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EFFECTS OF INSTITUTIONAL FACTORS ON RETENTION OF GRADUATE
STUDENTS OF COLOR IN SCHOOLS OF LIBRARY AND INFORMATION
SCIENCE

A Dissertation

Presented to

the Morgridge College of Education

University of Denver

In Partial Fulfillment

of the Requirements for the Degree

Doctor of Philosophy

by

Sandra M. Snyder-Mondragon

August 2009

Advisor: Dr. Kathy Green

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ABSTRACT

The intent of the study was to understand the changes that have occurred over the last 25 years in library programs as far as enrollment and diversity of students, number and ethnicity of the faculty, program income and expenses, cost of attendance, and scholarship and fellowship aid, in an effort to better understand library programs granting the MLIS degree. The study also endeavored to identify institutional factors associated with the retention and productivity rates of White students and students of color in schools of library and information science. During the period studied, the proportional representation of White students decreased. For students of color, proportional representation was stable during the same time period. Results revealed a medium effect size of time with productivity rates for both groups declining over time. Retention rate differed significantly by time, with a small effect size with retention rate that initially increased over time, but is now decreasing. The final analyses were meta-regressions to determine if retention and productivity rates can be predicted by cost of attendance, scholarship and fellow aid, and program size. Results indicated that for students of color, program size in 2000 was significantly predictive of retention, cost of attendance was predictive in 2002, and scholarship and fellowship aid was predictive of retention in 2004. No variables were significantly predictive for retention of White students. The last analysis was to determine if productivity rate can be predicted by

cost of attendance, scholarship and fellow aid, and program size. Results indicate that for White students in 2002, the cost of attendance was predictive of productivity rating. In 2003, scholarship and fellowship aid was predictive of productivity rate and in 2004, scholarship and fellowship aid was predictive of productivity rating. For students of color, results indicate that only scholarship and fellowship aid in 2005 was predictive of productivity rate. No other variables in any of the years studied showed any significant prediction of productivity rating for students of color.

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being there and coming through for me. Your encouragement, love, and occasional kick in the butt have been critical to my success.

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CHAPTER ONE

Statement of the Problem

Librarianship has been referred to as the “second oldest profession” by practicing librarians and faculty in library schools (Greal, 2008). Going back to nearly 3,000 B.C., librarians have been the caretakers of information and knowledge (Fourie & Dowell, 2002). Historically, they have been viewed as authorities, because of their ability to oversee a substantial collection of resources and materials that are readily available to users, and then instruct patrons on how to locate the information (Rubin, 1998). As time has passed, however, librarians are seeing increasing competition from the Internet and other avenues for information-gathering (Rubin, p. 378).

According to Winter (1988), there are three basic functions of librarians: classifying knowledge to organize it, indexing recorded knowledge so that it can be accessed, and understanding the formal organization of various bodies of knowledge. Additionally, Winter believes that “mediating between the user and the public record of knowledge is the special province of the librarian...” (p. 6).

Building on Winter’s belief that librarians are the bridge between the public and the information they seek, Rubin (1998) states that the foundational value of the profession is that of service. “Librarianship is quintessentially serving a special social function, rather than just a specific activity. It is engaged in a social service, emphasizing the welfare of the people over profit” (p. 378). Fourie and Dowell (2002) write that

“Librarians are responsible for looking at the information needs of the primary customers of a particular library” (p. 9).

Libraries have a long history of serving diverse patrons. As the diversity of America expanded during the nineteenth century through immigration, libraries were seen as the natural providers of material to this new, diverse population. At the turn of the twentieth century, libraries began a systematic effort to serve ethnically diverse populations. However, these efforts were focused on integrating the immigrants to American life, not necessarily providing access to materials in their native tongue. Libraries did, however, create branches in urban areas to serve these special populations, “especially industrial workers and those who did not speak English” (Rubin, p. 239). Branches were also the first to have special children’s sections in an effort to improve English-language skills.

Beginning with the Civil Rights Movement in the 1960s, the American Library Association (ALA) began advocating equal service to all citizens, including Blacks and Hispanics, who had been experiencing poor service from libraries. It was during this time that legislation was enacted that effected libraries. The Library Services and Construction Act (LSCA) of 1964 provided funding for libraries to develop services and collections for ethnic, disadvantaged, and underserved groups. Through the next decades, legislation continued to be enacted that expanded the mission of public libraries to serve the various ethnic communities in the United States (Rubin, p. 242-243).

Rubin (1998) writes that although much progress has been made in service to ethnically and linguistically diverse populations. “Prominent issues remain including

the need for recruitment and retention of a diverse library workforce, concern for the reduction of federal funding for library services to ethnic communities, and the need for good research on the impact of the programs and services that have been developed to serve these communities” (p. 244).

Just like libraries, American colleges and universities are experiencing an increase in the diversity of students as the demographics of the United States have changed over the last decades of the twentieth century and beginning of the twenty-first century.

Appendix A shows the demographic shift of the United States from 1950 – 2000.

Information on race in the national population has been collected in every decennial census beginning with the first census in 1790. The racial categories included on census questionnaires, as well as the wording of questions, have changed over time, reflecting changes in social attitudes and political considerations. As a result of changes in census questions, data on race and racial origin are not totally comparable over time (U.S. Census, 2003).

The limitations to comparability of race data between 1990 and 2000 are substantial because for the first time in a decennial census, respondents in the 2000 census could report more than one race (U.S. Office of Management and Budget, 1997; Bennett, 2000a and 2000b; Grieco & Cassidy, 2001). Categories reported for the 2000 census were White, Black, American Indian and Alaska Native, Asian, Hawaiian and Other Pacific Islander, and Hispanic or Latino origin. In Appendix A, Asian and Hawaiian and Other Pacific Islander data have been combined. The data clearly show that between 1950 and 2000, the U.S. population has seen an increase in the number of Black and Hispanic citizens. Blacks have increased 2.1% and the Hispanic population

has increased by 3.9% (since the 1970 census). Additionally, the percentage of Whites has decreased 9.2% over the same time period. Following national trends reported by the U.S. Census Bureau, U.S. colleges and universities have seen minority enrollment expand between 1976 and 2004 (Aragon, 2000). Figure 1 shows fall enrollments by racial/ethnic group for selected years from 1980– 2004.

Figure 1. Percentage of 18- to 24-year-olds in colleges and universities, by race/ethnicity: Selected years, 1976-2004.

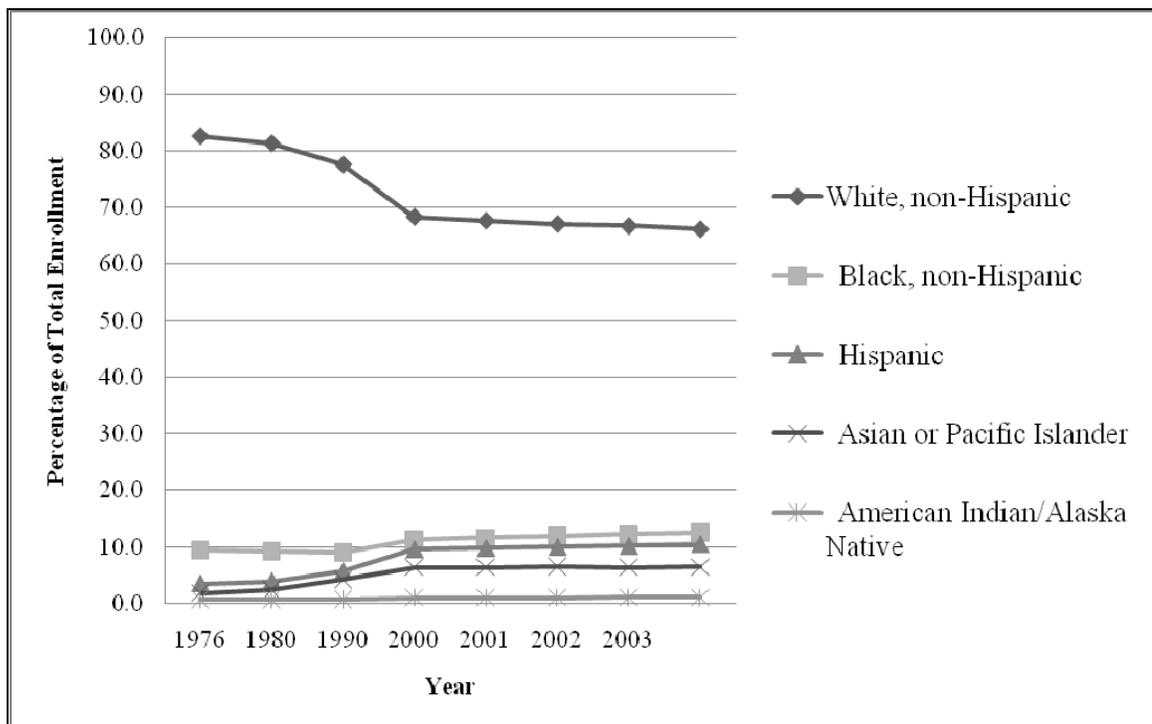
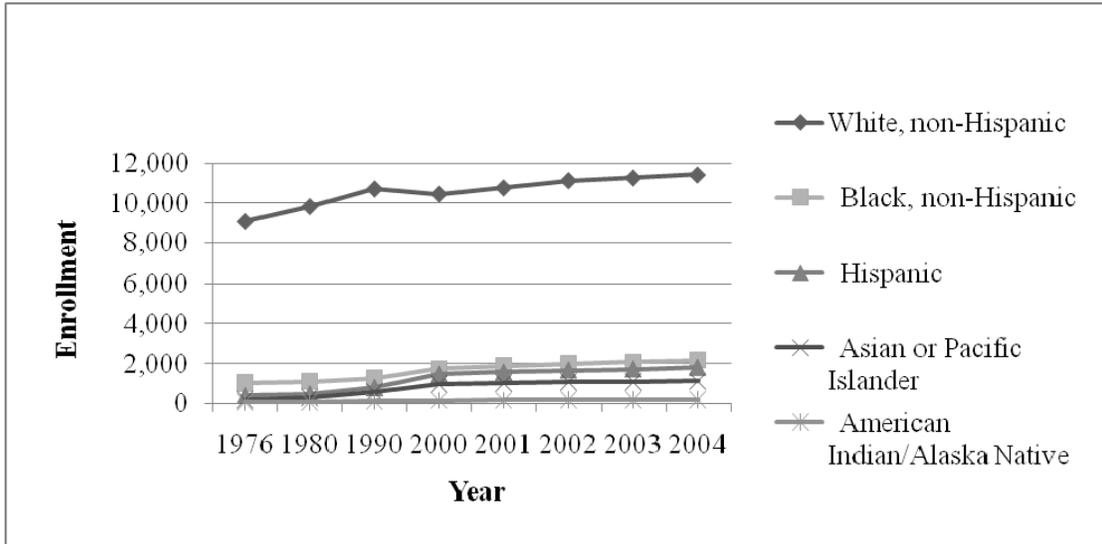
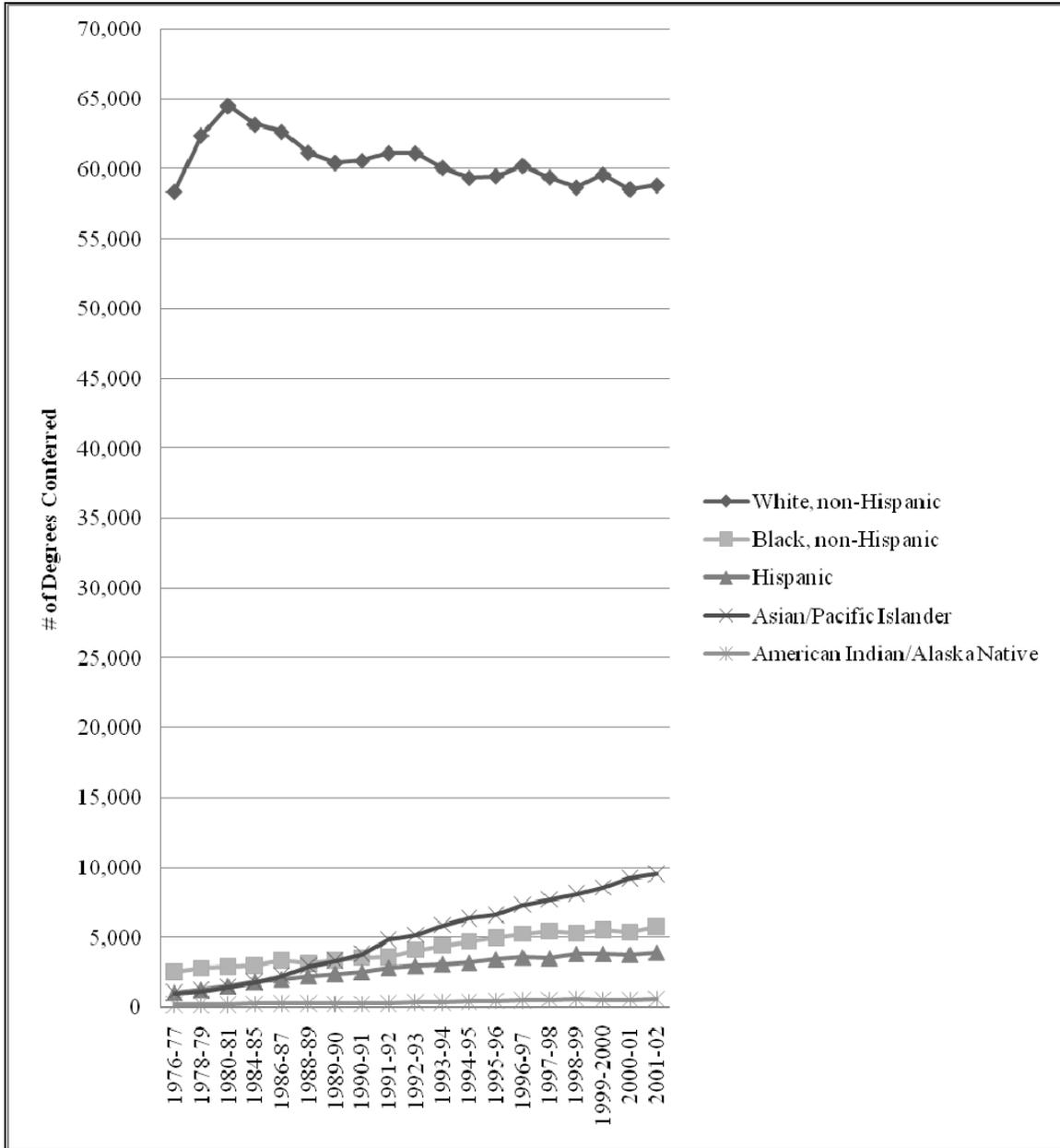


Figure 2. Enrollment of 18- to 24-year olds in thousands in colleges and universities, by race/ethnicity: Selected years, 1976-2004.



Figures 1 and 2 graphically represent the gap between White students and all other ethnic groups. While all groups show an increase in enrollment in higher education, clearly, White students are out-pacing all other groups. Figure 3 shows the number of degrees conferred by ethnic group for the years 1976-1977 through 2001-2002.

Figure 3. Number of degrees conferred in thousands by colleges and university, by race/ethnicity 1976-1977 through 2001-2002.



However, the increase in enrollment shown in Figure 1 does not equate to comparable graduation rates for students of color. Figure 3 shows that while the number of bachelor's degrees conferred on White students increased by 13.7% between 1976-77 and 2004-05, the percentage increase for Black students was only 3.1% and for

Hispanics 5.0% during the same time period. The data also suggest that although the percentage of 25-to-29 year olds with a bachelor's degree or higher increased for Whites, Blacks, and Hispanics, the gap between Black and Hispanic with Whites widened slightly between 1971 and 2001. Figure 4 shows the percentage of degrees conferred by ethnic group for the years 1976-1977 through 2001-2002.

Figure 4. Percentage of degrees conferred by ethnic groups 1976-1977 through 2001-2002.

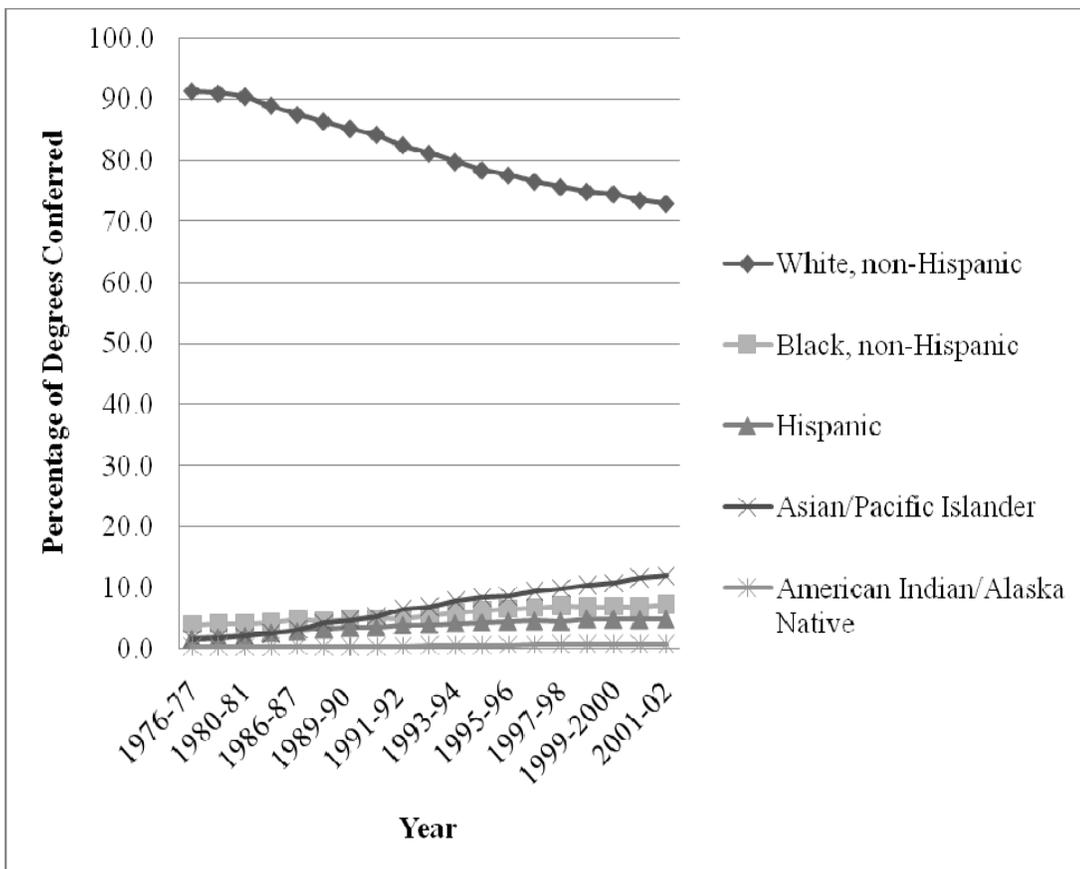


Figure 5 shows the percentage of individuals ages 18 to 24 who graduated from high school or completed a GED during the preceding 12 months for the years 1972-2006 for Whites, Blacks, and Hispanics.

Figure 5. Status completion rates of 18- through 24-year-olds not currently enrolled in high school or below, by ethnicity for the years 1972-2006.

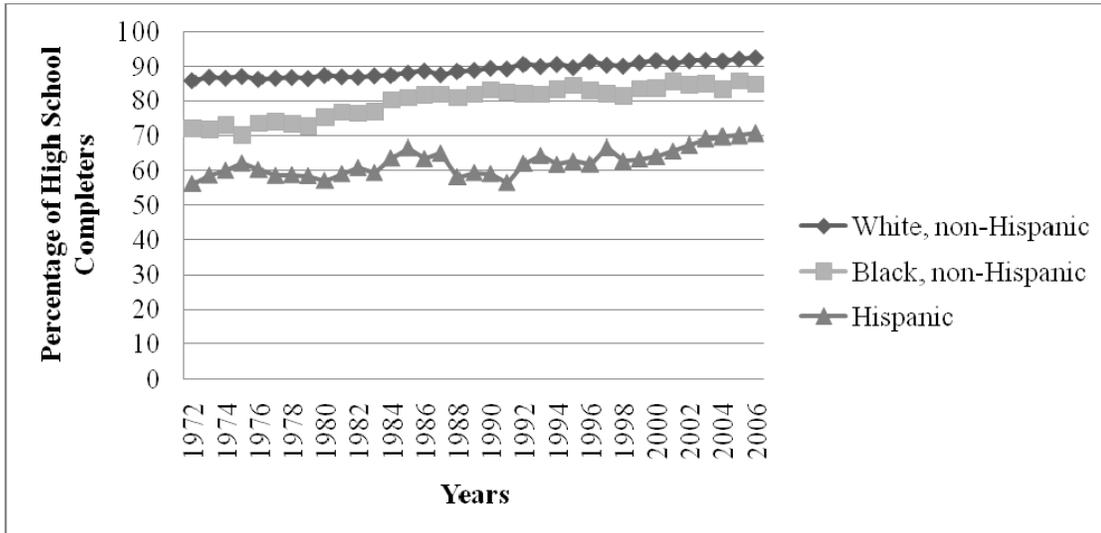


Figure 5 emphasizes the gap between Whites, Blacks, and Hispanic with a high school diploma. Clearly, there are disparities among the races. Data from the Colorado Department of Education (2001) show that 2.0% of White students, 3.0% of Black students, and 4.6% of Hispanic students dropped out of high school in 2001-2002 and the graduation rates for the class of 2002 included 86.4% of White students, 73.7% of Black students, and 65.5% of Hispanic students graduating (Colorado Department of Education, 2002).

