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An Inquiry into Relationships between Demographic Factors and Teaching, Social, and Cognitive Presence

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Abstract

One-third of all college students leave their institution after the first year. As exponential growth continues at online institutions of higher education, it is vital to uncover factors that contribute to student success and therefore impact persistence and matriculation. The Community of Inquiry framework includes three presences, teaching, cognitive, and social designed to assess the educational experience of the online learner. In this study, approximately 113,000 cases from a large national fully online university were examined to determine if student characteristics, e.g., student gender, ethnicity, and age, are a factor in the level of the three presences. Multiple semester sessions were analyzed across curricular areas. Results and recommendations are discussed.

KEY WORDS: Online learning; Retention; Higher Education; Gender Issues; Ethnic Membership; Adult Learners; Student Achievement

Introduction

Frustration is high at institutions of higher education as low levels of retention continue to plague these organizations. Students attend multiple institutions or choose to not persist in their goal of degree attainment as one-third of all college students leave their institution after the first year (Barefoot 2000; Marklein 2005; Kinzie 2009). Lack of academic preparation, deficiencies in support services, disconnection between students and faculty, and disengagement of students are all cited in the literature (Braxton 2000; Chickering and Gamson 1987; 1991; Kuh 2007; McCabe 2000; Tinto 1993; 2004) as reasons for students to become at risk of leaving college.

Undergraduate and graduate enrollment at both nonprofit and for-profit institutions of higher education in the area of online or distance learning has grown exponentially in the last decade. Annual figures from the 2008–2009 school year illustrate that since 2007, there has been a 17% increase in the number of students in postsecondary institutions taking an online course. Over 4.6 million individuals, or one in every four students, are opting to pursue higher education online (Greer 2010). Due to increased student enrollment, universities struggle with increased retention issues. Aragon and Johnson (2008) determined that attrition rates for online courses at some community colleges were 20% higher than face-to-face courses. Unfortunately, there is little research available concerning retention and best practices at fully online institutions. Additionally, little work exists about the online adult learner, yet there are institutions with a large majority of non-traditional learners. Further, studies focusing on student demographic characteristics as a factor in student engagement and retention are greatly needed.

Best practices for the traditional college classroom are not necessarily the same for online learning. Different eLearning and pedagogical models can assist educators and instructional

designers in creating, developing, and applying content and courses for students in online learning environments. One of the most recognized models of online learning, the Community of Inquiry (CoI) Framework, utilized by various institutions of higher education, educational leaders, and other organizations, provides explanation for best practices in online learning. Tested, validated, and used for development, instruction, assessment, and evaluation, the CoI guides practitioners in their creation and application of methods and tools to support student learning and add to opportunities for deeper engagement in the course, increased academic success, and continued persistence in education. Community is the foremost component of the CoI. Students who view themselves as part of a community of learners within the course, and, throughout the program, are more engaged as community is “an essential element in achieving the higher levels of learning associated with discourse and collaborative learning” (Ice and Kupczynski 2009, para 2).

Three main components, or presences, provide the structure of the CoI Framework: teaching, social, and cognitive (Garrison, Anderson, and Archer 2000; Swan et al. 2008). Design, facilitation, and direction laid out for the cognitive and social presences create the navigational map for a learner. The instructional elements of the teaching presence must connect the student meaningfully to learning outcomes. Activities within the course, the architectural framework of the discussion, and flow of facilitation, as well as contact with students through direct instruction, focusing, and resolving issues, complete the presence (Garrison, Anderson, and Archer 2000). Bush et al. (2010) determined that teaching presence is a significant factor in online and blended courses and that when teacher presence is low then student participation and satisfaction is low. Muilenburg and Berge (2005) reported a significant relationship between teacher presence and a student’s enthusiasm for the class.

Social presence is the degree to which participants in computer-mediated communication feel socially and emotionally connected (Garrison, Anderson, and Archer 2000, Swan et al. 2008). Social presence sets the climate of the learning environment and supports discourse about content between students (Garrison, Anderson, and Archer 2000). A product of the interaction between classmates, this presence builds on cognitive learning by encouraging discourse and critical thinking (Garrison, Anderson, and Archer 2000). Muilenburg and Berge (2005) found a strong correlation between social interaction in an online course and student enjoyment. Their study showed that the lack of social interaction within the online environment was a significant obstacle to the students’ satisfaction with the class, their efficacy in the class, and the probability of their enrolling in another online class (Muilenburg and Berge 2005).

