YOUR SAFE HARBOR AWAITS!

Welcome to Baltimore and the 36th Annual NEAIR Conference!

In response to the demand for accountability in higher education, this year's conference theme is **"Harbor in the Storm: Institutional Research in the Age of Accountability."**

Our Harbor Masters include Program Chair Steve Thorpe and Associate Program Chair Gayle Fink, who have created an absolutely outstanding program. Our keynote speakers, Dr. William 'Britt' Kirwan and Dr. Cliff Adelman will share broad perspectives on the accountability movement in higher education.

Our host city, Baltimore, and our conference hotel, the Sheraton Inner Harbor, are simply the perfect setting for our conference. Harbor Master Nicole Marano, our Local Arrangements Chair, and her team have been hard at work developing menus and sampling local flavors and activities so that you can experience all the area has to offer.

Our conference includes a variety of professional development workshops – Bruce Szelest, pre-conference workshop coordinator, has ensured that there are interesting offerings. Saturday evening, I will host a "Harbor in the Storm" reception, so you can connect with old friends and welcome new people to NEAIR. The conference will include session presentations, poster sessions, and new this year – "techshares." Our program concludes on Tuesday with a panel discussion on the **Implications of the Higher Education Opportunity Act for IR** followed by our annual raffle.

All in all, it will be a great few days. I look forward to seeing you.

Mitch Nesler

NEAIR President and Deck Hand

HARBOR IN THE STORM

Institutional Research in the Age of Accountability

NEAIR 36th ANNUAL CONFERENCE PROCEEDINGS

NOVEMBER 7-10, 2009

The Sheraton Inner Harbor, Baltimore, Maryland

BALTIMORE CONFERENCE CONTACTS

MITCH NESLER
President

STEVE THORPE
Program Chair

GAYLE FINK
Associate Program Chair

BRUCE SZELEST
Pre-Conference Workshop Coordinator

PAULA MAAS
Poster Session Coordinator

JULIE ALIG
Best Paper Chair

JIM TRAINER
Peer Review Coordinator

TERRY HIRSCH
Conference Evaluation Coordinator

BETH FREDERICK
Program Editor

NICOLE MARANO
Local Arrangements Chair

LIZ DEIGNAN
GURVINDER KHANEJA
Exhibitor Coordinators

LINDA JUNKER
Local Arrangements Coordinator

JEAN MARRIOTT
AV Coordinator

SHANNON TINNEY
Dine Around Coordinator

MARK PALLADINO
Website Chair

ANNEMARIE BARTLETT
Conference Website Coordinator

BETH SIMPSON
NEAIR Administrative Coordinator

Table of Contents

** Winner 2008 Best New Paper*

Acknowledgment
I am proud to present the NEAIR 36th Annual Conference Proceedings that records research work compiled by our members and presented at the 2009 annual conference. This year, 10 NEAIR Colleagues and their co-authors submitted seven conference papers to be included in the Proceedings. In addition to these research papers, presentations are available in the Members Only portion of the NEAIR website. I would like to thank NEAIR for this learning experience regarding the duties of the Publication Chair. Thank you also to Beth Simpson for all of her support and help throughout the year.

Michael D'Alessandro
Publications Chair, 2009-10
Westchester Community College

A PRINCIPLE COMPONENTS ANALYSIS OF THE DETERMINANTS OF STUDENT SATISFACTION AT A HISTORICALLY BLACK INSTITUTION

Tao Gong
Assistant Professor
Department of Agriculture
University of Maryland Eastern Shore

Jacqueline V. Parham
Doctoral Candidate
ORLD/EDLD program
University of Maryland Eastern Shore

Abstract

This paper used the Principle Components Analysis to identify the factors of student satisfaction at an HBCU. The results indicated that eight dimensions that are associated with student satisfaction scores were (1) Satisfaction with student support services, (2) Satisfaction with customer service, (3) Satisfaction with faculty advising, (4) Satisfaction with info services, (5) Satisfaction with non-academic support, (6) Satisfaction with non-faculty advisement, (7) Satisfaction with IT, and (8) Satisfaction with marketing.

Objectives

The purpose of this study was to identify the factors that relate to student satisfaction at a Historically Black College or University (HBCU). Previous literature reveals that student satisfaction may affect retention rates, performance rates (matriculation), and graduation rates (Aitken, 1982; Bean and Bradley, 1986; and Hutto and Fenwick, 2002). The institution in the study has experienced both retention and graduation issues in the past few years. For example, a trend showed that the one year retention rate declined from 69.1% (fall 2002 cohort) to 64.0% (fall 2004 cohort). Compared to the other

campuses in the university system in fall 2004, the retention rate was lower by approximately 18% of entering freshmen who did not return for the sophomore year.

Literature Review

A brief literature review helps understand the factors that may contribute to the satisfaction of students. Bean and Bradley (1986) had eight factors of student satisfaction: Institutional Fit, Academic Integration, Utility, Academic Difficulty, Social Life, Membership, Class Level, and High-School Performance. Elliot (2002) took data from a convenience sample of 1,805 freshman, sophomore, junior, and senior students from an upper Midwest university. Just over 1% (1.1%) of respondents was African American. The key determinants of student satisfaction were found to be students' feeling of belonging to the university and students' feeling that they were receiving a quality education. Elliot advised that university staff need to demonstrate a sincere concern for students through caring and helpful attitudes and policies.

Data

The data came from the HBI's student satisfaction survey results in fall 2004. Study subjects were 1,590 students who responded to the survey for the first time. The student population at the HBI was 3,775; thus, the response rate was 42%. The survey instrument was developed locally and has 59 items. Among them, there are eight demographic questions and one open-ended question. The survey was presented in a paper-and-pencil format to elicit data from participants. There are general directions at the beginning of the survey that instruct respondents how to complete the questionnaire. Participants ranked

their responses for each item on a five-point Likert scale which ranged from (1) strongly agree through (4) strongly disagree.

Methodology

The principle components analysis was used to reduce the number of variables in the student satisfaction survey. First, the Pearson Correlation was performed to check the inter-correlations between variables. Variables will be eliminated if they do not correlate or are highly correlated with any other variables. The correlation matrix shows that the variables in this study were well correlated and none of the coefficients were highly correlated with each other. Therefore, no variables were excluded from the explanatory factor analysis.

Then, the Kaiser-Meyer-Olkin Measure (KMO) and Bartlett's Test of Sphericity were conducted to test the sampling adequacy. Table 1 presents the test results. The value of KMO is greater than 0.5, which indicates that the sample is adequate for factor analysis. The Bartlett's Test of Sphericity is highly significant at less than 0.1%, which shows that the strength of the relationship among variables is strong.

TABLE 1: KMO AND BARTLETT'S TEST RESULTS FOR FALL 2004 STUDENT SATISFACTION SURVEY

Kaiser-Meyer-Olkin Measure of Sampling Adequacy		.957
Bartlett's Test of Sphericity	Approx. Chi-Square	31181.818
	Degree of Freedom	1275
	Sig.	.000

Next, factors were extracted from the correlation matrix. A variety of methods can be conducted to extract principle components. This research is to identify a small number of underlying factors that explain most of the variance in a large set of observed variables;

therefore, principle component analysis (PCA) is used. Eigenvalues will be used to determine the number of factors to retain. If factors have an eignevalue less than 1, they will be dropped. Table 2 presents the total variance explained. Eight components have an eigenvalue greater than 1. The first factor has an eigenvalue of 17.792 and explains 34.886% of the variance. The second factor has an eigenvalue of 3.614 and accounts for 7.087% of the variance. Factors 3 through 8 have an eigenvalue greater than 1 and explain 20.363% of the variance. Factors 9 through 51 have an eigenvalue less that 1, and therefore were eliminated.

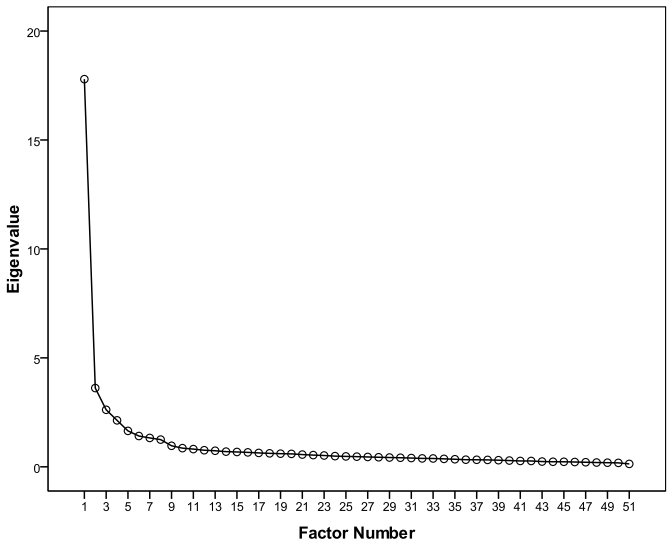
TABLE 2: TOTAL VARIANCE EXPLAINED

Factor	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	17.792	34.886	34.886	17.792	34.886	34.886	4.777	9.367	9.367
2	3.614	7.087	41.973	3.614	7.087	41.973	4.706	9.228	18.595
3	2.617	5.132	47.104	2.617	5.132	47.104	4.470	8.765	27.360
4	2.132	4.180	51.285	2.132	4.180	51.285	4.369	8.567	35.927
5	1.649	3.233	54.518	1.649	3.233	54.518	3.999	7.841	43.768
6	1.413	2.771	57.289	1.413	2.771	57.289	3.700	7.255	51.023
7	1.325	2.598	59.887	1.325	2.598	59.887	3.158	6.192	57.215
8	1.249	2.449	62.336	1.249	2.449	62.336	2.611	5.120	62.336

Note: The table was truncated at factor 9.

Scree plot was used to help determine how many factors to retain. This is a plot with the factor number on the horizontal axis and their corresponding eigenvalues on the vertical axis. It provides additional evidence on the number of factors retained. Figure 1 indicates that the first eight components have an eigenvalue greater than 1. Therefore, it confirmed that eight components should be retained.

FIGURE 1: SCREE PLOT FOR THE PRINCIPLE COMPONENT ANALYSIS WITH EIGHT FACTORS



Finally, factor rotation was conducted to help interpret the components. We use Varimax rotation method to maximize the factor loadings. Factors with loadings less than 0.5 were suppressed in the rotated component matrix to facilitate interpretation.

Results

As a result of the principal components analysis, this study revealed that eight dimensions related to the student satisfaction at the HBI. These eight dimensions were: (1) Satisfaction with student support services, (2) Satisfaction with customer service, (3) Satisfaction with academic advising, (4) Satisfaction with info services, (5) Satisfaction with non-academic support, (6) Satisfaction with non-faculty advisement, (7) Satisfaction with IT, and (8) Satisfaction with marketing. Table 3 presents a summary of the survey items and factor loadings.

TABLE 3: SUMMARY OF SURVEY ITEMS AND FACTOR LOADINGS

Factor Name and Items	Loading
Student support services	
Registrar's office	.670
Library	.665
Bookstore	.652
Student activities	.642
Computer labs	.625
Financial aid	.574
Food services (cafeteria)	.539
Student health services	.507
Customer service	
Staff addresses my problems	.757
Faculty willing give time & help	.752
Faculty is courteous	.728
Staff is courteous	.705
Staff is willing to give me the time	.698
Faculty addresses my problems	.647
Faculty advising	
Faculty advisors are accessible	.770
Advisement from faculty advisors is timely	.765
Advisement from faculty advisors is accurate	.752
Faculty advisors are courteous	.730
Faculty advisors provide me sufficient information	.701
Advisement I receive from faculty is satisfactory	.674
Info services	
I have received information regarding UMES in a timely manner	.674
I have received printed information regarding UMES	.652
If I file a complaint or suggestion, i believe it will be properly addressed	.631
University services are available to me at convenient times	.629
Time I have waited to receive services has been reasonable	.625
Should the need arise, I know how to file a complaint or suggestion on campus	.621
I am satisfied with the availability of class offerings	.602
Non-academic support	
Disability services	.803
Counseling services	.745
International student services	.738
Copy center	.686

Career services	.590
Non-faculty advisement	
Advisement from non-faculty is accurate	.801
Advisement from non-faculty is timely	.788
Non-faculty advisors provide me with sufficient information	.746
Non-faculty advisors are courteous	.709
Non-faculty advisors are accessible	.700
IT	
I am able to find information the school's web	.678
UMES website is easy to navigate	.655
I am aware that UMES offers internet courses	.595
I am satisfied with on-line registration	.574
Marketing	
Would still choose UMES	.777
Would recommend UMES	.715
UMES encourages personal growth	.630
Satisfied with education experience	.614

Conclusions

Satisfaction with Student Support Services

The first factor contributing to student satisfaction seems to be satisfaction with student support services. These support services include registrar office, financial aid office, computer labs, student activities, library, bookstore, food services, and health services. Reactions to these services are all loaded onto this single factor.

Satisfaction with customer service

The variables that load highly on the second factor seem to all relate to satisfaction with customer service. The questions, such as if either faculty or staff is courteous, if either faculty or staff is willing to give time and help, and if either faculty or staff addresses students' problems are all loaded onto this single factor.

Satisfaction with faculty advising

The variables that load highly on the third factor all seem to relate to different aspects of satisfaction with academic advising. Underlying contributions to satisfaction with faculty include if faculty advisors are accessible and courteous and if advisement from faculty advisors is timely, accurate, and sufficient.

Satisfaction with information services

The variables that load highly on the fourth factor seem to all relate to satisfaction with information service. Underlying contributions to satisfaction with information services include if students have received information regarding UMES in a timely manner and if they believe their concerns will be properly addressed. Satisfaction with information services also means students are satisfied with the availability of class offerings, time the student waited to receive services has been reasonable, and university services are available to students at their convenient times. One of the possible interpretations for this factor underscores the importance of the communicational dynamics in the bureaucracy of the organization. Students are able to penetrate the bureaucratic infrastructure through verbal and nonverbal communication. Therefore, this factor is related to the satisfaction of students.

Satisfaction with non-academic support

The variables that load highly on the fifth factor seem to all relate to satisfaction with non-academic support. The services, such as disability, counseling, international and career services contribute to the satisfaction of students. Previous literature reveals that

women, minorities, first-generation students often experience dispositional and situational challenges that can hinder their academic progress (Thomas, 2001, p. 140). Therefore, these services could highly relate to the satisfaction scores of these students. Supportive mechanisms from this source provide students with needed information by emotional sensitivity which is advantageous to the student and to the university's reputation and commitment.

Satisfaction with non-faculty advisement

The variables that load highly on the sixth factor measure the satisfaction with non-faculty advisement. The items, such as advisement from non-faculty is accurate and timely and non-faculty advisors are courteous, accessible, and provide me with sufficient information are loaded onto this single factor.

Satisfaction with IT

The variables that load highly on the seventh factor all seem to relate to different aspects of satisfaction with IT. The items, such as students are able to find information from the school's website, aware internet courses, and satisfied with online registration, and the website is easy to navigate are loaded onto this single factor.

Satisfaction with marketing

The variables that load highly on the last factor all seem to relate to marketing. Underlying contributions to satisfaction with marketing include items, such as students

would still choose and recommend the institution, the HBI encourages personal growth, and students were satisfied with education experience.

Table 4 provides the reliability analysis of the extracted factors. All eight dimensions have a Cronbach's alpha greater than 0.80, which suggests that these dimensions have a significant level of internal consistency.

TABLE 4: RELIABILITY OF THE FACTORS

Factor	Cronbach's Alpha	Number of Items
Student Support Services	0.860	8
Customer Service	0.905	6
Faculty Advising	0.933	6
Info Services	0.898	8
Non-Academic Support	0.867	5
Non-Faculty Advisement	0.909	5
IT	0.825	4
Marketing	0.811	4

Implications for research/practice

The implications for the HBI executives, administration, and other HBCU personnel are as follows: faculty and non-faculty advising, student support services, non-academic support, customer service, information services, IT, and marketing are all related to the satisfaction of students.

The traditions of academic success have been obtained through historical testimonies of balance between student satisfaction and academic preparation. These findings suggest that a relationship with faculty advisors and nonfaculty employees is important for students. The findings further suggest that student-support-service factors play an instrumental role in students' overall academic lifestyle. The academic lifestyle of a student includes studying, writing papers, and taking exams. This means having

supportive persons facilitating adequate and needed information before, during, and after the time of need. Because this "off-to-college" experience may be the first experience away from home, successful students require an advocate for both academic and administrative concerns.

Other factors that were most interesting from the results of the study dealt with communication dynamics and info services. This includes feeling comfortable enough to file a complaint. Open communication or an open-door policy helps to facilitate open communication for a greater educational experience. Satisfaction with these factors included students being given attention when having problems; and these factors can be thought of as good communication in services the university provides for problem resolution, conflict management, and growth and development. Being able to have assistance with both immediate and non-immediate problems prevents greater crises.

As stated above, HBCUs were created to provide academic and economic opportunities for Blacks. By creating greater student satisfaction HBCUs can continue to provide educational opportunities to students. HBCUs continue to provide an education for a larger Black population compared to other ethnic populations.

References

Aitken, N. D. (1982). College student performance satisfaction, retention: Specification and estimation of a structural model. *Journal of Higher Education, 53,* 32–50.

Bean, J. P., & Bradley, R. K. (1986). Untangling the satisfaction–performance relationship for college students. *Journal of Higher Education, 57,* 393–412.

Elliot, K. M. (2002). Key determinants of student satisfaction. *Journal of College Student Retention, 4,* 217–279.

Hutto, C. P., & Fenwick, L. T. (2002). *Staying in college: Student services and freshman retention at historically Black colleges and universities (HBCUs*). (ERIC Document Reproduction Service No. ED468397).

Thomas, V. G. (2001). Educational experiences and transitions of reentry college women: Special considerations for African American female students. *Journal of Negro Education, 70,* 139–155.

ASSESSING AND ENHANCING GRADUATES' EMPLOYABILITY WITH A RECRUITER SURVEY

Anne Marie Delaney
Director of Institutional Research
Babson College

Introduction. The purpose of this paper is to discuss the rationale, method and selected results from a recruiter survey designed to assess and enhance graduates' employability. Major research questions include the following:

- What criteria are most important to recruiters in evaluating candidates for employment?

- How do recruiters evaluate the College's MBA students on these criteria?

- How do recruiters evaluate students' interview performance relative to other students?

While the original study was conducted with recruiters of MBA students, the methodology may be applied to research with recruiters of undergraduate and graduate students in other academic fields.

Literature Review

Findings from previous recruiter surveys provide important information regarding the qualities recruiters seek in applicants. Results identify the importance of personal attributes, professional skills, performance in interviewing, and cultural fit with a company. Recruiters place a high priority on soft skills - communication and interpersonal skills. Previous research also highlights the increased focus on diversity and the need for colleges to provide appropriate services for on-campus recruiting. Some studies compare recruiters' perspectives with those of other groups, such as students and professors. This information is useful both for individuals seeking employment and for career services professionals advising and preparing students for their job search.

Kane (l993) conducted a survey of recruiters representing 56 different organizations to obtain knowledge about recruiters' perceptions of the skills MBAs should possess and to obtain insights regarding recruiters' selection criteria. Results revealed that recruiters assume graduates have the necessary technical skills. What they're looking for is people skills. Recruiters identified strong interpersonal, communication, and team-oriented skills as the most significant criteria for all major areas including general management positions, functional area positions, and commissioned sales positions. Recruiters viewed interview performance as the most important factor in evaluating students with previous work experience, and they identified communication skills as the most important criteria in evaluating students' performance in interviews.

Goldberg and Perry (l998) surveyed 44 recruiters to identify the importance of interviewing skills to recruiters' decisions. Results revealed that interviewing skills explained a great deal of the variance, beyond that explained by background/experience, in the likelihood that a student would be invited for an on-site interview and would receive an offer. Background/experience and interviewing skills together accounted for 27 percent of the total variance in the likelihood that the company would consider the student as a candidate for hiring. Overall, these results indicate that by improving verbal and nonverbal skills and thoroughly researching organizations where students apply, they can significantly increase their chances of success. Further, MBA programs should offer ample opportunities for students in all functional areas to develop these skills and enhance their placement possibilities.

Moody, Stewart and Bolt-Lee (2002) conducted research to determine what skills recruiters seek in applicants and the best method for students to demonstrate those skills. Results identified the following top five skills sought: communication (oral and written); computer literacy; interpersonal/social; critical thinking/leadership (tied); and teamwork. General and specific business knowledge about topics like accounting and marketing received the lowest rankings. Recruiters favored the interview as the best method for demonstrating interpersonal/ social, critical thinking, leadership, and teamwork skills. They considered the interview, resume and portfolio as appropriate methods for applicants to demonstrate computer literacy and oral and written communication. Recruiter comments highlighted the importance of preparing students for interviews by providing classes focused on professional presentation and by teaching students to communicate well, articulate their views, and focus for a specific interview.

In their survey of information systems recruiters, Fang, Lee and Koh (2005) found that recruiters viewed interpersonal and personal skills/traits, such as team skills, communication skills, critical/creative thinking skills, and personal motivation as the most important attributes for a new entry-level employee. Further, these interpersonal/ personal attributes were rated higher than information systems core knowledge and technical skills.

Roach (2006) notes the emphasis on diversity in corporate recruiting. Recruiters are looking for specific and highly targeted ways to attract minority and female recruits to the companies they represent. Colleges and universities, particularly those with a more diverse population of students, have become the best source of diverse applicants. There is also more focus on an applicant's ability to be culturally aware and to work with others of different cultures. An applicant who can demonstrate an ability to work with people of different cultures is at an advantage in the latest age of corporate recruiting.

Results from the Corporate Recruiters Survey (2006), conducted by the Graduate Admission Management Council, identify cultural fit with the company as the most common criterion employers consider as they evaluate MBA candidates. Other important attributes include a proven ability to perform, strong soft skills (communication and interpersonal skills) and strong "hard" skills (technical/analytical skills and conducting

cost-benefit/financial analysis). Recruiters describe soft skills as highly attractive skills and recommend that they be strengthened. Communication skills are considered critical for new employees and leadership is regarded as especially important for alumni who are out of school for longer periods of time.

