



EVALUATING PERSISTENCE AND DROPOUT RELATIVE TO CRISIS OF ATTRITION AND SOCIAL ISOLATION IN AN UNDERGRADUATE PROGRAM



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DOI: <https://doi.org/10.29121/ijetmr.v8.i4.2021.929>

Article Citation: Richmond Adebiaye, and Theophilus Owusu. (2021). EVALUATING PERSISTENCE AND DROPOUT RELATIVE TO CRISIS OF ATTRITION AND SOCIAL ISOLATION IN AN UNDERGRADUATE PROGRAM. International Journal of Engineering Technologies and Management Research, 8(4), 94-99. <https://doi.org/10.29121/ijetmr.v8.i4.2021.929>

Published Date: 30 April 2021

Keywords:

Retention Ratio
Social Isolation
Attrition
Crisis of Attrition
Academic Success

ABSTRACT

This research examines the crises of attrition in the students' population and study programs using descriptive statistics interpretation for solving social isolation for traditional face-to-face classroom education. The study used a descriptive research design with 'variable values' to examine two-degree programs. The study used several testing methods to evaluate the statistical analysis of the social and academic characteristics of freshmen students in both the Informatics and Computer Science programs at the University of South Carolina Upstate from Fall 2018 to Fall 2019. The criterion variable was the student outcome (persistence or dropout), while the general structure matrix pattern was examined to validate the convergent factors. The methodology included a variance of the eigenfunction and values for interpreting the factor structure of the variable values. The findings suggest several mitigating factors which include improved persistence of "enrollment number, program delivery mode, GPA at time of completion and dropout, student orientation, and courses completed at the time of student dropout would help improve academic success for students.

1. INTRODUCTION

There is a 'plethora of research' about persistence in higher education (Cofer & Somers, 2001; Paulsen & St. John, 2002). However, there is a gap in research on the effect of risk factors of persistence, a hidden crisis of attrition, and social isolation among students and program of study in baccalaureate degree attainment (Adebiaye, 2016). While attrition rates in higher education are higher for first-year students (Bank et al, 2013), other researchers like Zavaleta, Samuel & Mills (2015) defined social isolation as the "inadequate quality and quantity of social relations with others at the different levels where human interaction takes place (individual, group, community, and the larger social environment)" (Pg.9). Ali and Leeds, (2009) defined retention as students "who progress from one part of the program to the next" (Pg.3). Ali and Leeds (2009) explain that this progression assumes the successful completion of the course of study that allows for movement into the next course in a sequence. The lack of retention, also called dropout, has always been a historical challenge. Attrition is a 'decrease in the number of students engaged in a course of study. Persistence refers to the act of "continuity in higher education; namely on-time completion of the degree"

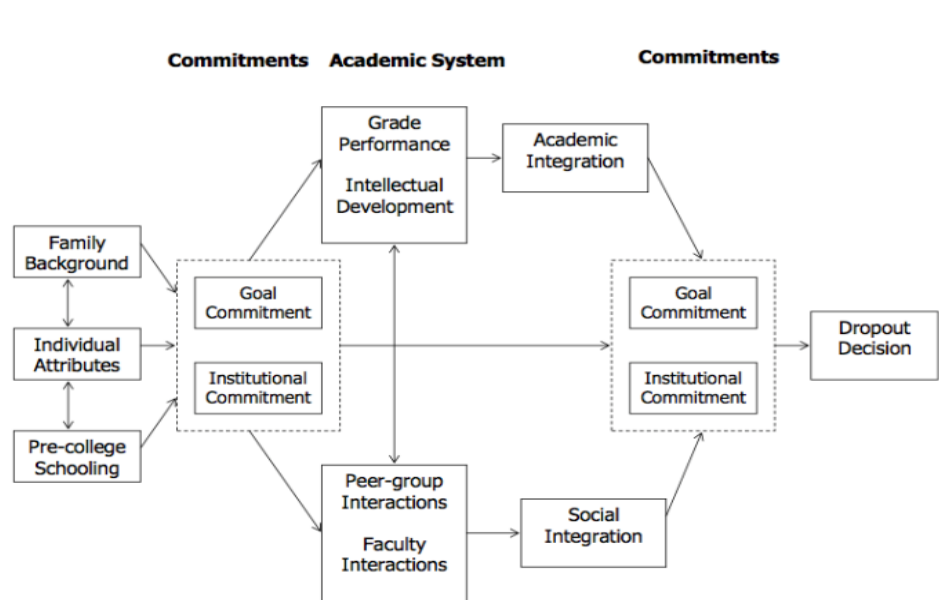
(Martinez, 2003). One major challenge of face-to-face learning is the lack of proper orientation and assimilation amongst students who first arrived at a higher institution. This gap usually results in a feeling of social isolation which ultimately affects their academic success. Since this study examines the effect of hidden attrition and social isolation, the study also ascertains the causes of isolation and feeling of isolation amongst new students that affect both their academic and college success.