Figure 5 also shows the gap between Black and Hispanic students. Ascher (1984), concluded that “Based on cultural stereotypes about Hispanic students, many teachers see lower potential and expect lower performance.” In a National Clearinghouse for Bilingual Education brief, Lockwood (2000) describes six attitudinal barriers to solving the Hispanic drop out problem:

1. Nothing can be done until the problem is understood and it’s too big to understand.

2. This is a local problem and national and state policy should not and cannot effect it.
3. There are some successful school programs but they cannot be generalized or replicated.
4. Hispanic children are not our children, therefore, the Hispanic drop out problem is not our problem.
5. The Hispanic drop out problem is a short term problem and will vanish when a larger issue (e.g., immigration policy) is remedied or reconciled.
6. To solve the Hispanic drop out problem costs more than the public will spend.

In *Latina College Students: Issues and Challenges for the 21st Century*, the barriers that Hispanic students face when accessing higher education are described as socioeconomic status, cultural stereotyping, under-preparation, stress factors (financial, academic, and social), and institutional marginalization (Rodriguez, Guido-DiBrito, Torres, & Talbot, 2000). Solberg's 1993 study reported that stress is a major cause for reduced college persistence in Latino students. Every student deals with stress, but for Latino students the family considerations, financial uncertainty, and pressures of academic rigor are intensified. According to Hernandez (2002), "Latino students who enroll at predominantly white institutions are not only adjusting to these developmental changes but may also bring various cultural, economic, social, and political factors that may deter a successful transition."

In summary, the data on the changing demographics of the United States population has important implications for the library profession and institutions of higher education. As the demographics of the population change, librarians must be able to

provide service to diverse user communities. This can be facilitated by increasing the diversity of librarians. Higher education institutions must find ways of increasing the graduation rate of students of color in order to meet the increasing demands of the library profession. The review of the literature explores the body of research on student retention in all aspects: undergraduate students, undergraduate minority students, graduate students, and graduate minority students. Also explored is the research on the costs of attrition not only to institutions, but also to students.

Purpose of the Study

The purpose of this study was to identify institutional factors associated with the graduation and retention rates of ethnically diverse students in schools of library and information science (LIS) and the study investigated students from 60 different library schools in the United States, Canada, and Puerto Rico. The study assessed the graduation and retention rates of White students and domestic students of color associated with institutional factors, such as cost of attendance, financial aid allocation, and size of program over a span of twenty years. The researcher conducted an investigation to determine if there were differences between White students and students of color graduation and retention rates over time. The specific goal was to determine which institutional factors were predictors of completion of the master's degree in library science. Identifying institutional factors that impact the graduation and retention of all students and specifically domestic students of color from schools of library and information science may assist institutions and students to improve the graduation rates of all students, including students of color.

An understanding of graduate student attrition is directly relevant to the profession of librarianship because of the compelling need to not only graduate students with the Master of Library and Information Science (MLIS) degree, but for the continuity of faculty able to teach these students. Rogers (1969) asserted that non-persisting doctoral students should be considered a failure of the department and the institution in either selection, in teaching, in faculty-student relationship, or in the continuity of the professional and academic climate. A great deal of attention has been focused on attrition in higher education from researchers, policymakers, and practitioners. This may be attributed to institutional accountability and assessment of outcomes by external forces such as State governments and accrediting agencies (Cohen & Brawer, 1996). Of equal importance are the institutional costs associated with recruiting, admissions, advising, planning, and running graduate programs. Brooks-Leonard (1991) asserts that the high costs of recruitment are motivation enough to retain students. Tuition-driven institutions are especially cognizant of the costs of student attrition (Grossett, 1991). Additionally, student attrition removes financial support from incoming or persisting students when they depart prior to graduation. Also, high attrition rates are a poor reflection on the department, college, and institution (Pauley, Cunningham, & Toth, 1999). All of these factors contribute to the need for institutions to retain students.

Research Questions

Each of the research questions pertains to institutional factors that impact the retention of graduate students of color in schools of library and information science.

1. Is there a statistically significant main effect of time and student group (White, students of color) on proportion of the graduating class, on graduation rate and

on retention? Is there a statistically significant interaction between time and group?

2. Do institutional factors (cost of attendance, financial aid allocation, size of program) have a statistically significant relationship with retention of domestic students of color? Does that relationship differ for students of color compared to white students?

Contribution to the Literature

While the research on retention of students is vast, little research has been done on one specific group: graduate professional students. This group includes students in law schools, medical schools, dental schools, and library schools. The wealth of literature on undergraduate retention serves as foundational studies for this dissertation. There is also a wide array of studies concerning the retention of doctoral students. Recently, higher education has taken an interest in the retention of students from diverse backgrounds. The growing body of literature on retention of diverse students spans community colleges to four-year institutions to research extensive universities. This body of literature, and the ensuing work that considers doctoral students provided a jumping off point for the study of diverse graduate professional students.

Further, there is limited research on institutional factors that impact the retention of students at any level. A comprehensive review of the retention literature shows a focus on student characteristics more than institutional factors. This study aims to fill a gap in the literature on retention and, ideally, will be replicable with other groups of students.

What is missing from the retention literature is any broad-based discussion on how institutional factors impact the retention of graduate students at the master's level.

Abedi and Benkin (1987) complain that “the literature on graduate students can charitably be described as sparse” (p. 4). It is clear from a review of the literature that the topic of minority graduate student retention is important to higher education, but that little research has been done to shed light on this phenomenon. While there is useful research focused on both undergraduate and graduate study and with attrition generally, there is little or nothing addressing institutional impact on minority graduate students. There is, therefore, a need to extend the research on minority graduate student persistence and attrition, and to do so in a way that enables the identification of variables influential in the attrition of these students.

Definitions and Related Concepts

Higher education is full of terminology that can be easily misunderstood or misinterpreted. Terms that mean one thing to one group, mean something else to another. Definitions for ethnic groups are taken from the Association of Library and Information Science Educators (ALISE) annual data report submitted by accredited library schools. They are provided here to clarify their meaning for this study as well as operational definitions of terminology used in the study.

Ethnicity Definitions:

American Indian or Alaska Native: A person having origin in any of the original peoples of North America, and who maintains cultural identification through tribal affiliation or community recognition.

Asian or Pacific Islander: A person having origin in any of the original peoples of the Far East, Southeast Asia, the Indian subcontinent, or the Pacific Islands.

Black: A person having origin in any of the black racial groups of Africa. Also termed African-American, not of Hispanic origin.

Hispanic: A person of Cuban, Central or South American, Mexican, Puerto Rican, or other Spanish culture or origin, regardless of race.

White: A person having origin in any of the original peoples of Europe, North America, or the Middle East.

Terminology:

Attrition: Withdrawal from an educational program. A reduction in the total number of students enrolled in a specific graduate or professional program.

Diversity: A structure that includes the tangible presence of individuals representing a variety of different attributes and characteristics, including culture, ethnicity, sexual orientation, and other physical and social variables (Komives & Woodard, 1996, p. 381).

Ethnicity: Students of ethnic origin – African American, Black, Hispanic, Asian/Pacific Islander. Hispanic includes individual of Mexican, Puerto Rican, Cuban, South or Central American, or other Spanish culture or origin.

Minority: A group of people who differ racially from a larger group of which it is a part. For purposes of this study, I consider Whites the dominant/larger racial group. All non-white races are listed above in the section on ethnicity.

Persistence: To attend school regularly until degree is completed.

Productivity Rating: Data point calculated by dividing the number of students graduating by the number of students enrolled in a program.

Retention: To return to school until degree is completed.

Students of Color: A group of students made of the combination of Black, Hispanic, Asian/Pacific Islander, and American Indian or Alaskan Natives.

Limitations and Assumptions

There are limitations to this study. This study was undertaken utilizing data collected from accredited schools of library and information science (LIS). Therefore, the findings of this study may or may not apply to other graduate professional schools or graduate degree programs.

Further, the data were collected by utilizing interlibrary loan to obtain copies of the annual statistical report from ALISE going back to 1985. There are some missing data from the earlier years and the schools have changed over the years. Some programs no longer exist and there are new programs, so the data are not consistent across years and programs.

Perhaps the greatest limitation of this study is that the researcher was unable to obtain ethnicity data for faculty. Ethnicity of faculty has been shown to have a positive relationship with student retention. Unfortunately, while these data are collected in the annual reports, they are confidential and not available.

In addition, institutional tracking of graduate student retention is not generally undertaken. While institutions are required to submit graduation rates for undergraduates, there is not mandate for graduate students. Further, the terms “persistence” and “retention” are often used to mean the same thing. The National Center for Education Statistics (NCES) associates “persistence” as a student measure and “retention” as an institutional measure. This study is focused on institutional

measure, so will therefore use the term “retention” to denote students who pursue their degree to graduation.

Summary

The changing demographics of the population of the United States require that libraries serve diverse groups of patrons. In order to do so, librarians from diverse backgrounds must be recruited and educated. To that end, library schools are cognizant of the need to diversify the students they admit into their programs. But admitting students is only one piece of the puzzle. Library schools must retain and graduate these students of color.

The purpose of this study was to determine the extent to which certain institutional factors impact the graduation and retention of students of color. Utilizing data from 60 library schools over a 20 year period, an analysis was completed to determine which, if any, institutional factors play a role in retaining students. The study also explored the changing landscape of library education as far as enrollments, graduation rates, revenue and expenses, and financial aid allocations. Finally, the study endeavored to determine if there was a significant difference between the retention and graduation rates of White students versus students of color. It is hoped that this study will add to the retention literature on graduate students.

CHAPTER TWO

Review of Selected Literature

There is a large body of research on the retention of students. Beginning with Alexander Astin's work in 1975 and continuing with Tinto's work in 1987, researchers continue to grapple with student retention. The following review focuses on this body of literature. The review begins with a clarification of the term retention and how it is often used interchangeably but erroneously with attrition. Then, the foundational theories of student retention are summarized. These foundational studies are the impetus for all current research on student retention and provide the groundwork for further studies. The review then shifts to the literature about retention of students from diverse ethnic backgrounds. These studies further focus the study of retention as it pertains to diverse students. The research on undergraduates provides the jumping off point for retention research on graduate students.

The retention research on graduate students begins where the undergraduate research leaves off and incorporates ideas and theories gleaned from undergraduate retention studies followed by the literature on diverse graduate students. While the study focuses on graduate students, themes from the literature on undergraduates inform the ways we think about graduate student retention.

Retention and Attrition

There is currently one standard national retention definition that was established by the federal government and must be reported by all colleges and universities on an annual basis. That definition is called “Program Retention” and specifies that postsecondary institutions “Track the full-time student in a degree program over time (6yrs/4yr college, 3yrs/2yr college) to determine whether the student has completed the program.” For this study, retention will be defined as students returning to school until a degree is completed. Attrition is defined as a withdrawal from an educational program (Center for the Study of College Student Retention, 2008).

The following sections discuss retention at different academic levels within the academy, as well as specific information on ethnic diversity of students within these stages. I will begin with an exploration of undergraduate retention to build a foundation for the following sections. Then, I will discuss the literature on undergraduate minority retention. This will lead to a discussion of the literature on graduate students and graduate students of color. Finally, I will review the literature as it pertains to the costs of attrition for institutions and students, and the impact on LIS education.

Undergraduate Retention

Astin (1975, 1993) has identified involvement (i.e., academic involvement, involvement with faculty, involvement with student peers) as a key factor in undergraduate student retention. Tinto’s (1987) model of institutional departure is based on academic and social integration and finds that students who are integrated into the institution are more likely to remain at the institution. Tinto's theory is that students

are successful when there is a focus on individuals as learners and a genuine interest in student life by faculty and staff. Frequent interactions by students with faculty members promote class participation and lead to an increase in the level of academic achievement. Tinto further suggests that student involvement in institutional social activities leads to student success. Similarly, decades of research by Astin confirm Tinto's findings.

In 1993, Tinto proposed a new theory of individual departure from institutions of higher education. In his revised model of social integration, he emphasized the experience and process of integration and its impact on student retention and college persistence. Through an extensive review of the retention research, Tinto identifies psychological and environmental perspectives as two main areas of retention study. He discusses the limitations inherent in these paradigms. The psychological model focuses on the individual student and suggests that departure is a failure to succeed in college. Environmental factors (i.e., social, economic, and organizational factors) also fail to capture the full dynamics and issues of departure. Tinto found that while environmental models are helpful in analyzing trends in society, they do not address "intervening factors, such as student subcultures and patterns of student-faculty interaction, that serves to transmit the effect of the organization to student behaviors" (Tinto, 1993, p. 90).

Tinto's theory is an effort to provide a sociological model of individual departure that emphasizes "the actions of the various actors in the collegiate environment, such as students, faculty, and staff" (p. 122). In this way, Tinto is able to understand how these interactions form social and academic communities in higher education institutions.

This understanding serves as the foundation for policy making that stresses the shared effort of a variety of actors, faculty and staff alike, across campus.

Tinto's theory involves five specific factors that contributed to student retention: (1) a student's pre-entry attributes (prior schooling and family background); (2) goals and commitment (the student's individual aspirations in the institution); (3) experience at the institution (academics and faculty and peer interactions); (4) external commitments while at the institution; and, (5) integration both academically and socially.

In the second edition of his book, Tinto argues against models of attrition that "see student departure as reflecting some shortcoming and/or weakness in the individual" (p. 85), further reinforcing the fifth aspect of his attrition model: the subjective category of integration. In essence, Tinto is arguing that a student may be passing classes with flying colors and still decide to drop out for reasons unrelated to "shortcoming and/or weakness." Tinto suggests that the act of dropping out should not necessarily carry a negative connotation.

Institutional experience is the key feature of Tinto's model of individual departure and is pivotal to later work by Swail. These models are the theoretical foundation for this dissertation. The institutional piece combines both academic and social factors. Academic interactions refer to educational experiences that take place in the classroom setting and informal interactions refer to faculty and staff contacts outside of classroom settings. Social factors include extracurricular activities and day-to-day interactions. The ability to engage in academic and social activities successfully contributes to the student's level of social and academic integration. Additionally, successful integration in several communities increases student persistence.

Many researchers have drawn on Tinto's model in an effort to explore the varied aspects of student retention. Berger and Milem (1999) utilized Astin's theory to further explore Tinto's model of departure. Their findings suggest that students who fully integrate into the academic and social networks and whose values and behaviors fit in with those prevalent on campus are more likely to persist. Bean (1982, 1986; Eaton and Bean 1995; Bean and Eaton, 2000) took Tinto's social integration theory to create a psychological model which emphasizes that a student's wish to persist is influenced by the learner's attitudes and experiences with the institution. Therefore, a student's attitude has a large impact on the desire to persist or drop out.

Additionally, Anderson's (1985) force field analysis of college persistence showcases the numerous factors involved in persistence. In this model, Anderson postulates that there are positive and negative forces externally to influence the student in a decision to drop out or persist in college. Some of the positive forces are parents, teachers, and counselors. Negative factors include lack of money, work conflicts, and family obligations.

Nora (2002) drew from previous persistence studies, including Tinto and Astin, and found that five major conclusions could be drawn from previous persistence studies.

They are:

1. Encouragement and support from family, faculty, friends, and staff can ease the transition into the freshman year of college.
2. Encouragement of several directions makes adjustment to college life easier for freshmen. For instance: family, friends, and faculty.

3. Academic and social experiences during the transition process are influenced by the degree of support and encouragement from significant others while the student is enrolled in college.
4. A student's commitment to the goal of attaining a college degree is not only impacted by the degree of integration into an education setting but is also directly and indirectly impacted by a support system provided by others that play a significant role in the student's life.
5. A student's decision to remain enrolled in college is impacted not only by the components (pre-college characteristics, integration factors, education and institutional commitment) in Tinto's theoretical framework, but, more importantly, are also influenced by a student's perceived support system that is operating from the moment that he or she enters college and begins the separation phase to the moment that the student graduates from college.

(Nora, 2002, p.51)

The American College Testing (ACT) Program compiles annual postsecondary first to second year retention rates from its ACT Institutional Data File. Retention data from ACT (2009) indicates that fewer U.S. students are returning to the same school for their second year of college. The data show that only 66% of first-year college students returned to the same institution for their sophomore year in the 2007–2008 academic year, the lowest percentage since 1989. That figure is down from 68% in 2006–07 and from 69% in 2005–06. Data collected from the National Center for Education Statistics (2003) indicated that 23.2% of all beginning students in four-year institutions in 1995-1996 transferred to another institution by the end of the sixth year. This equated to a

six-year retention rate of 55.3% for the beginning institution. When adding the institutions to which students transferred, the retention rate rose to 62.7% (NCES, 2003). Given the various measures and time frames used to calculate retention rates, there is a large degree of variance in how retention rates are calculated and can makes comparing this rate to graduate retention rates difficult.

The research on undergraduate retention is largely built on the Astin and Tinto models. Study after study has found them to be useful across institutions and among student groups. The previous studies are significant to this dissertation because of their influence on the many factors have on retention.

Minority Undergraduate Retention

The 2003 document “The Condition of Education” from the National Center for Education Statistics reports that more than half of undergraduates are women and almost a third were of an ethnic group other than White. Overall, the percentage of White students has decreased and the percentage of students from other racial/ethnic groups has increased. The report describes the undergraduate population as being 1% American Indian, 6% Asian/Pacific Islander, 13% Black, 12% Hispanic, and 68% White. Overall, 63% of all undergraduate students persist and obtain a bachelor’s degree after six years.

Hispanic students have the lowest levels of student retention with 63% completing high school among 25-to-29 year olds, 11.1% hold bachelor’s degrees or higher. Black students complete high school at the rate of 82% and 17.9% hold bachelor’s degrees or higher. The high school completion rate for white students is 93% and 33% of White

students hold a bachelor's degree or higher (National Center for Education Statistics, 2003).

For undergraduate students of color, Rinn (1995) noted that there may be little or no sense of belonging by students to the academic community early in their studies. The lack of a peer group contributes to this disconnect. Rinn also states that "If minorities don't discover that sense of belonging, and many don't, they are in danger of falling through the cracks, dropping or "flunking out" (p. 11). Further, minority students may feel out of place because so few students and faculty look like them (Rinn, 1995).

Further, culture shock contributes to their attrition. Rendón (1992) describes academic shock as "a feeling of alienation that moves the student from concrete to abstract experience and that takes the student from an old culture that is vastly different in tradition and style, and values to a new world of unfamiliar intellectual conventions, practices, and assumptions" (p. 56).

Many colleges and universities have created minority student communities in an effort to dissuade attrition. Tinto (1993), however, noted that minority student communities do not ensure retention of students of color. Roach (1999) noted that through purposeful admission policies that ensured a critical mass of minority students to form support communities, institutions were, in fact, making an effort to support and create these communities.

Chenoweth (1999), who studied retention at Historically Black Colleges and Universities (HBCU), found that programs at colleges and universities are responding to the retention problem of minority students. Student-faculty interactions are believed to lead to greater institutional commitment and increased social and academic integration

(Wyckoff, 1998). Scisney-Matlock and Matlock (2001) found that what is crucial in retention of students of color is that they receive mentoring from committed individuals who are invested in their academic and career development.

Given the growing ethnic diversity of our nation's student body and the small number of minority faculty across universities, it must become the "responsibility of all faculty to mentor all students regardless of race or ethnicity" (Scisney-Matlock & Matlock, 2001, p. 80). In order for faculty to be effective mentors in multicultural settings, we must start by: 1) challenging our own assumptions and preconceptions of "ethnic other"; 2) being committed to cultural awareness and knowledge of self and others; 3) demonstrating respect and acceptance of differences; and, 4) actively working to promote institutional changes that encourage ethnic and racial equality in higher education (American Psychological Association, 2003). Finally, academic administrators must also commit to provide their faculty and staff with appropriate training programs, so that they can effectively work with all students regardless of cultural background (American Psychological Association, 2003; Guang-Lea, 2002; Scisney-Matlock & Matlock, 2001).

Campbell and Campbell (2007) found that in mentoring programs, matching faculty and students based on ethnicity is advantageous to the mentored students. When compared with other matched groups not based on ethnicity, the ethnicity matched students did better in several categories than their counterparts. Ethnic matching was associated with more semesters of enrollment, more units completed, higher GPAs, a higher graduation rate, and a greater percentage of students entering a campus graduate program.

Finally, financial aid policies have been examined as contributing factors in the attrition of students of color (Tinto, 1993). Minority students are less likely to come from wealthy families and often stop out for financial reasons (Chenowith, 1999). Those minority students who return to school after stopping out often do so as part-time students. Additionally, Rinn (1995) reports that these students may not be prepared for the rigors of academic study and that they are less likely to have access to technology. Students of color, especially from disadvantaged backgrounds, often have difficulty completing their programs of study due to these factors. If these students cannot complete their programs, then they certainly cannot be considered for graduate study. This is critical to this study because LIS programs are graduate-level and require a baccalaureate degree for admission.

Graduate Student Retention

Despite the trends just described, over the past 25 years, minorities have increasingly enrolled in graduate programs. The National Center for Education Statistics (2002) reported that minority enrollment has increased 167% while White enrollment increased 13%. Further, Hispanic and Asian/Pacific Islander enrollment has seen the greatest growth. The report notes that in first-professional programs, minority enrollment increased by 271% from 1976 to 2000. For all graduate students, enrollment has largely been part-time in the last 25 years, but there is an increasing number of full-time graduate students.