Findings from an earlier Corporate Recruiters Survey (2004) indicate the services recruiters most want business schools to provide, including the ability to preselect candidates for interview schedules and online services, such as resume searches, job postings for open positions, and online interview scheduling. They would also like access to faculty members who could identify qualified students for job openings.

In a comparative study, Peterson (2004) investigated the criteria students consider in selecting desirable positions for employment and the accuracy of management professors' and corporate recruiters' perceptions of these criteria. The top criteria for students were opportunity for self-development, challenge and responsibility, freedom on the job, opportunity for advancement, training, and job security. The values that student respondents sought most were higher level and intangible goals related to self-fulfillment, accomplishment, and self actualization. Management professors listed students' top criteria as financial compensation, type of work, working with people, location of work, and company reputation. Recruiters ranked opportunity for advancement, training, job security, challenge, responsibility and financial compensation as the most important criteria. There was greater agreement between students and recruiters than between students and professors.

Derous (2007) compared the preferences and expectations of 700 applicants and 140 recruiters regarding personnel selection procedures. Results revealed that, compared with recruiters, applicants preferred treatment characteristics in which a negotiation component was more prevalent, making the selection procedure more personal and transparent. Recruiters preferred treatment characteristics that facilitate prediction over negotiation, such as an objective standardized treatment of all candidates and the provision of information on the job opening. Applicants' expectations of treatment were generally lower than recruiters' actual treatment of applicants.

Lee and Fang (2008) compared the perceptions of recruiters and students regarding skill requirements for entry-level information systems professionals. Findings revealed that both groups rated the interpersonal and personal skills/traits - such as team skills, communication skills, critical/creative thinking skills, and personal motivation - as the most important attributes for a new entry-level information systems employee. Both groups also rated interpersonal and personal skills much higher than core technical skills and organizational knowledge. Results showed some perception gaps with respect to technical knowledge and skills. Students ranked all knowledge and skills consistently as less important than recruiters ranked them.

Methodology

This study is based on a custom designed survey that elicited feedback regarding the importance of 15 potential criteria for hiring MBA candidates and an evaluation of MBA students on these criteria. Respondents were asked to rate students' performance in interviewing relative to other MBA students and they were asked to rate their satisfaction with their on-campus recruiting experience. T test analyses examined differences by gender and field of employment in recruiters' perspectives on the importance of criteria for hiring and ratings of candidates on these criteria.

Data Source. The population for this survey included 72 professionals from the business community. The survey was administered primarily on the Internet during the 2008 fall semester. Responses were received from 37 individuals, yielding a response rate of 51 percent. Forty-six percent of the respondents were male and 54 percent were female. The average number of years recruiting at the Graduate School was two years. Respondents most frequently recruited for marketing, finance and consulting.

Results

Importance of Hiring Criteria. Table 1 presents respondents' ratings on the importance of criteria in evaluating MBA candidates.

Table 1. Importance of Hiring Criteria in Evaluating MBA Candidates

Hiring Criteria	Not at All/ Slightly	Moderately	Very	Extremely	Total
Cultural Fit to Your Organization	3%	3%	35%	59%	100%
Analytical Ability	-	3	40	57	100
Communication - Oral	-	3	40	57	100
Motivation	-	5	38	57	100
Communication - Written	-	11	38	51	100
Interpersonal Skill	-	3	50	47	100
Understanding Ethics in Business Decisions	3	16	38	43	100
Team Building	5	22	46	27	100
Understanding Global Issues in Business	5	22	46	27	100
Creativity	3	30	43	24	100
Leadership	3	30	43	24	100
Technological Competence	6	35	35	24	100
Knowledge in a Specific Field	13	38	27	22	100
Understanding Diversity in the Workplace	11	32	38	19	100
Job Experience in a Specific Field	13	38	30	19	100

Note: These ratings are based on the scale: 1 'Not at All'; 2 'Slightly'; 3 'Moderately'; 4 'Very' and 5 'Extremely'.

As shown in Table 1, recruiters identify cultural fit to the organization as a highly important criterion: 59 percent rate this factor as Extremely Important. A majority, 51 to 57 percent, also consider analytical ability, oral communication, motivation, and written communication to be Extremely Important. In contrast, only 22 percent or fewer think knowledge or experience in a specific field and understanding of diversity in the workplace are Extremely Important.

Ratings for Candidates on Hiring Criteria. Table 2 presents respondents' ratings for the College's candidates on these hiring criteria. Respondents rate the candidates highest on motivation and understanding of ethics in business decisions, global issues in business, and diversity in the workplace. Some 18 to 24 percent rate the candidates Excellent and 57 to 71 percent rate them Very Good or Excellent on these criteria. More than 50 percent rate candidates Very Good or Excellent on cultural fit to the organization, oral communication, interpersonal skill, team building, analytical ability, and written communication. In contrast, only 32 and 35 percent respectively rate the candidates Very Good or Excellent on job experience and knowledge in a specific field.

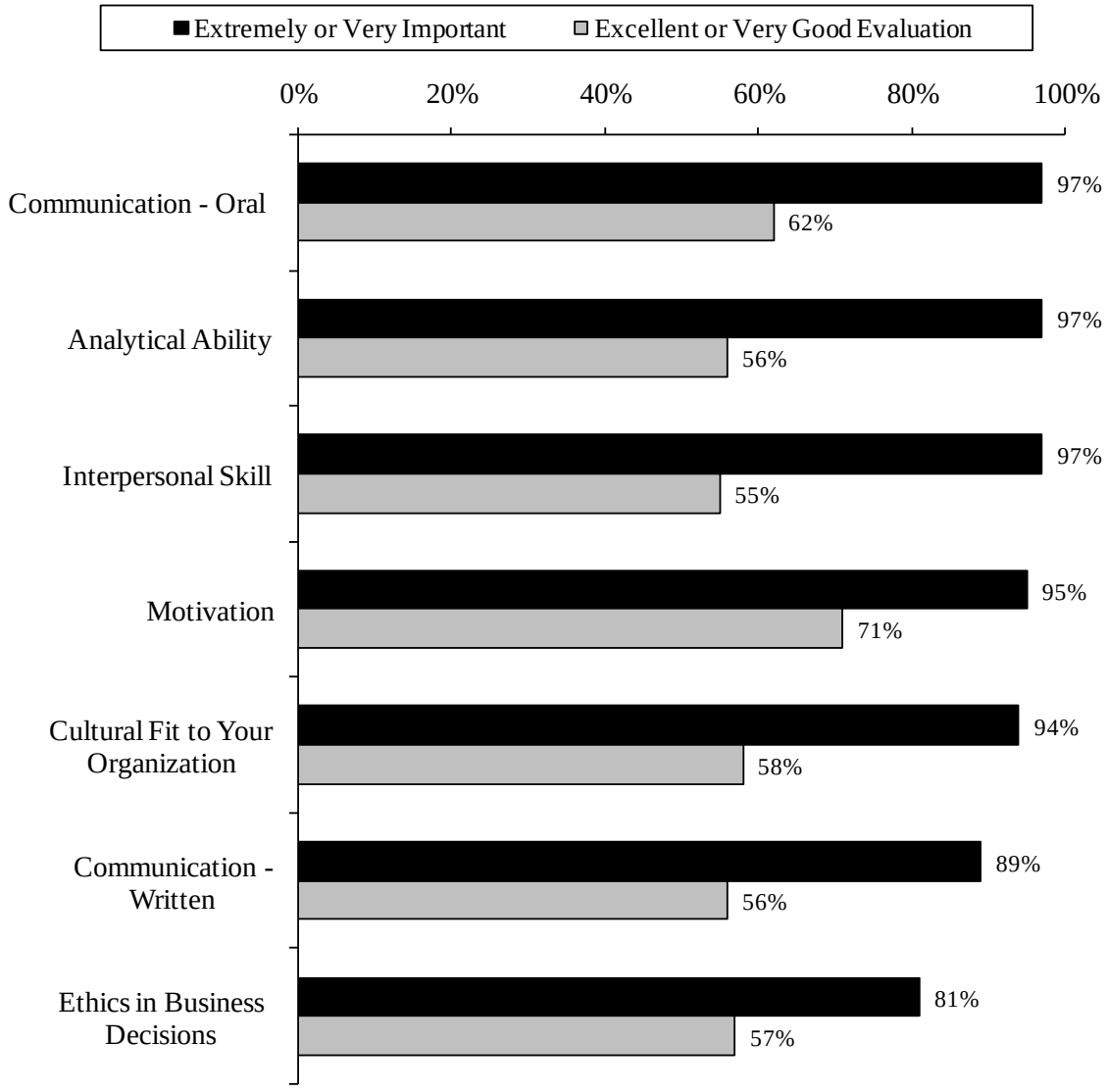
Table 2
Ratings for the College's MBA Candidates on Hiring Criteria

Hiring Criteria	Fair	Good	Very Good	Excellent	Total
Motivation	3%	26%	47%	24%	100%
Understanding Ethics in Business Decisions	-	43	36	21	100
Understanding Global Issues in Business	3	40	39	18	100
Understanding Diversity in the Workplace	3	37	42	18	100
Cultural Fit to Your Organization	3	39	49	9	100
Communication - Oral	9	29	56	6	100
Interpersonal Skill	-	45	49	6	100
Team Building	9	38	47	6	100
Technological Competence	9	46	39	6	100
Job Experience in a Specific Field	18	50	26	6	100
Analytical Ability	6	38	53	3	100
Leadership	12	41	44	3	100
Knowledge in a Specific Field	21	44	32	3	100
Communication - Written	12	32	56	-	100
Creativity	3	50	47	-	100

Note: These ratings are based on the scale: 1 'Poor'; 2 'Fair'; 3 'Good'; 4 'Very Good' and 5 'Excellent'.

Comparative Perspective on Hiring Criteria. Figure 1 presents respondents' ratings on the importance and evaluation of MBA candidates on selected hiring criteria. The top bar displays the percent rating these criteria as Very or Extremely Important and the lower bar shows the percent rating the MBA candidates Very Good or Excellent on these criteria. As shown, 95 to 97 percent rate motivation, interpersonal skill, analytical ability and oral communication as Very or Extremely Important and 55 to 71 percent evaluate the candidates as Very Good or Excellent on these criteria. Respondents rate the MBA candidates highest on motivation (71%), followed by oral communication (62%).

Figure 1 Comparative Perspective on Abilities: Importance and Evaluation of MBA Candidates



Significant Differences by Gender. Table 3 presents results from t test analyses that identified significant differences by gender in recruiters' ratings on the importance of criteria for evaluating candidates and their ratings of applicants on these criteria. As shown, female recruiters put more emphasis than males on: team building, understanding of diversity in the workplace, technological competence, and oral communication. Female recruiters rated candidates higher on technological competence, while male recruiters reported higher ratings on interest, energy, and enthusiasm.

Table 3
Significant Differences by Gender in Recruiters' Perspectives and Evaluation of Applicants

	Gender			
	Female	**Male**	**Mean Diff.**	**t Test**
Importance of Criteria				
Team Building	4.32	3.38	.94	3.41 **
Understanding of Diversity in the Workplace	3.95	3.19	.76	2.23 *
Technological Competence	4.05	3.38	.67	2.14 *
Oral Communication	4.79	4.25	.54	3.20 **
Ratings of Applicants				
Technological Competence	3.69	3.07	.62	2.45 *
Interest, Energy, and Enthusiasm	3.21	3.77	-.56	-3.64 ***

* $p \leq .05$; ** $p \leq .01$; *** $p \leq .001$

Significant Differences by Employment Field. As displayed in Table 4, significant differences were also found in recruiters' perspective on hiring criteria by the field of employment for which they were recruiting. Those recruiting for the consulting field put more emphasis on analytical ability, while those recruiting for finance put a higher priority on technological competence; job experience, and knowledge in a specific field.

Table 4. Differences in Recruiters' Perspectives by Employment Field on the Importance of Evaluation Criteria

	Employment Field			
Criteria	**Yes**	**No**	**Mean Diff.**	**t Test**
Consulting				
Analytical Ability	4.83	4.40	.43	2.69 **
Finance				
Technological Competence	4.23	3.50	.73	2.36 *
Job Experience in Specific Field	4.00	3.29	.71	2.26 *
Knowledge in Specific Field	4.00	3.33	.67	2.05 *

* $p \leq .05$; ** $p \leq .01$

Table 5 identifies significant differences in recruiters' evaluation of candidates by the field of employment for which they were recruiting. As shown, recruiters hiring for consulting positions rated candidates lower on motivation, ability to articulate career goals, and ability to communicate orally. In contrast, those recruiting for finance positions, rated candidates higher on knowledge of the company. Recruiters hiring for marketing positions rated candidates higher on knowledge in a specific field and on understanding of diversity in the workplace and global issues in business.

Table 5
Differences in Recruiters' Evaluation of Applicants by Employment Field

	Employment Field			
Criteria	**Yes**	**No**	**Mean Diff**	**t Test**
Consulting				
Motivation	3.42	4.18	-.76	-3.00 **
Ability to Articulate Career Goals	2.83	3.32	-.49	-2.46 *
Ability to Communicate Orally	2.82	3.36	-.54	-3.46 **
Finance				
Knowledge of the Company	3.46	3.05	.41	2.35 **
Marketing				
Knowledge in a Specific Field	3.50	2.95	.55	2.08 *
Understanding of Diversity in the Workplace	4.14	3.47	.67	2.61 *
Understanding of Global Issues in Business	4.07	3.47	.60	2.25 *

* $p \leq .05$; ** $p \leq .01$

Recruiters' Comments. In addition to the quantitative ratings, survey respondents offered comments and suggestions regarding their recruitment experience at the Graduate School. They cited the quality of recruits and the CCD Office as strengths, and they offered suggestions for improvement both for the MBA candidates and the recruiting experience. As reflected in the following comments, respondents recommended that MBA candidates improve their interview preparation and strengthen their technological and quantitative skills. With regard to the recruiting experience, respondents suggested arranging special rooms for interviewing; improving pre-screening for interviews; and increasing publicity about on-campus recruitment opportunities.

Strengths

Quality of Recruits

I have found some excellent recruits. Some of our best hires came from this institution.

I am generally happy with most of my recruiting that was done via professors' students.

Overall, I've had a good experience and a high quality of applicants.

Quality of Career Services Department

I had a great recruiting experience. The School is always responsive to our needs.

I've had a very good experience working with the career services department.

The information sessions were promoted well, and we had candidates who were truly interested in our industry.

The relationship between employer and the folks at Career Services is critical for us. It takes someone on campus to help explain what [our company] is all about.

Thank you for making our visits such an enjoyable experience.

Areas for Improvement - MBA Candidates

Interview Preparation

MBA candidates, especially those with an interest in marketing, need to better articulate their career goals in terms of tangible job titles, roles and responsibilities. Many students assume the position of "I'm flexible and I've been trained to be a great generalist. I would like to move into marketing." Students need to learn the language of recruiters and how to better position past work experience into post-MBA opportunity.

Our first round interview is a typical behavioral interview, and we were very surprised to find many candidates unable to articulate examples of leadership, ambition/goal setting, etc. They were far more unprepared than the students we met at other schools. MBA students in general need to determine immediately what they want to do with their careers. A lot of talented students seem to struggle with articulating their career goals. It's hard to pay someone $100k who doesn't know where they plan to go with their career.

Improve Technological Skills

We found an increase in the number of recruits who clearly have lower motivation and technology skills. One candidate did not know how to use Excel and blamed the team approach for the lack of skill. As an alumnus, I suggested he take more accountability for his lack of skill and he take an Excel course.

Improve Quantitative Skills

We ask a simple quantitative question that involves profit margin and most of the students we interviewed for an internship (timeline, January/February of their first year) were not familiar with basic finance terminology. Once the terminology was explained many students were still unable to answer the quantitative question. Of the candidates brought back for the second round, they were surprisingly unfamiliar with and unprepared for case studies, especially case studies involving quantitative ability, even though they had been told what to expect.

I felt the quantitative capabilities of candidates from other programs were stronger. Additionally, we sought candidates with strong technical/engineering expertise.

Areas for Improvement – Recruiting Experience

On-Campus Arrangements for Interviews

I found that the Career Development employees were very willing to work with me. However, there were times that the information we provided slipped through the cracks and I felt the need to double check many of the arrangements. Recruiting on campus was awkward because unlike other MBA schools we recruit at there were no rooms set aside for us so we met students in faculty offices.

Pre-Screening for Interviews

I felt that other MBA programs were more responsive and provided better pre-screening sources.

Publicize Recruitment Opportunities On-Campus

There should be a better, more efficient way to attract candidates to job positions or offer advice to us on what type of posting will attract your students to our internships & full-time openings.

I would suggest a more proactive approach to help identify potential MBA students who may not be aware of the opportunity.

Recommendations

Based on the research findings, the following recommendations were formulated to strengthen candidates' employability and to enhance recruiters' experience at the Graduate School.

1. **The Graduate School CCD Office should continue to provide a high level of support and assistance to recruiters.**

In evaluating their recruiting experience at the Olin Graduate School, respondents reported the highest ratings for the assistance provided by the CCD staff; 63 percent rated staff assistance as Very Good and 32 percent as Good.

2. **Encourage MBA students to continue to show a high level of motivation in their employment interviews.**

Ninety-five percent of the respondents rated motivation as Extremely or Very Important in hiring, and 71 percent rated the MBA students Very Good or Excellent on motivation.

3. **Advise MBA students to research thoroughly the culture of organizations where they seek employment and to assess how well they would fit into the culture.**

Recruiters rated cultural fit to the organization as the most important criterion in hiring MBA candidates; 59 percent rated it as Extremely Important and 35 percent as Very Important.

4. **Prepare MBA students to demonstrate superior competence in analytical ability, oral communication and written communication in job interviews.**

Close to 90 percent or more of the respondents rated these criteria as Extremely or Very Important in hiring MBA candidates.

5. **Advise MBA students to prepare well for employment interviews.**

Some 14 percent of the respondents rated the MBA students Poorer or Much Poorer than other MBA students on preparation for the interview. Some also recommended that students improve their ability to articulate their career goals during an interview.

6. **Consider assigning some space in the Graduate School for recruiter interviews.**

Compared with their evaluation of other aspects of the recruiting experience, respondents reported lower ratings for the physical facilities. Also one respondent commented unfavorably that there were no rooms set aside for recruiters.

7. **Increase publicity about on-campus recruitment opportunities.**

Some respondents recommended a more proactive approach to publicize recruitment opportunities and to identify potential MBA candidates for positions.

8. **The Graduate School CCD Office should maintain a current directory of individuals who recruit MBA students.**

A comprehensive and current database of recruiters is a necessary resource to conduct future surveys of recruiters. These surveys would potentially elicit valuable feedback from recruiters to improve students' preparation and performance in seeking employment.

Discussion

Results from this study and from previous research identify criteria recruiters consider important in evaluating and hiring candidates. As noted, participants in this study rated cultural fit to the organization as the most important criterion; 59 percent rated it Extremely Important in evaluating candidates. Similarly, respondents to the Corporate Recruiters Survey (2006) identified cultural fit with the company as the most common criterion employers consider as they evaluate MBA candidates.

Other findings from this study - highlighting the importance of "soft skills" - are also consistent with results from previous research. For example, the majority of respondents in this study rated oral and written communication as Extremely Important and close to 50 percent rated interpersonal skill as Extremely Important. Similarly, Kane (l993) reported that recruiters, representing 56 different organizations, cited interpersonal communication and team-oriented skills as the most significant criteria for hiring in all major areas. Moody, Stewart and Bolt-Lee (2002) found that interpersonal/social skills and oral and written communication were among the top five skills recruiters seek in applicants. Providing further evidence of the importance of "soft skills", Fang, Lee and Koh (2005) reported that recruiters in the information systems field considered interpersonal and personal skills and motivation as the most important attributes for new entry-level employees.

Recruiters have consistently attributed much more importance to interpersonal skills than to specific knowledge. For example, while 57 percent of the participants in this study rated oral communication and motivation as Extremely Important, only 22 percent rated knowledge in a specific field as Extremely Important. Previously, Moody, Stewart and Bolt-Lee (2002) reported that recruiters ascribed the lowest importance to general and specific business knowledge about topics like accounting and marketing. Even in a technical field, recruiters rated interpersonal/ personal attributes higher or more important than information systems core knowledge and technical skills (Fang, Lee & Koh, 2005). Also, in a comparative study of the perceptions of recruiters and students, both groups rated the interpersonal and personal skills/traits as the most important attributes for a new entry-level information systems employee and they rated interpersonal and personal skills much higher than core technical skills and organizational knowledge (Lee & Fang, 2008).

The consistency of these findings documents the importance of interpersonal skills and indicates that the following may be effective strategies for enhancing graduates' employability: develop students' communication skills; emphasize the importance of interpersonal skills; encourage students to show a high level of motivation in employment interviews and advise them to research the culture of the organizations where they are seeking employment opportunity. Recruiters' evaluation of how well students relate to others and how well they might adapt to an organization's culture may be primary determinants of the hiring decision.

References

Corporate recruiters survey results vital for career services. (2004, May-June). *Graduate Management News*.

Corporate recruiters survey: Survey report. (2006). McLean, Virginia: *Graduate Management Council.*

Derous, E. (2007). Investigating personnel selection from a counseling perspective: Do applicants' and recruiters' perceptions correspond? *Journal of Employment Counseling*, *44*(2), 60-72.

Fang, X., Lee, S. & Koh, S. (2005). Transition of knowledge/skills requirement for entry-level IS professionals: An exploratory study based on recruiters' perception. *Journal of Computer Information Systems, 46* (1), 58-70.

Goldberg, C., & Perry, A. (1998). Who gets hired: Interviewing skills are a prehire variable. *Journal of Career Planning & Employment, 58* (2), 47-50.

Kane , K.F. (1993). MBAs: A recruiter's-eye view. *Business Horizons,* 65-71.

