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Technologies that Assist in Closing the Achievement Gap: A Comparison African American and Caucasian Students' Learning and Community in the Online Classroom

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Abstract: Higher Education administrators and educators seek to understand how to design and to facilitate online courses to ensure quality, culturally responsive online education for minority students, specifically African American students, and to close the academic achievement gap that exists today. This study examines online students' using both synchronous and asynchronous technologies to determine whether students' social presence, cognitive presence, teacher presence, and perceived learning differ based upon ethnicity. A one-way multivariate analysis of variance (MANOVA) was conducted. Results yielded no significant difference in dependent variables based on ethnicity.

Introduction to the Literature

Distance education is the most rapidly growing form of education (Albrecht & Jones, 2007), and the anytime, anywhere method of course delivery via the internet, commonly referred to as Asynchronous Learning Networks (ALN), is the most commonly employed method by higher education institutions (National Center for Educational Statistics, 2008). Unfortunately, research has suggested that the achievement gap that exists in the traditional classrooms also exists in the ALN environment (Rovai & Gallien, 2005; Rovai & Ponton, 2005). The achievement gap in the ALN environment has been attributed to the culturally based community values and preferences of some minority groups. Emphasis that minorities such as African Americans place on communal values and community may not be supported in the ALN environment especially when educators do not utilize strategies and pedagogies that promote collaboration and community (Rovai & Ponton, 2005). This absence may result in poor academic achievement.

With the rapid increase in Internet bandwidth, educators have been provided with the opportunity to address the constraints inherent in the ALN environment (Anderson, 2004). Synchronous technologies enable educators to interact with their students in real time using readily available text, audio, and visual tools; research has started to support synchronous CMC technologies to improve the ALN environment by promoting social presence and community (Hrastinski, 2008; Rockinson-Szapkiw, 2010), decreasing feelings of distances and isolation felt within an asynchronous e-learning environment (Wang & Chen, 2007), and encouraging learning confidence (Wang & Chen). Thus, the addition of synchronous technologies in the ALN environment may support the culturally based community values and preferences of some minority groups and, thus, influence the closing of the achievement gap in the online environment. The purpose of this present study is to examine different ethnicities' perceived learning and sense of community, defined by social presence, teacher presence, and cognitive presence, to determine if the employment of both synchronous and asynchronous technologies in the online classroom may have an impact. More specifically, this study focuses upon African Americans and Caucasians to extend previous research that has already compared the two groups.

Previous research has examined the achievement gap in the traditional classroom using both objective learning outcomes and student perception measures. In the ALN environment, the achievement gap has been examined using instruments that measure students' perceived learning and community (Rovai & Ponton, 2005; Rovai, Gallien, & Stiff-Williams, 2007). Since online education literature has consistently equated perceived

community and critical thinking (Garrison & Arbaugh, 2007; Rovai, 2002) with effective education and these constructs have been previously used to study the achievement gap in the ALN environment, the present study uses a framework native to distance education literature that incorporates both the community and critical thinking. Garrison, Anderson, and Archer's (2000) Community of Inquiry (COI) framework serves as the theoretical foundation upon which to examine the quality of online education for this study. Research has shown that the COI framework provides an appropriate foundation upon which to examine the methodology of online higher education effectiveness (Arbaugh, 2007; Garrison, Cleveland et al., 2006). The underpinning assumption of this framework is that effective education within an online community transpires when there is interaction among three constructs: social presence, cognitive presence, and teaching presence. Social presence is "the ability of participants in the Community of Inquiry to project their personal characteristics into the community, thereby presenting themselves to the other participants as *real people*" (Garrison, et al, 2000, p. 89), and cognitive presence is "the extent to which the participants in any particular configuration of a community of inquiry are able to construct meaning through sustained communication" (Garrison et al., p. 89). Teaching presence is defined as the facilitation and design that guides the cognitive and social processes unto meaningful educational outcomes (Garrison, et al.).

Correlated with the construct of community (Rovai, 2002) and identified as the outcome that "must be the first measure by which online education is judged" (Swan, 2003, p.13), is learning, specifically used to examine the achievement gap. Learning has been measured through objective learning outcomes and self-report measures. The use of an objective measure, such as grades, in multi-course studies, as is the case in this study, is limited due to inconsistent assignments among instructors and differences in their personal and professional traits (Rovai, 2002). Research has suggested that cognitive learning may be measured using self-reports, which are valid and may be a better reflection of learning than grades, especially for adult learners (Carrallo, 1994).

