
Institutional Characteristics and Student Retention: What Integrated Postsecondary Education Data Reveals About Online Learning

Edward T. Chiyaka

Kent State University
echiyaka@kent.edu

Alec Sithole

Missouri Western State University
asithole@missouriwestern.edu

Fidelis Manyanga

Salem State University
fmanyanga@salemstate.edu

Peter McCarthy

Lane College
pmccarthyorama@gmail.com

Brian K. Bucklein

Missouri Western State University
bbucklein@missouriwestern.edu

Abstract

Online course delivery continues to grow as a viable means of providing increased educational access to more students, but low student retention rates remain a major challenge. In this study, key institutional characteristics that influence student retention in postsecondary education are analyzed. These are student-faculty ratio, graduation rate, acceptance rate, enrollment rate, institutional aid rate, default rate, and institution type. Using multivariable regression analysis, our findings show that graduation rate, default rate, and college type were significantly associated with retention rate among online degree-granting institutions. Furthermore, graduation rate was found to be strongly positively linearly related with retention rate, while default rate was strongly negatively linearly related with retention rate. Overall these findings have direct implications on the planning and management of online instruction.

Introduction

Institutional characteristics play a central role in shaping the reputation of an institution, and in student retention and success. Understanding the influence of institutional characteristics such as student completion rates help administrators make decisions that enhance student success (Tinto, 2012) and retention. Increasing the student retention rate requires collective efforts. Angulo-Ruiz & Pergelova (2013) suggested that institutional factors have an effect on student retention and could also impact other institutional commitments. Druzdzel & Glymour (1995) tied student retention to institutional selectivity based on the average standardized test scores of incoming freshmen. Astin (1997) argued that institutional performance is a compound effect of both institutional performance and student inputs (high school grades, admission test scores, actual degree completion rates, and racial and gender diversity). However, assessing institutional effectiveness can be affected by other factors, such as an open-door admission policy and the mission of the institute (Bailey, Jenkins, & Leinbach, 2005). In their study, (Bailey et al., 2005) they identified student transfer to four-year institutions as one factor that is often erroneously

considered as an institutional failure when, in fact, it is an invalid relative measure of institutional effectiveness.

According to Belanger, Mount, & Wilson (2002), institutional “branding” is an important factor on student persistence, completion, and attrition. Braxton, Vesper, & Hossler (1995) identified students’ social and academic expectations during enrollment, and career development as major factors for student retention. Another dimension has been to use institutional database variables to determine institutional retention rates (Caison, 2007), and longitudinal studies of full-time student retention (Craig & Ward, 2008). Low student engagement has also been cited as having a negative effect on persistence and attrition (Crosling, Heagney, & Thomas, 2009; Flynn, 2014).

Instructional financial resources and library expenditures have been shown to have an impact on graduation rates (Hamrick, Schuh, & Shelley, 2004; Fung, 2010). In another study, institutional management, program alignment, and student support services were found to be major determinants of institutional effectiveness (Jenkins, 2007; Kuh, 2005; Morrison, 2012). Lau (2003) concluded that the success of any institutional retention program is ultimately dependent on the student’s motivation in the learning process. Longden (2006) acknowledged the impact of state policies on student retention and success. While this factor has an effect on how institutions operate, there is no empirical data to determine the magnitude of its impact on student success. Braxton & McClend (2001) and Marsh (2014) noted academic, institutional administration, student affairs, and enrollment and orientation practices as major factors for student retention. Wilkins & Huisman (2014) also found that personal relationships between alumni and the institution, heritage, and prestige play a constructive role in institutional image-building.

Most of these studies have focused on traditional students and colleges or a combination of traditional and nontraditional colleges. Some studies have looked at nontraditional students, who were defined as those older than 24 years, not living on-campus, or part-time students, or some combination of these factors. These students were shown not to be influenced only by the social environment of the institution but also by the institution’s academic offerings and range of courses, certifications, and degrees (Bean & Metzner, 1985). Students who enroll in online programs may require more support in the form of counseling from college administrators to help them realize their educational aspirations since non-school factors, like adjusting their work schedules and making adequate child care arrangements, may hinder their progress and may lead to school dropout (Rovai, 2003).