Lee, S. & Fang, X. (2008). Perception gaps about skills requirement for entry-level IS professionals between recruiters and students: An exploratory study. *Information Resources Management Journal, 21* (3), 39-63.

Moody, J., Stewart, B., & Bolt-Lee, C. (2002). Showcasing the skilled business graduate: Expanding the tool kit. *Business Communication Quarterly*, *65* (1), 21-36.

Peterson, R. T. (2004). Management student, professor, and recruiter perceptions of objectives for gateway positions: An assessment. *Journal of Education for Business, 79* (4), 209-212.

Roach, R. (2007). Corporate recruiting in the 21st century. *Diverse: Issues in Higher Education*, *23* (18), 46-49.

DO COUNT YOUR CHICKENS:
FORECASTING INSTRUCTIONAL COSTS BASED ON YOUR CURRICULUM

Jennifer A. Lee
Office of Institutional Research
Fordham University

Abstract: Implicit assumptions made by traditional cost forecasting methods (e.g. cost per student, student-faculty ratio) limit its ability to model the behavior of instructional costs. In order to account for the simultaneously fixed and variable nature of instructional costs, this study proposes an alternative model for forecasting instructional costs using the academic curriculum and with the number of sections as a unit of measure instead of the number of students. The model is illustrated with a case study and compared against traditional methods.

Introduction

Forecasting is an important planning and management tool. Information on current and future courses and its costs is imperative for pricing analysis, budget planning and preparation, space development, and the evaluation of academic program policies. The objective of this study is to develop a model of projecting instructional requirement and costs using the Academic Curriculum.

Forecasting costs is of great use to decision makers if they identify the major cost-inducing variables in the system, and indicate the effect on total costs of a change in the level of activity associated with the variable. A cost study must first analyze the system and identify the variables that significantly affect cost levels. The next step is to analyze existing and past levels of expenditure against the level of activity associated with each variable, expressed in units of output, and compute unit costs. Once this is done, it becomes possible to project future system costs, given changes in the level of activities (Rumble, 1981).

The supply and production activities of colleges and universities have long been of interest to researchers. There are econometric studies of the production function (output as function of inputs) and the cost functions (costs as a function of output). The focus of these studies is the resource use and cost behavior, particularly with respect to scale economies, the relationship between marginal and average costs, and the range of production possibilities given extant technology (Brinkman, 2000).

In terms of cost analyses, Carlson (1976) summarized four types of methods in analyzing costs.

- The most common type makes use of descriptive statistics to compare departments, programs or colleges. While computationally straightforward, the utility of its results are sensitive to the size and type of the institution.

- Another type involves estimation of costs as a function of a set of variables via a regression model. However, it suffers from multi-collinearity, simultaneity and a host of other econometric issues.
- Whereas a regression fits a line through a set of points, a third type employs linear programming techniques to fit a plane around the edge of a scatter of points. Substantive assumptions about efficiency, quality and control are made, which are always difficult in higher education research.
- The last type of analysis is an engineering approach done by decomposing the process to a basic level and putting pieces back together with several alternatives. There are few such models published.

It is not necessarily true that full-cost data are better or more informative than direct cost data (Brinkman, 2000). Full costs are the sum of direct and indirect costs. Direct costs are costs that are directly proportional to the cost objective. Indirect costs, or overhead, are not directly proportional to the cost objective but are expenditures that support the provision of the objective.

Data on direct costs, in this case instructional costs, are particularly useful because such costs are likely to be under the direct control of a local administrator. In addition, schemes used to allocate indirect costs are, if not arbitrary, at least imprecise.

Different resources contribute to the provision of instructional services: personnel, supplies and equipment, classroom and laboratory space, libraries, communication and travel. The single biggest component of instructional costs is faculty compensation (Brinkman, 1985). Other cost components follow faculty costs, i.e. the larger the faculty, the higher the cost for research, equipment, supplies, etc. This paper focuses on forecasting instructional costs.

The main output in education is students. Therefore, various instructional cost studies use students as the unit of measure. For example, the average cost per student (Winston, 2000) or the average cost per student credit hour (To, 1987). Ahumada (1992) uses the student-faculty ratio, average class size, total number of courses and the average faculty salaries as rough measures of "input" and uses the cost per full-time student equivalent as output. Certainly, student enrollment is the critical cost driver.

Armstrong (2000) cautions that it is important to be careful and precise in the choice of variables in a cost-per type of analysis. A cost per student ratio, aggregate instructional expenditures divided by full-time student equivalent headcount, is an incredibly misleading number. This formula is insensitive to academic discipline. For example, a research university heavy in engineering will appear substantially more expensive than a liberal arts college, despite the fact that there are valid reasons why this would be so. Thus, cost ratios vary considerably across institutions. These variations exhibit the way programs are configured at the respective institutions. Ratios differ in the type of institution, kind of program offered, scale, and expectations for teaching load, department research, etc. (Brinkman, 1985).

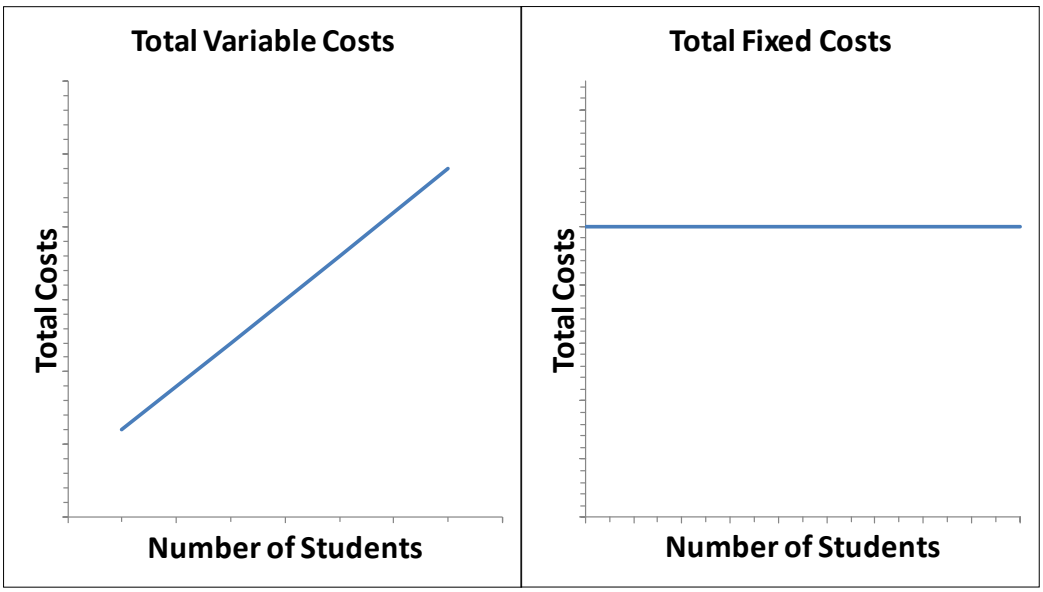
These studies can still be very useful for benchmarking and comparative studies on a unit level across different institutions. However, these traditional methods are

inadvisable for use to forecast instructional costs. Using these methods implicitly assumes that the current proportion of students in each major or academic program and the student' choice of electives would stay constant. Similarly, teaching loads and the composition of faculty (full-time, part-time, tenure, non-tenured) have to be the same as the scenario evaluated for the average costs. It would also not allow for increases in costs to vary across different disciplines.

Furthermore, the use of descriptive statistics or linear regression methods on a per student basis have an underlying assumption that costs behave in a linear manner in relation to student factors and vary directly with the number of students enrolled, i.e. increasing students results in a directly proportional increase in costs. These methods assume instructional costs are variable costs.

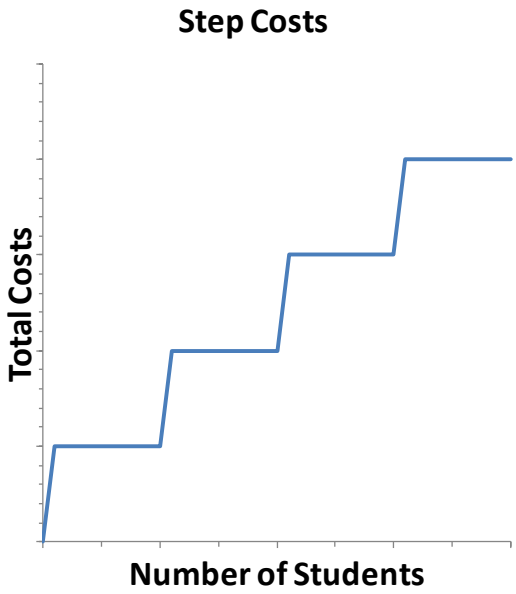
Variable costs are costs that vary with the cost unit. Fixed costs are costs that stay constant regardless of changes in the cost unit. Marginal costs, the additional cost for one additional unit of output, will be constant for variable costs and zero for fixed costs (see Brinkman and Allen (1986) for a discussion on cost variability in higher education). Traditional methods assume that instructional costs are variable costs. Average costs per unit are constant for variable costs and are decreasing for fixed costs.

Figure 1. An Illustration of Variable Costs versus Fixed Costs



However, in terms of forecasting and planning for costs, this assumption becomes problematic. Instructional costs are neither solely linear nor do they vary according to number of students. They are simultaneously variable and fixed or can be thought of as a step cost. Step costs are costs that are fixed within a certain level of activity beyond which an additional unit of input needs to be accrued. A step cost does not change proportionally with the cost unit but rather at discrete intervals.

Figure 2. An Illustration of Step Costs



Instructional costs vary according to the number of sections. Instructional costs are fixed within each section and will not vary with the number of students enrolled in a section. However, once the maximum class size is reached, an additional section would have to be offered and the full cost of a section incurred. These costs include, but are not limited to, classroom space, supplies, utilities, and instructor compensation. Furthermore, the marginal cost of enrolling an additional student will be zero if within the range of activity that is under capacity. But the marginal cost of one more student will be steep outside this range.

The nature of faculty compensation also validates the use of sections as the cost unit. Faculty compensation is based on a contract and is usually a direct function of the number of sections taught. Full-time faculty members are required to teach a certain number of sections with an academic year. Any section taught in excess of the contracted amount results in an extra stipend on a per section basis. Part-time or adjunct faculty members are also paid per section.

This paper therefore proposes the number of sections as the unit of measure and compares this method against more traditional, linear cost estimation models.

Methodology

Data and Source

As an illustration, the College of Business of an urban, private, non-profit small-research university is used. Business students follow a curriculum comprised of a Liberal Arts core, a Business core, majors and electives, summing up to 40 courses or 120 credit hours in all. The Liberal Arts Faculty teaches the Liberal Arts core and elective courses.

The Business Faculty teaches all Business core and elective courses. These two Faculties represent two separate budget areas with their own salary structure, tenure process, and course load requirement.

The student record system contained data on individual courses and enrollment for fall 2008 and spring 2009. Human Resources and the Faculty Affairs office provided information on faculty salaries, benefits and thereby per section costs.

Instructional Costs per Section

Instructional costs are expenditures related to the provision of instruction services. These include direct instructional costs such as teaching salaries and benefits, office and laboratory supplies, and departmental support personnel. They do not include the costs of maintaining the classroom space or of supporting central administrative offices (Dyke, 2000). The cost of maintaining office space for all staff members is not reportable as instructional cost and is counted as overhead. However, the cost of office equipment and the cost of laboratory equipment will be reported as instructional cost. When equipment is purchased that can be used for both teaching and research, attributing cost to the primary use is sufficient.

Following the guidelines of the Delaware Study, the salaries and benefits paid for instructional faculty comprises instructional costs. Faculty members are responsible for instruction or the generation and transmission of knowledge. These responsibilities include teaching as well as the research and public service missions of the university. This is true whether or not the person is teaching in a particular semester or term (Dyke, 2000). If the faculty member is appointed specifically for research and separately budgeted as research faculty, then the related salary and benefits are classified as research expenditures; otherwise, these should be counted as instructional cost.

Different labor market equilibrium price for workers of different disciplines cause wide variation in the instructional costs per department. Similarly, inflation in salaries and other costs also vary by department. Therefore, the unit of analysis should be instructional costs per section per department.

The instructional costs per section for each department can be calculated as an average. However, this assumes that the current composition of faculty will be maintained. In estimating the marginal cost of additional students, the marginal cost of a new faculty member must be used to calculate instructional costs per section. Deans and department administrators decide what type of instructor and its corresponding cost in staffing the forecasted sections.

Forecasting Sections

Each undergraduate has to take 40 courses according to their curriculum. This consists of courses or set of courses that they can choose from. For each course or set of courses, section sizes are computed and used to forecast the number of sections required for a certain number of students.

For each course in the curriculum, statistics on mean class size, maximum enrolled and section caps are obtained. The mean class size is a measure of how the average class is currently being conducted. The maximum is the largest number of students enrolled in a section of the course, an empirical measure of capacity. The section cap is a policy variable set by the various deans and department administrator.

Using each of the three class enrollment levels (mean, maximum and cap), the number of sections required for each course is computed. Since each course will have a different enrollment level, a certain number of students (*N*) will require different number of sections for every course. Each fraction of a section is rounded to a whole number.

$$\beta_{ij} = Round\{N_i(S_{ij})^{-1}\}$$

N_i=Number of students taking course *i* ($i \geq 40$)
S_{ij}=Class size of course *i* taught by department *j*
β_{ij}=Number of sections of class *i* be offered by department *j*

When the mean class size is used, the forecast number of sections is rounded off to the nearest whole number. Students that make up less than half a section are accommodated and distributed among existing sections. If the students number to more than half a section, a new section is opened.

When the maximum or the cap is used, the forecast number of sections is rounded up to the nearest whole number. Filling up the sections to the maximum or to the cap implies that capacity is reached within each section and that there is no room to accommodate even one more student.

The sections are then aggregated per department. This forecasts the number of sections each department will have to offer for *N* students following the academic curriculum. Classroom, laboratory, offices and other physical space demand can also be derived from the forecasted number of sections.

$$\mathrm{B}_j = \sum_i \beta_{ij}$$

B_j=Total number of sections to be offered by department *j*

Total Instructional Cost

The product of total sections per department and the instructional cost per section yields total instructional cost per department. These add up to total instructional costs incurred from the Business Faculty and Liberal Arts Faculty, and from there, the entire University.

$$\Pi = \sum_j \mathrm{B}_j \cdot \pi_j$$

π_j= Instructional cost per section for department *j*
Π=Total instructional cost for the University

In the model, the choice/decision variables are total student enrollment, instructional cost per section, and section caps.

- Total student enrollment is dependent on the University's targets. Choices are also made regarding the maximum number to be admitted to a particular college, program or major.
- Costs per section depend on the supply of instructors, i.e. a decision is made to hire a tenure-track faculty or adjuncts to staff a particular set of courses. A department that is over-utilized in terms of teaching capacity of its faculty members would need to hire more full-time staff at its pertinent cost. A department that is under capacity can teach additional sections using current faculty members or contract a part-time faculty member.
- Section caps are discipline specific and influenced by an underlying discipline-specific production relationship. A particular teaching structure or pedagogy, i.e. a class that is heavy on writing and class discussion, would require a smaller class size whereas a straight lecture course can accommodate large sizes.

All these variables are policy choices made by the administrators of the college or program (deans or department chairs).

Results

The three different section sizes were used to estimate total instructional costs. This provides an estimated interval for the estimated instructional costs for the University. Total instructional costs are presented in Table 1 below using the three different section sizes.

Table 1. Total Instructional Costs* for a Four-Year Bachelor's Degree Using Different Section Sizes

Number of Students	Total Instructional Costs		
In Cohort	Section Mean	Section Maximum	Section Cap
100	2,489	2,390	2,334
200	4,864	8,914	8,987
400	9,853	8,914	8,987
600	14,554	13,303	13,433
800	19,482	17,335	17,476

**All costs in thousands of dollars.*

Total instructional costs using the mean section size is the most expensive option. For this college, mean section sizes typically run below the section caps. In some courses, the section cap and the section maximum are identical. However, they differ in some cases due to additional demand for course sections during peak hours that are usually accommodated by going over the caps. The three options show a range of expenditures that can be expected, providing a minimum-maximum cost forecast.

Five different levels of enrollment are simulated in Table 2. Using the mean section size and an average per section cost based on current faculty expenditures and instructional load, total costs and an average per student cost was computed under the proposed "sections" model. Traditional methods of forecasting using the empirical student-faculty ratio (17.1 to1) and cost per student are also presented.

Table 2. Total Instructional Costs* for a Four-Year Bachelor's Degree Model using Sections versus Traditional Models

	"Sections" Model		Student-Faculty Ratio		Cost per Student	
Number of Students In Cohort	Total Cost	Average per Student	Total Cost	Average per Student	Total Cost	Average per Student
100	2,489	24.89	2,380	23.80	2,370	23.70
200	4,864	24.32	4,759	23.80	4,742	23.70
400	9,853	24.63	9,519	23.80	9,484	23.70
600	14,554	24.26	14,279	23.80	14,226	23.70
800	19,482	24.35	19,038	23.80	18,968	23.70

**All costs in thousands of dollars.*

Table 2 shows that traditional methods (student-faculty ratio and cost per student) underestimate total costs for every level of student enrollment. This is because an estimation based on the statistical averages assumes that the marginal cost is the average cost.

The model presented takes the nature of the step cost function into account and as such average costs per student and marginal costs do not stay constant. It indicates that going from 100 to 200 students realizes economies of scale; enrolling more students within the range results in lower average costs per student. The increase from 200 to 400 students however, indicates a growth beyond the previous range and an increase in average costs. The growth from 400 to 600 shows a growth within a relevant range that allows for a lower average costs per student.

Following the principle of conservatism, it is advised to underestimate revenues and overestimate costs in the budgeting process. Erring on the side of over-estimation of costs and spending below the forecasted amount would be better than under-estimation and having to request extra funding at during the year.

Discussion

The model presented allows a straightforward and concrete method of predicting future costs and instructional requirements. Aside from total cost in dollars, the demand for faculty, classroom space and size can also be estimated. A spreadsheet developed in Microsoft Excel facilitates dynamic analysis, enabling the end-user to change choice variables and immediately obtain an estimate of the cost.

The model helps identify cost-inducing variables in the system and the tradeoffs that can be made, allowing policy formulation. It also enables the University to evaluate financial implications of plans that have been prepared. One of the issues that the model

can efficiently measure is the choice of hiring more expensive faculty and increasing class sizes versus hiring less expensive faculty and keeping class sizes small.

Similarly, since the model uses the undergraduate curriculum and the number of sections to forecast costs, it would be able to determine costs due changes to the composition of the academic curriculum. The model would also be flexible to a shift in the composition of students' majors and academic programs. Cost-comparisons of a four-year Bachelor's degree for different majors can also be done.

While there are other expenditures other than instructional costs that affect total costs, instructional costs are the most direct and the most basic requirement for a higher education institution. Most other costs are indirect costs or overhead. These facts highlight the value of developing an instructional cost model.

References

Armstrong, K. (2000). "Building a Consistent and Reliable Expenditure Database". *New Directions for Institutional Research* 106: 47-54.

Adams, C.R., Hankins, R.L. and Schroeder, R.G. (1978). *A Study of Cost Analysis in Higher Education Vol. 1: A Literature of Cost Analysis in Higher Education*. Washington, D.C.: American Council on Education.

Ahumada, M.M. (1992). "U.S. Methods for Costing in Higher Education: Taking the Technology Abroad". *Higher Education* 24: 363-277.

Brinkman, P.T. (1985). *Instructional Cost per Student Credit Hour: Differences by Level of Instruction* (142). Boulder, CO: National Center for Higher Education Management Systems.

Brinkman, P.T. (2000). "The Economics of Higher Education: Focus on Cost". *New Directions for Institutional Research* 106: 5-17.

Brinkman, P. T. and Allen, R. (1986). "Concepts of Cost and Cost Analysis for Higher Education". *The AIR Professional File* (No.23).

Carlson D. (1976). *A Review of Production Function Estimation for Higher Education Institutions.* Cambridge, MA: Harvard Graduate School of Education.

Dyke, F. (2000). "Understanding Expenditure Data". *New Directions for Institutional Research* 106: 19-30.

Hample, S.R. (1980). "Cost Studies in Higher Education". *The AIR Professional File* (No. 7).

Hollowell, D.E. and Schiavelli, M.D. (2000). "The Importance of Cost Data: View from the Top". *New Directions for Institutional Research* 105: 75-87.

Middaugh, M.F. (2000). "Using Comparative Cost Data". *New Directions for Institutional Research* 105: 55-74.

Rumble, G. (1981). "The Cost Analysis of Distance Teaching: Costa Rica's Universidad Estatal a Distancia". *Higher Education* 10: 375-201.

To, D.L. (1987). *Estimating the Cost of a Bachelor's Degree: An Institutional Cost Analysis* (CS-87-320). Washington, DC: Office of Educational Research and Improvement.

Winston, G.C. (2000). "A Guide to Measuring College Costs". *New Directions for Institutional Research* 106: 31-46.

EVERY DOLLAR MATTERS:
EXAMINING YOUNG ALUMNI GIVING BEHAVIOR

Meredith S. Billings
Research Analyst
Office of Institutional Research & Evaluation
Tufts University

Abstract

In the current economic climate, colleges and universities need to successfully target new donors and understand how to cultivate philanthropic alumni. This study describes one university's approach by developing a logistic regression model to predict giving behavior in young alumni and compares the demographic and attitudinal differences among specific types of donors and between donors and non-donors. The most parsimonious model had eight significant predictors of giving behavior which are based on young alumni's demographics, undergraduate experience, and current alumni engagement.

Introduction

In 2006, Tufts University publicly announced Beyond Boundaries: The Campaign for Tufts, a university-wide fundraising initiative to raise $1.2 billion. As the largest of the eight schools, the School of Arts and Sciences' fundraising goal is $425 million and the School of Engineering's goal is $150 million. As undergraduate students are educated in both schools, the Tufts Fund was created to target undergraduate alumni, parents, and friends.