For schools of library and information science, the number of minority students graduating will not meet the needs of the changing demographics of American society. Black students made up only 4.2% of the total number of students receiving the MLIS

degree and 7.7% of the doctoral degrees. Hispanics received only 3% of MLIS degrees in 2002 and none received the doctoral degree. In all schools, Asian/Pacific Islanders represented 3.5% of the graduates for the 2001-2002 academic year (ALISE Statistics, 2002). Given that Blacks are 12.1% of the U.S. population, Hispanics are 12.5% of the U.S. population, and Asian/Pacific Islanders are 3.7%, all minority groups are underrepresented in library schools (U.S. Census, 2000).

The average age of library students is 38, putting them in the “non-traditional” category. Bean and Metzner (1985) utilized many of Tinto’s thoughts on retention and developed a retention model for “non-traditional” students. The social integration role was assumed to be not as important for older, part-time, and commuter students. Instead, Bean and Metzner utilized external environmental factors such as finances, number of hours worked per week, outside support and encouragement, and family responsibilities. Their model provided a meaningful inclusion of graduate student life outside of the academy by including work and family responsibilities.

Cabrera, Castaneda, Nora, and Hengstler (1992) combined Tinto’s integration model with Bean’s student attrition model and discovered an indirect influence of environmental, organizational, and personal variables on persistence. Their model, integrating factors from both studies, found that the two theories were not mutually exclusive and that they were, in fact, complimentary as related to the role of the institution and student commitment to the institution. Cabrera, et al.’s works led them to wonder that if the two theories were somehow merged, would our understanding of student persistence be enhanced?

In a second study in 1993, the researchers concluded that the effect of the environmental factor was by far more complex than the one envisioned in the integration model. While Tinto (1987) held that environmental factors shape commitments, the Cabrera, et al.'s study asserts that these factors also exert influence over social and academic experiences.

These findings support Bean's assertion that environmental factors influence persistence. Selected environmental factors (finances, number of hours worked per week, outside support and encouragement, and family responsibilities) clearly are not under the control of institutions, but must be considered when looking at retention of graduate students. These outside influences are important to note and are unknown variables placed in the context of this study.

Clearly, it is important that students with an undergraduate degree progress to LIS graduate programs in order to meet the demands of our changing society. Girves and Wemmerus (1988) developed two empirical models of graduate student degree progress: one for master's and another for doctoral students. Girves and Wemmerus' master's degree model predicts both directly and indirectly degree progress through grades, a strong predictor of success. Further, full-time master's students had higher grades and graduated at higher frequencies than part-time students. Additionally, the support and encouragement of the faculty was determined to be a factor in degree completion.

For doctoral students, grades were less predictive of degree progress. Rather, performance on examinations and ability in independent research were gauged as more indicative of student progress. Involvement in the program of study is critical to the

degree progress of doctoral students. Socialization with the department, including the faculty/student relationship, is directly related to doctoral degree progress. This study also found that advisor/advisee relationships and financial aid are critical to doctoral degree progress. These researchers recommended exploration of ethnicity of faculty and students, type and amount of financial support, and the relationship between faculty and students as areas for further research into graduate student persistence.

For all graduate students, Langenbach and Korhonen (1988) note five demographic factors that contribute to graduate student attrition: age, type of bachelor's degree held, years between completion of the bachelor's degree and enrollment in the master's degree program, distance from master's degree program site, and social science score on the Undergraduate Assessment Program Test.

Hagedorn (1999) also identified five major areas that effect female graduate students. These areas are family issues, interactions with faculty, interactions with fellow students, academic difficulty, and issues related to finances or financial aid (p. 101). Interaction with faculty is a well-established contributing factor in the successful completion of a college degree (Kuh, Pace, & Vesper, 1997; Stoez, 1989). A 1983 study found that 50% of non-persisting doctoral students reported that a poor relationship with their advisor contributed to their exiting their program (Jacks, Chubin, Porter, & Connolly). Further, female students tend to be more comfortable with female faculty (Berg and Ferber, 1983).

Retention of Graduate Students of Color

Much of the minority student retention research focused on undergraduate students (Fenske, Porter, & DuBrock, 2000; Jenkins, Harburg, Weissberg, & Donnelly, 2004;

Taylor & Miller, 2002). The importance of diversity in graduate education has received much attention in recent years (e.g., Council of Graduate Schools, 2003a, 2003b, 2003c; Jenkins & Thomas, 2002; Poock, 1999, 2000). The Council of Graduate Schools has argued that “recruiting underrepresented minorities is a challenge throughout graduate education” (Council of Graduate Schools, 2003b, p. 4). The need to recruit and retain a diverse graduate student body is clear. An inclusive campus enhances the academic environment, promotes student success in an increasingly global society, and has a positive impact on the curriculum (Council of Graduate Schools, 2003a). Graduate programs should strive toward an inclusive graduate student body because “. . . in an inclusive environment everyone wins. Benefits accrue, for both majority and minority students, in the quality of the educational experience and in the care and treatment of graduate students overall” (Council of Graduate Schools, 2003a, p. 13).

Lewis, Ginsberg, Davies, and Smith (2004) studied the experiences of Black doctoral students and recent graduates at a major research institution. Among their more significant findings related to retention were the importance of “positive relationships with faculty, increased peer interaction, and assistance with adjustment issues” (p. 232).

In 2003, the Council of Graduate School published a three-monograph series on inclusiveness. *Achieving an Inclusive Graduate Community*, *Recruiting for Success*, and *Ensuring Success* (Council of Graduate Schools, 2003a, 2003b, 2003c) focused on the importance of creating an inclusive environment, successful recruitment strategies, and tactics for effective retention.

Several studies address the completion of doctoral programs by students of color. Ellis' (1998) study on the impact of race and gender among Black and White doctoral students found that race was a prominent factor in its impact on doctoral student persistence. For Black women, their doctoral experiences were shaped more by their race than Black men and White students. Thompson's (1999) literature review explored Black student participation in doctoral studies from 1970 through the mid-1990s. Although enrollment increased in the 1980s, the percentage of Black students enrolled in doctoral programs in the 1990s is the same as the 1970s. She posits that the inequality in earnings between Black and White terminal degree holders is the main reason for the current enrollments in doctoral programs. She states that Blacks are shying away from graduate education because an advanced education does not make a significant difference in their economic status.

For Black students, Kobrak (1992) noted that institutions are hampered in their efforts to retain them because of limited interactions between students and faculty. He commented that the academic structure does not provide incentives for faculty to interact with students in non-research oriented activities, such as mentoring. Further, he discussed various ways White faculty can be involved in the retention efforts of Black students. Kobrak also suggested that Black Emeriti professors become engaged in the mentoring process but notes that changing organizational priorities to support mentoring is a political issue that involves the entire institution.

Tam and Rousseau (2000) studied application rates of minority students in special education programs. They found five reasons why minority students would pursue a doctoral degree: availability of financial assistance, desire for intellectual change,

confidence they could succeed, desire to be a college professor, and desire to learn research skills. They suggest that in order to increase minority participation in doctoral programs, institutions should increase financial aid, provide mentorship opportunities, and have affordable health insurance available to students.

A 1997 study investigated Black doctoral students who completed their degrees. Findings suggest that the frequency and quality of interactions with faculty and peers are important factors in the persistence of these students. They defined supportive faculty as those who were genuinely interested in the student, conveyed concerns and suggestions objectively with the student when criticism was warranted, and effectively communicated with students who were of a different race than the faculty member (Patterson-Stewart, Ritchie, & Sanders).

In a study of ethnic minority students, Mayo, Murguia, and Padilla (1995) reported that relationships with faculty of color proved to be the most significant dimension of social integration in affecting grade point average. Sedlacek (1989) found that minority students are more likely to succeed if they have mentors or role models in their schools. However, Haring (1999) reported that the results of research on the potential benefits of matching students and mentors on the basis of ethnic backgrounds have been mixed. For instance, Atkinson, Casas, & Neville's (1994) survey of mentors' perceptions of their relationships with students indicate that participants who mentored ethnically similar students viewed the relationship more positively than did those who mentored ethnic-other students. On the other hand, findings based on qualitative procedures (i.e., focus groups and interviews with students) provided little support for the importance of matching mentors and students on

ethnic background (e.g., Brown, Davis, & McClendon, 1999; Haring, 1999; Lee, 1999). Such inconsistency across studies deserves further examination.

Johnson-Bailey (2004) found in her study of Black women doctoral students four issues that impacted the retention of these women: (1) the presence of and mentoring of supportive professors and staff; (2) the presence of and networking by Black peers; (3) respect from the department's professorate; and, (4) the availability of continued funding. A major factor for all of the participants was the presence of supportive professors, particularly Black women professors.

Adequate financial aid is a recurring theme in retention research and has been found to be a significant factor in many studies (Nora, 1990). For graduate students, with their multiple responsibilities, financial reasons may be of special concern and may contribute to part-time enrollment of older students (Pisani & Ethington, 1992). In the 1990's, researchers developed a new theory to help understand how financial aid and personal finances of students impact retention. The Ability to Pay Theory (Cabrera, Stampen, & Hansen, 1990; Cabrera, Nora, & Castañeda, 1992) postulates that a student's ability to pay influences the student's academic and social integration, thus affecting persistence. So, if students are financially supported by their institutions, they are more likely to persist.

In her 1984 study of doctoral students across all academic and professional fields at UCLA, Benkin found that the two factors that seemed to differentiate students who completed all doctoral degree requirements except the dissertation (ABD) from doctoral recipients were reports of financial assistance and reported relationships with their faculty members.

The National Science Foundation (NSF) (2003) identified as primary sources of support for science and engineering graduate students in both public and private universities as research assistantships, teaching assistantships, fellowships and traineeships, and self-support. For this group, nonfederal funding streams were the primary source of support for students at public institutions (50%) and private institutions (41%). Further, Bentley and Berger (1998) identified four areas where the impact of financial support is apparent:

1. Students who receive support have higher completion rates and shorter time to degree than non-supported students.
2. Fellowships appear to be more effective in completion rates of doctoral students than among research assistants.
3. Research assistants tend to be more prolific scholars than other students, both before and after graduation.
4. No study has been identified that supports higher dollar amounts of financial aid equaling better student outcomes.

Overall, factors contributing to attrition in graduate study are related to Tinto's integration theory, relationships with faculty advisors (Golde, 2000), and financial aid. Students who receive no financial support and those who receive full fellowships are less likely to be integrated into the social and academic structure of the department and are more likely to withdraw (Lovitts & Nelson, 2000). Further, the more opportunities departments provide for integration into the academic culture, the lower the attrition rates. Integration can be accomplished through advising, co-authoring, and generally interacting with students in a variety of venues.

Clearly, institutional policies regarding financial aid can have a significant impact on the persistence of graduate students. As with all theories and models, there is the problem of applying the models unilaterally to all students and institutions. The complexity of the factors involved in student attrition and retention make it difficult for administrators to determine what policies are most effective in improving student retention (Swail, 1996). Clearly, understanding how different institutional factors and financial aid effect retention is missing from the literature. This study endeavors to better understand these complex factors.

Institutional Efforts

Clearly there are many factors which impact retention. Colleges and universities have attempted to curb attrition and increase retention in a variety of ways. Selected institutional efforts are included in this section. By viewing retention from an organizational perspective, a new perspective can be used to study student persistence.

Braxton and Mundy (2001) provide a comprehensive list of 47 recommendations to improve student success and retention. The recommendations are classified into three principles of effective retention advocated by Tinto: (1) effective retention programs must be committed to the students they serve; (2) the retention program must be committed to all students, not just specific groups, and, (3) retention programs should be committed to the development of communities which are socially and academically supportive of all students. The article further explores the implementation of recommendations from the standpoint of academic programs, advising, administration and governance, enrollment management, faculty teaching role performance, institutional research, and student affairs. They conclude that the problem of student

attrition is not easily solved and that several possible actions may or may not solve the problem. Further, implementation of the suggestions may require institutional policy changes.

Berger's (2001) study on institutional practices that encourage retention revealed that organizational behavior can effect persistence. Based on five models of institutional behavior (bureaucratic, collegial, political, symbolic, and systemic), Berger found that bureaucratic models – institutions with formal structures, rules, and regulations – were least conducive to student retention. Collegial institutions – collaborative, consensus-building; symbolic institutions – focus on stories, myths, legends, ceremonies, traditions to create meaning; and systemic institutions – open system that interacts with larger environment – had a positive effect on student retention. Evidence suggested that political institutions – competition for resources and varying interest groups – can have a negative impact on student retention. Berger recommends that student retention can be enhanced by providing clear lines of communication regarding goals, policies, and values; allowing students to participate in decision making; being fair with students; balancing structure and responsiveness; engaging students in political activity on campus; advocating and having advocates for students; building shared meaning through symbols; connecting with the external environment; and, using assessment of student perceptions of the campus climate.

Kuh (2001) also studies the relationship between campus culture and student persistence.

Culture is something an institution *has* which sets the school apart from others, including salient properties such as the institution's history and former

institutional leaders who personify its core values. Culture is something an institution *does* that effectss both student and institutional performance (Kuh, 2001, p. 24).

Students who feel they are valued and belong are more likely to persist and graduate. Kuh argues that not only should institutions assess the climate inside the classroom, but also the environment outside the classroom should also be explored. A college's culture can influence persistence, student satisfaction, and achievement.

According to Lovitts (2001) doctoral student attrition has an impact on the institution in variety of ways. First, there are costs to faculty and departments. Fiscal constraints coupled with accountability legislation have led to the dismantling of unproductive doctoral programs and, in some cases, entire departments (Lovitts). Second, there are costs to the university. The costs associated with recruiting new students are far higher than the costs associated with retaining them. Further, the costs associated with student services, such as loan processing, are coupled with the net loss of investment when institutional aid (fellowships, assistantships) result in not granting a terminal degree. Third, there is a cost to society. Society needs highly educated people to fill a wide variety of positions inside and outside of academe. Fourth, there are costs to the student. The government and private loans that accumulate as future debt for years when the degree is unfinished suggest that the student is unlikely to earn the anticipated salary needed to repay the loans. There are emotional costs as well, as non-completers face low self-esteem and lose self-confidence.

Nora (1990) also found that financial aid was a significant factor in many retention studies, especially for graduate students, who have many responsibilities beyond the

classroom; for example, children, jobs, and caretaker. Several studies (Cabrera, Stampen, & Hansen, 1990; Cabrera, Nora, & Castaneda, 1992) found that financial support from the institution was key to retaining students of color. Further, Bentley and Berger (1998) concluded that financial support from the institution resulted in higher completion rates.

The cost of tuition as a predictor of retention and productivity goes hand-in-hand with scholarship and fellowship aid. Students who leave without completing their degree are left with debt and unqualified for the job they want (AAUP, 2002; Lovitts & Nelson, 2000). Further, Pascarella and Terenzini (2005) and Schuh (2005) found that undergraduate students are relying on financial aid as the cost of attendance rises. High cost of attendance has been found to yield lower retention rates. Several other undergraduate studies have supported the findings of higher cost equalling lower retention (Gilmore, 1991; St. John & Starkey, 1995; St. John, Cabrera, Nora, & Asker, 2000).

Size of program has not been studied per se. However, the size of total institution has been studied at the undergraduate level. These studies have yielded mixed and often conflicting results. Some studies assert large institutions lead to attrition (Pascarella & Terenzini, 2005; Oseguera, 2005), while others have found institutional size to not be predictive of retention (Ryan, 2004; Titus, 2004).

While there are real institutional costs in time and money each time a student leaves without completing a graduate degree, the immediate cost to departing students is still greater. According to the American Association of University Professors (AAUP), “few students depart primarily for financial reasons.” Steadily increasing debt levels for

graduate students, especially in the arts and humanities, lead to severe economic and employment constraints for many of those who leave without completing the degree. Initial jobs are often well below a student's qualifications. Students who reported diminished self-esteem and self-confidence—who were "shaken up," "shell-shocked," "disappointed," or "depressed" when they left and commonly took jobs in the blue-collar sector of the labor market. This finding means that people with up to four years of graduate education took jobs as farmhands, sales clerks, and waitresses and felt lucky to have those jobs” (Lovitts & Nelson, 2000, p. 45).

In sum, the research suggests that institutions play a critical role through their culture in graduate school as well as the structure and process of graduate education. The retention literature suggests that students leave less frequently because of what they bring with them to the university than because of what happens to them after they arrive. A student who enters a department whose culture and structure facilitate academic and personal integration is more likely to complete the degree than a peer whose departmental culture is unfriendly or not welcoming. A student invited into the department's academic and social community is more likely to succeed than a student left entirely to his or her own resources.

Theoretical Framework

Swail's (2003) geometric model of student persistence focuses on student attributes and institutional practice. This model recognizes the inextricable relationship between persistence and achievement. Because it is different from other models, the emphasis places the student at the center of the model. Swail notes that the purpose of the model is to “provide a user-friendly method for discussion and to focus on the cognitive and

social attributes that the student brings to campus, and the institutional role in the student experience” (p. 76). The model begs the question: What can institutions do to help students finish college?

Swail’s model describes three forces that effect persistence and achievement: cognitive, social, and institutional factors (p. 77). The factors associated with each force are shown in the Figure 6 and in Table 1.

Figure 6. Swail’s Geometric Model of Persistence and Achievement

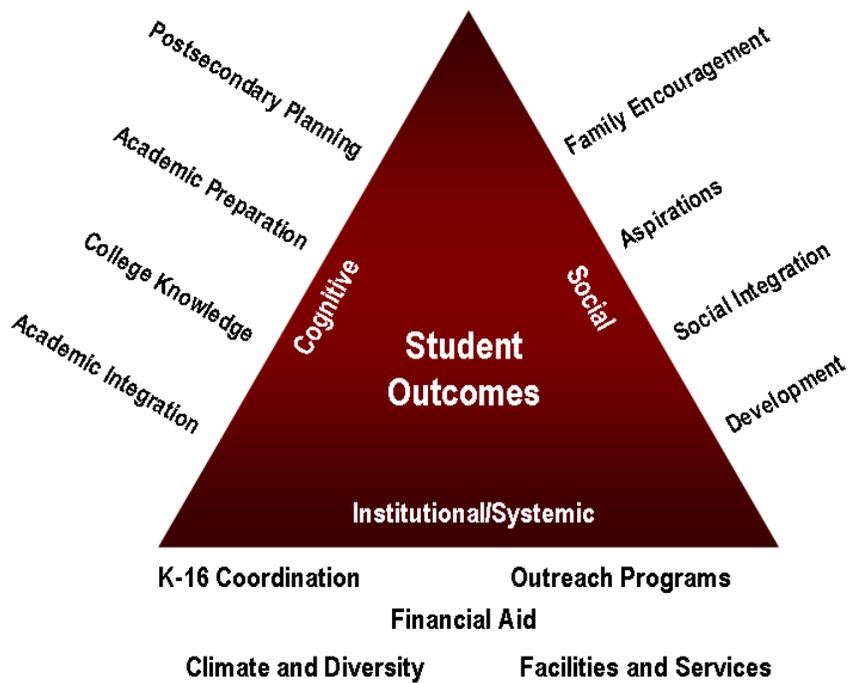


Table 1 lists the factors associated with the cognitive, social, and institutional/systemic forces in Swail’s model that form his geometric model of persistence and achievement.

Table 1

Factors Associated with Swail's Model

Factors	Example
1. Cognitive Factors	<ul style="list-style-type: none"> ▪ Academic Rigor ▪ Quality of Learning ▪ Aptitude ▪ Content Knowledge ▪ Critical-thinking Ability ▪ Technology Ability ▪ Study Skills ▪ Learning Skills ▪ Time Management ▪ Academic-related Extracurricular Activities
2. Social Factors	<ul style="list-style-type: none"> ▪ Financial Issues ▪ Educational Legacy ▪ Attitude toward Learning ▪ Religious Background ▪ Maturity ▪ Social Coping Skills ▪ Communication Skills ▪ Attitude toward Others ▪ Cultural Values ▪ Expectations ▪ Social Lifestyle ▪ Goal Commitment ▪ Family Influence ▪ Peer Influence
3. Institutional Factors	<ul style="list-style-type: none"> ▪ Financial Aid ▪ Social Services ▪ Recruitment and Admissions ▪ Academic Services ▪ Curriculum and Instruction ▪ Institutional Research ▪ Leadership

Swail's model serves as the framework for this study because it separates out what institutions can do to enhance student persistence. While much of the literature focuses on student and social factors, Swail's model provides a way of separating out those

factors directly associated with institutions. Because graduate students come to their programs of study with life experience, Swail's model makes it possible to discover those factors that are directly associated with persistence influenced by institutions.

Quantifying Retention and Graduation Rates

Each year, colleges and universities are required to submit undergraduate retention figures to federal and state governments. These data are often used to determine funding levels and may impact an institution's reputation (Hagedorn, 2006). In the early 1960s, Summerskil (1962) reported that retention rates vary from 18% to 88%. Summerskil also noted that there was not a universally used formula for determining retention rates. Today, nearly 50 years later, there is still no standard formula for calculating retention rates.

In 1990, The Student Right-To-Know and Campus Safety Act was enacted which requires colleges to report their graduation rates annually. In this legislation, graduation rate was defined as the percentage of full-time, first-time, degree-seeking enrolled students who graduate after 150% of the normal time for completion; defined as six years for four-year colleges (8 semesters or 12 quarters) and three years for two-year colleges (4 semesters or 6 quarters) (NCES, 2003). In both cases, summer enrollments are not calculated and the data are only reported for the fall term. While this formula is helpful, it excludes many students, mainly transfer students, part-time students, non-degree seeking students, students who begin their program mid-year, or students who have not declared a major. The formula is also a graduation rate, and not a retention rate.