Several recent developments in higher education, including competition to attract and retain more students, are leading to administrators taking a greater interest in focusing on the important performance indicators of institutional outcomes, especially graduation and retention rates. As online education evolves dramatically, greater opportunities are presented for practitioners to personalize learners’ education and re-imagine learning in new and unique ways. However, online education continues to experience retention challenges (Bawa, 2016). An understanding of institutional factors that influence retention of non-traditional students may help administrators develop policies that help to mitigate the causes of student retention issues, which are hampering the growth of online education.

Purpose of the study

Different studies have looked at student retention focusing on traditional colleges, and the factors identified include institutional, academic preparedness, self-motivational, psychosocial, and financial aid issues (Angulo-Ruiz & Pergelova, 2013; Astin, 1997; Belanger et al., 2002; Fung, 2010; Lau, 2003; Webster & Showers, 2011). However, little research has been conducted that examines non-traditional students and institutions that offer undergraduate online degrees. The major goal of this study was to determine institutional characteristics that influence student retention among schools offering online postsecondary education. We analyzed multi-institutional data to determine how institutional factors such as institution type, student-to-faculty ratio, retention rates, acceptance rates, enrollment rates, institutional aid rates, and default rates impact institutional performance. Additionally, we also determined if these institutional characteristics differ by institution type. Having a better understanding of institutional factors that influence student retention rate may help these institutions to craft policies that seek to strengthen lagging areas in order to improve their student retention rates.

Methods

Data used in the study were obtained from the [Open Education Database Online](#) (OEDb, 2015), a publicly available database that ranks online colleges to enable institutional comparisons. The OEDb is an education directory for both free and for-credit online learning colleges. Institutions included in the rankings are degree-granting institutions offering fully online and mostly undergraduate programs and operating nationally in the United States. The OEDb online college inclusion criteria for colleges ranked were: (a) the college must be listed in College Navigator and/or IPEDS, (b) the online college must be accredited, (c) the college must offer at least one fully online or mostly online undergraduate degree-granting programs, and (d) the college must have at least half of its metrics available for ranking.

The metrics considered included student-to-faculty ratio, institution-based financial aid, acceptance rate, enrollment rate, retention rate, graduation rate, and default rate. Colleges and universities with less than two-thirds of its metrics available were excluded from the 2013-2014 final rankings and thus, a total of 325 online colleges were ranked for the years 2013-2014 and all these were included in the final analysis of this study. Additionally, the researchers used the [IPEDS database](#) to collect more data on college type and student population (IPEDS, 2015). All IPEDS information was reported by individual institutions during surveys.

Measures

Variables used in this study are retention rate, enrollment rate, acceptance rate, default rate, student-to-faculty ratio, institutional-based financial aid rate, graduation rate, and student population.

Retention rate: The percentage of first time bachelor's (or equivalent) degree-seeking undergraduates from previous academic year who enroll again in the following academic year (in the same institution). A college's retention rate reflects on its ability to provide a satisfactory learning experience for its students.

Enrollment rate: The fraction of admitted students who join the institution to total number of applications for admission is often used as a measure of the competitiveness, student success, and institutional prestige. A correlation analysis is performed to determine if this measure has an effect on student retention and completion.

Acceptance rate: Student selectivity as a fraction of admitted to the total freshmen applicants. It is important to determine how this measure would have an effect on student success versus open enrollment.

Default rate: The percentage of students who fail to remain current on their loans after completion is often thought to be a critical measure of institutional effectiveness. In the analysis, a statistical analysis is performed to determine the significance of its influence on student retention, enrollment, and acceptance rate in online institutions.

Student-to-faculty ratio: It is a proportion of the total number of students in the institution to the total number of full-time (FTE) faculty. Institutional ranking and the student choice of an institution are partly dependent on the student-faculty ratio. The IPEDS total number of FTE faculty was calculated as the total of the full-time headcount and one-third of the part-time headcount. The exclusion included part-time faculty teaching exclusively non-credit courses and teaching assistants and those faculty and students in stand-alone programs (OEDb, 2015).

Institution-based financial aid rate: It is the percentage of undergraduate students receiving financial aid during a given academic year directly from the institution they attend. This variable is often construed as a measure of institutional effectiveness.

Graduation rate: The percentage of enrolled undergraduate freshmen who complete their programs within 150% of the expected program completion time. This is used as an indicator of the prospects for student success and as an important factor in institution image-building.