In an effort to meet the fundraising goals for the Tufts Fund, the Office of Institutional Research & Evaluation conducted a research study to gain a better understanding of the priorities and motivators of recent graduates. The main objectives of this study were to help inform the Tufts Fund's young alumni fundraising strategy for the remaining two years of the campaign, to create a positive experience for respondents, and to identity opportunities for future research. Therefore, the author addresses three main research questions in this paper:

1. What are the current motivators and priorities for young alumni?

2. Are there differences in demographics, attitudes, and experiences across donors and non-donors? Among different types of donors?

3. To what extent can the advancement office use these characteristics to provide a more targeted strategy for fundraising?

Literature Review

Typically since young alumni have lower participation rates of giving than their older counterparts, development and alumni offices may overlook this population when strategizing to raise overall alumni contributions. However, young alumni at many institutions of higher education represent too large of a population to be ignored. At Tufts, young alumni in the School of Arts, Sciences, and Engineering represent approximately 23% of their alumni. In addition, previous studies have found that current and future giving is significantly correlated with past giving behavior (Okunade & Justice, 1991; Lindahl & Winship, 1992). Monks (2003) argued, "Identifying young alumni who are more likely to give and encouraging them to do so, even in modest dollar amounts, may have significant lifetime giving effects" (p. 123). Therefore, alumni and development offices must create effective strategies to target these potential young donors.

Volkwein and Parmley (1999) developed a theoretical model of alumni giving that relied on individuals' motivation and their capacity to give. Motivation was characterized by proximity to the institution, alumni involvement, perceived need for support, and multiple degrees received from the college whereas capacity to give was represented by occupational status, income, education in progress, and highest degree earned. Volkwein and Parmley also stressed the importance of the individual's demographic background along with the individual's college experiences as factors for alumni giving.

Other research on alumni giving focused on whether the alumni had received financial aid from the university. Dugan, Mullin, and Siegfried (2000) found that alumni who received need based loans were 13% less likely to give to Vanderbilt University whereas alumni who received need based grants were 12% more likely to give to the university. Monks (2003) had similar findings and reported that undergraduate loans and, to a lesser extent, graduate loans decreased the likelihood that alumni would give to their alma mater. Lastly, environmental factors may affect alumni giving in a particular year. Wunnava and Lauze (2001) found an increase in donating behavior for occasional and consistent donors during reunion years at a small private liberal arts college in Vermont.

Methodology

Participants

During the fall 2008, the Young Alumni Survey was administered via email to alumni from the last ten graduating classes (1999-2008) at Tufts University. Each alumnus was assigned an unique identification number that was linked to biographical and giving information maintained by University Advancement. A total of 1,405 alumni completed the survey with a response rate of 16.3%. Ten individuals were removed from the analysis because two were current students, two alumni graduated before 1999, and six respondents could not be verified as young alumnus/a. The typical respondent was a 21-25 year old female who is currently living in the Boston area and working in the

government/public policy/non-profit sector.[1] In addition, 60% of the respondents had donated to Tufts University in the last six years (N = 844).

Data

The Young Alumni Survey was developed by members of the Office of Institutional Research & Evaluation and University Advancement to assess recent graduates' perceptions of their undergraduate and alumni experiences, to gauge their level of interest in alumni events and activities, and to understand where Tufts fits into their philanthropic priorities. Several questions were designed to assess the complex behavior of alumni giving by addressing alumni's motivations and their capacity to give. The purpose of these attitudinal questions was not only to compare how donors and non-donors responded, but also to assess whether there are differences in giving behavior among different types of donors.

The individual survey data was combined with institutional data from the Office of Financial Services, University Advancement, and the Tufts University Data Warehouse. The institutional data ranged from financial aid awards to overall lifetime donations to academic information such as GPA, major, and year of graduation. The institutional data combined with the survey data provided the study with additional context and gave the researcher a more meaningful understanding of participants' responses.

In addition, the alumni were tracked by the National Student Clearinghouse to determine whether they were enrolled in higher education during the semester that they responded to the survey.

Donor Predictor Model

To create a donor predictor model, the author used binary logistic regression to predict whether young alumni were donors (coded as 1 for yes and 0 for no) based on a set of survey and biographical information. The donor predictor model was analyzed by SPSS 15.0 with maximum likelihood estimation. The general purpose of logistic regression is to predict group membership of a case by calculating the probability that a case will belong in the event (Meyers, Gamst, & Guarino, 2006). In this study, the event is whether an alumnus was a donor of Tufts University.

Mathematically, the donor predictor model is represented by the following logistic regression equation:

$$ln\left(\frac{P}{1-P}\right) = \alpha + \beta_1 x_1 + \beta_2 x_2 + \ \ldots + \beta_n x_n$$

which translates into the probability of an event occurring (i.e. alumni being a donor) for given values of the predictor variables. The left side of the equation is the natural logarithm of odds of an alumnus/a being a donor. Odds are calculated by probability of the event occurring (alumni is a donor) divided by the probability of the event not

[1] Less than 40% of the data was available for survey respondents' occupational sectors.

occurring (alumni is not a donor) or $(P/1-P)$. The constant α is the y intercept and β is the slope parameter for each predictor until the nth predictor. The right side of the equation depicts how the slope coefficients (β) increase or decrease the log odds of being a donor.

Typically, researchers take the exponentials of the slope coefficients to calculate the odds ratio. The odds ratio is the predicted change in odds for one unit increase in the corresponding predictor variable. Odds ratios above one increase the odds, while odds ratios below one decrease the odds. Odds ratios at or near one indicate that unit changes in the predictor variable do not affect whether or not the alumnus/a is a donor.

In light of the research literature on young alumni donating behavior, the author made certain to collect the following biographical data: sex, year of graduation, GPA, major, residency, double Jumbo status,[2] total and type of financial aid awards, distance from the university, current enrollment in higher education, and whether the alumnus is in a reunion year. Although age is a significant predictor in past research studies, age and year of graduation had a high correlation (Pearson $r = 0.96$, $p < 0.01$) and age was removed from the analysis since two variables that are correlated 0.75 or higher should not be used together in multivariate analysis (Meyers et al., 2006). In addition, survey responses that evaluated respondents' experience as undergraduates, level of involvement in alumni activities, and philanthropic aptitude were also tested as predictors of donor status.

To further explore the differences between donors and non-donors, chi-square tests analyzed participants' responses to the likelihood of donating to particular areas or funds and whether receiving gifts or services would make an impact on young alumni's future giving behavior. In addition, donors and non donors were compared on average amount of financial aid received from Tufts University.

Donor Comparison Profiles

Donors were classified into five categories (Current Year,[3] LYBUNTs,[4] SYBUNTs,[5] Annual,[6] and Major[7]) based on the amount, frequency, and how recently the alumnus/a have donated. It is important to note that Current Year, LYBUNT, SYBUNT, and Annual donors are mutually exclusive categories. All Major donors except one individual are also Current Year, LYBUNT, or SYBUNT donors.

[2] A double Jumbo is defined as an alumnus who has also received a post-bachelor's degree from Tufts University.
[3] Current year donors were individuals who have pledged or given during the current fiscal year (July 1, 2008 – June 30, 2009) excluding Annual Donors.
[4] LYBUNTs were alumni who gave the last fiscal year, but have not given during the current fiscal year.
[5] SYBUNTs were individuals who gave in the last five years, but have not given in the last or current fiscal year.
[6] Annual donors were individuals who have given consecutively since they have graduated to a maximum of six years.
[7] Major donors were graduates who have given $500 or more over the course of their lifetime.

ANOVAs and independent sample *t*-tests were conducted to compare different types of donors on age, sex, distance from the university in miles, college affiliation (Engineering or Liberal Arts), GPA, undergraduate financial aid received, and average donation to Tufts. In addition, chi-square tests analyzed the likelihood of donors giving to particular areas or funds within the university.

Results

Donor Predictor Model

Logistic regression was used to predict whether young alumni were donors based on a set of survey and biographical information. Initially, 18 predictors were simultaneously entered into the model. The odds ratios of the 18 predictors ranged from 0.43 to 2.08 and are summarized in Figure 1. Although the 18 predictor model was statistically significant improvement over the constant-only model (χ^2 (28) = 293.152, $p < 0.001$), there were ten predictors that are not statistically significant. In order to create the most parsimonious model, these variables (distance from Tufts, double Jumbo status, undergraduate financial aid, being an "active" alumnus/a, undergraduate major, current enrollment in higher education, attending Homecoming, considering oneself "philanthropic," and volunteering at Tufts) were removed from the model.

The final 8 predictor model was statistically significant (χ^2 (14) = 285.022, $p < 0.001$). The model correctly predicted whether an alumnus would be a donor 82.0% of the time and whether an alumnus/a will be a non-donor 56.6% of the time. In addition, the final model had a high overall predictive success rate of 72.1% and accounted for 26.4% of the variance in the outcome variable, donor status (Nagelkerke $R^2 = 0.264$). The Hosmer and Lemeshow test was non-significant (χ^2 (8) = 11.733, $p = 0.164$) suggesting that the predicted probabilities match the observed probabilities providing further evidence that the model is a good fit for the empirical data. Therefore, University Advancement can use the set of eight variables to help them target potential donors.

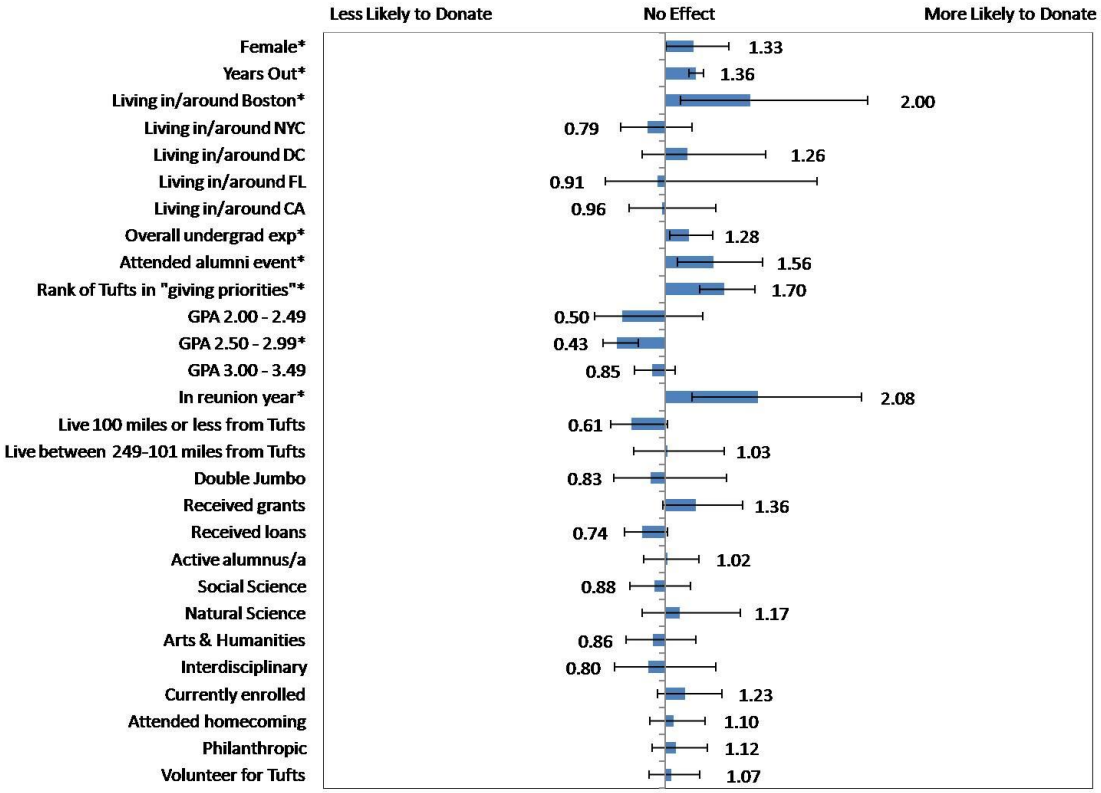
The eight significant predictors are based on young alumni's demographic information, undergraduate experience, and current alumni engagement. Table 1 summarizes pertinent information for each predictor in the final model. The two significant demographic predictors are gender and current residency. There is a 33.1% increase in the odds for females to donate than for males to donate controlling for the other variables in the model. In addition, alumni living in Boston are 1.379 times more likely to donate than graduates who live in other locations.[8]

The three significant predictors from undergraduate experience are the number of years that have elapsed after graduation, the overall rating of their undergraduate experience, and undergraduate GPA. Each year that passes after alumni graduated increases the odds by 35.5% that they will donate to Tufts University. In fact, young alumni who graduated six years ago are 2.49 times more likely to donate than young

[8] Other location excludes alumni living in or around New York City, Washington, D.C., Florida, and California.

alumni who graduated three years ago. In addition, there is a 31.5% increase in the odds for every one unit increase in their satisfacation with their undergraduate experience. Therefore, young alumni who rate their undergraduate experience as "excellent" are 1.73 times more likely to donate than alumni who rate their undergraduate experience as "average." Lastly, there is a 58.2% decrease in the odds for donor status for young alumni with GPAs between 2.50 to 2.99 compared to young alumni with GPAs between 3.50 to 4.00.

Figure 1. Odds ratios in the full donor predictor model for a sample of 1,278 Tufts University young alumni



The three significant predictors that represent current alumni engagement are whether alumni are in a reunion year, whether alumni have attended at least one alumni, and the rank of Tufts University in their philanthropic priorities. In the year of their fifth or tenth reunion, young alumni are 1.87 times more likely to donate than alumni not in a reunion year. Also, alumni who have attended at least one alumni event (excluding Homecoming) are 1.63 times more likely to donate than alumni who have not attended these events. Lastly, there is a 71% increase in the odds for alumni to donate for every one rank higher that Tufts receives in their philanthropic priorities. Therefore, alumni who rank Tufts as a "mid-priority" are 1.71 times more likely to donate than alumni who rank Tufts as a "low-priority."

Table 1. Final logistic regression model that displays the fitted relationship on whether an alumnus donates as a function of eight predictor variables for a sample of 1,315 Tufts University young alumni

					95.0% C.I. for Exp(B)	
	B	S.E.	Wald	Exp(B)	Lower	Upper
Female*	0.286	0.133	4.658	1.331	1.027	1.726
Living in/around Boston[a,]*	0.321	0.167	3.710	1.379	0.994	1.912
Living in/around NYC[a]	-0.113	0.178	0.406	0.893	0.630	1.266
Living in/around DC[a]	0.279	0.259	1.157	1.321	0.795	2.196
Living in FL[a]	0.010	0.560	<0.001	1.010	0.337	3.024
Living in CA[a]	0.096	0.241	0.158	1.100	0.686	1.764
Years out***	0.304	0.029	100.550	1.355	1.280	1.434
Undergraduate experience**	0.274	0.097	8.032	1.315	1.088	1.589
GPA 2.00 – 2.49[b]	-0.737	0.526	1.961	0.479	0.171	1.342
GPA 2.50 – 2.99 [b, ***]	-0.873	0.227	14.805	0.418	0.268	0.651
GPA 3.00 – 3.50 [b]	-0.199	0.137	2.118	0.819	0.626	1.072
In reunion year**	0.628	0.222	8.030	1.874	1.214	2.894
Attended alumni event***	0.488	0.139	12.341	1.630	1.241	2.140
Rank of Tufts for giving***	0.535	0.093	33.216	1.708	1.424	2.050
Constant***	-3.077	0.448	47.156	0.046		

*** $p < 0.001$; ** $p < 0.01$; * $p \leq 0.05$

[a] Relative to alumni living in "other" location

[b] Relative to GPA 3.50 – 4.00

The final logistic regression model for donor behavior predicts that young alumni who are female, graduated in the late 1990s/early 2000s, rated their undergraduate experience as positive, attended at least one alumni event excluding Homecoming, ranked Tufts as a priority in their list of philanthropic priorities, are experiencing their fifth or tenth year reunion, and live within the Boston area are a strong profile for potential donors. On the other hand, the logistic regression model predicts that non-donors tend to be males, graduated in the last couple years, and earned GPAs between 2.50 to 2.99.

To further explore the differences between donors and non-donors, young alumni were asked whether receiving special gifts or activities would make an impact on their future donation behavior. A larger percentage of donors (45.4%) indicated that receiving information that explains the impact of their donation is "somewhat important" on their decision to make a future donation compared to non-donors (37.9%).[9] Also, a higher proportion of donors (19.8%) indicated that knowing that alumni donations effected U.S. News & World Report rankings is "extremely important" on their decision to donate in the future (13.3%).[10] Donors and non-donors were also asked the likelihood of donating to particular funds or groups. While most of the areas did not have significant differences between donor and non-donor responses, there were significant differences for the

[9] $\chi^2(4) = 10.749$, $p = 0.03$

[10] $\chi^2(4) = 35.172$, $p < 0.001$

likelihood of donating to two areas: unrestricted funds and endowment funds. The percentage of donors willing to donate to unrestricted funds (30.7%) and endowment funds (37.8%) is significantly higher compared to non-donors (10.9% and 27.4%, respectively).[11,12]

Donor Comparison Profiles

Donors were classified into five categories to assess the differences (if any) among the groups and donor comparison profiles are shown in Table 2. Current Year, LYBUNT, SYBUNT, and Annual donors were compared to each other while Major Donors were compared with the overall donor group.

Table 2. Comparison profile of specific type of donors from a sample of 750 Tufts University young alumni

	CY	LYBUNT	SYBUNT	Annual	Major
N	87	266	362	34	55
Male (%)	35.6%	37.2%	34.5%	38.2%	50.9%*
Age (in years)	26.5	25.7	25.9	26.0	27.7***
Distance from the institution	583	742	878	743	636
Liberal arts (%)	94.3%	86.1%	85.4%	85.3%	80.0%
GPA	3.43	3.47	3.43	3.45	3.36
Total amount of grants[13]	$27,814	$17,165	$17,829	$15,414	$11,213
Total amount of loans[14]	$9,312	$7,517	$10,872	$4,328	$1,903***
Total financial aid received	$38,316	$26,161	$30,175	$21,364	$13,398**
Average donation last five yrs	$149	$720	$117	$588	$3,969
Average lifetime donation	$162	$1,022	$165	$643	$5,733

*** $p < 0.001$; ** $p < 0.01$; * $p < 0.05$

There were not significant differences among Current Year, LYBUNT, SYBUNT, and Annual donors on their demographic characteristics. However, there were significant differences among these donors for the likelihood of donating to particular funds or areas. There are significantly higher percentages of Annual donors willing to donate to unrestricted funds (58.8%),[15] faculty salaries (38.2%),[16] student activities (61.8%),[17] and endowment funds (64.7%).[18] There are significantly lower percentages of SYBUNTs willing to donate to unrestricted funds (22.0%)[19] and endowment funds (29.5%).[20] Current Year and LYBUNT donors did not differ significantly on their likelihood to donate to particular areas within the university.

[11] $\chi^2(2) = 74.884$, $p < 0.001$
[12] $\chi^2(2) = 19.974$, $p < 0.001$
[13] Total amount of grants include all federal, state, and university grants
[14] Total amount of loans include Stafford, Perkins, PLUS, and alternative loans
[15] $\chi^2(6) = 43.779$, $p < 0.001$
[16] $\chi^2(6) = 23.554$, $p = 0.001$
[17] $\chi^2(6) = 16.706$, $p = 0.01$
[18] $\chi^2(6) = 36.721$, $p < 0.001$
[19] $\chi^2(6) = 43.779$, $p < 0.001$
[20] $\chi^2(6) = 36.721$, $p < 0.001$

There are several significant differences for Major donors compared to overall donors on certain biographical information. There is a significantly higher percentage of Major donors who are male (50.9%) compared to overall donors (34.7%).[21] In addition, Major donors, on average, are significantly older ($t(842) = 4.715$, $p < 0.001$) and have received significantly less in undergraduate loans ($t(139.864) = -6.437$, $p < 0.001$)[22] and overall undergraduate financial aid from Tufts University ($t(71.061) = -3.570$, $p = 0.001$).[23] Similar to Annual donors, there is a higher percentage of Major donors who are willing to donate to unrestricted funds (59.3%)[24] and endowment funds (59.3%)[25] compared to overall donors (28.7% and 36.4%, respectively).

Limitations

A limitation of this study was not collecting income information from young alumni to use in the donor predictor model and donor comparison profiles. Monks (2003) found that an increase of $10,000 in personal income raises the expected donor contribution by 2% and an increase of $10,000 in household income raises the financial contribution by 9%. In addition, Melchiori (1988) identified that a higher proportion of major donors from the University of Michigan had annual incomes of $100,000 to $200,000 while the majority of other donors had personal incomes from $60,000 to $100,000.

In order to be sensitive to the privacy of alumni and to create a positive experience for respondents, income information was not asked on the survey. University Advancement rationalized that even if income information was a significant predictor of donating behavior, this information is not readily available for them to use to target specific young alumni as potential donors. In addition, alumni may choose not to respond to questions of this nature. Melchiori (1988) found that only 84% of alumni responded to personal-income questions and 65% of alumni answered household-income questions as compared to an almost perfect response rate for demographic questions on the same survey.

Since financial capacity is a significant predictor of whether alumni donate and the amount of the donation, it cannot be ignored. Therefore, the author used other variables to assess alumni's financial profile such as undergraduate financial aid received as an indicator of debt and family's wealth, years after graduation as an indicator of earning potential, and whether the alumnus was currently enrolled in higher education as an indicator of reduced financial capacity to give. While undergraduate financial aid was not a significant predictor of donor status for young alumni, donors, on average, received $9,915 less in financial aid compared to their non-donor counterparts ($t(1089.46) = 3.927$, $p < 0.001$).[26]

---

[21] $\chi^2(1) = 5.859$, $p = 0.015$

[22] Undergraduate loans includes Stafford, Perkins, PLUS, and alternative loans.