Cognitive presence is the extent to which learners, through triggering events, exploration, integration, and resolution of ideas, can construct and confirm meaning in that which they learn. Additionally, reflection of content and discourse with fellow students and faculty on subject matter further scaffold learning (Garrison, Anderson, and Archer 2000; Swan et al. 2008). Cognitive presence focuses on selection of content as well as supporting discourse within the classroom. Aragon and Johnson (2008) state that effective online courses need to “address individual differences, motivate the student, avoid information overload, create a real-life context, encourage social interaction, provide hands-on activities, and encourage student reflection” (p. 155).

Theoretical Framework

As of May 2010, American Public University System (APUS) boasted the second-largest body of CoI survey data available, with the SUNY Learning Network having only a slightly larger data set. Housing of this data allows the institution to derive meaningful analyses and help improve programs moving forward. Within the data lies specific information concerning student demographics. From the CoI framework, a common measurement instrument was created to fully capture each of the presences (Arbaugh et al. 2008). This effort resulted in a 34-item measurement tool with statistically validated items that operationalize concepts in the CoI model. Student responses to statements about his or her online experience clustered around items as defined by the CoI framework theory. Utilized by institutions of higher education, the survey can provide detailed insight into student experiences as related to the three presences. Analyses of student demographic characteristic data as a factor of the presences may provide insight into student engagement of the creation of knowledge, and not just a collection of facts. As the institution from which the data was obtained includes a very large majority of non-traditional learners, investigation into the data may provide information yet to be fully reported in the literature and assist educational leaders in decision making. The purpose of the study was to determine if student demographic differences are a factor within the three CoI presences (teaching, cognitive, and social) at a large national fully online university.

Research Questions:

- (1) Is gender a factor in the level of the three Community of Inquiry (CoI) presences (teaching, cognitive, and social) for students enrolled at a large national fully online university?
- (2) Is ethnicity a factor in the level of the three CoI presences (teaching, cognitive, and social) for students enrolled at a large national fully online university?
- (3) Is age a factor in the level of the three CoI presences (teaching, cognitive, and social) for students enrolled at a large national fully online university?

Method

Data from 18 months of end of course surveys for both undergraduate and graduate courses was obtained for this study. Total cases selected for the study included 113,194 responses. The population included fully online learners at a large national for-profit online institution of higher education. The institution as a whole serves military, military affiliated, and civilian students with over 90% of students over the age of 24. Conversely, from most colleges in the U.S., males constitute a majority of students enrolled at the university (Braxton 2000; Nelson Laird et al. 2004).

American Public University System (APUS), founded in 1991, is an online, for-profit university. First created as American Military University (AMU) a second virtual university, American Public University, was added in 2002. Fully accredited under the Higher Learning Commission of the North Central Association (NCA), granted in May 2006, APUS serves the needs of military students, those in public service, and civilians alike. As of early 2010, APUS served over 60,000 students a day offering nearly 80 degrees. Students in 109 countries participate in courses that commence at the beginning of each month as either eight or 16-week courses. APUS offers certificates, Associate degrees, Bachelor degrees, and Master degrees.

Archival data were acquired from the APUS Office of Institutional Assessment through a request for data. Information requested was provided to the researchers through an Excel file for all end-of-course survey responses. Data sets were examined for integrity, resulting in the removal of 10,028 entries, leaving 103,166 data sets in the final analysis.

Data were analyzed in three separate linear regressions, using the forward method of entry. In the regressions, mean scores for aggregated Teaching, Social, and Cognitive Presence items served as the criterion variable. Predictor variables consisted of a binary variable representing gender, a binary variable representing traditional versus non-traditional status, and four dummy binary variables representing ethnicity (Caucasian, Hispanic, Black, and Asian). As the use of dummy variables is incompatible with analysis of variance (Field 2005), regression analysis was utilized with the assumption that heteroscedasticity would be an issue.

This use of a binary dependent variable with linear regression is supported in the literature even though it compromises the assumption that residuals are normally distributed about the predicted DV scores (Cohen et al. 2002). The number of subjects included in this study ($n = 103,166$) ensures adequate statistical power by far exceeding the minimally adequate sample sizes suggested by Green (1991). Multicollinearity is a limitation inherent in this study given the instances of high correlations among the predictor variables.

