent. One way of beginning this process is to break down the student population by all available demographic and enrollment characteristics that are thought to be important. Figure 3 is an example

of a disaggregation for a small, rural, community college. The right-hand side of this breakdown represents a set of logical possibilities for cross cuts among demographic variables, each of which forms a distinct behavioral group. Rarely, however, will all such logical possibilities contain substantial numbers of students. Rather, students will cluster in certain categories that can then be aggregated for analytical purposes. In the example shown, 96.2 percent of the student population is accounted for by five distinct behavioral groups. Each of these five groups, once identified, was tracked separately.

Particularly useful student tracking groups can be constructed when data about students' intentions, gathered at the beginning of the enrollment period, are added to demographic and enrollment information. For example, Sheldon (1981) identified 14 behaviorally distinct student prototype groups as part of the California Community College Statewide Longitudinal Study. Each prototype group was defined in terms of a combination of factors, including attendance goal, demographic characteristics, and early enrollment behavior. Each of these groups had a markedly different enrollment pattern and persistence rate. This was largely because each group had a different set of reasons for wanting to be enrolled in the first place.

This type of disaggregation can be extremely important when explaining patterns of student behavior, and make it possible to avoid common misperceptions. Particularly with respect to retention programs, disaggregation allows enrollment managers to estimate the probable retention levels that can be achieved if institutional policies are changed or new programs initiated. For some students, changes in policies and programs do not make a difference (Tinto 1982). For others, the effect of such programs is much less than anticipated because program completion, per se, is simply not important to the students involved (Walleri 1981).



1 = Full-time, Day, Transfer (27.1%)
2 = Full-time, Day, Occupational (28.6%)
3 = Part-time, Day, Program (20.2%)
4 = Part-time, Evening, Program (12.5%)
5 = Off-campus, Full-time, Day, Occupational (7.8%)

Figure 3. Breakdown of SRC Enrollment by Types of Students Fall, 1980

Disaggregation can also be of considerable value when attempting to make sense of an institution's cost and resource utilization patterns. Different behavioral groups generally interact with the campus in quite different ways. Different types of students might, for example, concentrate in particular programs, enroll in particular kinds of classes regardless of their program affiliation, attend the institution at particular time periods or in particular locations, and consume quite different kinds of student services. As a result, changes in the relative sizes of these subpopulations can presage significant shifts in patterns of service utilization and departmental loads. Most institutions now make use of a methodology based on an induced course load matrix (ICLM) to examine the impact of shifts in program enrollments across the curriculum. Significant insights result from a parallel analysis that uses student behavioral groups as a substitute for programs in an ICLM.

In many cases, it is a particular goal of enrollment management to change the structure of enrollment. Rather than concentrating on total enrollment size, for example, enrollment managers might want to increase the proportion of students who have high ability, graduate from private high schools, consist of a particular racial or ethnic minority, and so forth (Litten 1984). In such cases, the target groups themselves constitute distinct analytical subpopulations for tracking purposes, and one objective of the student-flow model is to determine the policies and programs that have the greatest potential to change the proportion of these groups within a total enrollment of fixed or given size. The first case treated below constitutes an excellent example of a policy problem of this kind.

There is no one right way to disaggregate enrollment into the proper behavioral groups. Each institution is different, and the groups chosen for separate treatment are themselves different. In structuring behavioral groups, however, analysts

should consider (1) appropriate cross cuts of important demographic factors such as sex, age, ethnicity, and ability level, (2) appropriate cross cuts of enrollment factors such as student status, time of attendance, load carried, and place of attendance, (3) student choice of program, and (4) student academic goal and intended duration. In most cases, the bulk of an institution's undergraduate enrollment is best organized when it is categorized into no more than 8 to 10 groups.

Some Examples of Institutional Practice

As emphasized above, a comprehensive approach to enrollment-management research contains few universal recipes that can be applied to all institutional settings. Furthermore, the ingredients of recipes are already familiar to most research practitioners. As a result, different applications of the concept emphasize different things, depending upon the policy problem to be addressed. The following examples are drawn from institutions with which NCHEMS has worked directly, either through the recently completed NCHEMS/Kellogg Student Outcomes Project or on a consulting basis with NCHEMS Management Services, Inc.

