Community of Inquiry and Perceived Learning: The Impact of Blended Learning among High School Students

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Abstract: This causal comparative, quantitative study examined how blended learning impacts high school learners’ community of inquiry and perceived learning in comparison to online instruction. The study answered the following research questions: (a) Do differences exist among the social presence, cognitive presence, and teaching presence of high school students enrolled in a blended course as compared to those enrolled in an online course? (b) Does a difference exist between perceived learning of high school students enrolled in a blended course as compared to that of those enrolled in an online course? The researchers tested the hypotheses for research question one with a multivariate analysis of covariance (MANCOVA) and tested the hypothesis for research question two with an analysis of covariance (ANCOVA). Data used for analysis was acquired from archival program effectiveness data collected from a southeastern public charter high school using the Community of Inquiry survey and the Cognitive, Affective, and Psychomotor (CAP) Perceived Learning Scale.

Introduction

In the past decade, online learning has been the fastest growing form of distance education, growing more than 100% in recent years (Archambault, DeBruler, & Freidhoff, 2014; Watson, Murin, Vashaw, Gemin, & Rapp, 2012). The advantages of online learning are many and include providing freedom from limitation of space and time and reaching students in a global context (Kidd, 2010). However, limitations still exist with online learning (Todhunter, 2013) and include its limited capability to engage learners and the lack of a sense of belonging or community (Lim, Morris, & Kupritz, 2007). Blended learning may address these limitations as it combines online learning with traditional learning (Nowell, 2011), creating a community of learners who can be both together and apart, without being bounded by time, place, or situation (Garrison & Kanuka, 2004). Thus, blended learning has become the focal point of research at both the K-12 and higher education levels (Watson et al., 2012; Wold, 2013).

Online and blended learning is important to K-12 education as both have the potential to meet the diverse and special needs of students (Picciano, Seaman, Shea, & Swan, 2012). High quality online learning and blended learning provides benefits to K-12 students by providing new opportunities that lead to improved student outcomes (Oliver & Stallings, 2014); however, the quality of online courses remains a concern for K-12 administrators (Picciano et al., 2012). The increasing number of K-12 students enrolling in online and blended learning and the persistent concern of quality online education warrants examination of the generalizability of previous findings in higher education to the K-12 learning environment.

The community of inquiry framework is the most frequently cited model for online learning (Boston, Ice, Diaz, Richardson, Gibson, & Swan, 2010), as it provides guidelines for quality online and blended learning (Akyol & Garrison, 2011; Szeto, 2015). However, research on the CoI and K-12 online and blended learning is limited due to the lack of a theoretical framework for online, K-12 learning (Borup, Graham, & Drysdale, 2014) and therefore, the majority of research on the CoI has been conducted in higher education (Akyol & Garrison, 2011; Garrison, Anderson, & Archer, 2000). Research is needed on the CoI theoretical perspective on various other populations such as high school students (Garrison, Anderson, & Archer, 2010), as the CoI will also provide insights for K-12 online and blended learning (Murphy & Rodriguez-Manzanares, 2009). A theoretical framework for K-12 online learning would advance the field (Corry & Stella, 2012) and help ensure quality instruction for online and blended learners (Picciano et al., 2012).

Likewise, minimal studies have been conducted on perceived learning, a self-reported level of learning (Rovai, 2002), and K-12 online and blended learning. While many studies have used course grades to compare the effectiveness of online and blended learning environments (Keramidas, 2012; Larson & Sung, 2009), other researchers have argued that course grades are not the best method for measurement due to restricted ranges and
discrepancies between teachers (Rovai & Barnum, 2003). Not only have researchers suggested that self-reports of learning are a valid measure of learning, but also that perceived learning may be more important than reality as decisions about learning are often based on perceptions (Rovai & Barnum, 2003). The current study measured both the CoI presences and perceived learning as research indicates that the two combined can be used as a model for predicting students’ course outcomes (Rockinson-Szapkiw, Wendt, Wighting, & Nisbet, 2016; Wendt & Nisbet, 2017).