Student population: It is the totality of students enrolled at a particular institution. Between 2013 and 2024, the total enrollment is projected to increase by about 9% and 15%, respectively, for male and female students in the US. It is important to understand whether total student population affects student retention rate, and how this differs across different institutional types.

Hypothesis

Considering the different institutional characteristics, which include student population, student-to-faculty ratio, graduation rate, retention rate, acceptance rate, enrollment rate, institutional aid rate, and default rate, the research hypotheses were (1) the institutional characteristics differ by institution type and (2) the institutional characteristics influence student retention rate.

Statistical Analyses

Assumption(s)

The data analysis for this study was performed using SAS software, version 9.3. It was assumed that all variances were normally distributed and *t*-tests were used to test for the difference between two means of public institutions versus private institutions for different institutional characteristics. Simple linear regression was used to analyze the relationship between retention rate (main outcome variable) and the different independent variables. Multivariable regression analysis was used to estimate the regression model after controlling for other confounding factors. The significance level used was $\alpha = 0.05$ for a two-tailed test with a 95% confidence interval (C.I.).

Results

The sample consisted of 325 online colleges, of which 90 were public institutions and the remainder were private institutions. Table 1 gives the summary characteristics of the sample. Student population is predominantly high in public institutions compared to private institutions. For each characteristic, the mean and the associated 95% confidence interval are provided for the overall sample and for the sample classified by online institution type. The, p-values based on t-tests are included in order to test for the difference in means.

Table 1: Descriptive Statistics Classified by Institutional Type

Variable	Total n=325	Public Institutions n=90	Private Institutions n=235	p-value
Student Population, mean (C.I.)	10,953.93 (8576.83 13331.03)	18,842.96 (15,511.04 22,174.88)	7,932.60 (4980.49 10884.71)	<.0001
Student-Faculty Ratio, mean (C.I.)	15.292 (14.706 15.878)	18.211 (17.415 19.008)	14.174 (13.472 14.877)	<.0001
Graduation Rate, mean (C.I.)	0.524 (0.505 0.542)	0.522 (0.486 0.559)	0.524 (0.503 0.545)	0.9374
Retention Rate, mean (C.I.)	0.735 (0.720 0.749)	0.763 (0.738 0.788)	0.724 (0.706 0.741)	0.0170
Acceptance Rate, mean (C.I.)	0.660 (0.636 0.684)	0.673 (0.640 0.706)	0.655 (0.623 0.686)	0.4319
Enrollment Rate, mean (C.I.)	0.356 (0.337 0.375)	0.400 (0.368 0.426)	0.337 (0.313 0.361)	0.0018
Institutional Aid Rate, mean (C.I.)	0.700 (0.665 0.735)	0.500 (0.446 0.551)	0.778 (0.738 0.817)	<.0001
Default Rate, mean (C.I.)	0.075 (0.069 0.081)	0.082 (0.072 0.092)	0.073 (0.066 0.080)	0.1766

A comparison of the means by institution type shows that student population, student-faculty ratio, retention rate, enrollment rate, and institutional aid rate are significantly different between public and private online institutions. From Table 1, above, public online colleges were more likely to have a higher student population, higher student-faculty ratio, higher retention rate, and higher enrollment. On the other hand, private institutions were more likely to have higher institutional aid rate (77.8% compared with 50% for public online colleges). No significant difference was noted between public and private online institutions for graduation rate, acceptance rate, or default rate.

Strength of Association - Correlation

Correlation analysis was used to quantify the association between variables. The Pearson’s Product Moment Correlation coefficient was used to test for the strength of association between retention rate and the following independent variables: student-to-faculty ratio, enrollment rate, institutional aid rate, default rate, and acceptance rate. Table 2 shows a summary of the results.

The results indicate that for online colleges, the student-to-faculty ratio, graduation rate, enrollment rate, acceptance rate, institutional aid rate, and default rate were significantly correlated to retention rate at the .05 level of significance. Graduation rate was highly positively correlated with retention rate while default rate was highly negatively correlated with retention rate. A weak negative correlation was established between retention rate and the other variables of interest: student-to-faculty ratio, acceptance rate, and enrollment rate. Thus, among the six different variables, graduation rate and default rate have been shown to be highly positively and negatively, respectively, correlated with retention rate.

Table 2: Correlation analysis among key variables

		Student Faculty Ratio	Graduation Rate	Acceptance Rate	Enrollment Rate	Institutional Aid Rate	Default Rate
Retention Rate	Pearson Correlation	-.125*	.699*	-.145*	-.239*	.202*	-.594*
	p-value	.027	<.0001	.017	<.0001	.0003	<.0001
*Correlation is significant at the 0.05 level.							