Case 1—Managing an Identified Segment of Student Population

North Carolina State University (NCSU) is a major public teaching and research university with a headcount enrollment of approximately 22,000, about three-quarters of which is made up of undergraduates. In 1981-84, NCSU was one of seven participants in the NCHEMS/Kellogg Student Outcomes Project. This was a national demonstration project intended to enhance the use of information about student outcomes in program planning and decision-making of institutions of higher education. Because it was subject to a federal Consent Decree which mandated that the university attain a 10.2 percent total black enrollment by 1986, the focus of NCSU's campus project was to mobilize available information

about black student enrollment/success in order to inform a new set of institutional programs and policies.

The first step in the project was to build a comprehensive model which covered both admissions and student retention while students were enrolled. This was carried out for the purpose of comparing the dynamics of black and white student enrollment flow. This model was estimated using NCSU's extensive array of cohort tracking data which contained seven years of tracking information. The resulting summary profile (see figure 4) was striking in its implications for policy. First, it was clear that the greatest potential leverage on the black/white enrollment ratio could be exerted in the admissions phase, particularly in the number of applications generated from an identified pool of in-state, college-bound, high-school seniors. Second, it was clear that, once enrolled, black and

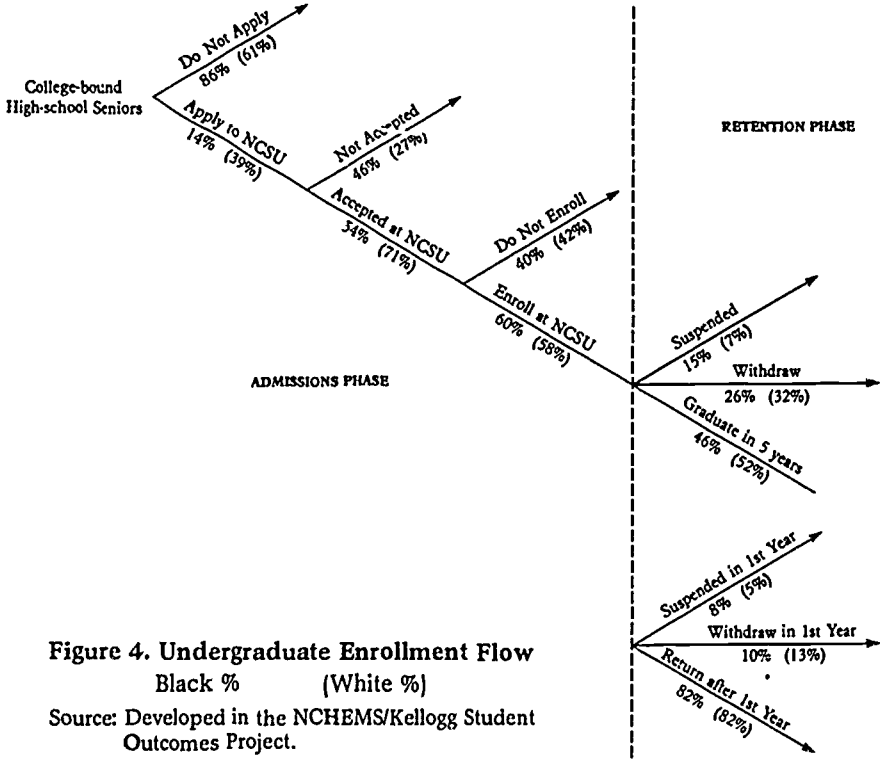


Figure 4. Undergraduate Enrollment Flow
Black % (White %)
Source: Developed in the NCHEMS/Kellogg Student Outcomes Project.

white students tended to leave NCSU in different ways, although their eventual degree-completion rates remained quite similar. Blacks tended to leave disproportionately for academic reasons, while whites tended to leave voluntarily for other reasons. Furthermore, additional disaggregation revealed substantially different flow patterns for black men and black women.

Armed with this information, the university committee which was assigned the responsibility of making recommendations considered its options. Two key decision points were directly controlled by institutional policy--the admissions rate and the academic good-standing policy that results in academic probation or dismissal. Review of historical records revealed that, first, much had already been done to equalize black and white acceptance rates and, second, attaining additional enrollment gains using this particular policy lever was unlikely. At the same time, the committee felt that the admissions process itself (largely based on SAT scores and high-school GPA's) might inadvertently be screening out potentially successful black applicants. As a result, an investigation of the noncognitive predictors of success of black students was placed on the research agenda. The other potentially available lever--direct policy--proved intractable. Indeed, in the course of the project, faculty at NCSU voted to strengthen the academic good-standing policy. This was a move with a potentially negative impact on black enrollment.