The NCES also uses two other retention formulas that differentiate between institutions as “less than four-year” and “four-year” institutions. This distinction allows students pursuing certificates to be included in the reporting, as most certificates can be completed in fewer than four years. In both formulas, the retention rate is calculated from fall of the first year of enrollment to the fall of the next year. Specifically excluded are students who leave because of death, disability, service in the armed forces, or church missions (NCES, 2003).

At the graduate level, there is no federal mandate to submit retention or graduation rates. Further, the Committee on Accreditation (COA) of the ALA does not require programs to submit these data along with their annual reports to ALISE. Therefore, there are no data for retention or graduation rates in ALA-accredited library programs. Further, the data collected for this study spans 20 years, with gaps of five years in the data, making a year-to-year comparison of enrolled students impossible. Additionally, the data collected in library schools on enrollment are not tracked by student, but are headcount or full-time equivalents (FTEs).

Summary

The purpose of this chapter was to review the body of literature on retention. The study of retention began with undergraduate students and has grown to include doctoral students and students of color. Missing from the literature is an understanding of graduate professional students. This study endeavors to understand the institutional factors that effect retention in graduate schools of library and information science.

CHAPTER THREE

Research Methodology

This dissertation addresses the retention, proportional class representation, and productivity rating over time and the effect of institutional factors on the productivity rates and retention of students of color in graduate library and information science degree programs. Is there a difference between the productivity rates and retention rates of White students versus students of color? What institutional factors have a statistically significant relationship with retention and productivity rating?

Much of the research to date on retention has focused on undergraduate students. While research exists on doctoral students, little to no research is available on the retention of graduate professional students at the master's level. As the population of the United States becomes more diverse, librarians that can serve the changing citizenry are critical to the mission of libraries.

This chapter describes the methodology used for this research study to determine if the productivity rates and retention rates of students of color differ from White students over time. The chapter also describes the methods used to determine what, if any, institutional variables had an effect on the productivity rates or retention rates of students of color in graduate schools of library science.

Purpose of the Study

The purpose of this study was to identify institutional factors associated with the productivity and retention rates of White and domestic students of color in schools of library and information science. The study reports aggregate data for students from 60 different library schools in the United States, Canada, and Puerto Rico. The study assessed the productivity and retention rates of domestic students of color versus White students over time given institutional factors such as cost of attendance, financial aid allocation, and size of program. The specific goal was to determine if institutional factors were predictors of retention and productivity rates of students seeking the master's degree in library science. Identifying institutional factors that impact the retention and productivity rates of students of color from schools of library and information science may assist institutions and students in improving the productivity rates and retention for all students, not just diverse students.

Description of the Setting

ALA accredited library schools are located across the United States and Canada. Appendix C is a complete listing of library schools and their accreditation history and status. The ALA was founded by Melvil Dewey, Justin Winsor, C. A. Cutter, Samuel S. Green, James L. Whitney, Fred B. Perkins, and Thomas W. Bicknell during the Centennial Exposition in Philadelphia in 1876. One hundred three librarians, 90 men and 13 women, responded to a call for a "Convention of Librarians" to be held October 4-6 at the Historical Society of Pennsylvania. At the end of the meeting, according to Ed Holley in his essay "ALA at 100," "the register was passed around for all to sign

who wished to become charter members," marking October 6, 1876 as ALA's birthday. The aim of the Association, in that resolution, was "to enable librarians to do their present work more easily and at less expense" (ALA, 2009).

The American Library Association is recognized as a specialized accreditor by the Council for Higher Education Accreditation (CHEA) to accredit master's and doctoral level programs in the United States and Canada. This means that ALA accreditation assures the quality of master's and doctoral level library and information studies programs in the United States and Canada through established standards, policies and processes. Furthermore, ALA policy 54.2 stated that the "master's degree from a program accredited by the American Library Association is the appropriate professional degree for librarians" (ALA Policy Manual, 1999-2000). Although ALA accredits library school programs, and ALA has a policy on what is considered the "appropriate" professional degree, this does not mean that it is mandatory for libraries in the United States to follow the ALA policy when they hire a librarian.

Libraries are able to define their own hiring policies, but most of them state that they prefer someone with a master's degree from an ALA-accredited program. Many libraries have hiring policies stating a requirement for a candidate with a degree from an ALA accredited library school and only from an ALA-accredited school. Even a United States citizen who completes a degree from abroad may not qualify to be hired (Dowling, 2007).

The ALA Office for Accreditation (OA) serves the general public, students, employers, and library and information studies master's programs through the

promotion and advancement of education in library and information studies. The ALA Office for Accreditation:

- Ensures fair and equitable accreditation reviews of library and information studies programs;
- Provides external review and validation of master's level library and information studies programs;
- Promotes diversity and inclusiveness in library and information studies education;
- Consults and assists in the development and advancement of library and information studies education;
- Communicates with constituencies regarding activities;
- Anticipates and prepares for the changing environment and the future needs of constituencies; and,
- Manages our operations and resources to be effective, responsive and relevant (ALA, 2009).

This study used data from 69 different schools that were in operation and accredited between the years of 1985 and 2005. During this 20 year period, some schools closed their doors (Clark Atlanta, Case Western Reserve, University of Chicago, Columbia University, University of Denver, Emory University, University of Minnesota, University of Mississippi, State University of New York – Geneseo, University of Northern Illinois, George Peabody College of Teachers merged with Vanderbilt in 1979 and was discontinued in 1988, University of Southern California) while new schools were opened (University of Puerto Rico, University of Denver – reopened 1996 and

reaccredited 2003, and Valdosta State University). One school, University of California-Berkeley chose to no longer seek ALA accreditation and remains in operation. Clark Atlanta's LIS program was started in 1941 but closed in 2007 because of budget deficits. Clark Atlanta's LIS program was one of two LIS programs housed in historically Black colleges and universities (HBCU) and the only accredited library program in Georgia (Oder, 2003). The only remaining LIS program housed in an HBCU is at North Carolina Central University. Further, the schools vary in size of students and faculty, geographic location, size of institution, institutional control, tuition, program revenue, program expenses, and allocation of resources to financial aid.

The participants in this study are ALA accredited graduate programs that offer a master's degree in library and information science. The Association for Library and Information Science Education (ALISE) Statistical Report and Database is a compilation and analysis of statistical data and descriptive information about graduate library and information science education programs that maintain ALISE Institutional membership. Data for the years 1985, 1990, 1995, 2000, 2001, 2002, 2003, 2004, and 2005 were used for this study. A complete listing of the schools is available in Appendix B.

The figures below provide data describing the programs during the time period used in this study. During the 20 year period studied, there have been changes in enrollment, size of faculty, revenue and expenses, and scholarship and financial aid allocations. Figure 7 shows the number of domestic students of color who graduated from accredited library schools as compared to all students.

Figure 7. Number of domestic students of color graduates compared to all students in schools of library and information science, 1985 - 2005

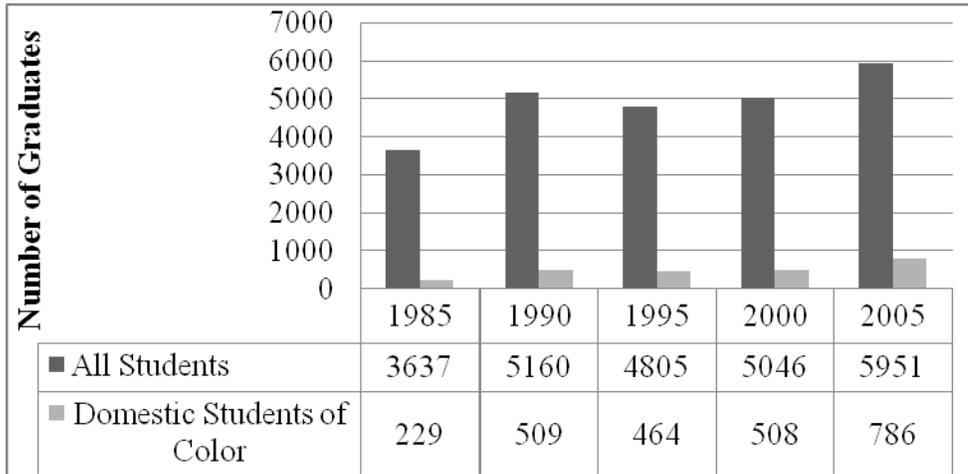


Figure 8 shows the percentage of domestic students of color of all graduates in accredited library schools. The figure shows an upward trend in the percentage of domestic students of color graduating from library schools.

Figure 8: Percent of total graduates that are students of color 1985 - 2005

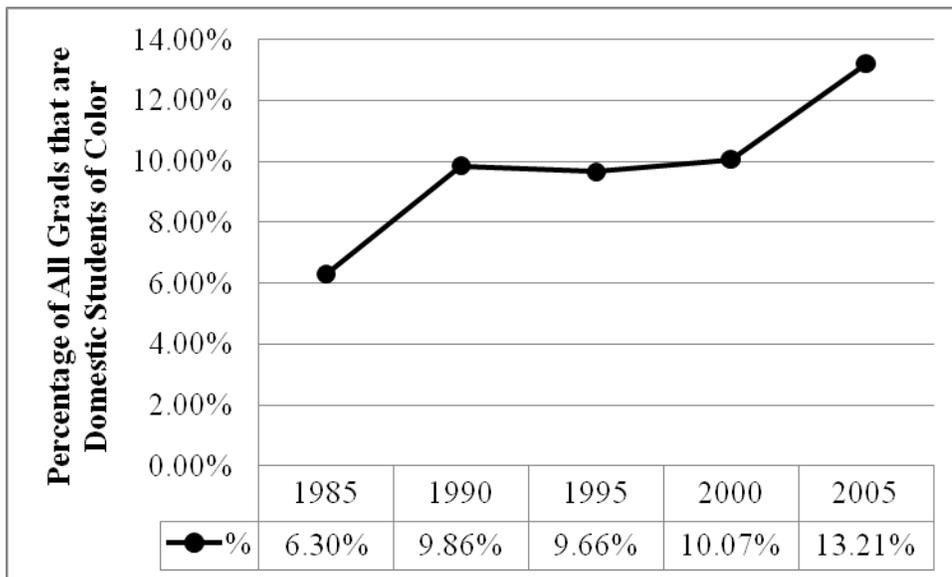


Figure 9 is a graphic representation of the full-time equivalent (FTE) faculty in library schools from 1985 to 2005. The trend in more recent years is an increase in the overall FTE of faculty.

Figure 9. Faculty FTE 1985 - 2005

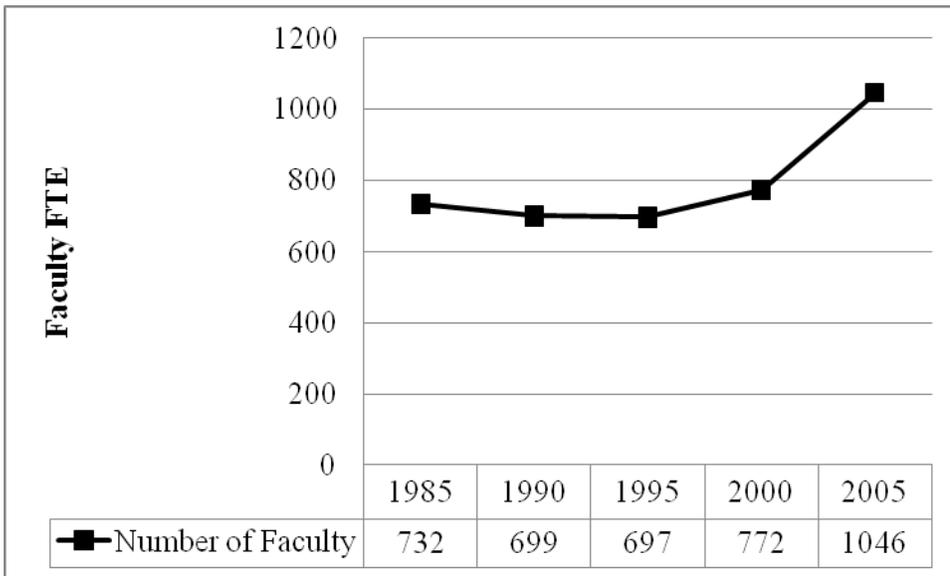


Figure 10 shows that the number of students enrolled in library programs has increased between 1985 and 2005. Nearly 10,000 more students are enrolled in library programs than in 1985. This enrollment increase supports the data represented in Figure 9 that more faculty are needed to teach increasing numbers of students.

Figure 10. Number of enrolled students 1985 - 2005

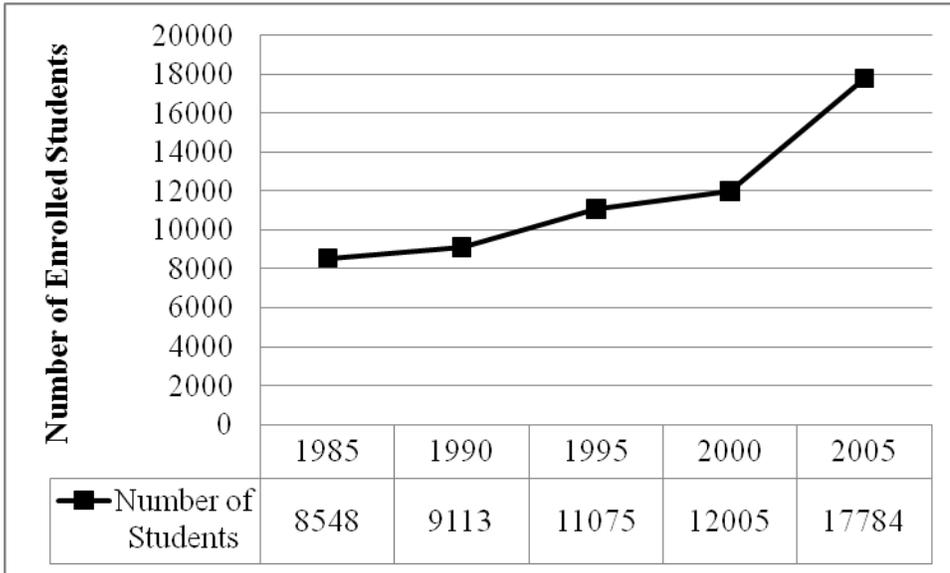
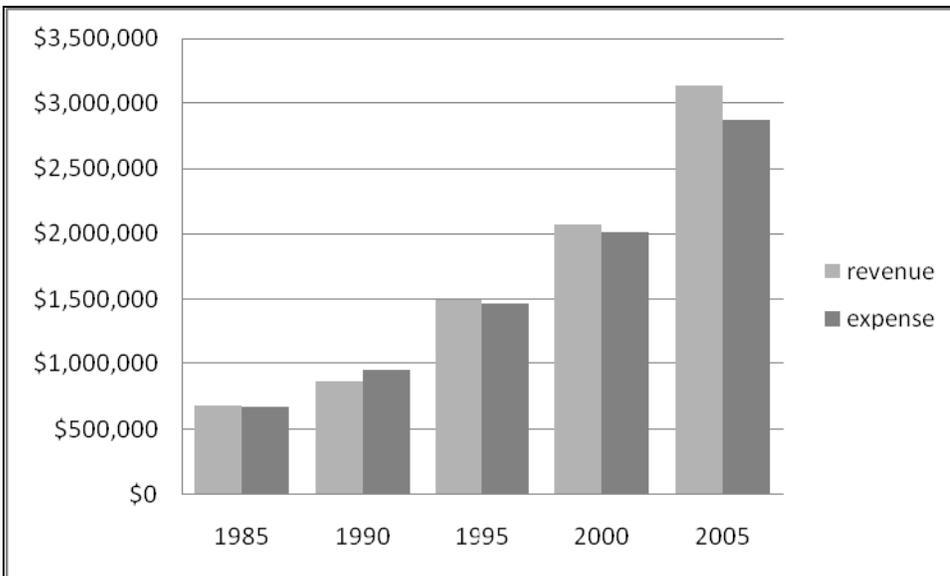


Figure 11 shows the mean income and expense for all programs for the year 1985, 1990, 1995, 2000, and 2005. In all but 1990, mean revenue exceeded mean expenses.

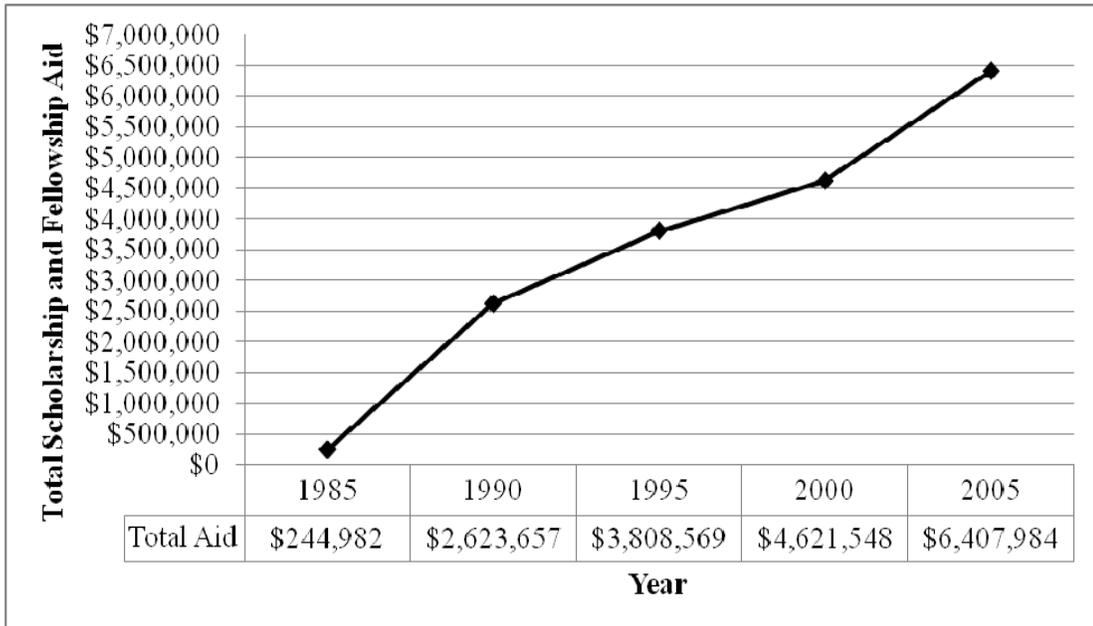
Figure 11. Mean revenue and expense for programs in 1985 - 2005



Just as revenue and enrollments have increased over the years, so has scholarship and fellowship aid. As revenue has increased, so has the amount of financial aid that is

available to students. Figure 12 shows the increase in total scholarship and fellowship aid over the 20 year period of data.

Figure 12. Total scholarship and fellowship aid 1985 - 2005



Figures 13 - 27 summarize the data for the tuition rates and financial aid and scholarship data utilizing boxplots, for 1985 to 2005. The boxplots graphically represent the the data by showing its minimum, first quartile, median, third quartile, and maximum. The numbers represent the dollar amount of tuition for the full degree. In the financial aid and scholarship boxplots, the numbers are the total amount aid allotted to ALA-accredited master's degree-seeking students by program. The dots represent programs that have costs or financial aid allocations outside of the top or bottom 90 or 10th percentiles.