2. RELATED WORKS

Reviewed literature revealed the numerous students' retention issues. McNeely (1938; 2008), showed how the first national retention study involving 25 universities revealed a 'dropout rate of 45%'. Gütl J. (2015) also identified rates of dropouts to be 35%-50%, while Tinto (1982; McMahon, 2013) had already confirmed earlier that student's dropout rates in traditional courses were constantly between 45%-55% over the last century (Pg.6). McMahon (2013) was more specific in their study showing an attrition rate of 80% from the year 2007-2013. A recent study from 2018-2019 showed incomplete rates of 17% in the face-to-face learning model (Mchahon, 2018). This satisfies the objective of this study as it relates to the first year of study. Similarly, Adamopoulos (2013) identified methods like "two-sample comparisons, simple cross-tabulations, logistic and linear regressions as well as Markov processes deployed to study the attrition rates (pg.6). Adamopoulos (2013) also referenced (Tinto, 1993) research on the positive impact of social life and its significance on attrition during the student's first year of study. Other researchers like Hortulanus et al., (2006) were more assertive that social isolation represents a lack of meaningful social contact among students and also between students and faculty members leading to issues affecting academic success.

3. PURPOSE OF THE STUDY

The purpose of this study is to identify factors for mitigating social isolation and crisis of attrition on undergraduate students in a face-to-face learning model. The finding in this study will contribute to the body of knowledge in identifying the problem associated with attrition and social isolation among students.



Tinto's Retention Model – A Conceptual Schema for Dropout from College (Tinto, 1993)

4. RESEARCH QUESTION

The specific question addressed in this study was - what impact do the hidden crisis of attrition, and social isolation have on the course retention rate in a face-to-face undergraduate program.

5. METHODOLOGY

The study used a survey methodology for data collection which included 45 completed response sets shared in order of the department's numbers. Bartlett's test of sphericity measure was used to test the appropriateness of factor analysis. Diaz, 2002, Reynolds & Weagley, 2003 measure of sampling adequacy (.935) and Mertler & Vannatta (2010) advanced and multivariate statistical methods were used. The test sphericity ($\chi^2 =$ returned '4694.87, $p = .000$ ') indicates the adequacy of the dataset for this purpose. Mcfadden & Patterson (2009) justified that the "measure of sampling adequacy (SA) for the two programs when greater than .90 is considered acceptable" (Pg.12). A construct validity test was conducted by allowing the questionnaires to be reviewed by a panel of tenured Professors with over 15 years of teaching. Finally, a reliability coefficient test was conducted to calculate the study instrument and its subscales, and the reliability of the instrument was found to be higher ($\alpha = .78$).

**Statistical Processes of Tables and Figures
Logistic Regression**

Table 1: Case Processing Summary: Hosmer and Lemeshow test

		Persistence = Persisters		Student persistence = Dropout		Total
		Observed	Expected	Observed	Expected	
Step 1	1	4	4.572	1	.428	5
	2	5	4.494	0	.506	5
	3	6	5.164	0	.836	6
	4	5	4.159	0	.841	5
	5	11	13.462	6	3.538	17
	6	5	4.149	1	1.851	6

Table 2: Data Showing Classification at the Freshmen Level

Course offered	2018 (actual expectancy)	2019
BS Computer Science	100%	33.33%
BS Informatics	100%	25%

Table 3: Regression Analysis

Anova ^b						
Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	1.222	2	.666	5.183	.020a
	Residual	6.515	51	.152		
	Total	7.737	53			
"a. Values Predictors - (Constant), GPA, last day of attendance) b. Dependent Variable: Student persistence"						

Statistical Analysis

The table represents the two-year options of (36/45 = 81.8%). This showed persistence for 2019, while 18.2% is for the predicted year of fall 2020. This is an indicator of the prediction probability of persistence to be greater. When other variables in the equation were studied, the result showed "the intercept-only model is in (odds) = - 1.504". The exponentiation of both sides of the above expression would provide a predictive odd of '[Exp (B)] = .222', representing the predicted odds 'persistence' of -1.255. Since 36 respondents showed a high persistence ratio and with only 8 dropping out, then the observed odd calculation resulted in 8/36 = 0.22, which confirmed our predictable ratio generated occurred in favor of persistence in classes. The study also used the "Omnibus Tests of Model Coefficients" which produced a Chi-Square ratio of 1.495 on df. Of 2. This indicates a statistical significance beyond .5. This is an indication that a 'Null-hypothesis' test reacted negatively to adding the year of admission variable. The result is an indication that no significant increase in the ability to predict the enrolment number was viable, hence not a significant factor with the result of $p > 0.05$ and the null hypothesis is rejected. When the model summary was calculated, we observe that the -2 Log-Likelihood statistics returned 40.33.