Method

Participants and Setting

A convenience sample of 64 online undergraduate and graduate counseling, psychology, social work, human service, and highly related discipline courses offered by colleges and universities across the United States was surveyed. The sample consisted of 11(17.2%) males and 53(82.2 %) females; 42 (65.6%) participants were Caucasian and 22 participants (34.4%) were African American . The quality of the courses was to be censured by using only regionally accredited institutions, and the selection threat to internal validity that arose from using non-equivalent groups and uncontrolled diversity among participants was minimized by limiting the study to students enrolled in courses that fall within similar disciplines (Campbell & Stanley, 1963). The courses included, but were not limited to, Theories of Counseling, Social Work and Technology, and Consultation and Supervision. Courses were each eight to sixteen weeks in length and delivered fully online using a combination of asynchronous and synchronous technologies, specifically two mediums: (a) CMSs and (b) e-conferencing systems. Courses were not limited to a particular CMS or e-conferencing system. Angel and Blackboard ™ were used; Adobe® Acrobat® Connect™, Wimba, Skype™, and Microsoft Live! were also used. Using the e-conferencing systems, students, both with the instructor and independent of the instructor, participated in group discussions, worked collaboratively on course assignments, studied for exams and quizzes, socialized, and performed "for class" presentations. All students used the real-time audio chat features of the systems; some students used additional features such as shared whiteboards, application sharing, polling, video, and archiving recordings. Students used the e-conferencing system at least three times during the duration of their courses.

Instrumentation

Participants completed a web-based survey that consisted of the Community of Inquiry Framework survey (Arbaugh et al., 2008) and the Perceived Learning Instrument (Richmond, Gorham, & McCroskey, 1987).The COI Framework survey (Arbaugh et al., 2008) is a 34-item self-report consisting of three subscales of social presence, cognitive presence, and teacher presence. On a 5-point Likert scale (i.e. 4 = strongly agree, 3 = agree, 2 = neutral, 1 = disagree, and 0 = strongly disagree), participants indicated the response that best reflects their feelings about statements such as ‘‘Online or web-based communication is an excellent medium for social interaction.” ‘Internal consistency estimates of reliability were calculated for the COI framework survey using Cronbach’s coefficient alpha. Cronbach’s coefficient alpha for the social presence, cognitive presence, and teacher presence subscales were .91, .95, and .94, respectively (Arbaugh et al.).

The Perceived Learning Instrument consisted of one question: “On a scale of 0 to 9, how much did you learn in this course, with 0 meaning you learned nothing and 9 meaning you learned more than in any other course you’ve had?” Since the instrument is composed of a single item, internal consistency reliability is not applicable. Test–retest reliability was reported to be .85 in one study examining adult learners (McCroskey, Sallinen, Fayer, Richmond, & Barraclough, 1996).

Procedures

Two to three weeks prior to the end of the course, students received an e-mail from the researcher forwarded by their course instructor purporting the importance of the research for improving online learning requesting that they complete an online survey for the purpose of research. Participants completed the web-based survey consisting of the Community of Inquiry Framework survey (Arbaugh et al., 2008), the Perceived Learning Instrument (Richmond, Gorham, & McCroskey, 1987), and demographics questions. No monetary incentive was offered to complete the online survey; however, some instructors may have offered extra credit to complete the survey.

Design and Data Analysis

The study employed a causal comparative design to seek to answer the following research question: Do students’ perceived learning and community of inquiry (i.e. social presence, cognitive presence, and teacher presence) differ by ethnicity (i.e. Caucasian and African American) in an online environment in which both synchronous and asynchronous technologies are used? A one-way multivariate analysis of variance (MANOVA) was conducted to analyze this question. Descriptive statistics disaggregated by ethnicity are shown in Table 1.