Figure 13. In-state tuition for all programs, 1985



Figure 14. Out-of-state tuition for all programs, 1985

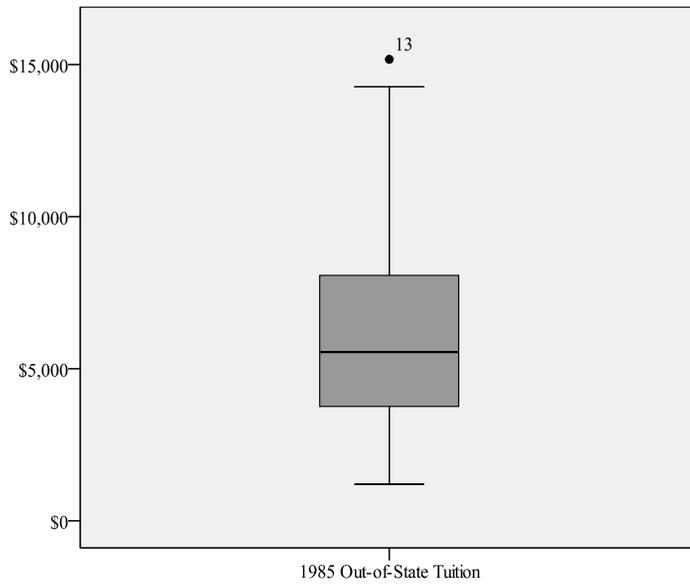


Figure 15. Total financial aid and scholarships for all programs, 1985

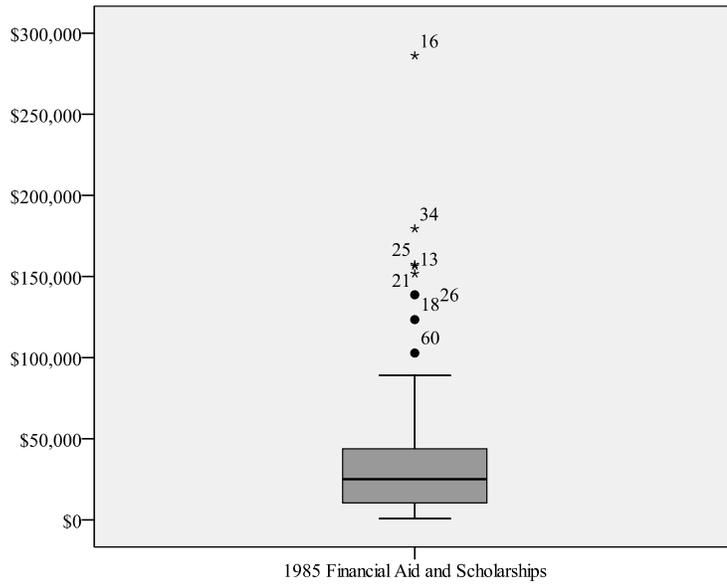


Figure 16. In-state tuition for all programs, 1990

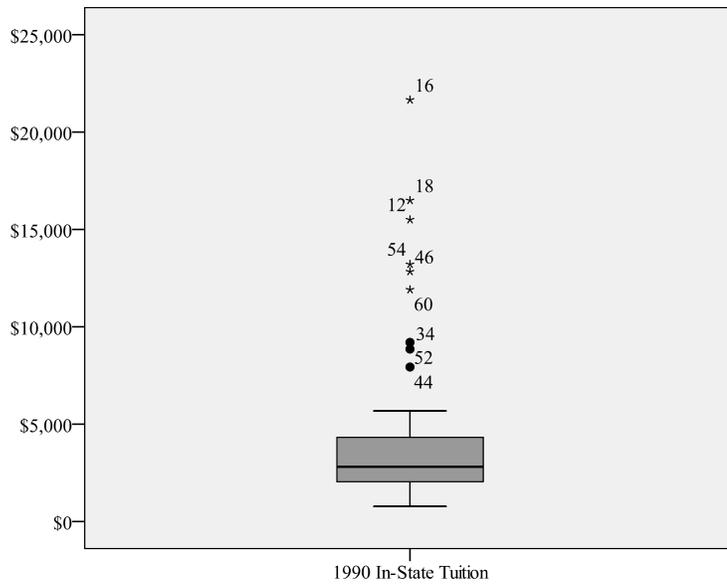


Figure 17. Out-of-state tuition for all programs, 1990

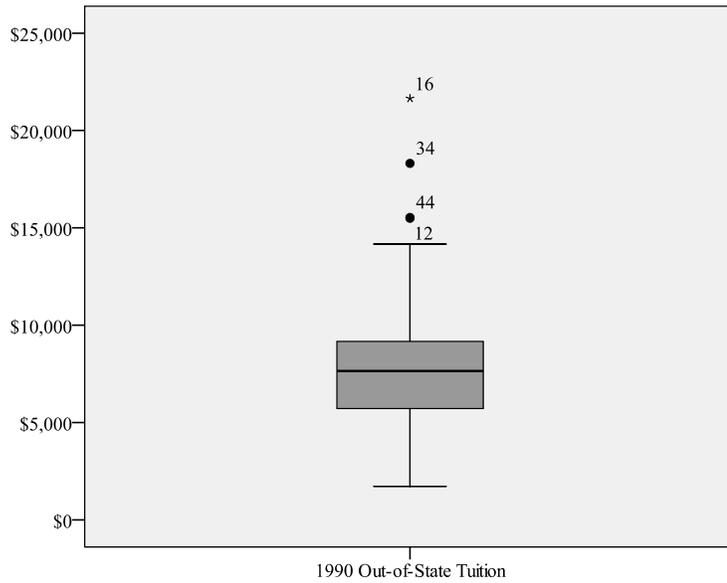


Figure 18. Financial aid and scholarships for all programs, 1990

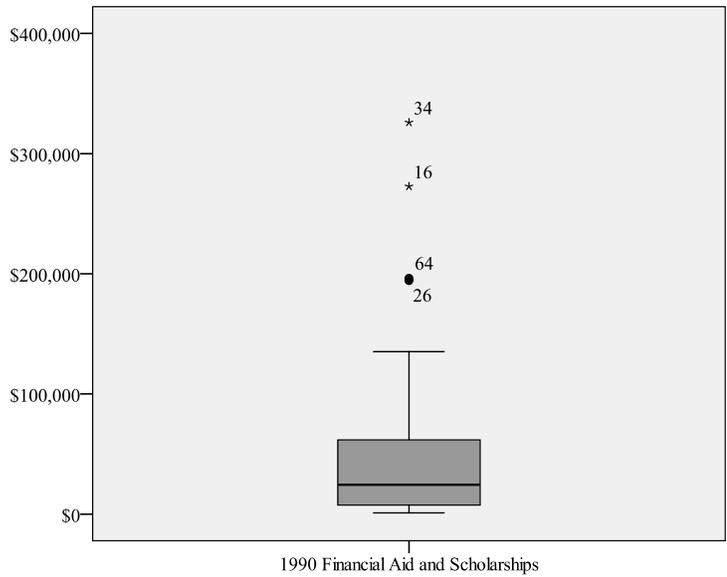


Figure 19. In-state tuition for all programs, 1995

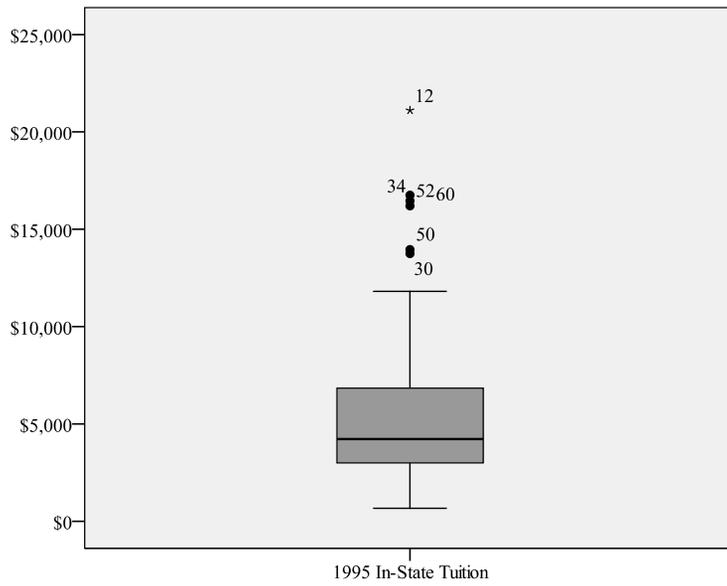


Figure 20. Out-of-state tuition for all programs, 1995

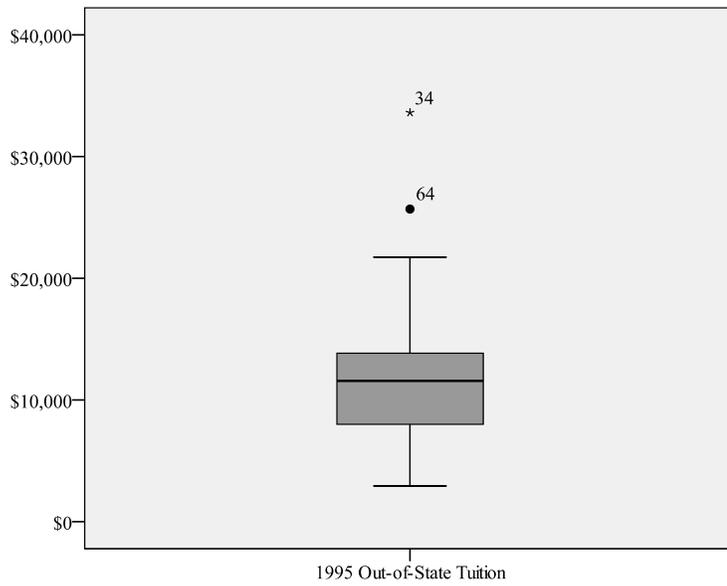


Figure 21. Financial aid and scholarships for all programs, 1995

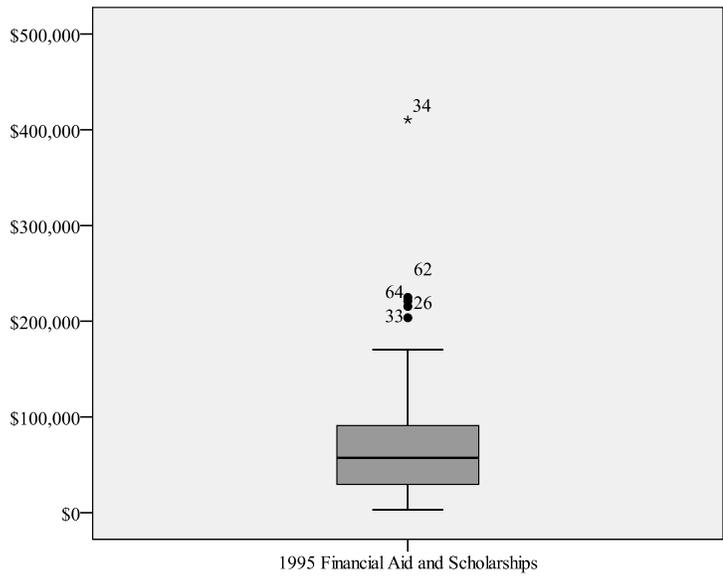


Figure 22. In-state tuition for all programs, 2000

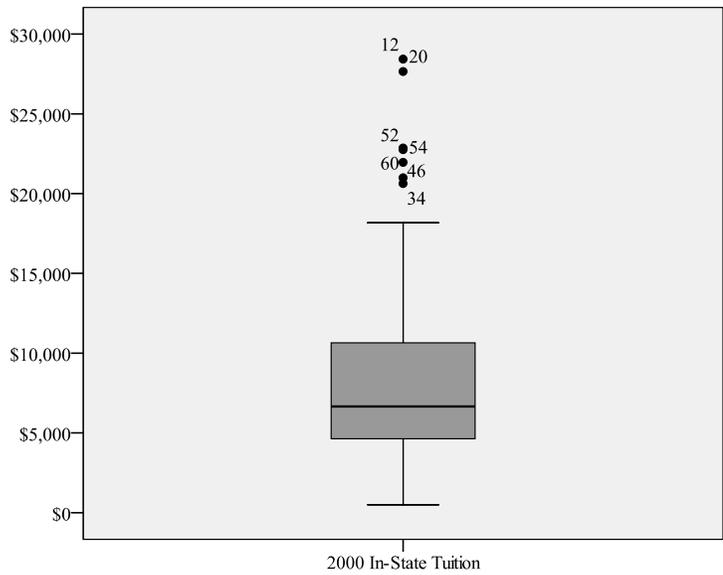


Figure 23. Out-of-state tuition for all programs, 2000

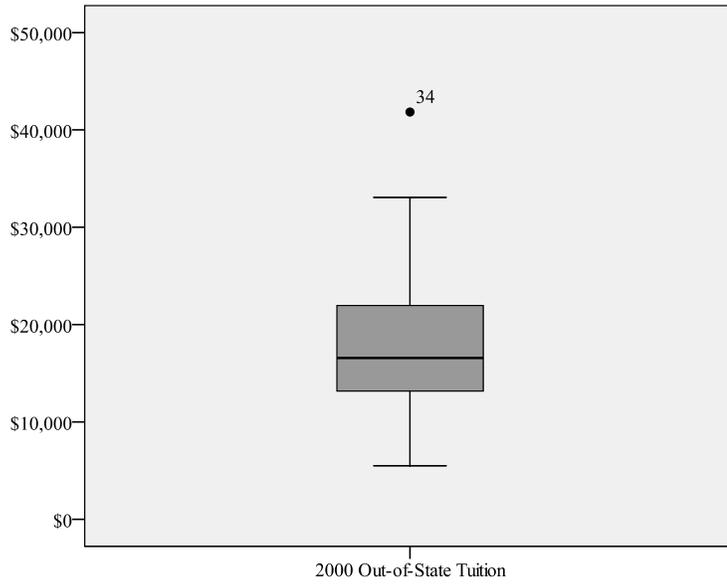


Figure 24. Financial aid and scholarships for all programs, 2000

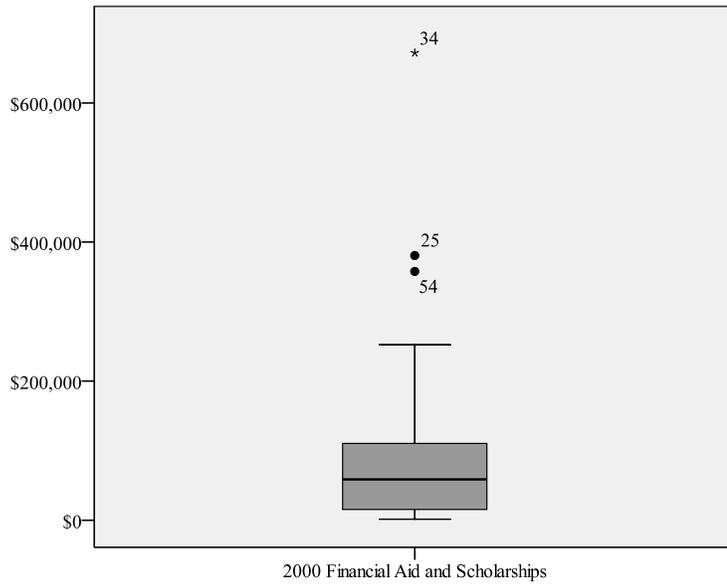


Figure 25. In-state tuition for all programs, 2005

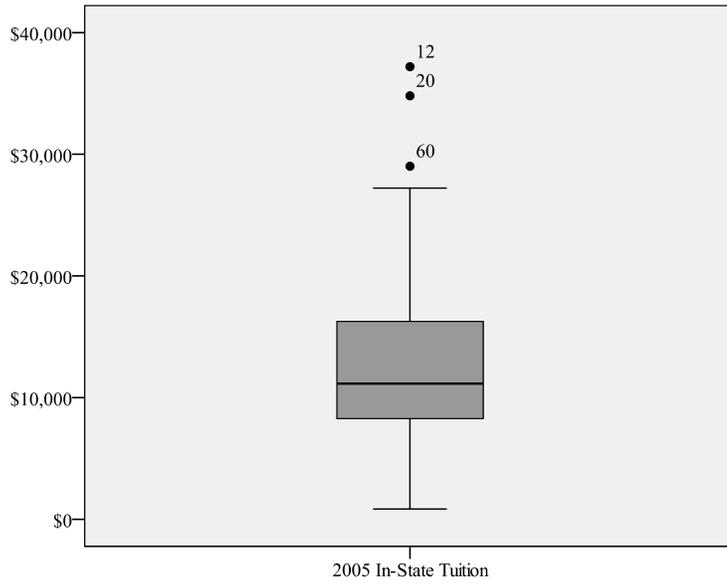


Figure 26. Out-of-state tuition for all programs, 2005

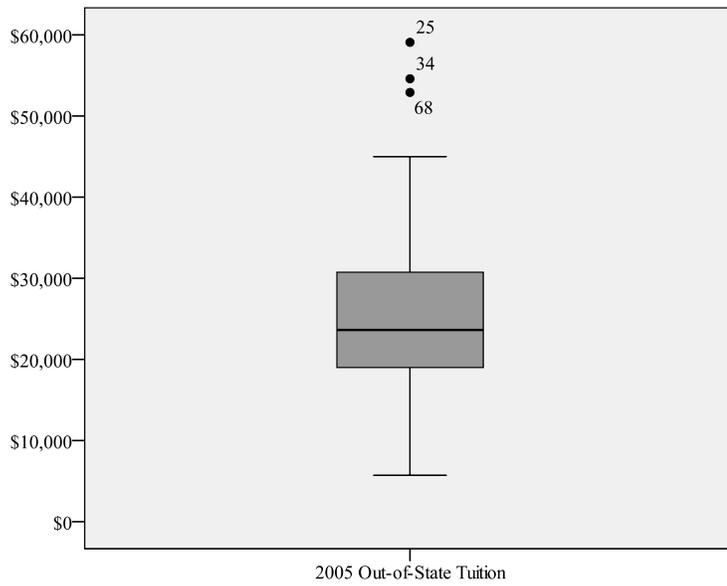
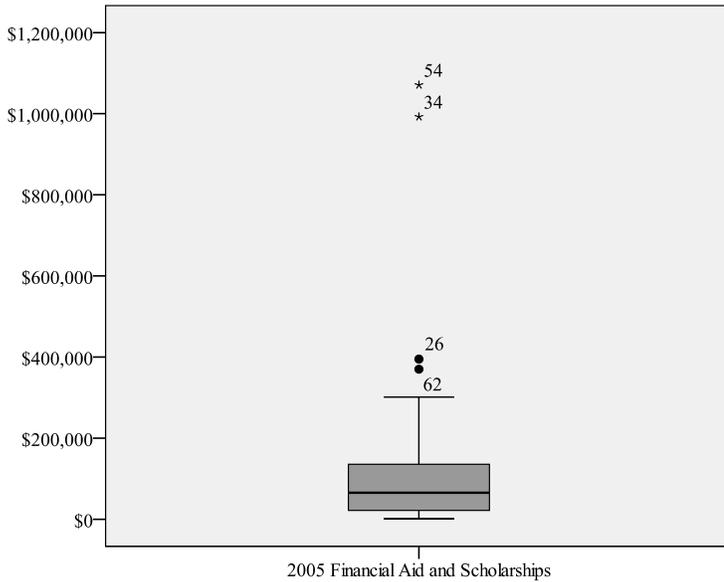


Figure 27. Financial aid and scholarships, 2005



Although all programs accredited by the American Library Association's Committee on Accreditation meet the *Standards*, there is a considerable diversity among programs. Individual institutions and programs establish their own admission requirements, which vary from program to program. Generally, programs require a bachelor's degree from a regionally accredited institution and a minimum grade point average of 3.0 on a 4.0 scale (or equivalent, e.g., B average). Many programs require Graduate Record Examination (GRE) scores; a few accept the Miller Analogies Test (MAT) or have no standardized test requirements. Students from outside the United States may be required to take The Test of English as a Foreign Language (TOEFL). Most programs request that students provide letters of recommendation and a statement of educational and professional objectives. Some programs may also require a personal interview. Entering students may be required to demonstrate computer skills or successful completion of remedial computer courses early in the course of study.

Considerable variation exists in curricula offered by the programs, such as the number and types of required courses. The number of academic credit hours required for a master's degree also varies from 36 semester hours to 72 quarter hours. Some programs emphasize full-time studies, while others have a larger percentage of part-time students; however, most have an institutional time limit for completing a degree.

Many programs can be completed in one calendar year with full-time attendance; some require two academic years to complete. Programs requiring a thesis or practicum may require more time to complete (ALA, 2008).

Each year, ALISE and the COA cooperate to collect statistical data from library and information studies programs. Programs are asked to supply data in the following areas:

- Faculty Part I - salary information, ethnicity;
- Faculty Part II - rank, years in service, highest degree completed;
- Students;
- Curriculum;
- Income and Expenditure; and,
- Continuing Education.

The purpose of the *ALISE Statistical Report and Database* is to compile, analyze, interpret, and report statistical (and other descriptive) information about library and information science programs offered by schools that are members of ALISE and offering the ALA-accredited master's degree. The statistical report is published by ALISE as a service to the Association membership. A statistical database is produced as a means of collecting the data systematically and making it available to researchers and

administrators in an easily manipulated format. Together, the report and database support the mission and goals of ALISE by providing empirical data on the state of LIS education in member schools and by documenting trends in faculty staffing, student populations, curriculum change, funding, continuing education, and other aspects of LIS education (ALISE, 2008). All data are from ALA – accredited program in Library Science (LS). While data exist for other types of library programs, I am primarily interested in the accredited programs.

Research Questions

1. Is there a statistically significant main effect of time and student group (White, students of color) on proportion of the graduating class, on productivity rates, and on retention? Is there a statistically significant interaction between time and group?
2. Do institutional factors (cost of attendance, financial aid allocation, size of program) have a statistically significant relationship with retention and productivity rates of domestic students of color? Does that relationship differ for students of color compared to white students?

Variables

The dependent variables for this study were productivity rates and retention rates. The dependent variable data were collected from the ALISE database of aggregate data from ALA accredited library programs. Dependent variables are the “variable(s) that the independent variable is presumed to effect” (Fraenkel & Wallen, 2003, p. 43). The independent variables, “those that the researcher chooses to study in order to assess

their possible effect(s) on one or more other variables” (p. 43) are institutional factors such as cost of attendance, scholarship and fellowship aid, and size of program.

Definitions of Operational Variables

Cost of Attendance: Total cost to receive the full MLIS degree.

Scholarship and Fellowship Aid: Total value of scholarships and fellowships awarded by fiscal year. Includes awards administered directly through the school of library and information science, federal funds, awards made through the parent institution’s funds, and awards made through the schools but from non-federal sources (such as the H. W. Wilson awards and tuition waivers). Excludes awards made directly to students from outside sources, assistantships, and work/study awards.

Size of Program: Number of students matriculating identified by the program as American Indian, Asian or Pacific Islander, Black, Hispanic, or White.

Productivity Rating: The number of degrees awarded divided by the number of students enrolled.

Proportion of Students of Color in Graduating Class: The number of students of color receiving a degree divided by the total number of degrees.

Proportion of White Students in Graduating Class: The number of White students receiving a degree divided by the total number of degrees awarded.

Retention Rate: Calculated for White students and students of color by dividing the number of White or students of color enrolled next year by the number of White or students of color enrolled this year.