Most of the critical decisions in the total enrollment flow pattern remained out-side of the institution's direct control. The committee's efforts were therefore directed toward mobilizing data in order to identify what determined these decisions and how they might be positively influenced by university action. A key point revolved around the perceived barriers which prevented black high school students from applying to NCSU. Findings from several years of survey data, including surveys of entering students, continuing students, and alumni, revealed that entering

black students saw NCSU as prestigious and academically challenging--a school at which it would be difficult to succeed. Historical data, however, indicated that black students did in fact succeed and landed good jobs and acceptances by graduate schools at the same rates as whites. With this and similar information, the committee coulo make informed recommendations. And, partly as a result of these recommendations, the university made major changes in, first, recruitment efforts for black students, second, its advisement and placement procedures, and, third, its academic skills programs (Rogers 1984).

Case 2—Admissions Planning in a Multicampus System

The Fundacion Educativa Anna G. Mendez (FEAGM) is a private system of institutions in and around San Juan, Puerto Rico. The system contains three institutions, each of which enrolls approximately 5,000 commuting students in a range of primarily career-oriented programs. In the fall of 1984, FEAGM contracted with NCHEMS to provide assistance in enrollment analysis and master planning of admissions. FEAGM's immediate concern was a sharp decline in the number of applications and, consequently, the size of the entering student population. Discovering the roots of this phenomenon and identifying some policy mechanisms either to reverse or counterbalance it were of critical importance to a set of institutions that are over 90 percent tuition-driven. Reversing the phenomenon meant, first, discovering at what point in the admissions process students of different types were actually being lost and, second, determining the reasons for different types of student behavior.

As a result, the first analytical task was to chart historically admissions patterns and total student flow using a modified Markov model as implemented on Lotus 1-2-3. Two major findings emerged from this analysis. First, although the number of applications showed a declining pattern for two of the three institutions, the absolute

number of nonmatriculants remained constant. As a result, the total yield percentage of the admissions process also showed decline. Second, two- and four-year retention figures were extremely low and varied widely by program, although, interestingly, not by ability level. This finding suggested that losses in applications, if they did not prove reversible, were capable of being counter-balanced by increased retention. An increase of 8.3 percent in the overall retention rate, for example, was all that would be required to offset the admissions losses experienced by the hardest hit of the three institutions.

The student-flow analysis also helped FEAGM to decide what additional data were needed. Data were first needed to help determine the degree to which declines in total applications were reversible. Following up on this need, FEAGM undertook three complementary data-collection efforts: (1) a review of economic and employment conditions on the island of Puerto Rico and their impacts on postsecondary enrollment, (2) an interview-based analysis of the perceptions of high-school counselors and community leaders of FEAGM and other regional colleges and universities, and (3) a survey of currently enrolled students to determine why they chose to attend FEAGM institutions.

Results of these analyses were revealing. First, several findings indicated that some gains could be made in raising FEAGM's market-share percentage within a relatively fixed application pool. For example, both counselor and student-survey data indicated that proximity and program availability constituted major reasons for choosing a particular institution. But counselor interviews also revealed considerable ignorance about what programs FEAGM institutions actually offered. Clearly some effort needed to be directed toward making potential students aware of the existence of new high-demand program areas.

Results of the economic analysis were more sobering. An upturn in employment across Puerto

Rico has caused many potential students to choose work over enrollment regardless of their choice of institution. FEAGM's clientele of students who commute and are occupationally oriented was particularly vulnerable to this general economic trend.

A key aspect of the analysis undertaken at each of the three institutions was the disaggregation of total enrollment into different behavioral groups. All three FEAGM institutions were highly multifunctional, and each simultaneously served several different student bodies. For each institution, behavioral groups were defined in terms of cross-cuts among four variables--sex, age, enrolled load, and time of attendance (see figure 5). Separate tracking analyses were undertaken for the largest groups so identified. In most cases, changes in total enrollment dynamics could be directly traced to changes occurring in only one or two of these groups. At one institution, for example, virtually all admissions losses could be accounted for by full-time, traditionally aged, daytime-attending, female students. Such information allowed much