[23] Overall financial aid includes all loans, grants, and work study received for the alumnus's bachelor's degree

[24] $\chi^2(2) = 22.175$, $p < 0.001$

[25] $\chi^2(2) = 11.340$, $p = 0.003$

[26] Financial aid includes all loans, grants, and work study received for the alumnus's bachelor's degree.

Conclusions & Implications for Future Research

This study found a set of observable characteristics that the Tufts Fund staff can use to effectively identify and target young alumni who are strong candidates for potential donors. Staff members also can use this study to pinpoint alumni who are unlikely to donate and remove these individuals from solicitation lists. This will help save scarce office resources which is extremely important in the current economic climate. In addition, the Tufts Fund staff now have a better understanding of how young alumni would like to be contacted, how they would like to be thanked (after their donations), and to what areas they will most likely donate. This is extremely beneficial as the office begins to craft a more targeted strategy for the last two years of the campaign.

Surprisingly, the study did not find many significant differences among different types of donors in regards to demographic or attitudinal characteristics. Therefore, more research is needed to discover why some young alumni are consistent donors and why some young alumni are only occasional donors. If it is simply a matter of a more targeted outreach to turn occasional donors into consistent donors that would be a very invaluable finding!

References

Dugan, K., Mullin, C., & Seigfried, J. (2000). Undergraduate financial aid and subsequent giving behavior. Williams Project on the Economics of Higher Education Discussion Papers. DP-57.

Lindahl, W. & Winship, C. (1992). Predictive models for annual fundraising and major gift fundraising. *Nonprofit Management and Leadership, 3,* 43-64.

Melchiori, G.S. (1988). Applying alumni research to fundraising. In G.S. Melchiori (Ed.), *Alumni research: Methods and applications* (pp. 51-65). San Francisco: Jossey-Bass Inc., Publishers.

Meyers, L.S., Gamst, G., & Guarino, A.J. (2006). *Applied multivariate research.* Thousand Oaks: Sage Publications.

Monks, J. (2003). Patterns of giving to one's alma mater among young graduates from selective institutions. *Economics of Education Review, 22*, 121-130.

Okunade, A. & Justice, S. (1991). Micropanel estimates of the life-cycle hypothesis with respect to alumni donations. In *Proceedings of the Business and Economics Statistical Section of the American Statistical Association* (pp. 298-305). USA: American Statistical Association.

Volkwein, J. F., & Parmley, K. (1999). Testing why alumni give: A model of alumni gift-giving behavior. In D. Shoemaker (Ed.), *Research in alumni relations: Surveying alumni to improve your programs* (pp. 59-62). Washington, DC: CASE Books.

Wunnava, P. V. & Lauze, M. A. (2001). Alumni giving at a small liberal arts college: Evidence from consistent and occasional donors. *Economics of Education Review, 20,* 533-543.

HOLDING ON TO STUDENTS – A SEARCH FOR FRESHMEN ATTRITION RISK FACTORS IN A METROPOLITAN PRIVATE UNIVERSITY[27]

Elisabeth Lackner
Research Analyst, Office of Institutional Research
The New School

Abstract

The objective of this study was to explore first year attrition. A comprehensive in-house dataset was created and linked to freshmen survey responses for this study. This study has revealed a number of factors that have consistent and significant effects on attrition at The New School. These factors are academic achievement (first semester GPA), interest in learning (learning habits during high school and satisfaction with the quality of courses and teaching at The New School), learning group participation, and financial factors such as unmet need, institutional scholarship amount, and general financial concerns. This study confirms the widely researched effects of financial aid (Fenske, 2000; Fike, 2008; Wessel, 2006; Angrist, 2007) and first semester GPA (McGrath, 1997; Wang, 2007) on retention. The results however do not confirm the assumption that a student's demographic background, high school type and location, student housing, and general measures of college preparedness (SAT Math scores, high school GPA, admissions ratings) are critical factors of retention in our institution.

Objectives of the research

The objective of this study was to better understand freshmen attrition and to develop a prediction model that identifies freshmen who are at risk of dropping out after their freshmen year. The lack of an integrated data warehouse was a major challenge and limited previous retention analyses. Thus, a comprehensive integrated data set was created to support analytical tasks that may help identify trigger points of attrition This integrated data set covers *input* factors (Astin, 1991) such as demographic data, high school characteristics, college preparedness, as well as financial support, academic experience, and environmental factors in the first year of college. In addition, survey responses from four Cooperative Institutional Research Program (CIRP) freshmen surveys (fall terms 2004 to 2007) and a fall 2007 in-house student satisfaction survey were also linked to the data set in the hope to improve the understanding of one-year

[27] The Author would like to thank Douglas Shapiro and Charis Ng for their support and assistance in this project.

freshmen attrition. The results were intended to inform future methods of retention research at The New School.

Literature review

Retention analyses in higher education apply several approaches ranging from an interactionalist theory driven approach (Tinto, 1993; Pascarella and Terenzini; 1980), an input-environment-outcome theory driven approach (Bean, 1990; Astin, 1991) to approaches guided by data availability (McGrath, 1997; Caison, 2007; Fike, 2008). Studies have confirmed the importance of financial support (Fenske, 2000; Fike,2008; Wessel,2006; Angrist, 2007; Wang, 2007) and first semester GPA (McGrath, 1997; Wang, 2007). Finally, retention studies focus also on the transfer pattern of students and retention is not simply treated as a dichotomous yes/no event and also differentiates between dropouts and stopouts (Herzog, 2005).

Data Source and Methodology

This is a quantitative study using descriptive statistics, Chi-square tests, independent samples t-tests, factor analysis, and logistic regression. We first compiled a comprehensive dataset from various in-house data sets and NCES reported data that comprised of wide-ranging information on degree seeking students and spanning over multiple academic years. This initial dataset (excluding survey responses) consists of the following areas of interest: Demographic information (age, gender, ethnicity, location of permanent home), high school characteristics (public vs. private, location and urbanicity, number of peers from the same high school), college preparedness measures (high school GPA, high school rank and percentile, SAT scores, ACT scores, admissions ratings), first semester GPA, financial aid (estimated family contribution, parent adjusted gross income and savings, unmet need, type and amount of financial aid, and total aid), environmental variables [28] (freshmen learning group participation, student housing), and retention (fall-to-fall retention, yes or no). All financial aid Dollar values used in the study were adjusted for yearly tuition increases and reflected 2008 Dollar values in thousands. Demographic data, first semester GPA, and the environmental variables (learning group participation and student housing) were available for all cases. Other variables such as high school rank and percentile values were only known for 21 percent of the cases. For detailed descriptive statistics on all variables included in the first step of this study please go to Appendix A.

Because the undergraduate divisions offer very distinct majors at The New School, the data set used in this study was a subset of the larger data set and only covered one particular undergraduate division with programs in applied fields. The sample size of this subset is 1983 freshmen.

[28] John Bean and Alexander Astin stress the importance of environmental variables on campus such as facilities and programs, courses, faculty, and peer groups.

In a second step, Cooperative Institutional Research Program freshmen survey responses (CIRP survey) of the fall terms 2004 to 2007 were added to the data set. This added quantified information on attitudes, opinions, and behavior to the data set, which was not readily available elsewhere. Finally, the relationship between responses from an in-house student satisfaction survey administered in fall 2007 and the retention of fall 2007 freshmen was analyzed. The retention rates of all four cohorts ranging between 85 and 87 percent were compared and a Chi-square analysis revealed no statistical significant difference between the cohorts.

First step: In-house data analysis

Cohorts were tested individually and combined using Chi-square analyses to test the effects of nominal and ordinal scaled independent variables. Independent samples t-tests were conducted to compare the financial aid characteristics and other interval scaled variables such as GPA scores of the retained student population to the not-retained student population. Finally, binary logistic regressions were performed to test a series of independent variables on predicting the odds of leaving after the freshmen year.

Academic and environmental factors

Students who participated in freshmen learning groups had higher retention rates (Table 1). These students were randomly registered into clusters of courses in their first semester. All students in a learning group had the same classmates in all their courses.

Table 1: Learning group participation

New Freshmen, Fall Terms 2004-2007 (N = 1983) p-value: 0.003			
	Started	**Retained**	***% Retained***
In learning group	1373	*1199*	87%
Not in learning group	610	*502*	82%

Students with a low first semester GPA had lower retention rates. In particular, students with a first semester GPA of 2.88 and lower were more vulnerable to attrition. The means comparison showed a clear difference between the retained and the not-retained group (Table 2).

Table 2: First semester GPA			
New Freshmen, Fall Terms 2004-2007 (N = 1976), p-value: 0.000			
	Started	**Retained**	***% Retained***
Lowest to 2.88	502	373	*74%*
2.89 to 3.23	497	446	*90%*
3.24 to 3.50	490	435	*89%*
3.51 to 4.00	487	444	*91%*
T-test result: First semester GPA			
p = 0.000			
	Groups	**N**	**Mean**
First semester GPA	Not-retained	278	2.51
	Retained	1698	3.18

Financial aid factors

Independent samples t-tests revealed that students who were retained had significantly lower unmet need and higher total aid, including institutional scholarship amounts (merit-based and non-merit-based scholarships) than those who left after the freshmen year (Table 3).

Table 3: T-test results: Financial aid and retention[1]			
New Freshmen, Fall Terms 2004-2007 (N = 1983)			
All Dollar amounts were converted to 2008 Dollar value based on tuition increases.			
Financial Aid Variables	Groups	N	Average Fall 2008 Dollar Amount
Unmet Need	Not-retained	282	*$ 7,303.00*
F = 22.151, p-Value = 0.000***	Retained	1701	*$ 3,946.00*
Total financial aid	Not-retained	282	*$ 14,630.00*
F = 17.437, p-Value = 0.000***	Retained	1701	*$ 17,800.00*
Scholarship Amount	Not-retained	282	*$ 6,176.00*
F = 13.320, p-Value = 0.003**	Retained	1701	*$ 7,536.00*
Merit Scholarship Amount	Not-retained	282	*$ 1,168.00*
F = 15.399, p-Value = 0.001**	Retained	1701	*$ 1,632.00*

Non-Merit Scholarship Amount	Not-retained	282	*$ 5,008.00*
F = 16.527, p-Value = 0.030*	Retained	1701	*$ 5,904.00*

[1] Cases without an amount on record were included in this sample and were coded to have a $0 amount.

Predicting attrition

Logistic regression models were developed to analyze the combined freshmen retention behavior of the fall 2004 to fall 2006 freshmen cohorts. Unmet need (negative effect), institutional scholarship amount in thousands (positive effect), first semester GPA (positive effect), participation in a freshmen learning group (positive effect) and SAT verbal scores (weak negative effect, meaning the higher the score the more likely to be at risk of leaving) proved to have a statistically significant impact on improving the predictability of the odds of retention (Table 4).

The fact that low SAT Verbal scores in combination with these factors had a weak but statistically significant positive effect on retention might be due to the nature of the academic programs under investigation, which are primarily in applied fields. No liberal arts and writing majors were included in this study.

Table 4: First logistic regression model

New Freshmen, Fall Terms 2004-2006 (N = 1028)

Variables	B coefficient	P value	Odds ratio
First semester GPA	1.166	0.000	3.209
Learning group participation	0.571	0.005	1.770
SAT Verbal score	-0.004	0.000	0.996
Non-merit-based scholarship in thousands [1]	0.052	0.003	1.054
Unmet financial need in thousands [1]	-0.034	0.000	0.966
Constant	-0.168	0.795	0.846

[1] Cases without an amount on record were included in this sample and were coded to have a $0 amount value.

-2 Log Likelihood: 725.784
Cox & Snell R Square: 0.108
Nagelkerke R Square 0.194

A -2 Log Likelihood of 725.784 and R Squares of 0.108 and 0.194 do not indicate a strong prediction power. An odds prediction equation was performed to identify the individuals at risk of dropping out in the fall 2007 cohort based on the model's coefficients (validity test of the model). If the predicted probability of retention was 75 percent or greater, students were assigned to the retained or "low risk" group; otherwise, they were assigned to the not-retained or "high risk" group. For a detailed description of the prediction equation see Appendix B.

The prediction was then compared with the actual retention behavior. The results showed that the model was only modestly successful. Only 36 percent of those who actually dropped out had been identified as high risk (19 cases out of 53 drop outs). The overall accuracy rate of the model was 83 percent.

Table 5: Validation of first model
Fall 2007 freshmen cohort

N = 438		Predicted odds of leaving	
		High risk	**Low risk**
Actual	**leave**	19	34
	stay	40	345
	Risk	32%	9%

Sensitivity of prediction: P(correct | retained): 79%
Specificity of prediction: P(correct | attrited): 36%
False positive: 9%
False negative:68%
Overall accuracy rate: 83%

Interestingly however, thirty-two percent of those predicted at high risk of leaving actually left after their freshmen year. Only nine percent of those predicted at low risk of leaving actually left. This means that the high-risk group identified by the model had more than three times the probability of dropping out as the low risk group had.

None of the background variables (‘*input factors’*) except for low SAT Verbal scores had a significant prediction power on attrition. The results indicate that no particular demographic such as ethnic group, nationality, gender, degree of urbancity, and distance from home, or students living in dormitories is more compelled to leave after the freshmen year. High school data and college preparedness measures such as SAT Math scores, high school GPA, and admissions ratings had no effect (see Tables 6 and 7).

Table 6: No effects
New Freshmen, Fall Terms 2004-2007
p-value > 0.05

	Started	Retained	% *Retained*
Basic demographics			
Male	419	351	84%
Female	1564	1350	86%
US citizen	1483	1262	85%
White or Asian (over-represented group)	1041	887	85%
US minorities (under-represented[1] group incl. multi-ethnic)	324	272	84%
US minorities excl. multi-ethnic	249	208	84%
Unreported	120	104	87%
International student	500	439	88%
Lives in student housing	1563	1345	86%
Does not live in student housing	408	345	85%
High school information			
Public high school	1029	873	85%
Private high school	311	260	84%
High school is within the tri-state area	531	454	85%
High school is outside the tri-state area	809	679	84%
High school located in a large city	449	383	85%
High school in a suburban area or large town	711	601	85%
High school in a rural area or small town	180	149	83%

[1] African American, Hispanic, and Native American

Table 7: No effects continues
First-time Freshmen Fall Terms 2004 to 2007

p-values > 0.05

	Groups	N	Mean
Age	Not-retained	282	19
	Retained	1701	18
Distance to school (in miles)	Not-retained	232	686
	Retained	1285	663
Number of peers from the same high school	Not-retained	257	5
	Retained	1574	5
SAT Math	Not-retained	205	547
	Retained	1277	550
High school GPA	Not-retained	182	3
	Retained	1023	3
Admissions rating	Not-retained	274	3.4
	Retained	1638	3.6

Second step: Incorporating CIRP Freshmen and Fall 2007 Student Satisfaction Survey Data

The Higher Education Research Institute (HERI) of the University of California developed and makes available the Cooperative Institutional Research Program (CIRP) freshmen survey to universities and colleges to survey new entering freshmen on a variety of subjects relevant to freshmen year. The New School regularly administers the CIRP freshmen survey and HERI was able to link our retention data set to the CIRP freshmen survey data of The New School respondents (fall terms 2004 to 2007).

The survey data included the following areas of interest: demographic information (age, high school graduation year, reported average high school grade, living status of the parents, parents' highest degree, household income, students' and parents' religion, and ethnicity), quantified reports on high school activities and leisure activities during high school, reasons for attending and choosing this particular college, self assessment on a variety of abilities and characteristics (for example academic ability, leadership ability, and spirituality among others), political views, college expectations, and goals for the future.

The fall 2007 student satisfaction survey was developed in-house in order to assess general satisfaction with individual programs, course offerings, faculty and academic support, facilities and technical support, and the satisfaction with the college community.

A sample comparison (Table 8) revealed that the survey populations had fewer international students (sixteen percent and eleven percent compared to twenty-five percent in the general sample), and the SAT scores were somewhat higher among survey respondents. Almost all CIRP respondents stayed in student housing (where the CIRP surveys were administered). Finally, the student satisfaction survey respondents participated less frequently in learning groups (57 percent compared to 69 and 71 percents).

Table 8: Sample comparison: Total cohort, CIRP survey, and Fall 2007 student satisfaction survey participants

	All four Cohorts	CIRP freshmen survey Fall 2004-2007	Fall 2007 Student satisfaction survey
N	1983	773	123
One year retention rate	86%	87%	88%
Female	79%	81%	79%
Male	21%	19%	21%
Age (mean)	18.5	18.2	18.3
% International Students	25%	**16%**	**11%**
Student housing	79%	**99%**	80%
Learning group participation	69%	71%	**57%**
SAT Verbal (mean)	529.6	**546.6**	**557.3**
SAT Math (mean)	549.7	**556.8**	**555.2**
HS GPA (mean)	3.3	3.3	3.3
Admissions rating (mean)	3.6	3.6	3.8

The findings of the CIRP data were consistent with the results of the in-house data analysis. Students who stated that they have major concerns about financing their college education were less likely to continue into sophomore year. Reversely, students who interacted with their teachers outside class in high school were more likely to continue. A high first semester GPA and a habit of asking teachers for advice seem to influence retention positively, while financial concerns and unmet financial need both influence retention negatively. In addition, students who felt strongly that The New School is a reputable college (for them "the national ranking of The New School was a 'very important' reason for choosing this college") were more likely to stay on (Table 9).

Table 9: CIRP survey responses that affected retention
New Freshmen Fall Terms 2004-2007

	Percent of total cohorts	Sig[1]	Started	Retained after one year	% Retained
All	*100%*		1983	1701	*86%*
CIRP respondents	*39%*		773	669	*87%*
The ranking in national magazines was a reason for choosing to attend this particular college.	32%	0.03*			
Not important			249	207	*83%*
Somewhat important			229	204	*89%*
Very important			162	148	*91%*
Asked a teacher for advice after class during the past year	37%	0.002**			
Not at all			146	120	*82%*
Occasionally			412	350	*85%*
Frequently			184	173	*94%*
Do you have any concern about your ability to finance your college education?	36%	0.019*			
No concerns			234	211	*90%*
Some concerns			347	303	*87%*
Major concerns			135	108	*80%*

[1] Asymp. Sig. (2-sided) of Pearson Chi-Square Test

A factor analysis on learning behavior during the senior year in high school found a factor that we called "Being serious about learning in the senior year of high school". Table 10 lists the three variables that constitute this factor and their factor loadings.

Table 10: Factor: Being serious about learning in the senior year of high school
New Freshmen Fall Terms 2004-2007, N = 552

Variable	Factor loading
Asked a teacher for advice after class	0.665
Studied with other students	0.407
Time spent studying and doing homework	0.324

The factor score was stored as a variable in the dataset and subsequently included in a second logistic regression analysis. The second analysis combined the variables of the first model with the statistically significant CIRP variables in a forward stepwise logistic regression of all four cohorts.

Table 11: Final logistic regression model

New Freshmen, Fall Terms 2004-2007 (N = 436)

Variables	B coefficient	P value	Odds ratio
First semester GPA	1.017	0.000	2.764
SAT Verbal score	-0.007	0.000	0.993
Non-merit-based scholarship in thousands [1]	0.073	0.024	1.075
Unmet financial need in thousands [1]	-0.033	0.018	0.967
Concern about the ability to finance college education	-0.768	0.001	0.464
Factor: Being serious about learning in senior year	0.481	0.043	1.618
Constant	2.985	0.019	19.780

[1] Cases without an amount on record were included in this sample and were coded to have a $0 amount value.

-2 Log Likelihood: 270.109
Cox & Snell R Square: 0.122
Nagelkerke R Square 0.230

The revised model no longer included learning group participation. The CIRP variable that measures how important rankings in national magazines were in choosing The New School was also not included.

The model's summary statistics improved. The -2 Log Likelihood value is considerably smaller and the R square values are somewhat higher. However the prediction power is still relatively weak. The inclusion of CIRP data reduced the sample size by more than half. A validity test of the model revealed that the gap of the actual dropout rates between the high and the low risk group had widened. Forty-three percent of the individuals identified as high risk actually left compared to only seven percent of the low risk group. Also, the percentage of false negative predictions is lower in this model. While in the first model 68 percent were wrongfully predicted of leaving in the revised model only 57 percent were wrongfully predicted to leave after freshmen year (Table 12). However, the sample size of the fall 2007 test group is very small and caution must be taken to generalize these findings.

Table 12: Validation of final model
Fall 2007 freshmen cohort

N = 157		Predicted odds of leaving	
		High risk	**Low risk**
Actual	**Leave**	6	10
	Stay	8	133
	Risk	43%	7%

Sensitivity of prediction: P(correct | retained): 94%
Specificity of prediction: P(correct | attrited): 37.5%
False positive: 7%
False negative:57%
Overall accuracy rate: 88.5%

Student satisfaction survey findings

Freshmen who were satisfied with the quality of teaching and the courses offered had a statistically significant higher retention rate. Ninety to ninety-one percent of satisfied freshmen continued into sophomore year compared to only seventy-one to seventy-three percent of freshmen who were not satisfied with these qualities. Finally, students who were overall satisfied with their college education were much more likely to be retained (Table 13).

Table 13: New Freshmen Student Satisfaction Survey participants, Fall 2007

	Percent of total cohorts	Sig[1]	Started	Retained after one year	% Retained
Quality of teaching	*6%*	*0.016**			
Very dissatisfied or dissatisfied			21	15	*71%*
Satisfied or very satisfied			97	88	*91%*
Liberal Arts Courses Offered	4%	0.037*			
Very dissatisfied or dissatisfied			22	16	*73%*
Satisfied or very satisfied			64	58	*91%*
Course offered	6%	0.023*			
Very dissatisfied or dissatisfied			17	12	*71%*
Satisfied or very satisfied			103	93	*90%*
Overall satisfaction with your education	6%	0.000***			
Very dissatisfied or dissatisfied			18	11	61%
Satisfied or very satisfied			98	90	92%

Conclusions and Implications for Research

High retention and graduation rates are important for The New School's academic and financial stability and are seen as a measure of institutional effectiveness nationwide. It is every institution's hope to clearly identify the risk factors that contribute to attrition in order to develop preventive measures. This project started with the gathering of in-house and third party data in order to establish a comprehensive data set that can be utilized to study retention at The New School. The analysis of available data on freshmen at The New School confirmed the fact that demographic characteristics such as gender, ethnicity, citizenship, geographic distance from school, and high school types do not affect attrition significantly. This indicates that The New School is not biased towards a particular demographic in freshmen year.