Data Collection Procedures

Data were collected for the years 1985, 1990, 1995, 2000, 2001, 2002, 2003, 2004, and 2005 from ALISE. The following tables are from the annual ALISE report:

1. Degrees and Certificates Awarded by Gender and Ethnic Origin, Master's – LS (ALA – accredited): Table II-3-c-2-LS
2. Enrollment (Number) by Gender by Full-time and Part-time Status, Master's – LS (ALA – accredited): Table II-1-c-2a-LS and
3. Enrollment by Gender and Ethnic Origin, Master's – LS (ALA - accredited): Table II-4-c-2-LS
4. Total Faculty Full-time and Part-time by Number and FTE: I41 and I43
5. Tuition: II-13-c-s-LS
6. Scholarship and Fellowship Aid, Master's – LS (ALA – accredited): Table II-11-c-2-LS
7. Scholarship and Fellowship Aid Available to Part-time Students, Master's – LS (ALA – accredited): Table II-11-a-2
8. Assistantships, Master's – LS (ALA – accredited): Table II-12-c-2-LS
9. Assistantships Available to Part-time Students, Master's – LS (ALA – accredited): Table II-12-a-2
10. Assistantships by Gender, Master's – LS (ALA – accredited): II-12-c-2-LS
11. Total Program/College Income: IV-19
12. Total Program/College Expense: IV – 20
13. Total Program/College Expense for Student Aid: IV – 20

The following variables were calculated by the researcher:

1. Productivity Rates
2. Proportion of White and domestic students of color of Total Enrollment
3. Retention Rates

Data entry was completed by the researcher with assistance from a paid assistant.

The data arrived from ALISE as paper copies of the tables requested. The researcher and the assistant each entered pieces of the data manually into Excel. The Excel spreadsheet was then downloaded into SPSS and saved as a SPSS data file.

Data Analysis Procedures

In order to better understand the history of library programs, descriptive analyses of library programs and students were undertaken. Numbers of students, numbers of graduates, size of faculty, tuition rates, and amount of financial aid and scholarships were analyzed to provide a description of how library education has changed over the years.

Next, a series of repeated measures analysis of variance (ANOVA) was completed to determine differences, if any, between White students and students of color (SOC) in productivity rating, retention, and proportional representation rates over time.

Finally, the data were analyzed using meta-regression to determine if institutional variables were predictive of retention in the programs. A meta-regression synthesizes summary data from several studies, or in this case, reports from multiple schools over multiple years. In the case of this dissertation, the summary data were retention rates and productivity rates from the ALA-accredited library schools. If the effect size is consistent across all programs, then the meta-regression yields a combined effect that is

more precise than any of the separate estimates and also allows us to conclude that the effect is robust across the kinds of programs sampled. If, however, the effect size varies from one study to the next, the meta-regression may allow us to identify the reason for the variation and report that the independent variables are more effective in a particular kind of program (Borenstein, Hedges, Higgins, & Rothstein, 2007).

The meta-regression analysis consisted of the following steps:

1. Effect size adjustments.
2. Analyzing the effect size mean and distribution.
3. Analysis of heterogeneity of the distribution of effect size.
4. Analysis of statistically dependent effect sizes.

The null hypotheses for the study are as follows:

1. There is no statistically significant difference in retention rates and productivity rates of White students and domestic students of color over time.
2. The institutional factors cost of attendance, financial aid allocation, and size of program have no effect on the productivity rates rate of domestic students of color.

Summary

The purpose of this chapter was to discuss the research methodology, data collection procedures, and describe the setting for this study. Data were collected from 60 library schools spanning 20 years to determine productivity rates, retention rates, and proportion of students in the graduating class for White students and students of color.

Beginning with ANOVAs, the study endeavored to determine if there were differences between White students and students of color over time for productivity rates, retention rates, and proportion of students in the graduating class for White students and students of color.

Finally, a meta-regression analysis was undertaken to determine if institutional factors can predict the retention of students of color. A meta-analysis that simultaneously examines multiple predictors of the relationship between two variables is called meta-regression. It is roughly analogous to linear regression but the unit of measurement is an aggregate reflecting a “study.” The independent variables are called moderator variables. That is, they are the variables you believe may predict the size of the effect. The dependent variable is the effects sizes that you are meta-analyzing.

Meta-analysis is the analysis of empirical analyses that attempts to integrate and explain the literature about some specific important parameter. Over the past two decades, meta-analysis has been extensively employed in psychological and educational research (Rosenthal, 1984; Hedges & Olkin, 1985). G. V. Glass is usually credited for the development of meta-analysis (Glass, 1976, 1978; Glass et al., 1981).

According to Stanley and Jarrell (1989), MRA provides a framework for quantitative surveys of the empirical literature, replication, and self-analysis. Literature reviews are essential for fast-growing fields of research. By summarizing past research, they provide coherence to the divergent views expressed about a subject, and they can lead researchers towards the more fruitful questions remaining.

CHAPTER FOUR

Results

Like all academic programs, library science programs want to retain and graduate students. However, no examination of institutional factors that may contribute to the retention and productivity rates of students of color has been conducted. Such analysis will provide insights into institutional practices that will contribute to the retention of students. Understanding the differences between domestic students of color and White students as far as retention, productivity rating, impact of financial aid, and institutional characteristics will allow programs to better plan for all students and lessen attrition.

The objective of this chapter is to present the findings of the study. The results section will focus on enrollment behavior of domestic students of color over time, with a focus on graduation and productivity rates. However, productivity rate was not explicitly available as a variable in the database. Therefore, multiple computed measures were constructed. First, the number of degrees awarded was divided by the number of students enrolled to compute the *Productivity Rating*. Second, the number of students of color receiving a degree was divided by the total number of degrees awarded to compute the *Proportion of Students of Color in Graduating Class*. The *Proportion of White Students in Graduating Class* was calculated by dividing the total number of degrees awarded by the number of White students receiving a degree.

Next, *Productivity Rating* was calculated by taking the total number of degrees awarded to students of color and dividing by the number of students of color enrolled. This formula was duplicated for White students.

Finally, a *Retention Rate* was calculated for White students and students of color by dividing the number of White or students of color enrolled next year by the number of White or students of color enrolled this year.

Figures and tables, as well as narrative descriptions are included to convey findings of the study. The findings section of this chapter addresses the research questions for the ALA-accredited library schools used in the study. The research questions were:

1. Is there a statistically significant main effect of time and student group (White, students of color) on proportion of the graduating class, on productivity rating and on retention? Is there a statistically significant interaction between time and group?
2. Do institutional factors (cost of attendance, financial aid allocation, size of program) have a statistically significant relationship with retention and productivity rates of domestic students of color? Does that relationship differ for students of color compared to white students?

Findings Addressing Research Question 1

Proportional Representation by Student Group over Time (1985 – 2005). Several ANOVAs (analyses of variance) were conducted to compare the means of the two student groups (White students versus students of color) over time. The first analysis of the data was to determine if there was an interaction between time and student group (White and students of color) for proportional representation in the graduating class.

Since the data were longitudinal, repeated measures ANOVA was used. Data were available for 1985, 1990, 1995, 2000, and 2005. This analysis was conducted to assess whether the proportion of students of color in the graduating class changed from 1985 to 2005.

Sphericity is a critical assumption of repeated measures analysis of variance, which posits homogeneity of the variance of paired difference scores. Since the Greenhouse-Geisser epsilon values are greater than .70, we can assume that sphericity has not been violated. The Greenhouse-Geisser epsilon results were as follows (Table 2).

Table 2

Greenhouse-Geisser epsilon values for repeated measures analysis of student group proportion in graduating class by time (1985 – 2005)

Within Subjects Effect	Epsilon ^a Greenhouse-Geisser
group	1.000
time	0.896
group * time	0.782

A repeated-measures ANOVA, with sphericity assumed, indicated that proportional representation differed significantly between the groups, $F(1,36) = 430.75, p < .001, \eta^2 = .923$ (Table 3). Proportion by group of the graduating class also differed significantly over time, $F(4,144) = 6.33, p < .001, \eta^2 = .15$. Also, the interaction between group and time was statistically significant, $F(4,144) = 4.18, p < .003, \eta^2 = .104$. Table 4 provides the means and standard deviations by group by year. Since the interaction was significant, a follow-up analysis was conducted analyzing the trend over time for each student group separately. Results are presented graphically in Figure 28. A graphic

representation of the results show a statistically significant cubic contrast of time and a quadratic contrast of group and time. The proportional representation of White students enrolled in library schools has declined over the years, with a significant time main effect, $F(4,146) = 4.281$, $p < .004$, $\eta^2 = .097$ and enrollment of students of color was stable over time, with a nonsignificant main effect of time, $F(4,152) = .80$, $p = .457$, $\eta^2 = .021$.

Table 3

Repeated measures analysis of variance summary table—student group proportion in graduating class by time

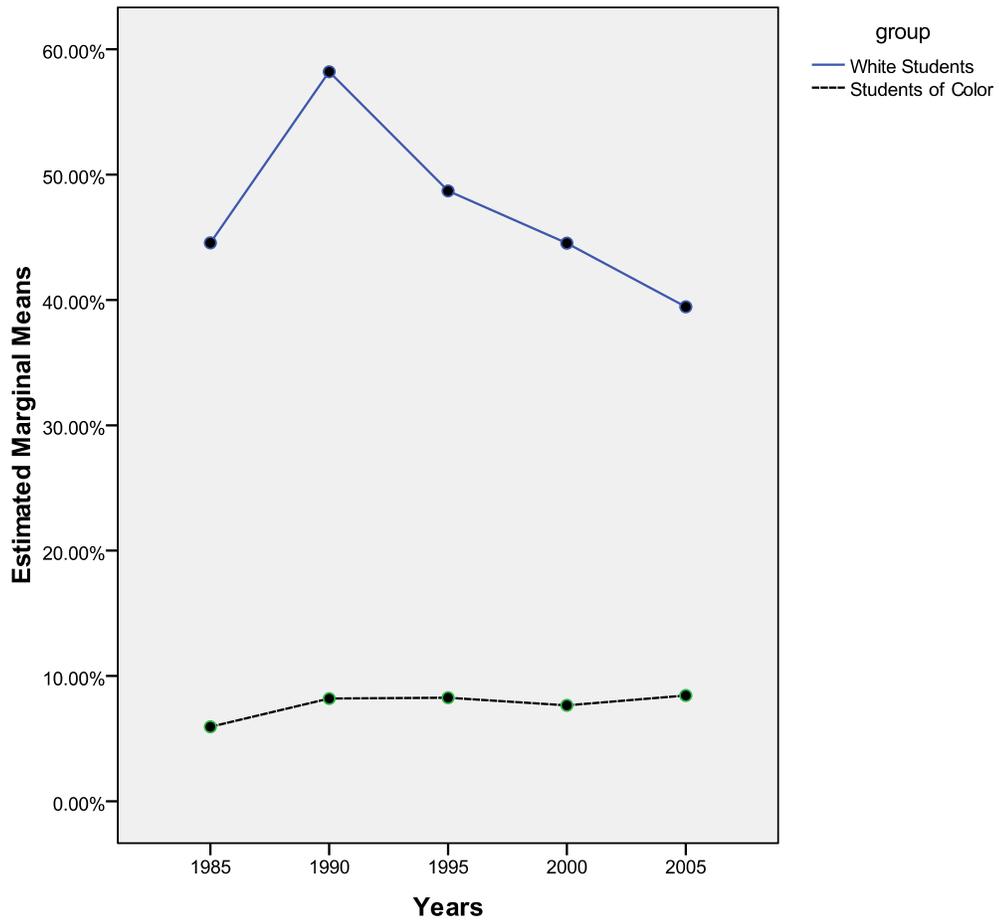
Source	Type III Sum of Squares	df	Mean Square	F	<i>p</i>	Partial Eta Squared
group	143483.92	1	143483.92	430.74	<.001	.923
Error	11991.76	36	333.10			
time	3927.63	4	981.91	6.32	<.001	.150
Error	22343.02	144	155.16			
group * time	3533.29	4	883.32	4.18	.003	.104
Error	30399.28	144	211.10			

Table 4

Means and standard deviations by year and student group for proportional representation in graduating class (1985 – 2005)

Year	Student Group	N	Mean %	Std. Deviation
1985	SOC	52	36.71	40.66
	White	53	46.47	32.69
1990	SOC	49	86.41	131.61
	White	48	60.19	22.54
1995	SOC	43	73.33	88.85
	White	42	47.69	21.16
2000	SOC	49	41.52	26.82
	White	50	46.59	24.87
2005	SOC	49	33.81	24.24
	White	48	40.89	47.84

Figure 28. Trend over time by group for proportion of graduating class



Productivity Rate over Time (1985 – 2005). Analysis of the interaction of time and group was undertaken to examine the productivity rates of students of color and White students. Data for the years 1995, 2000, and 2005 were used in this analysis because of aberrant data in years 1985 and 1990.

For this analysis productivity rate was calculated as the percentage of students graduating from each group, White or students of color, out of the total number of students matriculating: $\text{Productivity Rate} = \frac{\text{number of students graduating}}{\text{number of students enrolled}}$.

Sphericity was assumed in this analysis as the Greenhouse-Geiser epsilon values were greater than .70. The Greenhouse-Geisser results are presented in Table 5.

Table 5

Greenhouse-Geisser epsilon values for repeated measures analysis of graduation rate by time

Within Subjects Effect	Epsilon ^a Greenhouse-Geisser
group	1.000
time	0.789
group * time	0.731

A repeated-measures ANOVA, with sphericity assumed, indicated that productivity rate differed significantly by time, $F(2,76) = 4.18, p < .019, \eta^2 = .099$ (Table 6). Also, the interaction between group and time was statistically significant, $F(2,76) = 4.91, p < .01, \eta^2 = .115$. There was no significant difference by group. Table 7 provides the means and standard deviations by group by year.

Table 6

Repeated measures analysis of variance summary table—interaction of graduation rate and time

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
time	21575.05	2	10787.52	4.18	.019	.099
Error	195733.12	76	2575.43			
group	1348.32	1	1348.32	.58	.450	.015
Error	87959.13	38	2314.71			
time * group	18267.15	2	9133.57	4.91	.010	.115
Error	141182.95	76	1857.67			

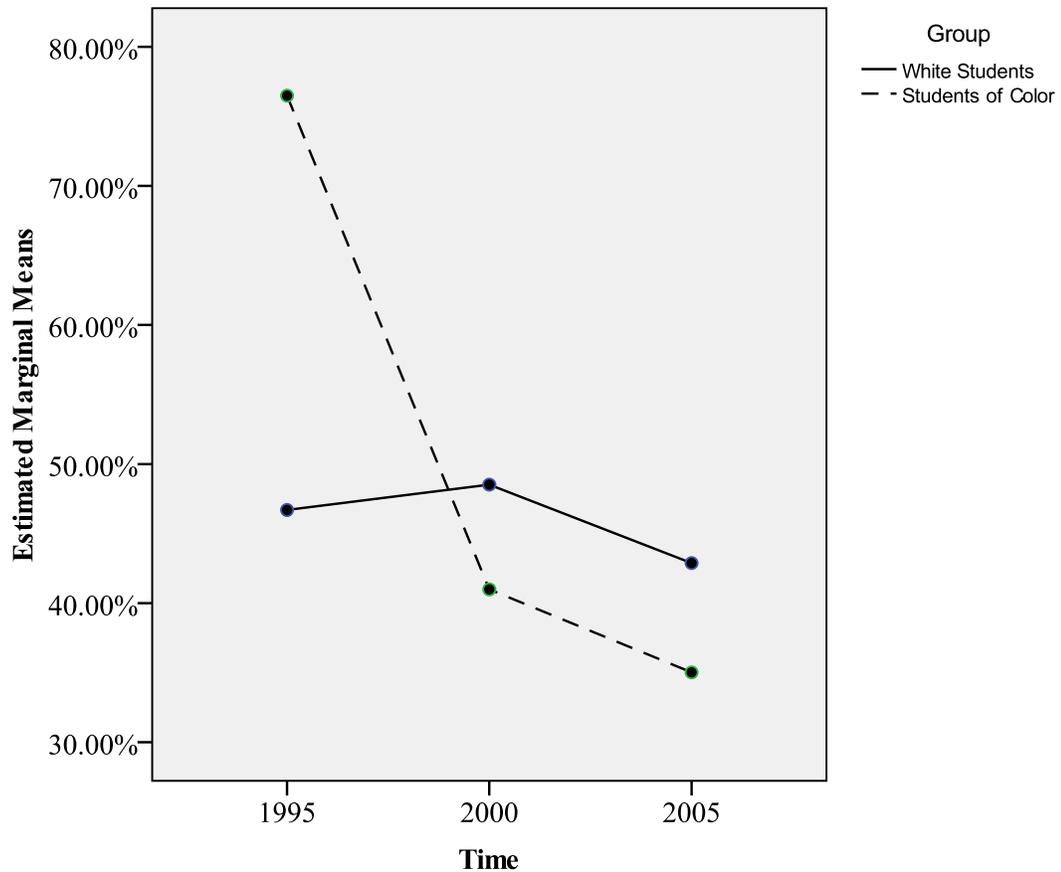
Table 7

Means and standard deviations by year and student group for productivity rate (1985 – 2005)

Year	Student Group	N	Mean %	Std. Deviation
1995	SOC	39	76.49	92.58
	White	39	46.70	19.01
2000	SOC	39	40.99	27.46
	White	39	48.52	27.75
2005	SOC	39	35.02	25.62
	White	39	42.88	52.69

Productivity rates for students in 1995, 2000, and 2005 revealed an unexpected finding. Students were graduating at less than expected rates. Weighting of the data by size of program had no effect on the results.

Figure 29. Trend over time by group for productivity rating (1995, 2000, 2005)



Follow-up analysis by a paired sample t-test revealed a significant difference in productivity rating for White students between 2000 and 2005, $t(53) = 2.717$, $p = .009$. There was no significant difference for White students between 1995 and 2000. Paired sample t-tests revealed that for students of color no significant difference in productivity rating for 1995 and 2000 and 2000 and 2005.

Proportional Representation by Time (2000-2005). In order to better understand what the data were indicating, a rethinking of the years of data used was undertaken. Concerns about the earliest years of data were that there was missing data, the

calculated productivity rates did not make sense in that they were extremely variable, and the variables available on the database did not allow computation explicitly tracking the same students. Therefore, in an attempt to compute a more precise value of proportional representation, data on students enrolled and graduating for the years 2001, 2002, 2003, and 2004 were added. It was reasoned that, while still flawed as a measure, comparing numbers of students to those enrolled from year to year might be more accurate.

A repeated measures ANOVA, using the Huynh-Feldt correction for violation of sphericity (Table 8), indicated that the proportion of graduating class differed significantly by group $F(1,43) = 80.09, p < .001, \eta^2 = .651$ (Table 9). There was no statistically significant effect of time or group x time. Means and standard deviations by group by time are provided in Table 10.

Table 8

Huynh-Feldt epsilon values for repeated measures analysis of student group proportion in graduating class by time

Within Subjects Effect	Epsilon ^a
	Huynh-Feldt
group	1.000
time	0.212
group * time	0.219

Table 9

Repeated measures analysis of variance summary table—student group proportion in graduating class by time

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Time	4420.26	1.06	4163.11	.99	.329	.023
Error	191190.31	45.65	4187.61			
Students	492427.84	1.00	492427.84	80.09	<.001	.651
Error	264355.31	43.00	6147.79			
Time *	3896.19	1.09	3563.15	.83	.375	.019
Students						
Error	200076.34	47.01	4255.21			

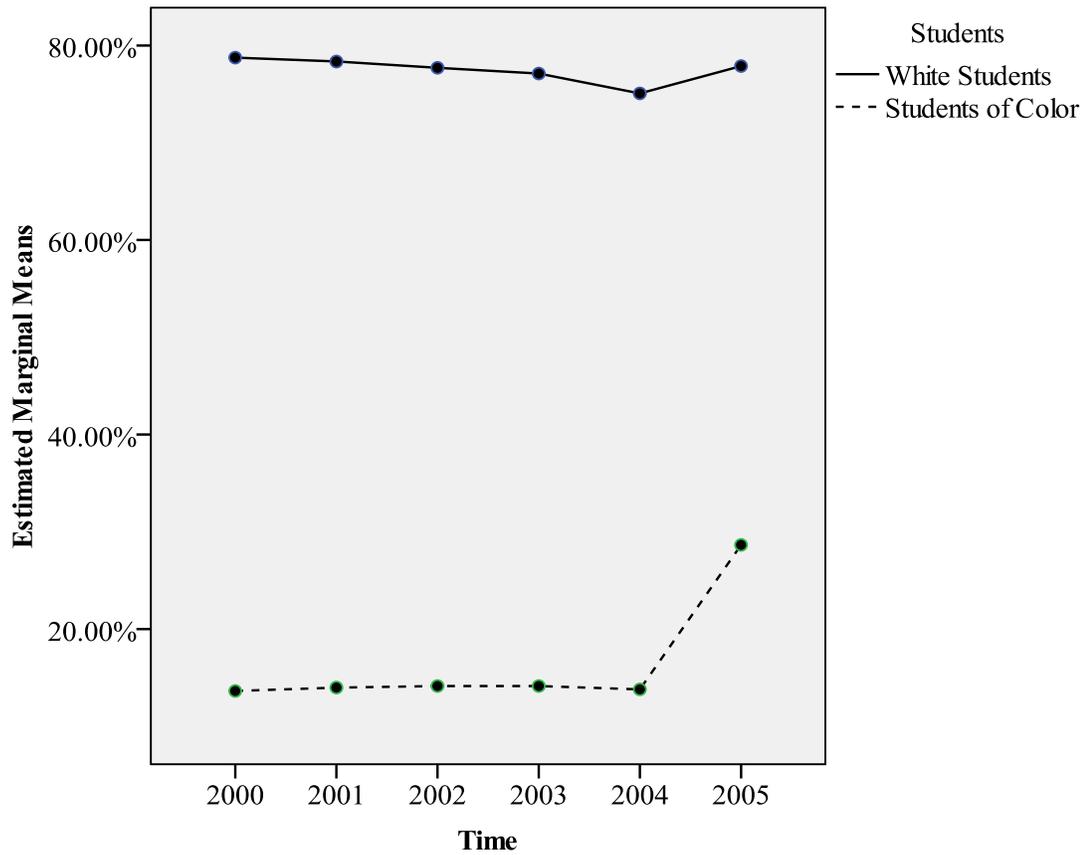
Table 10

Means and standard deviations by year and student group for proportional representation in graduating class (2000 – 2005)

Year	Student Group	N	Mean %	Std. Deviation
2000	SOC	44	13.64	17.6
	White	44	78.75	20.33
2001	SOC	44	13.99	18.83
	White	44	78.35	22.97
2002	SOC	44	14.15	18.46
	White	44	77.71	22.42
2003	SOC	44	14.16	16.89
	White	44	77.11	22.04
2004	SOC	44	13.81	15.62
	White	44	75.08	20.21
2005	SOC	44	28.66	110.74
	White	44	77.89	18.94

For White students the proportional representation was 77.48 while for students of color the proportional representation was 16.4. Figure 30 reports the trend over time by group for proportion of graduating class.