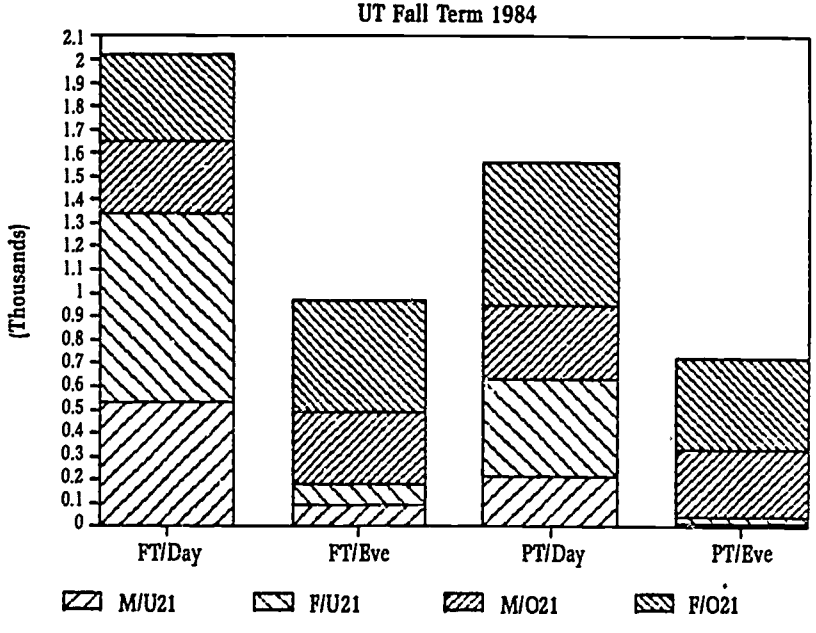


Figure 5. Enrollment Composition by Group

more careful targeting of recruitment or retention practice. Separate analyses were also conducted for each program area and for both on- and off-campus attenders.

Conclusions

Each of these cases illustrates the gains that can be achieved by organizing research efforts around a single conceptual model. While the conduct of individual research studies may be little affected by such an approach, the agenda of which studies to undertake at what time, as well as the manner in which the results of discrete studies can be integrated in the context of a single policy problem, represent considerable gains. Most important of all, the model is a considerable aid in communicating the implications of research to institutional policymakers. Indeed, the ability to focus the attention of top administrators is probably the greatest advantage of such an approach.

As emphasized previously, there is no one single way to implement a comprehensive research effort to support institutional enrollment management. Experience in using the approach does, however, indicate a number of broad guidelines. These include the following:

- Look at the big picture. The most important single step in all enrollment management research is to develop an appropriate enrollment model for the institution. The choices of how detailed the model should be, the time-horizon that is covered by the model, and what variables to include remain institutional choices. But the model itself should be a clear and visible part of all communication of research results.
- A partially estimated model is better than none. Many institutions do not attempt to model student flow because the longitudinal data required to drive a full-scale model of student flow are not available. Indeed,

longitudinal tracking data bases are still lacking at many institutions; at others, such data bases are only a year or two old. But even partial data can be of value in ruling out less promising courses of action. In many institutions, for example, examination of admissions flow alone can show immediate promise; and this is an area in which reasonably complete data are available.

- Disaggregate enrollment until distinct behavioral patterns emerge. Aggregate models of student flow are of little value unless behaviorally distinct elements of the student population can be identified and treated separately. The best way of identifying groups is through experimentation--by examining different successive cuts of enrollment statistics, for example, until a number of groups emerge which hang together. Graphic inspection of different enrollment components is of considerable value here.

- Review the results of past research. Most institutions have considerable reserves of knowledge about student behavior based upon studies executed in the past. A major barrier inhibiting ongoing use of the results of such studies is that they are not organized in terms of available policy actions or perceived policy problems. Using an enrollment-flow model to organize and communicate accumulated knowledge can pay substantial dividends.

- Construct a prioritized agenda for future research. One problem with constructing an institutional-research agenda is that it is potentially limitless. Any number of interesting and apparently useful studies could be undertaken, although available resources limit which ones can be carried out. A comprehensive approach helps set research priorities in the context of

institutional strategy. Scarce human resources can be directed toward gaining knowledge about potential actions with the highest estimated payoff for the institution.

- Revisit the model continuously and check the validity of its assumptions. Enrollment models are only as good as the assumptions upon which they rest. These assumptions often change due to changes in the institutional environment and policy. As a result, enrollment models should never be seen as immutable. Rather, they should be constantly reviewed in order to ensure their appropriateness and discover new insights into available student data.

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