The analysis further confirmed that financial constrains, academic performance (first semester GPA) and academic interest (learning habits in high school, and the satisfaction with course offerings and the quality of teaching) seem to influence attrition at The New School. Furthermore, students who were convinced that The New School is a reputable institution were also more likely to continue on after freshmen year.

The prediction models developed in this project were able to identify some high risk factors. However, the models were not strong enough to explain attrition solely on the factors included.

This study reveals that specific attention to demographic information and college preparedness measures does not improve our understanding of freshmen retention at The New School. The focus of future analyses should however be on academic achievements and interests, learning habits, study behavior, and financial concerns. These findings should guide the development of quantitative and qualitative instruments such as surveys and focus groups to research further risk factors and underlying causes of attrition at The New School.

Bibliography

Angrist, Joshua, Lang, D., and Oreopoulos P. (2006). *Lead them to water and pay them to drink: An experiment with services and incentives for college achievement*. http://www.nber.org/papers/w12790: NBER Working Paper No. 12790.

Astin, Alexander W. (1991). *Assessment for excellence: The philosophy and practice of assessment and evaluation in higher education*. New York, NY: Macmillan.

Bean, John P. (1990). Why students leave: Insights from research. In D. Hossler, J.P.Bean, & Associates (Eds.), *The strategic management of college enrollments* (170-185). San Francisco: Jossey-Bass.

Caison, Amy L. (2007). Analysis of institutional specific retention research: a comparison between survey and institutional database methods. *Research in Higher Education*, 48(4), 435-451.

Fenske, Robert H., Porter, J.D., and DuBrock, C. P. (2000). Tracking financial aid and persistence of women, minority, and needy students in science, engineering, and mathematics. *Research in Higher Education*, 41(1), 67-94.

Fike, David S. and Fike, Renea. (2008). Predictors of first year student retention in the community college. Community College Review, 36(2), 68-88.

Herzog, Serge. (2005). Measuring determinants of student return vs. dropout/stopout vs. transfer: A first-to-second year analysis of new freshmen. *Research in Higher Education*, 46 (8), 883-928.

McGrath, Michael and Braunstein, A. (1997). The prediction of freshmen attrition: an examination of the importance of certain demographic, academic, financial, and social factors. *College Student Journal*, v31, 396-408.

Pascarella, E. T., and Terenzini, P. T. (1980). Predicting freshman persistence and voluntary dropout decisions from a theoretical model. *Journal of Higher Education*, 51(1), 60–75.

Tinto, V. (1993). *Leaving College: Rethinking the Causes and Cures of Student Attrition*. (2nd.). Chicago, IL: The University of Chicago Press.

Wang, Mindy. (2007). A Validity Test of Financial Aid Logistic Model in Predicting Student Retention. A paper presented at the 34th annual NEAIR conference in New Brunswick, NJ.

Wessel, R. D., Bell, C. L., McPherson, J. D., Costello, M. T., & Jones, J. A. (2006). Academic
disqualification and persistence to graduation by financial aid category and academic ability.
Journal of College Student Retention: Research, Theory & Practice, 8, 185-198.

Appendix A

Descriptive statistics

Table A-1: Demographic Data (Input)

New Freshmen, Fall Terms 2004-2007 (N = 1983)

	N	%	Min	Max	Mean	St. Div.
Age	1983	100%	16	36	18.5	1.5
Gender (male)	419	21%				
Gender (female)	1564	79%				
Ethnicity (AI)	5	0%				
Ethnicity (AS)	412	21%				
Ethnicity (BL)	86	4%				
Ethnicity (HS)	158	8%				
Ethnicity (ME)	75	4%				
Ethnicity (WH)	629	32%				
Ethnicity (IN)	498	25%				
Ethnicity (Unknown)	120	6%				
Citizenship (Citizen/Permanent Resident)	1485	75%				
Citizenship (International)	498	25%				
Home is within the Tri-State area	512	26%				
Home is outside the Tri-State area	1471	74%				
Distance of home to The New School	1517	77%	0	5315	667	904

Table A-2: High School Data

New Freshmen, Fall Terms 2004-2007 (N = 1983)

	N	%	Min	Max	Mean	St. Div.
Number of peers from the same high school	1831	92%	1	62	5.3	7.9
Public High School	1029	52%				
Private High School	311	16%				
High School within the Tri-State area	531	27%				
High School outside the Tri-State area	809	41%				
HS Urbanicity (Large City)	449	23%				
HS Urbanicity (Suburban/Large T)	711	36%				
HS Urbanicity (Small Town/Rural)	180	9%				
High School Percentile	425	21%	1	99	67.1	22.8
High School Rank	417	21%	1	819	120.8	117.9

Table A-3: Test Scores, High School GPA, and Admissions Rating						
New Freshmen, Fall Terms 2004-2007 (N = 1983)						
	N	**%**	**Min**	**Max**	**Mean**	**St. Div.**
SAT Verbal Scores	1476	74%	200	800	529.6	93.0
SAT Math Scores	1482	75%	210	800	549.7	90.8
ACT English	80	4%	12	33	23.0	4.5
ACT Math	80	4%	13	34	21.8	4.6
ACT Composite	135	7%	14	34	22.8	3.8
Admissions Rating	1912	96%	1	6	3.6	0.9
High School GPA	1205	61%	1.3	4.9	3.3	0.5

Table A-4: In School Experience						
New Freshmen, Fall Terms 2004-2007 (N = 1983)						
	N	**%**	**Min**	**Max**	**Mean**	**St. Div.**
Learning group (yes)	1373	69%				
Learning group (no)	610	31%				
Student housing (yes)	1563	79%				
Student housing (no)	408	21%				
First semester GPA	1976	100%	0	4	3.09	0.68
Financial Aid						
Unmet Need	1524	77%	-47,000	47,021	5,055	11,389
Total Aid	1502	76%	0	67,234	20,141	15,789
Institutional Scholarship Amount	1430	72%	759	38,100	8,957	5,786
Estimated Family Contribution	1107	56%	0	100,000	18,479	25,518
Parents Adjusted Gross Income	1063	54%	-479,375	1,000,000	84,708	107,759
Savings	1039	52%	0	144,000	1,214	5,640
Merit Scholarship Amount	905	46%	400	10,000	3,019	1,598
Loans Amount	894	45%	500	52,724	16,497	13,255
State and Federal Grants Amount	503	25%	0	25,610	5,025	3,987
Student Adjusted Gross Income	433	22%	-2,799	38,211	3,445	4,659
Pell Grant Amount	298	15%	400	4,310	3,158	1,245
Workstudy Amount	110	6%	45	4,790	1,514	909

Appendix B

Prediction Equation of the First Model

COMPUTE ODDS_Model_final = EXP(-0.168+(1.166*FirstSemesterGPA) + (0.571*LearningGroup) + (-0.004 *SATVerbalScore)+ (0.052 *NonMeritScholarship) + (-0.034*UnmetNeed)) . EXECUTE .

COMPUTE PRet_Model_final = ODDS_Model_final/ (1 + ODDS_Model_final) . EXECUTE.

RECODE PRet_Model_final (0.75 thru Highest=1) (0.001 thru 0.7499=0) INTO Ret_Model_final_0.75 . EXECUTE .

STUDENTS' PERCEPTIONS MATTER: EARLY SIGNS OF UNDERGRADUATE STUDENT RETENTION/ATTRITION

Authors:

Corbin M. Campbell
Doctoral Student
Higher Education Program
Graduate Assistant
Office of Institutional Research, Planning, and Assessment
University of Maryland

Jessica Mislevy
Doctoral Candidate
Department of Measurement, Statistics, and Evaluation
Graduate Assistant
Office of Institutional Research, Planning, and Assessment
University of Maryland

INTRODUCTION

Along with the massification of higher education and increasing costs, the pressure on institutions to retain all students to degree completion has been mounting (Crosling, Thomas, and Heagney, 2008). On an international level, for the first time in the nation's history, the Unites States is falling behind other nations in terms of the percentage of the population who is educated (National Science Board, 2008). Nationally, obtaining a higher education degree has been linked to economic growth (Baum and Ma, 2007), which may be particularly poignant during the current recession. At an institutional level, the costs of not retaining students are substantial, both financially and in terms of prestige (Crosling, Thomas, and Heagney, 2008). For individual students, considering the rising cost of higher education, degree completion becomes more critical in order to feel the benefits for the substantial investment (Paulsen & St. John, 2002).

Historically, both scholars and practitioners have used mainly dichotomous definitions of retention: here or not here, drop out or not, retained or not, persisted or not. This is evidenced by the outcomes of interest in several of the most prominent theories on retention. For example, Tinto's (1993) landmark theory is based on a study of whether a student persists or not. Even models that take into consideration factors that influence non-traditional students have tended to look at retention as persisted or not (Bean and Metzner, 1987). In the past few decades, the studies on retention and persistence that include this type of dichotomous characterization of retention are substantial (see, for example Pascarella & Terenzini, 1980; Spady, 1971; Tinto, 1993).

More recently, scholars have begun to recognize the importance of understanding the various pathways to degree completion. Nationally, one in five students who began college in a four year institution eventually earned their degree via transfer to another institution (Adelman, 2004). Additionally sixty percent of students who earned a bachelors degree had attended more than one post-secondary institution (Adelman, 2004). Concurrent enrollment at dual institutions (or "Double-dipping") continues to be on the rise (Adelman, 2004). Other scholars have investigated how attending a two year institution influences a four-year degree attainment (Cabrera, Burkum, & La Nasa, 2005).

Scholars have arrived at a more complex picture of the pathways through college, termed "swirling," than the more rigid, linear depiction of retention from the 1970s, 80s, and early 90s (Borden, 2004; Santos & Wright, 1990). McCormick (2003) names 8 types of enrollment "swirls" that describe various patterns associated with transferring among one or more institutions over one or more time periods. Along with this new conceptualization of enrollment patterns have come more complex methodological

considerations. The "swirling" patterns cannot adequately be described by logistic regression, which was the traditional methods for retention (Porter, 2002). New studies have used more sophisticated modeling techniques, including multinomial logistic regression among others (see, for example, Porter, 2002).

While more recent studies better account for a more complex view of enrollment patterns, there are three main limitations in the current literature. First, while many institutions are moving toward *reporting* a more complex picture of retention because of accountability movements, such as the Voluntary System of Accountability (VSA), few institutions consider institutional implications of student "swirlers." When institutions are interested in understanding retention, it is typically institution-centric. That is, institutions want to know what factors and programs influence students' decisions to stay at that particular institution. For example, a study by Hausmann, Schofield, and Woods (2007) evaluating the effectiveness of a programmatic effort aimed at retention defined retention as the students' persistence at that one specific institution.

Second, as Porter (2002) describes, few if any of these studies examine stopping out behavior in addition to transferring or concurrent enrollment. For example, Herzog's (2005) study moved beyond a dualistic understanding by tracking in simultaneous institutions and investigating retention from 1st semester to second semester freshmen year and then to sophomore year. While this study is highly useful at describing retention through the second year, it fails to consider the longer term issues in retention and does not consider stopping out behavior. Third, most models of retention that do account for multiple outcomes focus mainly on academic and financial variables, without including

variables on engagement or student perceptions of climate and self abilities (See, for example, Herzog, 2005 and Porter, 2002).

The present study is designed to address these three critiques. First, it is directly linked to practice. Developed in conjunction with a campus-wide assessment committee, the study was designed to inform practitioners about the various predictors of retention. Second, the study investigates four separate enrollment patterns (continuous enrollment, stopping out, transferring out, and discontinued enrollment) using multinomial logistic regression. Third, the study seeks to connect student perceptions from a survey of freshmen with enrollment patterns five semesters later.

THEORETICAL FRAMEWORK

This study is guided by the theoretical understanding of student swirl (Borden, 2004; McCormick, 2003; de los Santos & Wright, 1990). Under this theory, student persistence in college is viewed as a circular rather than linear process. While some students may be continuously enrolled at one institution from matriculation to graduation, many students may stop-out and return to their university or transfer to another university. Some may do a combination of stopping-out and transferring multiple times along their college journey. Others may leave higher education all-together. The theory on student swirl allows for the understanding that the college enrollment process is complex, and students may have various experiences.

The present study seeks to understand what factors are associated with students who have four different enrollment outcomes: stop-out, transfer-out, drop-out, and continuous enrollment. Previous scholars have found that there are multiple factors that

contribute to the retention of students. The present study will focus on eight factors that have been linked to student retention or persistence:

- Student involvement/engagement (Tinto, 2006-2007)
- Academic abilities (Tinto, 1997; Cabrera et al., 1993; Perna,1997; and Hu & St. John, 2001; Cabrera, Burkum, & LaNasa, 2005)
- Financial constraints (Cabrera, Burkum, & LaNasa, 2005; Cabrera, Nora, & Castenada, 1993; Herzog, 2005; Paulsen and St. John, 2002)
- Sense of belonging (Hausmann, Schofield, and Woods, 2007)
- Educational and degree aspirations (Cabrera, Burkum, & LaNasa, 2005)
- Race/ethnicity (Hu & St. John, 2001)
- Gender (Astin, 1975; Peltier, Laden, & Matranga, 1999; Reason, 2003; Tinto, 1993)
- Residency/local student status (Herzog, 2005)

METHODOLOGY

Data Sources

The present study uses pre-existing data to explore issues behind degree-seeking undergraduate students' enrollment patterns. We used two sets of data from students at the University of Maryland (UM), a large, public, research institution in the mid-Atlantic region:

Beginning Student Survey: The *Beginning Student Survey* (BSS) is a locally-developed instrument crafted by the Beginnings subgroup of the Campus Assessment Working Group (CAWG). Created in 1996, CAWG is a volunteer committee dedicated to building a culture of evidence at UM (www.irpa.umd.edu/CAWG). CAWG gathers and

exchanges information about the student, staff, and faculty experience at the university, typically by administering large-scale surveys to cross-sections of students on an annual basis.

The BSS is given to first-time freshmen eight weeks into their first fall semester. In the fall of 2002, the BSS (hereafter referred to as the BSS'02) was administered to students in classes designated for freshmen (e.g., ENGL101, UNIV100, etc). The BSS'02 asked students about their expectations, attitudes and behaviors.

Questions on the BSS'02 covered a broad range of topics. Items from the survey that were selected for inclusion in this study were based on the following criteria: 1) potential usefulness in identifying future enrollment patterns at eight weeks into the semester, (i.e., outcome variables such as college GPA were not included); 2) having sufficient variability; and 3) having face validity with the retention literature or with a previous study conducted by the campus-wide assessment committee.

National Student Clearinghouse (NSC): The National Student Clearinghouse (NSC) is the nation's largest database of enrollment data (www.studentclearinghouse.org). All fifty states are represented as well as some territories, with participating institutions enrolling over 92% of all types of U.S. higher education students. The NSC provides continuing collegiate enrollment and degree information to institutions on their prospective, current, and former students. The NSC uses student identification numbers to search data from every participating institution to supply semester-by-semester enrollment information on these individuals.

Sample

The sample was initially comprised of 2135 first-time, full-time, degree-seeking freshmen in Fall 2002 who completed the BSS'02. Respondents who did not provide a valid university identification number were excluded, as there was no way to link their survey responses to institutional or enrollment data. Additionally, international respondents were removed from the analyses because of possible confounding issues related to visas and/or their family's possible transient diplomatic status, leaving usable data for 2084 respondents. Of those, 49% were male and 51% were female. Additionally, 64% were White, 13% were Asian American, 12% were Black/African American, 6% were Hispanic, <1% was American Indian, and 5% were of an unknown race/ethnicity. Sixty-eight percent entered UM as in-state residents, while 32% were out-of-state residents at matriculation. The mean age was 18 (SD = 0.489).

Procedures

National Student Clearinghouse data were used to categorize the remaining 2084 BSS'02 respondents according to their enrollment status in the fall of 2005, three years after they matriculated at UM. The four categories included:

- **Continuously enrolled Stayers**: Respondents who were continuously enrolled at UM between Fall 2002 and Fall 2005, or had graduated from UM by Fall 2005 (n = 1588, 76%);
- **Stop-outs**: Respondents who were enrolled at UM in Fall 2005 after having temporarily discontinued enrollment at UM for at least one semester between Fall 2002 and Fall 2005 (n = 239, 12%);

- **Transfer-outs**: Respondents who, at some point between Fall 2002 and Fall 2005, discontinued enrollment at UM, and were enrolled at another institution in Fall 2005 or had graduated from another institution by Fall 2005 (n = 158, 8%);
- **Drop-outs**: Respondents who were enrolled at UM in Fall 2002, had left UM, and had no NSC graduation data or enrollment data for Fall 2005 (n = 99, 5%).

Note that the classification of respondents regarding their Fall 2005 enrollment was institution-centric for individuals with "swirling" enrollment behaviors. That is, an individual who may have attended an institution other than UM between Fall 2002 and Fall 2005, but had returned to UM by Fall 2005 was classified as a stop-out (because he or she ultimately returned to UM), not a transfer-out.

Multinomial Logistic Regression (MLR) was used to evaluate possible associations between student characteristics and survey responses, and Fall 2005 enrollment outcomes (i.e., stayers, stop-outs, transfer-outs, and drop-outs). In order to reduce the number of items to be included in the MLR, maximum likelihood factor analysis was used to distinguish thematic clusters of survey items with the same response options. Two separate analyses were conducted because the survey included two groups of items with different response options. The correlation matrices for both analyses were factorable as evidenced by Bartlett's Test of Sphericity ($p < .001$) and the Kaiser-Meyer-Olkin measure of sampling adequacy (KMO = 0.844 and .883). A varimax rotation with Kaiser normalization was applied to the first analysis to achieve simple structure.

Three factors were extracted (Factors 1 and 2 from the first analysis and Factor 3 from the second), as was determined by a visual examination of the associated scree plots

and a notable drop in eigenvalue magnitude for subsequent factors. Items included in the factors had loadings greater than .350. We evaluated internal consistency among items in each factor through Cronbach's alpha. The three factors had Cronbach's alpha values of greater than .600 (Factor 1 = .644, Factor 2 = .723, Factor 3 = .855). These results suggest the internal consistency of each factor is adequate, or that each set of items does an adequate job of measuring a single unidimensional construct.

We examined the content of items within each component (see Table 1) and developed construct names (Factor 1: Academics; Factor 2: Institutional Connectedness; Factor 3: Study Skills). Respondents' answers were averaged across the survey items associated with each factor to form scale scores.

Factor	Response Options	Survey Items
Academics	5 point scale with 1=Strongly disagree; 5=Strongly agree	I am earning the grades I want. I've stayed motivated. I feel adequately prepared for academic demands here. I'm adjusting to the academic work of college.
Study Skills	4 point scale with 1=Below average; 4=Highest 10%	At present, how do you think you compare with other freshmen at UM in the following areas: • Oral communication skills • Math skills • Note taking • Listening • Managing time • Understanding what you read • Reading speed • Writing – organization • Writing – grammar • Managing stress • Memory • Preparing for exams • Taking exams
Institutional Connectedness	5 point scale with 1=Strongly disagree; 5=Strongly agree	There are social/leisure activities on campus that I like. If I run into problems here, I know someone who'll listen to and help me. I'm adjusting to the social life of college. There are sufficient campus activities on weekends to meet my interests and needs. I'm satisfied with my current living arrangements. I'm as involved in campus activities as I want to be. I can develop a class schedule that fits my needs. I feel safe on campus. I know where to get help on campus with reading and study skills. I understand the purpose of the CORE program.

Table 1. Items that contribute to three factors

Variables included in the model are listed in Table 2, below. They were selected by their relevance to the theoretical framework, grounded in the literature on retention,

and those of interest to the campus committee due to their potential usefulness for practitioners.

Model	Construct	Item/factor	Data Source
IV	Involvement/engagement	Institutional Connectedness Factor	BSS
IV	Academic abilities and resources	Academics Factor, Study Skills Factor	BSS
IV	Financial constraints	Working on or off campus, Concern about ability to pay for education	BSS
IV	Sense of belonging	General attitude toward UM, Whether UM was first choice	BSS
IV	Educational and degree aspirations	Having selected a field of study/major, Having identified a career direction or interest	BSS
IV	Race/ethnicity	Asian American, Black/African American, Hispanic, White, Unknown	Institutional data
IV	Residency/local student status	In-state v. Out-of-state	Institutional data
IV	An interaction between state residency and financial concern was included to allow for the possibility that financial concern may act differently for in-state and out-of-state students.	Interaction between state residency and concern about finances	Institutional data and BSS
DV	Enrollment Pattern	Outcome five semesters after matriculation (fall '05): Continuously enrolled, Stop-out, Transfer-out, Drop-out	NSC data

Table 2. Conceptual Model

Over the last several decades, the literature on retention of college students has consistently demonstrated that gender is an important predictor variable for retention (e.g., Astin, 1975; Peltier, Laden, & Matranga, 1999; Reason, 2003; Tinto, 1993). Furthermore, our initial analyses showed significant interactions between gender and the

other variables in the model. Therefore, we ran separate analyses for men and women, and report the separate findings.

LIMITATIONS

This report provides some useful insight into issues that can influence undergraduates' enrollment patterns. However, the study has some limitations. Only first-time full-time freshmen who both responded to the BSS'02 and gave their UID were included. The analyses were limited to questions that appeared on the BSS'02 and to institutional data. The BSS'02 is a self-report questionnaire. The accuracy of the responses has not been validated by other independent measures. The National Student Clearinghouse data, although quite comprehensive, reflect only participating colleges and universities. Fall 2005 was selected as the cutoff by which to categorize respondents' enrollment status. An earlier or later cutoff date could have categorized some students differently (e.g. a Stop-out in Fall 2005 might have transferred later on or someone not enrolled in Fall 2005 may be stopping out from another institution during that semester). Additionally, the study did not seek to understand the experience of students who were concurrently enrolled at multiple institutions, which is a growing trend in higher education (Adelman, 2004). Lastly, it is important to bear in mind that the MLR results provide a screening tool for identifying issues that are associated with certain enrollment patterns (Stayers, Stop-outs, Transfer-outs, or Drop-Outs). The MLR does <u>not</u> claim to prove causal relationships, and therefore should <u>not</u> be used to make predictions for individual students.