Figure 30. Trend over time by group for proportion of graduating class



Follow-up analysis on the students of color at years 2004 and 2005 determined the apparent increase seen in Figure 30 was not statistically significant. A paired sample t-test revealed no statistically significant difference between 2004 and 2005, $t(45) = -.976$, $p = .334$.

Student Group Productivity Rating over Time (2000-2005). As with the proportion of representation, re-evaluating the productivity rating for the years 2000 – 2005 was deemed appropriate to allow for a year-to-year comparison. Again, while not a true graduation rate, productivity rate comparisons year-to-year may yield more insight into student retention.

Since the Greenhouse-Geisser epsilon values were greater than .70, we can assume that sphericity was not violated (Table 11). A repeated-measures ANOVA, with sphericity assumed, indicated that graduation rate differed significantly over time, $F(4,172) = 2.85, p < .025, \eta^2 = .062$ (Table 12), with no statistically significant effects for group or group x time. Means and standard deviations by group by time are provided in Table 13. The effect size of time was medium and productivity ratings decreased over time.

Table 11

Greenhouse-Geisser epsilon values for repeated measures analysis of student group productivity rating by time

Within Subjects Effect	Epsilon ^a
	Greenhouse-Geisser
group	1.000
time	0.734
group * time	0.871

Table 12

Repeated measures analysis of variance summary table—student group productivity rating in graduating class by time

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Time	6065.72	4	1516.42	2.85	.025	.062
Error	91331.85	172	530.99			
Students	221.35	1	221.35	.89	.349	.020
Error	10606.87	43	246.67			
Time * Students	1370.62	4	342.66	1.11	.353	.025
Error	53036.61	172	308.35			

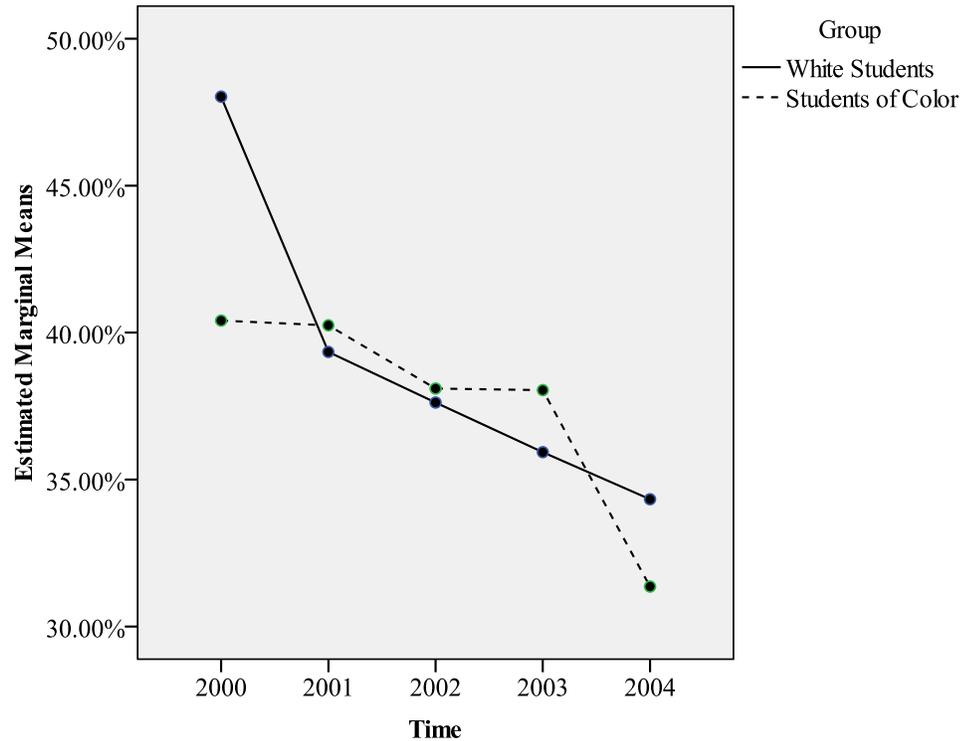
Table 13

Means and standard deviations by year and student group for student productivity rating (2000 – 2005)

Year	Student Group	N	Mean %	Std. Deviation
2000	SOC	44	40.41	24.37
	White	44	48.03	25.42
2001	SOC	44	40.25	24.81
	White	44	39.34	11.57
2002	SOC	44	38.01	26.03
	White	44	37.62	10.99
2003	SOC	44	38.04	24.37
	White	44	35.93	14.89
2004	SOC	44	31.36	17.98
	White	44	34.33	14.58

Figure 31 shows a statistically significant linear contrast for time. Productivity ratings indicate a significant time main effect, $F(1,43) = 7.588, p < .009, \eta^2 = .150$.

Figure 31. Trend over time by group for productivity rating



Retention Rate by Time (2000-2004). By adding the data for the years 2001, 2002, 2003, and 2004, a more accurate retention rate could be calculated for 2000-2004. Because enrollment data are not yet available for 2006, a retention rate could not be calculated for 2005.

A repeated measures ANOVA, using the Huynh-Feldt correction for violation of sphericity (Table 14), indicated that the retention rate differed significantly by time $F(4,180) = 18.06, p < .001, \eta^2 = .286$ (Table 15). There was no statistically significant effect of group or group x time. Means and standard deviations by group by time are provided in Table 16. The effect size of time was large and retention rate decreased over time.

Table 14

Huynh-Feldt epsilon values for repeated measures analysis of retention rate by time

Within Subjects Effect	Epsilon ^a Huynh-Feldt
group	1.000
time	0.692
group * time	0.667

Table 15

Repeated measures analysis of variance summary table—student group proportion in graduating class by time

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Time	360331.68	2.76	130198.72	18.063	<.001	.286
Error	897688.47	124.54	7208.04			
Students	8332.02	1.00	8332.02	2.176	.147	.046
Error	172315.60	45.00	3829.23			
Time * Students	19223.71	2.66	7205.02	1.10	.348	.024
Error	786457.04	120.06	6550.29			

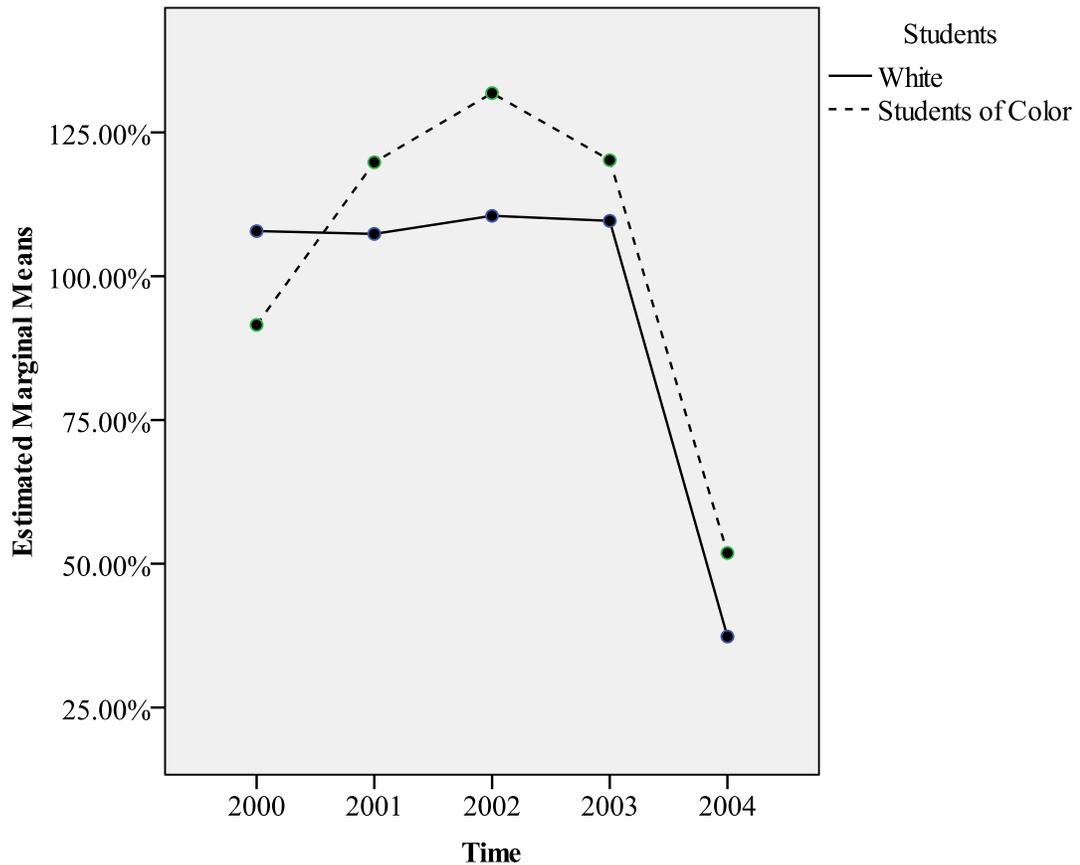
Table 16

Means and standard deviations by year and student group for retention (2000 – 2004)

Year	Student Group	N	Mean %	Std. Deviation
2000	SOC	46	91.54	41.54
	White	46	107.84	25.81
2001	SOC	46	119.79	53.78
	White	46	107.36	26.34
2002	SOC	46	131.83	145.19
	White	46	110.49	19.04
2003	SOC	46	120.18	63.24
	White	46	109.61	26.46
2004	SOC	46	51.86	113.22
	White	46	37.33	18.34

For White students the retention rate was 94.528 while for students of color the retention rate was 103.040. Possible explanations for a retention rate greater than 100% are that the formula does not take into consideration the variability in the time it takes students to complete a program of study. For instance, part-time students take longer to complete their degree than full-time students. Programs may have differing time limits to degree. Some programs may have a two year limit while others have five. Also, programs that are growing in enrollments may have higher retention rates because of the addition of greater numbers of students. A graphic representation of the results show a statistically significant linear, quadratic, and cubic contrast for time. Figure 32 reports the trend over time by group for retention rate.

Figure 32. Trend over time by group for retention rate



Follow-up analysis of the retention rate for students of color at 2003 and 2004 determined the decrease seen in Figure 32 was statistically significant. A paired sample t-test revealed a significant difference, $t(46) = 3.386, p < .001$. The retention rates for White students at years 2003 and 2004 were also analyzed. A paired sample t-test revealed a significant difference between 2003 and 2004, $t(46) = 13.278, p < .001$. Finally, a t-test revealed no significant difference between the retention rates of White students and students of color in 2004, $t(47) = -.921, p = .362$.

Findings Addressing Research Question 2

Retention Rates by Student Group over Time (2000 – 2004). Table 17 shows the meta-regression results of the model where the dependent variable is retention rate, with a sample size of 49, and cost of attendance (tuition), scholarship and fellow aid (fin aid), and school size (size) are the independent variables. The model with the combined effects of the three independent variables was significant for students of color in 2002, $R^2 = .21$, $p < .01$. For the nonsignificant regressions, R^2 ranged from .00 to .11. Results indicate that for students of color, program size (size) in 2000 was significantly predictive of retention, $\beta = -.3067$, $p < .05$. Cost of attendance (tuition) was predictive of retention in 2002, $\beta = .4850$, $p < .01$, as was scholarship and fellowship aid (fin aid) in 2004, $\beta = -.3098$, $p < .05$. No variables were significantly predictive of retention for White students in any year.

These findings suggest that for White students, cost of attendance, scholarship and fellowship aid, and school size are not predictive of retention. For students of color, program size, cost of attendance, and scholarship and fellowship aid are predictive of retention.

Table 17

Meta-regression results for retention rates (2000-2004)

Variable	2000		2001		2002		2003		2004	
	R ²	β	R ²	β	R ²	β	R ²	β	R ²	β
White Students	.00		.11		.00		.00		.04	
Tuition		-.05		-.28		-.07		.04		.01
Fin Aid		.03		.02		.00		-.05		-.18
Size		.07		-.09		.03		-.10		-.14
Students of Color	.08		.02		.21**		.01		.11	
Tuition		.05		-.08		.48**		.08		.06
Fin Aid		-.03		-.13		.11		-.06		-.30*
Size		-.30*		.04		-.14		-.05		-.27

*p < .05, **p < .01

Productivity Rates by Student Group over Time (2000 – 2005). Table 18 shows the meta-regression results of the model where the dependent variable is productivity rate, with a sample size of 49, and cost of attendance (tuition), scholarship and fellow aid (fin aid), and school size (size) are the independent variables. Three of the models were significant for White students. In 2001, $R^2 = .21$, $p < .01$, in 2002, $R^2 = .18$, $p < .05$, and in 2003, $R^2 = .16$, $p < .01$. Of the meta-regression models that were non-significant, R^2 ranged from .01 to .08. Results indicate that for White students in 2002 cost of attendance (tuition), $\beta = .4571$, $p < .01$, in 2003 scholarship and fellowship aid (fin aid), $\beta = -.3606$, $p < .01$, and scholarship and fellowship aid (fin aid) in 2004, $\beta = -.0351$, $p < .05$ were predictors of productivity rating.

For students of color, results indicate that no overall models were statistically significant; only scholarship and fellowship aid (fin aid) in 2005 were predictive of productivity, $\beta = -.3326$, $p < .05$. No other variables in any of the years studied showed any significant prediction of productivity rating for students of color.

These findings suggest that for White students, cost of attendance and scholarship and fellowship aid are predictive of productivity rating. For students of color, only scholarship and fellowship aid are predictive of productivity rating; however, the overall model for students of color was not significant.

Table 18

Meta-regression results for productivity rate (2000-2005)

Variable	2000		2001		2002		2003		2004		2005	
	R ²	β	R ²	β	R ²	β	R ²	β	R ²	β	R ²	β
White Students	.01		.21**		.18**		.16*		.03		.11	
Tuition		.04		.21		.45**		.21		.06		.13
Fin Aid		-.09		-.39		-.18		-.36**		-.17		-.35*
Size		-.10		-.28		-.14		-.01		.03		-.23
Students of Color	.02		.05		.01		.02		.08		.10	
Tuition		-.05		.15		.01		.05		-.13		.14
Fin Aid		.06		-.19		-.02		-.15		-.05		-.33*
Size		.16		-.03		-.11		-.10		.26		-.22

*p < .05, **p < .01

Summary

The purpose of this study was to identify whether cost of attendance, scholarship and fellowship aid, and size of program were statistically significant predictors of retention and productivity of graduate students of color in school of library and information science. Analyses were also run with White students in the same setting. The two research questions were (1) Is there a statistically significant main effect of time and student group (White, students of color) on proportion of the graduating class, on productivity rating and on retention? Is there a statistically significant interaction between time and group? (2) Do institutional factors (cost of attendance, financial aid allocation, size of program) have a statistically significant relationship with retention and productivity rates of domestic students of color? Does that relationship differ for students of color compared to white students?

To answer the first research question, multiple ANOVAs were run to determine if there were differences between White students and students of color in their proportion of participation in graduate schools of library science. Further, was there an effect of time? Results indicated that there was a statistically significant difference between the groups as far as proportional participation in programs. The results also indicated a significant relationship over time for proportional participation in programs. For White students, their proportional participation over time was significant in that it decreased over time, while for students of color, their proportional participation over time was stable.

Further analysis revealed a significant effect of time and time and group for both groups of students on productivity rating. There was no significant difference between the groups on productivity rating for the years 1985 – 2005. Productivity rating for all students was declining over the years. Follow-up analysis revealed a significant difference in productivity rating for White students in 2000 and 2005, with productivity decreasing over time, but no significant difference for students of color.

The years of data used for proportional participation was rethought. To allow a year-to-year comparison, data for the years 2001 to 2005 were added to the study. For the years 2000-2005, proportional participation analysis indicated a significant difference in representation by the groups, with a higher proportional participation of White students than of students of color. There was no statistically significant effect of time or group by time.

Since data for 2001 to 2005 were added, a re-analysis of productivity rating for 2000 – 2005 was warranted. Results indicated that productivity rate differed significantly over time with no statistically significant effects for group or group by time. The trend shows that the effect size of time was medium and productivity was decreasing over time.

By adding the data for the years 2001, 2002, 2003, and 2004, a more accurate retention rate could be calculated for 2000 to 2004. Because enrollment data are not yet available for 2006, a retention rate could not be calculated for 2005. A repeated measures ANOVA indicated that the retention rate differed significantly by time.

This means that retention rates for all students decreased over time. There was no statistically significant effect of time or group x time.

The final analyses were meta-regressions to determine if retention rate can be predicted by cost of attendance, scholarship and fellow aid, and program size. None of the overall meta-regression models were statistically significant. However, results indicated that for students of color, program size in 2000 was significantly predictive of retention, cost of attendance was predictive in 2002, and scholarship and fellowship aid was predictive of retention in 2004. No variables were significantly predictive for retention of White students.

The last analysis was to determine if productivity rate can be predicted by cost of attendance, scholarship and fellow aid, and program size. Results indicate that for White students in 2002 the cost of attendance was predictive of productivity rating. In 2003 scholarship and fellowship aid was predictive of productivity rate and in 2004, scholarship and fellowship aid was predictive of productivity rating.

For students of color, results indicate that only scholarship and fellowship aid in 2005 was predictive of productivity rate. No other variables in any of the years studied showed any significant prediction of productivity rating for students of color.

CHAPTER FIVE

Introduction

A great deal of attention has been focused on retention in higher education from researchers, policymakers, and practitioners. This may be attributed to institutional accountability and assessment of outcomes by external forces such as State governments and accrediting agencies (Cohen & Brawer, 1996). Of equal importance are the institutional costs associated with recruiting, admissions, advising, planning, and running graduate programs. Brooks-Leonard (1991) asserts that the high costs of recruitment are motivation enough to retain students. Tuition-driven institutions are especially cognizant of the costs of student attrition (Grossett, 1991). Rogers (1969) asserted that non-persisting doctoral students should be considered a failure of the department and the institution in either selection, in teaching, in faculty-student relationship, or in the continuity of the professional and academic climate. Additionally, student attrition removes financial support from incoming or persisting students as students depart prior to graduation. Also, high attrition rates are a poor reflection on the department, college, and institution (Pauley, Cunningham, & Toth, 1999). All of these factors contribute to the need for institutions to retain students. An understanding of graduate student retention is directly relevant to the profession of librarianship because

of the compelling need to not only graduate students with the MLIS degree, but for the continuity of faculty able to teach these students.

Librarianship is a service profession with a long history of service to diverse patrons. Beginning in the early 1900s and continuing through the Civil Rights Act of 1964, libraries have been funded to ensure collections meet the needs of ethnic, disadvantaged, and underserved populations. Throughout this period, much progress in service to diverse patrons has been made. The profession has been less successful in the recruitment and retention of diverse librarians. The continuing demographic shift, with Black and Hispanic populations increasing and the White population decreasing, the need for qualified, diverse librarians is ever more prevalent. Will libraries be able to maintain a high level of service to increasingly diverse patrons?

Summary and Conclusions of the Study

The historical landscape of library schools since 1985 was described in this study. The intent of the study was to understand the changes that have occurred over the last 25 years in library programs as far as enrollment and diversity of students, number and ethnicity of the faculty, program income and expenses, cost of attendance, and scholarship and fellowship aid in an effort to better understand library programs granting the MLIS degree. The study also endeavored to identify institutional factors associated with the retention and productivity rates of White students and students of color in schools of library and information science. The study investigated aggregate data from 60 different library schools in the United States, Canada, and Puerto Rico. The study assessed the productivity and retention rates of White students and students

of color as it pertains to institutional factors, such as financial aid allocation, size of program, and cost of attendance. The specific goal was to determine which institutional factors were predictors of retention and productivity rates for students seeking the master's degree in library science. Identifying institutional factors that impact the retention of students of color in schools of library and information science may assist institutions in improving the retention rates of all students, not just domestic students of color.

The purpose of this study was to identify whether cost of attendance, scholarship and fellowship aid, and size of program were statistically significant predictors of retention and productivity of graduate students in schools of library and information science over the last two decades. Further, data from the study were used to describe library programs and how they have changed over the past 20 years. The two research questions were (1) Is there a statistically significant main effect of time and student group (White, students of color) on proportion of the graduating class, on productivity rating, and on retention? Is there a statistically significant interaction between time and group? (2) Do institutional factors (cost of attendance, financial aid allocation, size of program) have a statistically significant relationship with retention and productivity rates of domestic students of color? Does that relationship differ for students of color compared to White students?