This statistically measured how poorly the model predicts the decisions - the smaller the statistics the better the model. The Cox & Snell R² was also tested and showed a result of (R²=0.031) but falls short of a maximum value of 1. The Nagelkerke R² when tested also showed a result of less than 1 (R²= .051). To accurately test whether the null hypothesis could have an inference in the prediction, the “Hosmer-Lemeshow” tests for the null hypothesis were used and the results showed the model fits perfectly with observed persistence. Research design showed how the cases are implemented according to their predicted probability of the criterion variable. ANOVA test was also conducted to test the significance of students’ persistence. The result showed students’ persistence of “ $F(2, 41) = 4.283, p = .02$ ”. This represents a non-significant factor. On the evaluation of the ‘last day of attendance’, the result showed a result of “ $B = .16, (p = .01)$ ”. Finally, a test GPA using a cross-tabulation of persistence indicates a result of (R=4.435) which represents a correlation factor, which also means a non-significant factor of $p = 0.22$.

6. RESULTS AND DISCUSSIONS

1) Effect of social isolation on students’ s performance resulting in drop-out?

The findings indicate that with $p > 0.05$ indexed variables of test for GPA characteristics, the effect was lesser on persistence. This provided insights into understanding other characteristics that are external to student and instructor that impact student’s dropout. The indexed percentage indication that social interaction amongst and between students could alleviate the problems of social isolation and represent a significant factor in the decision by students to dropout

2) Impact of the social, crisis of attrition and academic characteristics on retention

The reported test score of 18.18% of the ‘academic characteristics’ factor indicating a lack of interest from students as the reason for dropping out ultimately aligned with the recommendation by Rovai (2003) that “observed patterns of attrition attributed to factors that influenced any dropout decisions by the student. It is also an indication of dissatisfaction by students with the course structure, schedule, low confidence levels on courses and assignments.

3) Impact of classroom face-to-face learning methods on retention?

The face-to-face traditional method showed a result of 81.82% enrolment with strong persistence. This indicates strong retention numbers and a clear indicator that this learning “method has a positive effect on the retention of the students enrolled” (Yorke, M. (2014).

7. CONCLUSIONS

The study’s results showed that the attrition rate represents an important factor while the crisis of social isolation was found to be statistically significant in persistence for the two programs. However, when the logistic regression analyses were evaluated, there was no significant effect of social isolation which may have been due to the enrollment data and retention ratio on the two programs. It may also be due to the small number of samples tested. Notwithstanding, a binary logistic regression analysis showed a significant positive effect on attrition if the social isolation problems are mitigated. The data representing retention showed strong viability for a traditional face-to-face delivery method with high ratings for the two programs sampled. This suggests that attrition remained an issue and a major factor in this study. The findings showed the importance of academic, social, and oriented integration of freshmen compared to indexed by the variables of course structure, design, or finance or family issues having any form of “influence on the persistence of students” (Adebaiye, 2016). Finally, the results showed significant differences in the ratio of dropouts and persistence when comparing both programs. This reinforces findings that social isolation and the hidden crisis of attrition support strategies do lead to improved retention.

8. IMPLICATIONS AND RECOMMENDATIONS FOR FURTHER RESEARCH

It is pertinent to recognize the challenges of social isolation and crisis of attrition during the planning of programs and/or during freshmen enrollment the readiness of prospective students for higher education, social assimilation during pre-admission orientation or matriculation should be prioritized for an improved retention rate. Future research should include topics on social interaction and inclusions to enhance students’ retention. Other variables like extended family issues, student’s perception of higher education, demographic factors (distribution of respondents, socioeconomic characteristics, population, etc.) could have provided sustainable unbiased estimated

data to analyze the p-values and coefficients in regression analysis and recommended for future studies. It is also recommended that a further study be conducted to understand the characteristics that impact the attrition ratio in graduate programs.

SOURCES OF FUNDING

This research received no specific grant from any funding agency in the public, commercial, or not-for-profit sectors.

CONFLICT OF INTEREST

The author have declared that no competing interests exist.

ACKNOWLEDGMENT

None.

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