Regression Analysis

Univariate analysis was performed for potential determinants of student retention rate. A summary of the results is shown in Table 3. Univariate results indicate that student-faculty ratio, graduation rate, acceptance rate, enrollment rate, institutional aid rate, default rate, and college type are significant predictors of student retention rate. The coefficient of college type of -0.0394 (95% C.I. -0.0716 -0.0071) indicates that private online colleges and universities have higher retention rates than public online colleges. Also, the coefficient of graduation rate 0.5542 (95% C.I. 0.4906 0.6177) indicates that for every unit increase in graduation rate, retention rate will increase by about 55%. Negative regression coefficients show that for every unit increase in the factor, retention rate will decrease by the magnitude of the estimate. However, based on univariate regression analysis, an institution’s student population was found not to be a significant predictor of student retention.

Prior to running multiple linear regression analysis, multi-collinearity was checked among the independent variables. The variance inflation factor, which measures the impact of collinearity among variables in a regression model, was significantly less than 2.5 for all variables included. In addition, it was assumed that all variances were normally distributed. Multivariable analysis results are also shown in Table 3. After adjusting for other factors, student-faculty ratio, acceptance rate, enrollment rate, and institutional aid rate became non-significant ($p > 0.05$). All other variables, which include graduation rate, default rate, and college type, remained significant predictors in the model. Typically, according to Table 3, a unit increase in the graduation rate would result in an approximate increase of 52% in retention rate, while a unit increase in the default rate would result in about 37% decrease in retention rate. Additionally, public online colleges have a significantly higher retention rate when compared to private online colleges.

Table 3: Univariate and multivariable analysis for retention rate as the dependent variable

Variable	Univariate Regression Analysis		Multivariable Regression Analysis	
	Estimate (95% C.I.)	p-value	Estimate (95% C.I.)	p-value
Student-Faculty Ratio	-0.0031 (-0.0057 -0.0004)	0.0268	-0.0014 (-0.0038 0.0010)	0.2609
Graduation Rate	0.5542 (0.4906 0.6177)	<.0001	0.5162 (0.4413 0.5911)	<.0001
Acceptance Rate	-0.0709 (-0.1290 -0.0129)	0.0168	-0.0170 (-0.0541 0.0200)	0.3658
Enrollment Rate	-0.1522 (-0.2264 -0.0780)	<.0001	-0.0179 (-0.0731 0.0372)	0.5226
Institutional Aid Rate	0.0847 (0.0390 0.1304)	.0003	0.0114 (-0.0301 0.0529)	0.5893
Default Rate	-1.7232 (-2.0259 1.4205)	<.0001	-0.3664 (-0.6843 -0.0485)	0.0241
College Type	-0.0394 (-0.0716 -0.0071)	0.0170	-0.0424 (-0.0672 -0.0175)	0.0009

Discussion

Our study results reveal that retention rate was significantly associated with graduation rate, default rate, and college type. An increase in graduation rate will lead to an increase in retention rate, while an increase in default rate would lead to a decrease in retention rate. This means that online institutions that direct more effort towards addressing default and graduation rate are more likely to retain their students.

Our findings also suggest that other factors like student-faculty ratio, acceptance rate, enrollment rate, and institutional aid rate are not significant predictors of retention rate among online learning institutions. However, among traditional learning institutions, institutional aid has been reported to be a major factor for student retention (Gansemer-Topf & Schuh, 2005; Wilms, Moore, & Bolus, 1987) and thus, this result may reflect the differences in the retention dynamics between the two learning environments. Other differences, including student demographics (e.g., age, extracurricular activities, work and family responsibilities, and academic preparedness), expectations, and needs (Colorado & Eberle, 2010) could be major factors in the observed discrepancies among predictors of student retention between online and face-to-face learning environments. Harris and Martin (2012) reported that online courses mostly suit learners who intend to improve their knowledge retention, require an education program that fits their work and home obligations, and those that prefer customizable learning experiences (e.g., self-paced courses). A number of students who take online courses are mostly working learners that could be motivated by other factors other than financial aid (Colorado & Eberle, 2010). Thus, for online learning, the major issues affecting student persistence could be their learning experience and not the total number of students in class. While the student-faculty ratio plays substantial roles in encouraging persistence (Webster & Showers, 2011), our study showed a weak positive relationship with retention rate.