These seemed to be reasonable questions to ask given the historical data available from accredited LIS programs. However, the data that have been collected for over 25 years does not allow for computation of true retention or graduation rates. Since the

data are not tracked by student, but by program, graduation and retention rates could not be determined accurately. Therefore, this researcher would not recommend further use of these data for retention or graduation rate studies. At any rate, analysis was undertaken with the data at hand to begin to try and understand retention and graduation rate at library schools.

To answer the first research question, multiple ANOVAs were run to determine if there were differences between White students and students of color in their proportion of participation in graduate schools of library science. Further, was there an effect of time? In 1985, 1990, 1995, 2000, and 2005, proportional representation of White students decreased. For students of color, proportional representation was stable during the same time period. Data for the years 2001 – 2004 were added and the analysis for proportional representation were redone. The results indicated a continued proportional representation of White students enrolling at a much higher rate than students of color. These findings support the report issued by the U.S. Bureau of the Census (2002, 2003) and data collected by the National Center of Education Statistics (2002, 2003, 2004). Students of color are clearly under-represented in ALA-accredited LIS programs. Data from the U.S. Census (2002, 2003) and the NCES (2002, 2003, 2004) support this finding in that because of lower participation rates by ethnic minorities in undergraduate programs, there are fewer students of color to enroll in graduate programs, as compared to White students. Therefore, fewer students of color are graduating from library programs.

Productivity ratings for 1985 – 2005 were analyzed. Aberrant data from 1985 and 1990 were removed from the analysis. Time and Group by Time yielded significant results. Results for 1995, 2000, and 2005 indicated that for White students, productivity rates were declining. For students of color, productivity rates were stable. Weighting of the data by the size of the program had no effect. By adding the data for the years 2001, 2002, 2003, and 2004, a more accurate productivity rate could be calculated for 2000-2005. Results of this analysis revealed a medium effect size of time with productivity rates for both groups declining over time. This result follows trends by undergraduate students as true graduation rates (productivity rates for this study) are dropping at the undergraduate level as well. Reasons for student attrition range from cost of program to external obligations, such as work and childcare.

Retention rates for 1985, 1990, and 1995 could not be calculated because enrollment data were not available for the intervening years. However, with the addition of data from 2001-2004, retention rates could be calculated for 2000 – 2004. A repeated measures ANOVA indicated that the retention rate differed significantly by time, with a small effect size. Retention rate initially increased over time, but is now decreasing. Retention rate for White students was 94.528% while the retention rate for students of color was 103.040%. Possible explanations for a retention rate greater than 100% are that the formula does not take into consideration the variability in the time it takes students to complete a program of study, part-time students take longer to complete their degree than full-time students. Programs may have differing time limits to degree. Some programs may have a two year limit while others have five. Programs that are

growing in enrollments may have higher retention rates because of the addition of greater numbers of students. Considering the literature on student departure, possible explanations for a decreasing retention rate may be cost of program and external factors, such as family obligations. Retention data from ACT (2009) indicates that fewer U.S. students are returning to the same school for their second year of college. The data show that only 66% of first-year college students returned to the same institution for their sophomore year in the 2007–2008 academic year, the lowest percentage since 1989. That figure is down from 68% in 2006–07 and from 69% in 2005–06. Like undergraduate students, graduate student retention is declining with no difference in the decline for White students compared to students of color.

The final analyses were meta-regressions to determine if retention and productivity rates can be predicted by cost of attendance, scholarship and fellow aid, and program size. Results indicated that for students of color, program size in 2000 was significantly predictive of retention, cost of attendance was predictive in 2002, and scholarship and fellowship aid was predictive of retention in 2004. No variables were significantly predictive for retention of White students.

The last analysis was to determine if productivity rate can be predicted by cost of attendance, scholarship and fellow aid, and program size. Results indicate that for White students in 2002, the cost of attendance was predictive of productivity rating. In 2003, scholarship and fellowship aid was predictive of productivity rate and in 2004, scholarship and fellowship aid was predictive of productivity rating.

For students of color, results indicate that only scholarship and fellowship aid in 2005 was predictive of productivity rate. No other variables in any of the years studied showed any significant prediction of productivity rating for students of color.

These findings support the literature on retention of graduate students. Hagedorn (1999) noted that finances or financial aid effect retention of female graduate students. Tam and Rousearu (2000) also found that availability of financial assistance was key to minority students applying to graduate school. Nora (1990) also found that financial aid was a significant factor in many retention studies, especially for graduate students, who have many responsibilities beyond the classroom; for example, children, jobs, and caretaker. Several studies (Cabrera, Stampen, & Hansen, 1990; Cabrera, Nora, & Castaneda, 1992) found that financial support from the institution was key to retentaining students of color. Further, Bentley and Berger (1998) concluded that financial support from the institution resulted in higher completion rates.

The cost of tuition as a predictor of retention and productivity goes hand-in-hand with scholarship and fellowship aid. Students who leave without completing their degrees are left with debt and unqualified for the job they want (AAUP, 2002; Lovitts & Nelson, 2000). Further, Pascarella and Terenzini (2005) and Schuh (2005) found that undergraduate students are relying on financial aid as the cost of attendance rises. High cost of attendance has been found to yield lower retention rates. Several other studies with undergraduates have supported the findings of higher cost equalling lower retention (Gilmore, 1991; St. John & Starkey, 1995; St. John, Cabrera, Nora, & Asker, 2000).

Size of program has not been studied per se. However, size of total institution has been studied at the undergraduate level. These studies have yielded mixed and often conflicting results. Some studies assert large institutions lead to attrition (Oseguera, 2005; Pascarella & Terenzini, 2005), while others have found institution size to not be predictive of retention (Ryan, 2004; Titus, 2004). Since size of a given program is under institutional control, it was selected as a predictor variable for this study. Results indicated that size of program was predictive of retention for students of color in 2000. Size of program, as analyzed in this study, is not a strong predictor of retention. As research on undergraduates found, this variable yielded mixed results.

The use of Swail's model as a theoretical framework for this study was intended to graphically represent what aspects of retention are under institutional control. This study confirmed that financial aid is a predictive factor for retention, as described in Swail's model. This study did not directly measure other aspects of Swail's model under institutional influence. For instance, faculty ethnicity would fall under the academic services piece of Swail's model, but was not able to be analyzed because of these data were confidential and so not available.

Discussion

Retention has been studied since the early 1960s. As Summerskil noted in 1962, there is no universal formula for calculating retention. That is true today. This lack of conformity makes retention research difficult. At the graduate level, there is no mandate by either the federal government or the ALA to report true retention rates. Further, a graduation rate is extremely difficult to quantify at the graduate level.

Undergraduate-serving institutions have a well-established process for determining graduation rate. No such process exists at the graduate level. Students must be tracked individually to determine graduation rate. This is simply not done, or is not reported, by graduate programs submitting data to national or program-specific accrediting agencies.

While ALA has made progress in collecting data that provide a historical and descriptive picture of library education, key indicators are not assessed. For instance, graduation rate, retention rate, financial aid, and part-time versus full-time enrollment are not reported by student or student group. Further, data on the allocation of scholarship and fellowship aid is not tracked by student, so determining allocation by ethnic group is impossible. This lack of data makes calculating precise retention and graduation rates for library students impossible. As important as retention of students of color is to the library profession, there is no systematic process for tracking program success in retaining and graduating students of color. Specific data points that must be collected by library programs, in addition to what already is collected, to enable research on retention and graduation are:

1. Full-time or part-time status by student;
2. Ethnicity, gender, age, marital status, children or not, working or not;
3. Scholarship and fellowship aid (program and institutional) allocation;
4. Amount of financial aid in the form of loans each student is accruing;
5. Calculate retention each year;
6. Drop-out versus stop-out status of students clearly defined;
7. Calculate graduation each year;

8. Track advisors by ethnicity and gender to determine if matching works; and,
9. Track students by program delivery (on campus, on-line, cohort, mixed).

Programs are also not required to report admission data. Acceptance rates by student, so that participation by students of color can be tracked, would be helpful. We know from this study that proportional participation in graduate programs of library science by students of color is significantly less than that of White students. Is this because students of color are not being admitted at the same rate as White students or are not applying at the same rate? How many students of color are denied admission and why? Just as Roach (1999) noted, through purposeful admission policies, programs could ensure a critical mass of minority students to form support communities.

Programs should also consider how scholarship and fellowship aid is allocated to students. How can programs allocate these funds to ensure retention of all students? Partnering with community organizations to locate qualified students is a great way to increase the pool of students of color. Locate grant opportunities to fund students. Use retention and graduation rates to recruit new students of color by advertise program success in this area. Think carefully about advisor assignment. Does matching work for your program? Follow-up with students to ensure they are receiving quality advising and mentoring. Evaluate size of program via assessment techniques to determine what size program fits your institution and faculty. Is the student to faculty ratio conducive to high quality advising and mentoring? Is program scholarship and fellowship aid robust enough for the number of students? Finally, evaluate on-line, cohort, on-campus, and mixed delivery programs for retention and graduation rates. In

recent years, several library programs have initiated off-campus cohort and on-line programs. How do the retention and graduation rates of these students compare to on-campus students? There is no way to tell from the data presently available if a student is on-campus, in a cohort, or taking classes on-line.

The research on retention tells us that faculty play a positive role in the retention of students of color (Rinn, 1995; Rendon, 1992; Wyckoff, 1998; Scisney-Matlock & Matlock, 2001; Campbell & Campbell, 2007; Kuh, Pace, & Vesper, 1997; Stoez, 1989; Jack, Chubin, Porter, & Connolly, 1983; Berg and Ferber, 1983; Lewis, Ginsber, Davies, & Smith, 2004; Kobrak, 1992; Patterson-Stewart, Ritchie, & Sanders, 1997; Mayo, Murguia, & Padilla, 1995; Sedlacek, 1989; Johnson-Bailey, 2004). Having ethnicity data of faculty available for analysis would have made the study of retention and productivity rates of White students and students of color in library schools possible. As it is, the faculty role in retention cannot be evaluated because of the lack of data in this area.

ALISE collects the data from library schools each year. Until 2008, the data were submitted on Word® tables from the programs. Then, the data are re-entered by someone (graduate students?) into Excel® or some other program for analysis. This repeated entry of data makes error likely. ALISE needs to devise a system whereby program data are loaded directly into an online database for easier and more accurate analysis. For this study, photocopies of tables were accessed from archival materials for entry into a spreadsheet. Availability of a database would make research on library programs and students much easier. Suggestions for ALISE include:

1. Implement an on-line data-collection system;
2. Make data accessible to query, use IPEDS system as a model;
3. Include new data points suggested for library schools;
4. Digitize old data and make it available electronically;
5. Separate faculty ethnicity data from salary data; and,
6. Track data by student, not just by program.

Initiating such changes in data collection can only be mandated by the accrediting body, the ALA's COA. To that end, this researcher strongly recommends that the ALA include retention and graduation rates in accrediting decisions. If the library profession really wants to diversify its ranks, it must make retention and graduation of students of color a clear standard for accreditation and re-accreditation. It is only through mandating this criterion will real change occur in the profession.

Suggestions for Future Research

The findings of this study suggest a need for further research on the retention and productivity rates (graduation rate) of graduate students of color, utilizing longitudinal data, across several programs. Suggestions for future research topics include:

1. What institutional factors besides cost of program, scholarship and fellow aid, and program size effect the retention of graduate students of color?
2. Does institutional control play a role?
3. Does institutional type impact retention and graduation rate?
4. Does the theory that faculty ethnicity impacts retention hold true for master's level students as it does for doctoral students?

5. Are there other institutional variables (revenue, expense budgets, geographical location) that effect retention?
6. How does federal funding impact retention and graduation rates?
7. Follow-up with students of color who have left their programs. Why did they do so?
8. How readily do students of color who complete their program find employment?

Researchers should carefully consider their question(s) when utilizing data from ALISE. As this researcher found, there are limitations to what can be analyzed with the current data. However, the data that are available do provide a wealth of information to LIS and higher education researchers. The historical nature of the data makes it possible to look at trends in library education over time. The data could be analyzed for any number of research questions, as long as retention and graduation rates are not needed for analysis. Further investigation into Swail's model would be possible with the ALISE data by looking into the other factors outlined in the model. At any rate, the fact that the data exist is a testament to the positive intentions of the library profession.

APPENDICES

Appendix A

United States - Race and Hispanic Origin: 1950 to 2000

Census year	Total population	White	Black	Race			Hispanic origin (of any race)	White, not of Hispanic origin
				American Indian, Eskimo, and Aleut	Asian and Pacific Islander	Other race		
NUMBER								
2000	281,421,906	211,460,626	34,658,190	2,475,956	10,641,833		35,305,818	
1990	248,709,873	199,686,070	29,986,060	1,959,234	7,273,662	9,804,847	22,354,059	188,128,296
1980	226,545,805	188,371,622	26,495,025	1,420,400	3,500,439	6,758,319	14,608,673	180,256,366
1970	203,211,926	177,748,975	22,580,289	827,255	1,538,721	516,686	(NA)	(NA)
1960	179,323,175	158,831,732	18,871,831	551,669	980,337	87,606	(NA)	(NA)
1950	150,697,361	134,942,028	15,042,286	343,410	321,033	48,604	(NA)	(NA)
PERCENT								
2000	100.0							
1990	100.0	80.3	12.1	0.8	2.9	3.9	9.0	75.6
1980	100.0	83.1	11.7	0.6	1.5	3.0	6.4	79.6
1970	100.0	87.5	11.1	0.4	0.8	0.3	(NA)	(NA)
1960	100.0	88.6	10.5	0.3	0.5	-	(NA)	(NA)
1950	100.0	89.5	10.0	0.2	0.2	-	(NA)	(NA)

Appendix B
Listing of Accredited Library Schools and Years of Data Used in the Study

University	1985	1990	1995	2000	2005
University of Alabama	X	X	X	X	X
University of Albany, SUNY	X	X	X	X	X
University of Alberta	X	X	X	X	X
University of Arizona	X	X	X	X	X
Ball State	X				
Brigham Young	X	X			
University of British Columbia	X	X	X	X	X
University at Buffalo, SUNY	X	X	X	X	X
University of California Berkeley	X	X	X		
University of California at Los Angeles	X	X	X	X	X
Case Western	X				
The Catholic University of America Chicago	X	X	X	X	X
Clarion University of Pennsylvania	X	X	X	X	X
Clark Atlanta			X	X	X
Columbia	X	X			
Dalhousie University	X	X	X	X	X
University of Denver	X				
Dominican University				X	X
Drexel University	X	X	X	X	X
Emory	X				
Emporia State University		X	X	X	X
Florida State University	X	X	X	X	X
University of Hawaii at Manoa	X	X	X	X	X
University of Illinois at Urbana-Champaign	X	X	X	X	X
Indiana University	X	X	X	X	X
University of Iowa	X	X	X	X	X
Kent State University	X	X	X	X	X
University of Kentucky	X	X	X	X	X
Long Island University	X	X	X	X	X
Louisiana State University	X	X	X	X	X
University of Maryland	X	X	X	X	X

McGill University	X	X	X	X	X
University of Michigan	X	X	X	X	X
Minnesota	X				
University of Missouri-Columbia	X	X	X	X	X
Université de Montréal	X	X	X	X	X
North Carolina Central University	X	X	X	X	X
University of North Carolina, Chapel Hill	X	X	X	X	X
University of North Carolina at Greensboro	X	X	X	X	X
Northern Illinois	X				
University of North Texas	X	X	X	X	X
University of Oklahoma	X	X	X	X	X
Peabody	X				
University of Pittsburgh	X	X	X	X	X
Pratt Institute	X	X	X	X	X
University of Puerto Rico		X	X	X	X
Queens College	X	X	X	X	X
University of Rhode Island	X	X	X	X	X
Rosary	X	X	X		
Rutgers, the State University	X	X	X	X	X
St. John's University	X	X	X	X	X
San Jose State University	X	X	X	X	X
Simmons College	X	X	X	X	X
University of South Carolina	X	X	X	X	X
University of South Florida	X	X	X	X	X
Southern California	X				
Southern Connecticut State University	X	X	X	X	X
University of Southern Mississippi	X	X	X	X	X
Syracuse University	X	X	X	X	X
University of Tennessee	X	X	X	X	X
University of Texas at Austin	X	X	X	X	X
Texas Woman's University	X	X	X	X	X
University of Toronto	X	X	X	X	X
University of Washington	X	X	X	X	X
Wayne State University	X	X	X	X	X
University of Western Ontario	X	X	X	X	X

University of Wisconsin-Madison	X	X	X	X	X
University of Wisconsin-Milwaukee	X	X	X	X	X

Appendix C
ALA-accredited programs since 1925

Institution	Accreditation Period
Alabama, University of	1972/73 to present
Alabama Agricultural and Mechanical University (discontinued 1981)	1973/74 to August 1982
Alberta, University of	1968/69 to present
Arizona, University of	1972/73 to present
Atlanta University (see Clark Atlanta University)	1941/42 to June 1988
Ball State University (discontinued August 1985)	1978/79 to February 1987
Brigham Young University (discontinued August 1993)	1968/69 to February 1995
British Columbia, University of	1961/62 to present
California - Berkeley, University of	1924/25 to May 1994
California - Los Angeles, University of	1960/61 to present
Carnegie Institute of Technology (discontinued 1962)	1924/25 to 1962
Carnegie Library of Atlanta (transferred to Emory University 1930)	1924/25 to 1930
Case Western Reserve University (discontinued 1986)	1924/25 to December 1987
Catholic University of America	1946/47 to present
Chicago, University of (discontinued 1990)	1932/33 to December 1991
Clarion University of Pennsylvania	1974/75 to present
Clark Atlanta University (discontinued 2005)	1941/42 to May 2005
Columbia University (see also New York Public Library and New York State; discontinued June 1992)	1925/26 to December 1993
Dalhousie University	1970/71 to present
Denver, University of	1932/33 to February 1987; 2003/04 to present
Dominican University (formerly Rosary College)	1936/37 to February 1957; 1960/61 to present
Drexel University	1924/25 to present
Emory University (see also Carnegie Library of Atlanta; discontinued August 1988)	1928/29 to February 1990

Emporia State University	1930/31 to February 1958; 1964/65 to present
Florida State University	1951/52 to present
Hampton Institute (discontinued 1939)	1926/27 to 1940
Hawaii, University of	1965/66 to present
Illinois, University of	1924/25 to present
Indiana University	1951/52 to present
Iowa, University of	1969/70 to present
Kent State University	1961/62 to present
Kentucky, University of	1940/41 to present
Long Island University	1969/70 to present
Los Angeles Public Library (discontinued 1932)	1924/25 to 1933
Louisiana State University	1932/33 to present
McGill University	1927/28 to present
Maryland, University of	1965/66 to present
Marywood College	1944/45 to January 1956
Michigan, University of	1926/27 to present
Minnesota, University of (discontinued June 1985)	1933/34 to December 1986
Mississippi, University of (discontinued December 1984)	Summer 1979 to June 1986
Missouri-Columbia, University of	1967/68 to present
Montreal, University of	1967/68 to present
New Jersey College for Women (discontinued 1952)	1927/28 to 1953
New York - Albany, State University of	1930/31 to February 1959; 1965/66 to present
New York - Buffalo, State University of	1970/71 to present
New York - Geneseo, State University of (discontinued August 1983)	1944/45 to February 1959; 1966/67 to February 1985
New York Public Library (consolidated with New York State Library School and transferred to Columbia University in 1926)	1924/25 to 1926
North Carolina - Chapel Hill, University of	1932/33 to present
North Carolina College for Women (discontinued 1933)	1929/30 to 1934
North Carolina - Greensboro, University of	1980/81 to present
North Carolina Central University	1973/74 to present

North Texas, University of	1965/66 to present
Northern Illinois, University of (discontinued May 1994)	1967/68 to May 1994
Oklahoma, University of	1930/31 to present
Oregon, University of (discontinued August 1978)	1966/67 to January 1980
Our Lady of the Lake College	1941/42 to January 1957
Peabody College for Teachers, George (merged with Vanderbilt University 1979; discontinued in August 1988)	1930/31 to January 1990
Pittsburgh, University of	1962/63 to present
Pratt Institute	1924/25 to present
Puerto Rico, University of	1988/89 to present
Queens College, City University of New York	1968/69 to present
Rhode Island, University of	1969/70 to present
Rutgers University	1954/55 to present
College of St. Catherine	1929/30 to February 1959
St. John's University	1974/75 to present
St. Louis Library School (discontinued 1932)	1924/25 to 1933
San Jose State University	1967/68 to present
Simmons College	1924/25 to present
South Carolina, University of	1972/73 to present
South Florida, University of	1973/74 to present
Southern California, University of (discontinued 1986)	1936/37 to December 1987
Southern Connecticut State University	1970/71 to present
Southern Mississippi, University of	1978/79 to present
Syracuse University	1928/29 to present
Tennessee, University of	1972/73 to present
Texas - Austin, University of	1951/52 to present
Texas Woman's University	1936/37 to present
Toronto, University of	1935/36 to present
Vanderbilt University (see Peabody; discontinued August 1988)	1974/75 to February 1990
Valdosta State University	2006/2007 to present
Washington, University of	1924/25 to present
Wayne State University	1965/66 to present
Western Michigan University (discontinued 1983)	1946/47 to December 1984

Western Ontario, University of	1967/68 to present
College of William and Mary (discontinued 1948)	1936/37 to 1949
Wisconsin - Madison, University of	1924/25 to present
Wisconsin - Milwaukee, University of	1974/75 to present

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