RESULTS

To determine if a predictor had a significant omnibus effect on enrollment behavior, a likelihood ratio test was applied comparing the difference in -2 log-likelihoods between the final model and a reduced model in which the effect of the predictor is omitted. A significant likelihood ratio test indicates that at least one of the predictors' regression coefficients is not equal to zero in the model. The results of logistic regressions comparing continuously-enrolled respondents to 1) stop-outs, 2) transfer-outs, and 3) drop-outs are presented are then examined to determine the specific comparison(s) in which the predictors' regression coefficients are statistically significantly different than zero. Only those predictors determined to have a significant omnibus effect are addressed in the comparisons of continuously enrolled respondents against the other groups. The exploratory p value considered throughout the study was $p<.10$.

Note that the MLR gives results in terms of positive or negative changes to the odds – that is, the likelihood of the relevant outcome divided by the likelihood of staying continuously enrolled, given certain student characteristics. In order to simplify the description of the findings but also remain true to the MLR, we describe these odds ratios in terms of "relative risk." We indicate the effect on the relative risk of a unit increase in a given predictor variable, given all other variables in the model are held constant.

Women

As indicated in Table 3, six of the predictors in the MLR help distinguish continuously enrolled females from those with other enrollment behavior: general attitude, academics, residency, UM choice, future direction, and race/ethnicity.

Effect	Model Fitting	Likelihood Ratio Test		
	-2 Log Likelihood of Reduced Model	Wald Test	DF	Sig
Intercept	1350.903	0.000	0	--
Residency x Finances	1351.809	0.906	3	0.824
Study Skills	1354.248	3.345	3	0.341
Institutional Connectedness	1356.303	5.401	3	0.145
General Attitude	1378.144	27.241	3	0.000
Finances	1352.935	2.033	3	0.566
Academics	1359.588	8.685	3	0.034
Residency	1359.428	8.525	3	0.036
Work ON Campus	1357.020	6.117	3	0.106
Work OFF Campus	1355.215	4.312	3	0.230
UM NOT 1st Choice	1360.086	9.183	3	0.027
Future Direction	1375.933	25.030	9	0.003
Race/ethnicity	1381.945	31.042	12	0.002

Table 3. Omnibus Test of Effects on Female Enrollment Behavior

The results of the MLR comparing female stop-outs with females who remained continuously enrolled are presented in Table 4.

Predictor	B	Std. Error	Sig	Exp(b)
Intercept	-1.459	0.946	0.123	--
Out-of-State	0.552	0.485	0.255	1.737
Race/ethnicity (vs. White)				
Black/African American	-1.307	0.400	0.001	0.271
Asian	-0.621	0.372	0.095	0.537
Hispanic	-1.104	0.629	0.080	0.332
Unknown	-0.121	0.421	0.774	0.886
Work ON campus	0.373	0.349	0.286	1.451
Work OFF campus	0.070	0.379	0.853	1.073
UM NOT 1st Choice	0.612	0.202	0.002	1.843
Future Direction (vs. no major or career)				
Identified major only	-0.121	0.364	0.739	0.886
Identified career only	-0.114	0.328	0.728	0.892
Identified both major and career	-0.732	0.230	0.001	0.481
Academics	0.440	0.179	0.014	1.552
Study Skills	-0.286	0.237	0.227	0.751
Institutional Connectedness	-0.408	0.243	0.093	0.665
General Attitude	0.152	0.159	0.339	1.164
Finances	0.044	0.106	0.676	1.045
Residency x Finances	-0.058	0.145	0.691	0.944

Table 4. Female Stop-Outs vs. Continuously Enrolled

Compared to females who were continuously enrolled, the relative risk of stopping out is greater for those who did not know their future direction. That is, females reporting that they had not selected a major or identified a career direction are more likely to stop-out than females saying they had selected both a major and career path, with the relative risk increasing by a factor of 2.

The Academics factor also helps distinguish between female stop-outs and females who stay continuously enrolled. The higher the female respondent's score on the Academics factor, the greater her relative risk of stopping out. Specifically, given a one

unit increase in Academic score, the relative risk of being a stop-out would be 1.5 times more likely when the other variables in the model are held constant.

Female respondents for whom UM was their first choice institution have a lower relative risk of stopping out. For those saying UM was not their 1st choice, the relative risk of stopping-out rather than staying continuously enrolled increases by a factor of 2.

Lastly, race/ethnicity is a variable helping to distinguish female stop-outs from females who remained continuously enrolled. Compared to White females, women of color have a lower relative risk of stopping out. White females are more likely to stop-out than 1) Black/African American females with their relative risk increasing by a factor of nearly 4, 2) Hispanic females with their relative risk increasing by a factor of 3, and 3) Asian females with their relative risk increasing by a factor of 2.

Although the regression coefficient associated with Institutional Connectedness is significant in the comparison of female stop-outs and stayers, the omnibus test for this effect is not statistically significant.

The results of the MLR comparing female transfer-outs with females who remained continuously enrolled are presented in Table 5.

Predictor	B	Std. Error	Sig	Exp(b)
Intercept	1.990	1.213	.101	--
Out-of-State	1.857	0.676	0.006	6.403
Race/ethnicity (vs. White)				
Black/African American	-0.646	0.432	0.135	0.524
Asian	-0.704	0.536	0.189	0.495
Hispanic	-0.264	0.625	0.673	0.768
Unknown	-0.668	0.768	0.384	0.513
Work ON campus	-0.557	0.640	0.384	0.573
Work OFF campus	0.470	0.482	0.329	1.600
UM NOT 1st Choice	0.123	0.281	0.661	1.131
Future Direction (vs. no major or career)				
Identified major only	0.288	0.463	0.534	1.334
Identified career only	0.308	0.418	0.462	1.361
Identified both major and career	-0.608	0.328	0.064	0.544
Academics	0.431	0.237	0.068	1.539
Study Skills	-0.390	0.339	0.249	0.677
Institutional Connectedness	-0.429	0.330	0.194	0.651
General Attitude	-0.944	0.198	0.000	0.389
Finances	-0.079	0.131	0.549	0.924
Residency x Finances	0.129	0.204	0.527	1.138

Table 5. Female Transfer-Outs vs. Continuously Enrolled

For this comparison, general attitude helps distinguish female transfer-outs from females who remained continuously enrolled. A less-than-positive general attitude towards UM indicates a greater relative risk of transferring out. Specifically, for a one unit increase in general attitude, the relative risk of transferring out would be expected to decrease by a factor of 0.389 when the other variables in the model are held constant.

Residency also plays an important role in this comparison; for out-of-state respondents relative to in-state respondents, the relative risk for being a transfer-out relative to a stayer increases by a factor greater than 6.

Compared to females who were continuously enrolled, the relative risk of transferring out is also greater for those who did not know their future direction. That is, the relative risk of females reporting that they had not selected a major or identified a career direction stopping out is nearly twice as great as females saying they had selected both a major and career path.

Again, the Academics factor helps distinguish between female transfer-outs and females who stay continuously enrolled. Given a one unit increase in Academic score, the relative risk of transferring out would be 1.5 times more likely when the other variables in the model are held constant.

The results of the MLR comparing female drop-outs with females who remained continuously enrolled are presented in Table 6.

Predictor	B	Std. Error	Sig	Exp(b)
Intercept	0.889	1.520	0.559	--
Out-of-State	0.507	0.759	0.504	1.661
Race/ethnicity (vs. White)				
Black/African American	-0.183	0.441	0.678	0.833
Asian	-2.119	1.048	0.043	0.120
Hispanic	-0.029	0.615	0.963	0.971
Unknown	NA[a]	NA[a]	NA[a]	NA[a]
Work ON campus	0.920	0.443	0.038	2.510
Work OFF campus	0.912	0.453	0.044	2.490
UM NOT 1st Choice	0.089	0.354	0.801	1.093
Future Direction (vs. no major or career)				
Identified major only	0.124	0.838	0.882	1.132
Identified career only	-0.136	0.833	0.871	0.873
Identified both major and career	0.835	0.464	0.072	2.306
Academics	-0.048	0.227	0.863	0.953
Study Skills	-0.465	0.432	0.282	0.628
Institutional Connectedness	-0.518	0.374	0.166	0.596
General Attitude	-0.215	0.259	0.406	0.807
Finances	-0.256	0.224	0.253	0.774
Residency x Finances	0.139	0.270	0.608	1.149

Table 6. Female Drop-Outs vs. Continuously Enrolled

[a] The maximum likelihood estimate could not be reached for this parameter.

Although the regression coefficients associated with the employment variables are significant in the comparison of female drop-outs and stayers, the omnibus test for this effect was not statistically significant. Again, future direction helps distinguish female drop-outs from females who remained continuously enrolled. Females reporting that they had selected a major and identified a career direction are more likely to drop out than females saying they had not selected a major or career path, with their relative risk increasing by a factor of 2. Race/ethnicity also plays a role, with Asian females having a lower relative risk of dropping out as compared with White females; for White females

relative to Asian females, the relative risk for dropping out compared to staying continuously enrolled increases by a factor of 8.

Men

As indicated in Table 7, three of the predictors in the MLR help distinguish continuously enrolled males from those with other enrollment behavior: study skills, general attitude, race/ethnicity.

Effect	Model Fitting	Likelihood Ratio Test		
	-2 Log Likelihood of Reduced Model	Wald Test	DF	Sig
Intercept	988.550	0	0	--
Residency x Finances	991.446	2.896	3	0.408
Study Skills	995.507	6.957	3	0.073
Institutional Connectedness	992.763	4.213	3	0.239
General Attitude	999.506	10.956	3	0.012
Finances	989.998	1.448	3	0.694
Academics	993.740	5.190	3	0.158
Residency	993.598	5.048	3	0.168
Work ON Campus	989.003	0.453	3	0.929
Work OFF Campus	990.552	2.002	3	0.572
UM NOT 1st Choice	991.480	2.930	3	0.403
Future Direction	994.703	6.153	9	0.724
Race/ethnicity	1011.187	22.637	12	0.031

Table 7. Omnibus Test of Effects on Male Enrollment Behavior

The results of the MLR comparing male stop-outs with males who remained continuously enrolled are presented in Table 8.

Predictor	B	Std. Error	Sig	Exp(b)
Intercept	-2.961	1.429	0.038	--
Out-of-State	1.600	0.741	0.031	4.951
Race/ethnicity (vs. White)				
Black/African American	-0.559	0.759	0.461	0.572
Asian	0.020	0.483	0.967	1.020
Hispanic	-0.950	1.045	0.363	0.387
Unknown	0.954	0.506	0.059	2.596
Work ON campus	0.247	0.470	0.599	1.280
Work OFF campus	-0.694	0.758	0.360	0.500
UM NOT 1st Choice	0.278	0.315	0.376	1.321
Future Direction (vs. no major or career)				
Identified major only	-0.800	0.608	0.188	0.449
Identified career only	-0.132	0.474	0.780	0.876
Identified both major and career	-0.643	0.390	0.099	0.526
Academics	0.091	0.299	0.760	1.096
Study Skills	-0.076	0.355	0.831	0.927
Institutional Connectedness	0.570	0.357	0.110	1.768
General Attitude	-0.543	0.225	0.016	0.581
Finances	-0.187	0.164	0.254	0.830
Residency x Finances	0.309	0.225	0.169	1.362

Table 8. Male Stop-Outs vs. Continuously Enrolled

Although the regression coefficients associated with residency is significant in the comparison of male stop-outs and stayers, the omnibus test for this effect was not statistically significant. General attitude, however, plays a role, in that the relative risk of stopping out decreases as general attitude toward UM improves. Specifically, for a one-unit increase in general attitude, the relative risk of stopping out compared to staying continuously enrolled is expected to decrease by a factor of 0.581. Lastly, respondents of an unknown race/ethnicity are more likely to stop out than White respondents, though this finding may have limited practical meaning.

The results of the MLR comparing male transfer-outs with males who remained continuously enrolled are presented in Table 9.

Predictor	B	Std. Error	Sig	Exp(b)
Intercept	1.143	1.205	0.343	--
Out-of-State	0.229	0.634	0.718	1.257
Race/ethnicity (vs. White)				
Black/African American	0.358	0.456	0.432	1.431
Asian	-0.829	0.557	0.137	0.436
Hispanic	0.673	0.466	0.149	1.959
Unknown	-0.284	0.764	0.710	0.753
Work ON campus	-0.160	0.501	0.750	0.852
Work OFF campus	0.331	0.410	0.420	1.392
UM NOT 1st Choice	-0.137	0.305	0.653	0.872
Future Direction (vs. no major or career)				
Identified major only	-0.316	0.495	0.523	0.729
Identified career only	-0.409	0.478	0.392	0.664
Identified both major and career	-0.139	0.356	0.695	0.870
Academics	-0.463	0.248	0.062	0.629
Study Skills	-0.442	0.336	0.188	0.643
Institutional Connectedness	0.221	0.304	0.467	1.247
General Attitude	-0.291	0.196	0.139	0.748
Finances	-0.033	0.155	0.830	0.967
Residency x Finances	-0.149	0.203	0.464	0.862

Table 9. Male Transfer-Outs vs. Continuously Enrolled

None of the predictors help to distinguish between male respondents who transfer out and those who remain continuously enrolled. Note that although the regression coefficients associated with Academics is significant in the comparison of male transfer-outs and stayers, the omnibus test for this effect is not statistically significant.

The results of the MLR comparing male drop-outs with males who remained continuously enrolled are presented in Table 10.

Predictor	B	Std. Error	Sig	Exp(b)
Intercept	1.557	1.671	.352	--
Out-of-State	-0.454	1.077	0.673	0.635
Race/ethnicity (vs. White)				
Black/African American	1.438	0.523	0.006	4.211
Asian	0.727	0.539	0.177	2.069
Hispanic	0.771	0.689	0.263	2.163
Unknown	NA[a]	NA[a]	NA[a]	NA[a]
Work ON campus	-0.186	0.769	0.809	0.830
Work OFF campus	0.306	0.551	0.579	1.358
UM NOT 1st Choice	-0.600	0.455	0.187	0.549
Future Direction (vs. no major or career)				
Identified major only	-0.259	0.766	0.735	0.772
Identified career only	0.004	0.688	0.995	1.004
Identified both major and career	0.367	0.553	0.507	1.443
Academics	0.409	0.374	0.274	1.505
Study Skills	-1.078	0.475	0.023	0.340
Institutional Connectedness	-0.414	0.419	0.324	0.661
General Attitude	-0.524	0.242	0.031	0.592
Finances	0.080	0.287	0.780	1.083
Residency x Finances	-0.162	0.330	0.623	0.850

Table 10. Male Drop-Outs vs. Continuously Enrolled

[a] The maximum likelihood estimate could not be reached for this parameter.

For this comparison, the Study Skills factor helps distinguish male drop-outs from their continuously-enrolled counterparts. Holding all else constant, for a one-unit increase in Study Skills, the relative risk of dropping out decreases by a factor of 0.340. Put differently, the lower the male respondent's score on the Study Skills factor (i.e., "below average"), the greater his relative risk of being not enrolled.

As found in other comparisons, general attitude toward UM is an important predictor of enrollment behavior. For a unit increase in general attitude, the relative risk

of dropping out as compared to staying continuously enrolled decreases by a factor of 0.592 given the other variables in the model are held constant. Again, this means that the relative risk of being not enrolled increases as general attitude toward UM became less-than-positive.

Lastly, for Black/African American males relative to White males, of the relative risk of dropping out compared to staying continuously enrolled is expected to increase by a factor of 4.

Summary of Results

Compared with female Stayers:

Female Stop-outs

- The relative risk of stopping out was greater for those who did not know their future direction.
- The higher the female respondent's score on the Academics factor, the greater her relative risk of stopping out.
- Female respondents for whom UM was their first choice institution had a lower relative risk of stopping out.
- African American, Hispanic, and Asian women had a lower relative risk of stopping out compared with White women.

Female Transfer-outs

- The relative risk of transferring out was greater for those who did not know their future direction.
- A less-than-positive general attitude toward UM indicated a greater relative risk of transferring out.
- Out-of-state women had a greater relative risk of transferring out compared with in-state women.
- The higher the female respondent's score on the Academics factor, the greater her relative risk of transferring out.

Female Not Enrolled

- The relative risk of dropping out was greater for those who knew their future direction.
- Asian American women had a lower relative risk of being not enrolled compared with White women.

Compared with male Stayers:

Male Stop-outs

- The relative risk of stopping out increased as their general attitude toward UM was less-than- positive.

- For men of an undisclosed race, the risk of stopping out was greater than it was for White men.

Male Transfer-outs

- There were no main effect variables that distinguished between male respondents who transferred out and those who were continuously enrolled.

Male Not Enrolled

- The relative risk of being not enrolled increased as their general attitude toward UM was less-than-positive.
- For African American men, the risk of being not enrolled was greater than it was for White men.
- The lower the male respondent's score on the study skills factor (i.e., "below average"), the greater his relative risk of being not enrolled.

DISCUSSION

The present study finds that there are certain perceptions and demographics that are related to the relative risk of stopping-out, dropping-out, or transferring out as compared to being continuously enrolled. For both men and women, general attitude toward UM seems to be related to subsequent enrollment pattern. This may indicate that students can detect early on in their experience whether the campus is a good fit, mirroring research on sense of belonging and the first year experience (Hausmann, Schofield, and Woods, 2007). Similarly, race/ethnicity seemed to play a role for both men and women, which corroborates the research conducted by Hu & St. John (2001). Interestingly, Herzog (2005) had the opposite finding: race did not have a significant influence on retention. In the present study, race/ethnicity was a significant predictor for both men and women, but there was no consistent pattern of racial/ethnic group influences in enrollment outcomes.

For women, some unexpected patterns emerged. Enrollment patterns of women seem to be more complex than for men: there are more factors that can help identify those who will not stay continuously enrolled. They are at higher risk of stopping out when

they do not know where they are going (lack future direction), mirroring Cabrera, Burkum, & LaNasa's (2005) findings that educational aspirations predict retention patterns. The higher the score on the academics factor, the higher the odds of stopping out and transferring. What does it mean that female students who perceive themselves highly in academics are more at-risk to go elsewhere or to "pause" their education? For women who score high on the academics factor and lack future direction, are they going "full steam ahead" in no direction, and stopping out as a result? Additionally, if UM was not her first choice, a woman student is at a higher risk of stopping-out, but not for transferring-out. Why did she decide to return to UM? A female student is also at greater risk of transferring-out if she is a non-resident of the state. Is out-of-state tuition a concern? Is distance from home a concern? Is the culture on campus different than home?

For men, we know less from this model about what makes a difference in their enrollment outcomes. Other than general attitude and race/ethnicity that were significant for both genders, there was only one additional variable that was a significant predictor to the overall model: study skills. The lower the score on the study skills factor, the higher the odds of dropping-out. This finding mirrors several studies that demonstrate that academic abilities matter in retention studied (see, for example Tinto, 1997; Cabrera et al., 1993; Perna,1997; and Hu and St. John, 2001). For this study, does the negative relationship between perceived study skills and continuous enrollment have to do with confidence or abilities? Do they struggle with the academic rigor and then leave as a result?

Implications

Possible early interventions based on the associations observed in this investigation were brainstormed by CAWG. Some of these recommendations are listed below. However, because the associations do not suggest causality, the effectiveness of these recommendations must be investigated to determine their impact on subsequent enrollment behavior.

- Many of the issues discussed are identifiable eight weeks into the semester through a few simple questions that could be asked by an advisor or a resident assistant, and by looking at institutional records.
- Early general attitude toward UM plays an active role in subsequent enrollment patterns. Therefore, faculty, administrators, and staff can take a proactive approach by asking students first hand what is behind their attitude toward UM and what might enhance their experience.
- UM has ample resources for its undergraduate students. Making a conscious effort to guide students to these resources could positively affect their future enrollment decisions.

Future Research

This study is exploratory, and most of the variables used in the MLR model are from a survey given early in respondents' first semester. While the MLR findings offered insight into the role of certain issues in students' subsequent enrollment patterns, further questions were raised and need to be explored:

- What factors influence the role that gender plays in a student's subsequent enrollment? Why are more female students stopping out than male students? Why

are more men than women who leave UM seemingly not enrolled in higher education three years after their matriculation at UM?

- What dynamics influence the role that race/ethnicity plays in a student‘s subsequent enrollment?
- What shapes the early less-than-positive general attitude toward UM that influences a student’s subsequent enrollment?
- What role does coming to UM with self-perceived lower study skills play in a student’s subsequent departure from UM and apparently from higher education generally? The lower the male respondents’ scores on their self-assessed study skills, the higher their relative risk of being a drop-out. Does this tendency have to do with confidence or abilities? What role does coming to college with self-perceived lower study skills play not only in their departure from UM but also in their not enrolling in another institution? Did male students in the drop-out category leave school altogether because they felt they had below average skills for <u>any</u> college/university? Were these students knowledgeable of academic support resources on campus?
- What role does being undecided about one’s major or or career direction play in a female student’s subsequently deciding to stop out? Did they do so because they needed more time to decide on their field of study?
- Are there differences between students who transferred out to a two-year and a four-year institution? Can these differences help practitioners to better understand and perhaps intervene with these groups of students?

CONCLUSIONS

The analyses presented in the present study reveal that students' perceptions do matter with regard to enrollment patterns. While models that use financial aid, GPA, and other direct measures can be helpful in understanding students' enrollment patterns, it may be that instead of using a model to predict whether students will leave, an academic advisor or resident advisor could simply ask them: what is your general attitude toward our university?