Our study results are in line with recent trends in the education sector. A higher default rate in student loan repayment has been shown to be associated with increased unemployment, lagging economy, rising college costs and student borrowing, and reduction in support from existing industry (Hillman, 2014). In private-for-profit colleges, student demographics and family financial resources have been reported to have an effect on the default rate (Darolia, 2013).

Recommendations

The uniqueness of predictors for online student retention indicates that efforts aimed at matching online with traditional course structures are unlikely to improve student retention rate. While online university retention rate data from US News focuses on loan default rates, loan repayment rates, and the retention rates among top online institutions, prospective online students focus on accreditation, faculty credentials, and prestige, among others considerations for enrolling. Success in online learning requires more

personalized teaching and evaluation techniques that contribute to better understanding of concepts taught. According to Bawa (2016), the online environment includes underprepared faculty that have little training on the rigor and expectations for online classes. There is a need to direct more effort towards collecting student entry and exit survey data. Such evidence-based data may help in identifying online learners with the highest risk of attrition.

Retention rate differences between private and public online colleges could be an indicator of the differences in faculty training and professional development in areas such as online delivery techniques. Institutionally, increasing and improving faculty, administrator, and staff development opportunities, support, and continuous training must be part of the agenda. Such initiatives can include peer mentoring programs, workshops, and partnership-building with existing professional online learning communities. A certification framework that lays out a consistent set of online teaching requirements should be one that is adaptive, and allows training of instructors in defined skills and knowledge.

Since the acceptance rate has a negative influence on student retention rate, online college administrators, particularly at institutions with high acceptance rates (but, with low retention and graduate rates), may need to focus more on the needs of online students if they are to increase their student retention rate. Where possible, exit interviews might be helpful in understanding the sources of dissatisfaction from the affected parties. Strategies need to be developed such that upon successful implementation, students' reflection should be able to critically evaluate their progress through self-awareness, and self-inspired improvement.

The strong negative linear relationship between retention and financial default rate may indicate that even among those colleges that have higher retention rates, administrators need to prioritize development of mechanisms that help to reduce the default rate. Based on the findings from Volkwein et al. (1998), student loan default was significantly dependent on the characteristics of the borrower (student). In that case, administrators of online colleges with high default rates need to integrate personal finance counseling or guidance into their orientation or induction programs. While it may be true that the majority of online learners are adult working students who may have stable jobs, young and unemployed individuals who enroll with online colleges would likely benefit from increased collaborations between online colleges and industry. We note that there are financial implications (which most online colleges would want to avoid) for implementing such initiatives. Nevertheless, the emerging trend of an increasingly younger population of students becoming online learners (Dabbagh, 2007) means they need assistance with securing jobs, career guidance, and personal financial management, among other issues, and should be part of the agenda for online colleges.

Collaboration between peer private and public online colleges could help to facilitate best practices in online instruction and coaching to increase the graduation and retention rates. While online colleges that seem to be succeeding may be reluctant to share their experiences with their peers, sharing student data and problems that impede student success would be beneficial to both students and all online colleges.

Conclusion

Results of this study show that there is a strong positive relationship between graduation and retention rates while a negative relationship between retention and default rates was established for both four-year colleges and universities offering online education. Additionally, student to faculty ratio was shown not to be a statistically significant predictor of online student retention unlike in traditional colleges (face-to-face) programs. Conversely, any factors that increase retention rates will also increase the graduation rates. Institutions offering online degree programs need to focus on programs that can help to lower institutional default rates, such as a freshmen finance guidance for all recipients of institutional financial aid. Finally, early student retention efforts and sufficient technical support for faculty could have a positive impact on student retention rate. Further research on the impact of student characteristics (factors), such as social and academic preparedness on retention rate, is recommended.

Limitation of the Study

Data Source: Data used in the study were obtained from the [Open Education Database](#) Online. This is a publicly available database that ranks online colleges to enable comparisons and does not reflect online universities and colleges of the entire world and their education systems. Additionally, based on the inclusion criteria, institutions included in the rankings are degree-granting institutions offering fully online and mostly undergraduate programs and operating nationally in the US. Therefore, there is no claim to suggest that the results of this study are generalizable to all colleges in the world.

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