	Caucasian		African American	
Variable	*M*	*SD*	*M*	*SD*
SP	27.93	5.56	28.23	5.89
CP	36.10	8.06	40.50	5.65
TP	40.10	9.02	44.45	8.78

Learning	6.67	2.25	7.00	1.75

Table 1. Dependent Variable Descriptive Statistics Disaggregated by Ethnicity

For the one-way MANOVA, preliminary assumption testing was conducted and results were found satisfactory. The assumption of the homogeneity of variance-covariance was tenable based on the results of the Box's test, $M = 9.12$, F (10, 8.62) = .84, $p = .59$. The results of Levene's test of equality of error provided evidence that the assumption of homogeneity of variance across groups was tenable for SP, CP, TP, and perceived learning, F (1, 62) = .63, $p = .43$; F (1, 62)= .1.20, $p = .28$; F (1, 62) = .01, $p = .91$; and F (1, 62) = .37, $p = .54$, respectively.

Results for the MANOVA yielded no statistically significant difference between the two groups on the combined dependent variables, Pillai's Trace = .14, F (1,62) = 2.34, $p = .07$, partial $\eta^2 = .14$. The observed power was .64. Based on these results, evidence was insufficient to reject the null hypothesis: Caucasian and minority students enrolled in online courses using synchronous and asynchronous technologies do not differ significantly in terms of their of social presence, cognitive presence, teaching presence, and perceived learning.

Discussion of Educational Importance

Since online education is the most rapidly growing form of higher education, there is a need to understand how to design and facilitate online courses to ensure quality and equitable online education for minority students, specifically African American students, and to close the academic achievement gap. Accordingly, this research begins to examine whether differences exist among African American and Caucasian students' perceived social presence, cognitive presence, teaching presence, and learning in online courses that employ synchronous and asynchronous technologies. This study found that there are no differences in the dependent variables among groups. This suggests that the achievement gap, at least the perceptions of the gap, that exists both in the traditional environment and ALN environment may be minimized through the adoption of synchronous technologies in online higher education.

The unique opportunities that e-conferencing systems provide to online students in remote geographical locations to interact with educators and with their fellow students in real time using text, audio, and visual tools may promote educational experiences that aligns with African American's communal values. For, the real time dynamic audio, visual interaction has been shown to assist in overcoming the feeling of isolation often present in the asynchronous learning environment and is said to support the building of community or social presence at an expedited rate when compared to an asynchronous only environment (Groen, Tworek & Soos-Gonczol, 2008; Wang & Chen, 2007). The instant feedback that occurs in synchronous interaction counteracts the frustration and breakdown of communication that students feel in ALN environments when feedback lags or questions go unanswered for days (Bonk & Park, 2007). Considering the potential of e-conferencing systems to support the building f social presence, the addition of e-conferencing system to the ALN environment may result in increased motivation, more positive attitudes toward learning, increased satisfaction, and flow to enhance learning and cognitive presence of all students (Csikszentmihalyi, 1990; Entwistle & Entwistle, 1991; The New Media Consortium, 2006). It is, thus, important to recognize that in the development of an effective, culturally sensitive e-learning experience, educators understand how communication technologies affect variables associated with effective, culturally sensitive online education and, then, choose the technologies that most effectively facilitate the learning goals desired and the students served. This, then, necessitates educators becoming competent in online facilitation using a variety of informational and communication technologies (ICTs) .

Although educators' technology selection and competent use of technology to support effective, equitable learning is essential (Cobb, 1997), it is important to recognize that foundational to technology is the use of pedagogy that aligns with African American's values. That is, it is important to use strategies that allow African American students to learn content within a collaborative context (Rovai & Ponton, 2005). Pedagogical strategies employed in

the synchronous e-learning environment need to differ from those employed in lecture-style F2F courses if they are to be effective for online students, particularly African American student (Murphy & Ciszewska-Carr). Dykes and Schwier (2003), discussing synchronous technologies for online education, stated that synchronous interaction is effective when "the strength of the instructor's voice didn't drown out other voices or dominate discussions" (p.25). Similarly, Groen et al. (2008) stated that simply using synchronous applications for prolonged lectures and teacher-dominated purposes requires only passivity from students and is a barrier to the creation of community. Using synchronous modes of communication to promote equitable online education for minority students, specifically African American students, and to close the academic achievement gap, needs to be based on pedagogy that aligns with ethnic values.

It must be recognized that this study has limitations that necessitate additional research. The results of this study are based on self-report instruments and, thus, perceptions. To expand this study, then, research that employs an instrument that measures objective learning outcomes is needed. Also, limited generalization of results could be improved by replications of this study across other universities, educational levels, and academic disciplines. Collecting qualitative data to provide deeper insight may also prove beneficial.

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