Secondly, this research was a collaborative effort with a campus-wide group that engaged in dialogue about how the findings could be translated into practice. This kind of scholar-practitioner model is especially poignant in studies of retention because interventions for students who are at risk of leaving must be considered in light of campus resources. The present model allows practitioners at UM to think differently about identifying transfer-outs, stop-outs, drop-outs and continuously enrolled students and meeting their unique needs.

ACKNOWLEDGEMENTS

The authors wish to thank the members of the Campus Assessment Working Group, especially Eowyn Ellison and the Beginnings Subgroup for their work with the BSS, and the Retention Subgroup for their role in the development of this project, modeling approach, and initial analyses and reporting. We also wish to acknowledge IRPA staff members Michelle Appel and John Dobrosielski for their assistance with the NSC data.

REFERENCES

Adelman, C. (2004). Principal Indicators of Student Academic Histories in Postsecondary Education, 1972–2000, US Department of Education, Washington, DC.

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

Baum, S., & Ma, J. (2007). Education pays: The benefits of higher education for individuals and society. *Washington, DC: The College Board*.

Bean, J. & Metzner, B. S. (1985). A Conceptual Model of Nontraditional Undergraduate Student Attrition. *Review of Educational Research, 55*(3), 485-540.

Borden, V. M. H. (2004). Accommodating Student Swirl: When Traditional Students Are No Longer the Tradition. *Change, 36*(2), 8.

Cabrera, A. F., Burkum, K. R. & La Nasa, S. M. (2005). Pathways to a four year degree: Determinants of transfer and degree completion (pp. 155-214). In A. Seidman (Ed.). College Student Retention: A Formula for Student Success. ACE/Praeger series on Higher Education.

Cabrera, A. F., Nora, A., and Castaneda, M. (1993). College persistence: Structural Equations modeling test of an integrated model of student retention. Journal of Higher Education 64(2):123–39.

Crosling, G., Thomas, L., & Heagney, M. (2008). Improving student retention in higher education: New York: Routledge Falmer.

Haussmann, L. R., Schofield, J. W. & Woods, R. L. (2007). Sense of belonging as a predictor of intentions to persist among African American and White First-year college students. *Research in Higher Education*, 48(7), 803-840.

Herzog, S. (2005). Measuring determinants of student return vs. dropout/stopout vs. transfer: A first-to-second year analysis of new freshmen. *Research in Higher Education, 46*(8), 883-928.

Hu, S., and St. John, E. P. (2001). Student persistence in a public higher education system: Understanding racial and ethnic differences. Journal of Higher Education 72(3): 265–86.

McCormick, A. C. (2003). Swirling and double-dipping: New patterns of student attendance and their implications for higher education. *New Directions for Higher Education, 2003*(121), 13-24.

National Science Board (2008). Science and Engineering Indicators 2008. Arlington VA: National Science Foundation.

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

Paulsen, M., and St. John, E. P. (2002). Social class and college costs: Examining the Financial nexus between college choice and persistence. Journal of Higher Education 73(2): 189–236.

Peltier , G. L., Laden, R., & Matranga, M. (1999). Student persistence in college: A review of research. *Journal of College Student Retention*, I, 357-376.

Perna, L. W. (1997). The contribution of financial aid to undergraduate persistence. Paper presented at the 22th annual forum of the Association for Study of Higher Education, Albuquerque, NM.

Porter, S. R. (2002). Including transfer-out behavior in retention models: Using the NSC Enrollment Search data. Air Professional File 82 (Winter): 1–16.

Reason, R. D. (2003). Student variables that predict retention: Recent research and new developments. *NASPA Journal*, 40 (4), 172-191.

de los Santos Jr, A., & Wright, I. (1990). Maricopa. *Community, Technical, and Junior College Journal*, 60(6), 32-34.

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

Tinto, V. (1993). *Leaving college: Rethinking the causes and cures of student attrition*. Second edition. Chicago: University of Chicago Press.

Tinto, V. (1997). Classrooms as Communities: Exploring the Educational Character of Student Persistence. *Journal of Higher Education, 68*(6).

Tinto, V. (2006-07). Research and practice of student retention: What next? *Journal of College Student Retention*. Vol. 8(1), 1-19.

The Kobayashi Maru of IR: Gender Equity Research in Faculty Salaries, Career Development and Academic Services

Yong-Lyun Kim
Mitch Nesler
State University of New York
Empire State College

The Kobayashi Maru of IR: Gender Equity Research in Faculty Salaries, Career Development, and Academic Services

The primary purpose of the study is to identify potential gender inequity in faculty positions in terms of salary, career development, and their workloads at a public four-year institution. A women's group on campus requested this research be conducted by the Office of Institutional Research in 2007. As a result, this study found out no significant evidence that verified institutional gender inequity in faculty salaries, career development, and workloads. However, in the process of distributing this result to the college communities, the researchers confirmed that the women's group still had a strong perception of gender inequity even after they were informed the result of the study.

Because of interest focused on equity issues in higher education, there are many situations in which institutional researchers are called upon to determine whether the institution is inequitable. Among the various issues regarding gender equity in higher education, faculty salary analysis becomes a major area under discussion. In fact, many institutions regularly check their faculty salaries to ensure institutional equity in faculty positions. Also, some professional organizations such as the American Association of University Professors (AAUP) have annually reported the result of the national data analysis about faculty salary and provided institutions with empirical information for benchmark.

For example, according to a CUPA faculty survey study (2007), female faculty generally have a lower salary than their male counterparts; females earn 92% of what males earn. In this report, CUPA specified the national faculty salary by discipline, because academic discipline is a major factor differentiating faculty salaries. The estimation of salary difference amount by gender and discipline could be benchmarking information for institutional salary analysis. Based on the result of the national data analysis, individual institutions are able to set up a standard for decision making related to the equity policy of faculty salaries.

With regard to the study indentifying unfairness of faculty salaries, McLaughlin and Howard (2003) have suggested four criteria that include equity, competitiveness, compression, and comparability. Each criterion have a representative research question: Do protected classes, such as women and minorities, earn salaries that are consistent with the majority (equity)? Do faculty at the institution earn salaries consistent with discipline peers at other institutions (competitiveness)? Do salaries of new faculty approach or exceed salaries paid to senior faculty in the same discipline (compression)? When looked at in the context of your institution, across ranks and disciplines, and within the mission of your institution, do the salaries of various groups have the proper relationship to each other (comparability)? Among the four criteria, the first criterion particularly provides studies with the conceptual framework of analyses in the investigation of gender inequity.

In institutional research regarding equity issues, however, there is a huge possibility for researchers to face a dilemmatic situation in which the result of data

analysis does not meet expectations of the both institution and immediate stakeholder group, so the institutional researchers cannot find a wining scenario from the result. For example, if a study found some evidences that verify gender inequity, the administrators of the institution may dissent from the result in terms of methodological issues and appropriateness of the analysis. Meanwhile, even if the study found no evidences about gender inequity, the minority group such as women faculty would not believe the result and make same issues to the one from the administrators in the opposite case.

In this study, we are trying to identify potential gender inequity in faculty positions in terms of salary at a public four-year institution. This study is a response to the request from a women's group on campus to the office of institutional research. In addition to salary analysis, this study does further look into faculty career development and workloads to diagnose potential gender inequity in those two aspects of faculty life in the institution. In this study, faculty career development includes promotion and tenure rate and administrative or academic services. Faculty workloads include teaching and mentoring student obligations. Based on the findings from the analysis, this study will provide policy implications for the dilemmatic situation about different interests from different stakeholder groups regarding the equity issue.

Data and Analysis

In order to identify gender differences in faculty salaries, this study used the salary data of a four-year public institution in New York. With this faculty salary data, two analysis methods were employed; descriptive analysis and regression analysis. In the descriptive data analysis, this study checked gender difference in salary by faculty rank and tenure status. In the regression analysis, the study had seven independent variables that belong to three categories of factor; gender, discipline, and length of (academic) time. One thing that should be noticed is that while most higher education institutions generally have 9/10 month salary contract, the faculty members in the institution have 12 month contracts.

For the gender difference in faculty career development, this study looked into the data about promotion and tenure evaluation records during 2001 to 2007. The institution reviewed 42 promotion cases and 24 continuing appointments within that time period. Promotions include career mobility from assistant professor level to associate level and associate professor level to full professor level. With faculty career development, this study also analyzed faculty members' academic and administrative services such as major search committee, governance committee, and faculty chair positions.

Meanwhile, the data about faculty workloads included teaching and mentoring student obligations. The total number of direct/indirect credit delivered and mentee students were checked across faculty ranks and genders. In this analysis, t-test was employed to check whether or not the gender differences in faculty workloads regarding teaching and mentoring were significant.

Results

The college had 156 full-time faculty members across ranks and areas of study (disciplines) in 2007. In the full-time faculty population, female faculty group was somewhat larger than male faculty group; 60% were female and 40% were male faculty. However, we found gender imbalance in faculty positions especially in assistant and full professor levels, when we broke down the population by faculty ranks. Table 1 illustrated

that the college had more female faculty (70%) than male faculty (30%) in the assistant level, but the reverse was true at the full professor level in which 70% were male and 30% were female.

Table 1. Gender Balance by Ranks

	Faculty Rank			
	Assistant Professor	Associate Professor	Professor	Total
Female	54 (72.0%)	24 (57.1%)	9 (27.3%)	92 (59.0%)
Male	21 (28.0%)	18 (42.9%)	24 (72.7%)	64 (41.0%)
Total	75 (100%)	42 (100%)	33 (100%)	156 (100%)

1) Salary

Across genders and ranks, the faculty in the college earned $71,425 on average based on a 12 month annual salary. This salary average equated to $58,424 as a 9/10 month annual salary. To adjust the 12 month salary to 9/10 month salary, this study applied AAUP calculation method (weighting rate = .818). To investigate gender gap in faculty salary this study divided the average salary by genders. Table 2 showed the average salaries for both genders and gender gap. There was 16% of gender gap in salaries; female faculty on average earned 84% of what male faculty earned at the college.

Table 2. Salary by Gender

Gender	Salary	Salary gap by gender
Female	$66,369.4	
Male	$78,693.5	16%

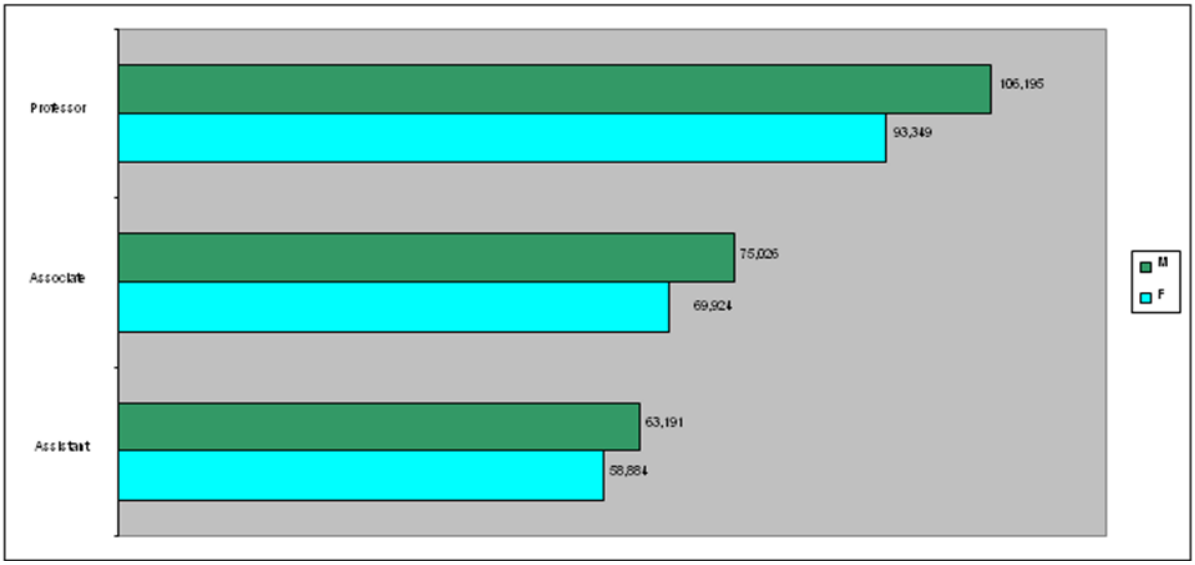
However, this gender gap in salary was reduced when the study broke down faculty salary by ranks. In the associate professor level, gender gap in salary was 7.3%, while in assistant and full professor levels the gender gaps were relatively small, 2.4% and 2.3% respectively. Table 3 illustrated gender gaps in faculty salaries across ranks.

Table 3. Salary by Gender and Rank

	Assistant	Associate	Full
Female	59,471 (54)	74,237 (24)	91,595 (9)
Male	60,909 (21)	80,058 (18)	93,768 (24)
Gender salary gap by rank	2.4%	7.3%	2.3%

Compared to the national data, these institutional gender gaps in faculty salaries were not very depressing. According to AAUP (2008), nationally, there were 12.1% of gender gap in full professor salaries, 6.8% of gap in associate professor salaries, and 6.8% of gap in assistant professor salaries. The figure below shows national gender gaps in faculty salaries by ranks. The gender gaps of the institution in full and assistant professor levels were much smaller than the national gaps.

Figure. National Gender Gap in Faculty Salary



In this descriptive data analysis, this study did not consider faculty disciplines and length of time, which were generally perceived as important factors affecting faculty salary (Haignere, 2002; Lawler, 1983), into account. In order to identify the actual impact of gender on the salary difference, however, this study needed to control disciplines (areas of study) and length of academic service both before and after the time when faculty was hired by the institution. A regression analysis, as a next step, was conducted with the equation below.

$$y_1 = \beta_0 + \beta_1 x_1 + \beta_2 x_2 + \beta_3 x_3 + \beta_4 x_4 + \beta_5 x_5 + \beta_6 x_6 + \beta_7 x_7 + \varepsilon_1$$

Where:

Dependent variable

Y = Annual Salary of Faculty Members

Independent Variables

X1 = Gender

<Length of Time>

X2 = Faculty Rank

X3 = Length of Service
X4 = Prior Experience
<Areas of Study, Discipline>
X5 = BME (Business, Management and Economics)
X6 = CS (Cultural Studies)
X7 = STSC (Social Theory, Social Structure, and Change)

In the equation, the dependent variable was the annual salary of faculty members, and there were three groups of independent variables: gender, length of time, and areas of study (disciplines). Length of time included faculty rank, length of service at the institution, prior academic experiences that faculty obtained before they were hired by the institution. Three independent variables under the areas of study had a dichotomous scale (being a faculty member in the area of study or not). These three variables were selected because they were the top three disciplines in highest salary across the institution.

The regression analysis yielded high value of R Square, .872, which means that 87.2% of total variance in faculty salary was explained by the 7 independent variables in the equation. More specifically, the table (Coefficients) below illustrates that gender was not a significant factor influencing faculty salary when controlling the length of time and the areas of study. Whereas, all independent variables under the length of time were significant; faculty rank had the strongest impact on the salary and length of service at the college and prior experience were following respectively. Meanwhile, three independent variables under the areas of study were not significant.

Table 4. Result of Regression Analysis

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.934[a]	.872	.866	$5,435.607

a. Predictors: (Constant), AOSSTSC, Gender1, PreExperience, AOSCS, AOSBME, faculty rank, TimeHired

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	27815.292	2204.536		12.617	.000
	Gender1	535.027	994.360	.018	.538	.591
	faculty rank	9460.081	722.525	.558	13.093	.000
	TimeHired	51.631	5.050	.466	10.224	.000
	PreExperience	118.108	54.206	.071	2.179	.031
	AOSBME	1966.871	1189.259	.052	1.654	.100
	AOSCS	-1688.100	1291.663	-.041	-1.307	.193
	AOSSTSC	-301.308	1572.000	-.006	-.192	.848

a. Dependent Variable: Annual Salary

2) Career development

During the time from 2001 to 2007, the college had 42 promotion review cases that included faculty career development from assistant to associate and associate to full professor level. Among the review cases 70% of females' requests were approved and 54.5% of males' requests were approved. Table 5 demonstrated frequencies and percentages of the review cases by gender. With regard to faculty tenure evaluation, the college had 24 continuing appointments and 100 % of the tenure requests including 16 females and 8 males within that time period.

Table 5 Promotion Rate by Gender

	Approved	Denied	Total
Female	14 (70.0%)	6 (30.0%)	20 (100%)
Male	12 (54.5%)	10 (45.5%)	22 (100%)
Total	26 (61.9%)	16 (38.1%)	42 (100%)

This study also investigated faculty members' college-wide administrative services that included major search committees, governance committees, and faculty chair positions. In 13 major search committees at president's council levels from 2005 to 2008, 18 male faculty and 13 female faculty have served as a member. The college's five governance committees in which faculty members were actively involved included 19 female faculty and 16 male faculty. Among these governance committees three female faculty members were taking chair positions. The college had 12 faculty chair positions in 2008 and those positions were occupied by six females, five males, and one vacancy.

3) Workloads

Total amount of direct credit delivered by faculty was calculated through multiplying the credit numbers of direct teaching courses by the number of students in the courses. Overall, the averages of direct credits delivered by both genders were close to one another; female faculty delivered 356 direct credits and male faculty delivered 351 direct credits on average. This closeness was found in the gender comparison of indirect credits delivered. Indirect credit in the institution refers to faculty service for students in arranging, monitoring, and reviewing student documentation regarding student learning. Total amount of indirect credit was determined through multiplying the credit numbers of indirect teaching courses by the number of students. On average, female faculty delivered 227 indirect credits and male faculty delivered 215 indirect credits. Table 6 and 7 illustrated numbers of direct and indirect credits delivered by faculty respectively.

Table 6. Direct Credits by Gender

Gender	N	Minimum	Maximum	Mean	Median	Std. Deviation
Female	1	4	867	356.3	342	194.1
Male	8	18	702	351.7	319	183.2

Table 7. Indirect Credits by Gender

Gender	N	Minimum	Maximum	Mean	Median	Std. Deviation
Female	71	5	670	227.1	200	148.9
Male	58	4	756	215.8	189	165.1

One of the educational focuses of the institution is on the individualized student learning, so that the relationship between faculty and students are much closer than that of traditional institutions. In this respect, mentoring students is a huge obligation to which faculty members have to devote as a part of their workloads. The data analysis yielded that both male and female faculty had a similar number of mentee students; female faculty had about 95 mentee students and male faculty had 104 mentee students on average. In order to test significance of the gender difference in teaching and mentoring workloads, this study conducted a t-test and found no significant gender difference across direct and indirect credits delivered and number of mentee students.

Conclusion

From the descriptive data analysis, the study found some gender differences in faculty salary across the ranks, but these institutional differences were less than the national data. Whereas the result from the regression analysis yielded that gender was not a significant factor affecting faculty salary variance when the study controlled the length of time (rank, length of service at the college, and prior experience) and the area of study (discipline). Rather, faculty rank had the most powerful impact on salary and the length of service at the college was the second most powerful factor in the analysis. However, all three variables under the area of study were not significant, which means that faculty salaries of the institution are not obviously different across the areas of study.

The analyses associated with gender difference in career development and faculty workloads found no evidence that was unfavorable to female faculty. In fact, the proportion of female faculty regarding the approval rate of the promotion and tenure requests was higher than that of male faculty. Also, the analysis about faculty's college-wide administrative services did not yield any gender-specific information that was unfavorable to female faculty. In the analysis of faculty workloads, the study found no significant gender differences in terms of direct and indirect teaching credits and number of mentee students as well. Consequently, the results of the study yielded no significant gender differences in faculty positions of the institution in terms of salary, career development, and professional obligations.

Discussion

Although the study concluded that there were no obvious gender inequities in faculty salary, career development, and their workloads, the women's group who requested this study to be conducted by the IR office was not satisfied with the result of the study, rather they casted some doubts on the appropriateness of the analyses in the study. In addition, the result of a national survey in which more than 50% of faculty

members of the institution participated in 2007-2008 indicated that female faculty had a perception of gender inequity at the college.

This discrepancy between the result of the study and women's perception of gender inequity could be explained by two possible ways. First, this study might employ incomplete methods in the analyses. Female faculty actually perceive gender differences or have experienced inequitable situations throughout their life at the college. However, because these perceptions typically stem from organizational culture and atmosphere or stereotypical traditions, the statistical methods in this study could not reveal what may be a real but subtle gender inequity in the college. If it is the case, this study recommends some alternative research methods that are focused on qualitative approaches such as interview or climate survey.

Second, female faculty may have a misconception of gender differences at the college. As this study indicated, there is a gender imbalance across faculty ranks; while the college has more females in the assistant professor level, there are more male than female in the full professor level. If female faculty simply compared their working conditions to those of their male counterparts, they could not attain accurate information about gender differences especially in salary, because male faculty members in the college generally have more seniority than female faculty members. If it is the case, this study suggests that building a consensus regarding the gendered situation in the institution is important. In order to do that some efforts should be taken to inform female faculty the result of the study through various open communications.

References

American Association of University Professor. (2009). Disparities in the salaries and appointments of academic women and men. Retrieved December 16, 2009 from http://www.aaup.org/AAUP/issues/women/menwomenpay.htm

CUPA. (2008). National faculty salary survey by discipline and rank in four-year colleges and universities: For the 2008-2009 academic year. Retrieved December 16, 2009 from http://www.cupahr.org/surveys/files/salary0809/NFSS09ExecutiveSummary.pdf

Haignere, L. (2002). *Paychecks: a guide to conducting salary-equity studies for higher education faculty*. Washington, D.C.: American Association of University Professors.

Lawler, E. E. (1983). *Pay and organization development*. Reading Mass.: Addison-Wesley.

McLaughlin, G. W., & Howard, R. D. (2003). Faculty salary analyses. In Knight, W. E (Ed.), *The Primer for Institutional Research* (pp. 48-78). Tallahassee: Association for Institutional Research.

Milkovich, G. T., & Newman, J. M. (1987). *Compensation*. Plano, TX: Business Publications.