One significant advantage of using linear regression is that it provides a coefficient of determination. The term *coefficient of determination* refers to a statistic that defines the percentage of variance explained for by the predictor variables. For this reason, the coefficient of determination (expressed as *Adjusted R²* in regression) helps program directors and administrators decide how heavily to use the results in guiding their decision-making for programmatic improvement. Further, the forward method of entry was used to order predictor variables by their relative statistical significance and variance accounted for in the predictive model.

Results

Table 1. shows the number of students in each demographic category:

Table 1.
Student demographic frequencies

Student demographic variable	<i>n</i>
Gender	
Male	69,122
Female	34,044
Ethnicity	
Caucasian	76,343
Black	14,444

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Hispanic	10,316
Asian	2,063
Age status	
Non-traditional	89,755
Traditional	13,411

For the Teaching Presence subscale, the aggregate mean was 4.367 with a standard deviation of 0.806.

Forward method linear regression resulted in three of the variables being statistically significant predictors of the criterion variable (the aggregate mean of teaching presence indicators) (Table 2).

Table 2.

Forward method linear regression predictors of criterion variable: teacher presence

	Unstandardized coefficients		Standardized coefficients		
	B	SE	Beta	t	Sig.
Constant	4.403	0.006		729.790	0.000
Ethnicity—Caucasian	-0.096	0.006	-0.052	-16.840	0.000
Gender—Female	0.062	0.005	0.036	11.461	0.000
Traditional student status	-0.048	0.007	-0.020	-6.459	0.000

The relative contributions of each of the predictor variables to the significant predictive model are listed in the Model Summary below. The *Forward* method in SPSS enters predictor variables one by one in order of decreasing significance. Table 3, therefore, illustrates the changes in Adjusted R^2 , for the significant predictors of the criterion variable, as each variable is entered:

Table 3.
Adjusted R² for the predictors of the criterion variable: teaching presence

Model	R	R²	Adjusted R²	Standard error of the estimate	R² change
Ethnicity—Caucasian	0.050 ^a	0.003	0.003	0.8049280	0.003
Gender—Female	0.063 ^b	0.004	0.004	0.8043413	0.001
Traditional student status	0.066 ^c	0.004	0.004	0.8041826	0.000

For the Social Presence Subscale, the aggregate mean was 4.274 with a standard deviation of 0.682.

Forward method linear regression resulted in three of the variables being statistically significant predictors of the criterion variable (the aggregate mean of social presence indicators) (Table 4).

Table 4.
Forward method linear regression predictors of the criterion variable: social presence

	Unstandardized		Standardized		
	B	Std. error	Beta	T	Sig.
Constant	4.322	0.005		845.706	0.000
Ethnicity—Caucasian	-0.072	0.005	-0.046	-14.748	0.000
Traditional Student Status	-0.051	0.006	-0.025	-8.044	0.000
Gender—Female	0.017	0.005	0.012	3.827	0.000

The relative contributions of each of the predictor variables to the significant predictive model are listed in the Model Summary below. The *Forward* method in SPSS enters predictor variables one by one in order of decreasing significance. Table 5, therefore, illustrates the changes in Adjusted R², for the significant predictors of the criterion variable, as each variable is entered:

Table 5.
Adjusted R^2 for the predictors of the criterion variable: social presence

Model	R	R^2	Adjusted R^2	Standard error of the estimate	R^2 change
Ethnicity—Caucasian	0.045 ^a	0.002	0.002	0.6814105	0.002
Traditional student status	0.053 ^b	0.003	0.003	0.6811721	0.001
Gender—Female	0.054 ^c	0.003	0.003	0.6811270	0.000

For the Cognitive Presence subscale, the aggregate mean was 4.313 with a standard deviation of 0.704.

Forward method linear regression resulted in four of the variables being statistically significant predictors of the criterion variable (the aggregate mean of cognitive presence indicators) (Table 6).

Table 6.
Forward method linear regression predictors of the criterion variable: cognitive presence

	Unstandardized		Standardized		
	B	Std. error	Beta	t	Sig.
Constant	4.356	0.007		609.823	0.000
Ethnicity—Caucasian	-0.077	0.007	-0.048	-11.336	0.000
Traditional Student Status	-0.072	0.007	-0.035	-11.086	0.000
Gender—Female	0.040	0.005	0.026	8.415	0.000
Ethnicity—Black	-0.022	0.009	-0.011	-2.598	0.009

The relative contributions of each of the predictor variables to the significant predictive model are listed in the Model Summary below. The *Forward* method in SPSS enters predictor variables one by one in order of decreasing significance. Table 7, therefore, illustrates the changes in Adjusted R^2 , for the significant predictors of the criterion variable, as each variable is entered:

Table 7.
Adjusted R^2 for the predictors of the criterion variable: cognitive presence

Model	R	R^2	Adjusted R^2	Standard error of the estimate	R^2 change
Ethnicity—Caucasian	0.039 ^a	0.002	0.002	0.7030779	0.002
Traditional Student Status	0.054 ^b	0.003	0.003	0.7025856	0.001
Gender—Female	0.060 ^c	0.004	0.004	0.7023391	0.001
Ethnicity—Black	0.061 ^d	0.004	0.004	0.7023195	0.000

Scholarly Significance

Of all areas tested, analyses of the data showed a significant relationship between student demographics and CoI presences (social, teaching, and cognitive) in four areas. The variables of Ethnicity—Caucasian, Age—Traditional student status, Gender—Female, and Ethnicity—Black were significant. All other variables, Ethnicity—Hispanic, Ethnicity—Asian, Age—Non-traditional student status, and Gender—Male were found to have no significant relationship with CoI presences.

Specifically, for the Teacher Presence the variables of Ethnicity—Caucasian, Gender—Female, and Age—Traditional student status were found to be significant. The same three variables were determined to have a significant relationship for Social Presence. Lastly, for Cognitive Presence, there were four variables found to have a significant relationship: Ethnicity—Caucasian, Gender—Female, Age—traditional student status, and Ethnicity—Black.

However, the relevance of significance was limited since variance accounted for by the predictor variables was so small as to have no practical implication. Even though significance was found through analysis of the data in certain variables, though with a very small amount of variance accounted for in the predictor variables (student demographic characteristics), a theme that is so pervasive in the general literature is not significant in this study.

Review of the literature has shown that student demographics are a factor in a students' academic success. Engagement, satisfaction, and academic achievement, including persistence and matriculation, have been tied to certain student demographics, especially age, gender, and ethnicity (Astin 1993; Gonyea et al. 2006; Kuh 2007; Kuh et al. 2000; Pascarella and Terenzini 1991; 2005; Tinto 1993). The preponderance of the literature stems from research on traditional brick and mortar institutions. Whereas other colleges and universities, both two- and four-year, will report a relationship between academically purposeful activities, satisfaction, and engagement with some set of student demographic variables (i.e., NSSE and CCSSE survey results), there is no meaningful relationship between variables at this particular institution. This, in itself, is very significant. No demographic variable, within a large sample, was found to have a meaningful relationship to any of the three CoI presences, hence no connection to learning constructs and overall student satisfaction and engagement.

Further research is warranted to investigate these findings. Though the data were derived from a large sample and taken from the results of classes across curricula, recommendations for a

repeat of the study may be beneficial. If no further meaningful relationships can be found between student demographic characteristics and the three CoI presences, other factors would need to be examined. The prior study (Gibson, Kupczynski, and Ice 2010) testing the relationship between student demographics and end-of-course GPA at the same online institution also found no relationship. With demographic characteristics playing no role in end-of-course GPA or in satisfaction and learning constructs (i.e., CoI presences) perhaps curriculum and instruction, specifically the construct of the course and pedagogical and androgogical methods employed, may be a factor in evening out the student demographics or may factor into student satisfaction and learning.

The overwhelming majority of non-traditional students may also be an aspect of the institution worth investigating. A school with over 90% non-traditional age students may possibly have a different culture of learning. Also, and not a variable tested in this study, the large number of military and military affiliated students may also have an impact on results of testing. Further, the overall effect of a fully online university is not known. Further studies must be performed to explore the dynamics of such institutions of learning.

Directions for Future Study

Further research is warranted to investigate predictors such as student demographics and their relationship to student success in an online environment. This study provides connections to the current body of literature as well as produces results that will help begin to fill the void in current research in online learning. Establishing that there may indeed be no connect with the three CoI presences and student demographic characteristics illuminates an additional component to working with students in an online community. Additionally, such information may influence initiatives designed to decrease attrition. A one-size-fits-all policy does not prove valuable.

Through development of learning constructs, engagement, satisfaction, and achievement, students can obtain success in college. Understanding the predictors that increase student academic achievement and the issues that prevent student persistence and matriculation is imperative for institutions to survive. Continually striving to serve the student, from research and then application of best practices through policies and initiatives, is the goal for every educator. Online learning is continually evolving. Continued success for students, especially at colleges and universities experiencing explosive, even hyper, growth is critical. Determining methods and techniques to increase student success is essential.

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