**Communities of Inquiry**

The community of inquiry (CoI) framework is a theoretical framework that presents the social and academic factors necessary for the development of high-quality online education (Garrison et al., 2000), consisting of three overlapping elements: cognitive presence, social presence, and teaching presence (Akyol, Garrison, & Ozden, 2009). The CoI framework is a widely-recognized model for understanding interactions in blended and online environments (Boston et al., 2010), as it embodies a process of creating a deep and meaningful learning experience by using a collaborative, constructivist approach (Garrison & Akyol, 2013). Deep and meaningful learning is defined as the more substantial levels of understanding caused by learner-centered approaches and higher-order thinking that promotes long-term knowledge retention (DeLotell, Millam, & Reinhardt, 2010).

Cognitive presence is the degree to which online and blended learners can construct and validate meaning through the phases of practical inquiry leading to resolution of a dilemma, reflection, discourse, analysis, and synthesis (Garrison, Anderson, & Archer, 2001). Social presence is the degree to which the learners feel affectively connected to each other as they insert their personal characteristics into the CoI, reflecting the interpersonal relationships of the community (Akyol & Garrison, 2011; Rourke, Anderson, Garrison, & Archer, 2001). Teaching presence provides leadership and is the design, facilitation, and direction of social and cognitive developments for the purpose of meaningful and worthwhile learning outcomes (Akyol & Garrison, 2011; Anderson, Rourke, Garrison, & Archer, 2001). The interdependences of the presences create the dynamics of an online or blended educational experience in setting climate, supporting discourse, and selecting content (Garrison et al., 2010) and it is at these intersections of the presences that learning takes place (Arbaugh, Cleveland-Innes, Diaz, Garrison, Ice, Richardson, & Swan, 2008; Kozan & Richardson, 2014). The interrelationships of the three presences are needed to create a “meaningful, collaborative and constructivist discourse that is necessary for high-level learning” (Shea, Hayes, Uzuner-Smith, Gozza-Cohen, Vickers, & Bidjerano., 2014, p. 10).

The CoI framework is grounded in the philosophical fundamentals of collaborative constructivism. At the core of Dewey’s (1959) educational philosophy and practice were community and inquiry, as Dewey believed that individual development and inquiry was a social activity, dependent upon community. According to Dewey (1959), when collaboration occurred, students would be responsible learners that actively constructed and confirmed meaning. The CoI framework was developed to further explore a collaborative constructivist approach in online learning (Swan, Garrison, & Richardson, 2009). The foundation of the CoI framework is that a community of learners engaged in critical reflection and discourse supports higher-order learning (Garrison et al., 2010). The intersection of the teaching, social, and cognitive presences conceptualizes the quality of the education experience (Szeto, 2015).

**Perceived Learning**

Many studies (Akyol & Garrison, 2011; Keramidas, 2012; Larson & Sung, 2009; Lim et al., 2007) have used course grades to compare the effectiveness of traditional, online, and blended learning environments. While some researchers have stated that course grades continue to be the most prevalent method of student learning outcomes (Dumont, 1996; Hiltz & Wellman, 1997), others have argued that using grades to operationalize student learning is not always the best method (Rovai & Baker, 2005; Rovai & Barnum, 2003). According to Rovai and Baker (2005), course grades have restricted ranges and have little relationship to what students have learned as students may enroll in a course already knowing the material. Rather than being related to cognitive learning, the grade may reflect their class participation or attendance. Course grades may simply measure performance at a certain point in time (Gašević, Dawson, & Siemens, 2015). Given all of these reasons, using grades as a measure of cognitive learning can be problematic (Rovai & Barnum, 2003).

A student’s self-reported perception of learning should reflect their view of the educational effectiveness of the course since instruction is intended to foster learning (Rovai & Baker, 2005). Self-reporting, including self-reports of student learning outcomes, has been found to be an adequate and appropriate measure (Pike, 2011). The self-reporting Cognitive, Affective, and Psychomotor (CAP) Perceived Learning Scale was developed to measure learning in the cognitive, affective, and psychomotor domains in traditional and online education settings (Rovai,
The CAP Perceived Learning Scale provides benefits to online and blended learning research by enabling instructors and researchers to study educational effectiveness across instructors, courses, and formats (Rovai et al., 2009). In this study, the CAP Perceived Learning Scale assisted in understanding the effectiveness of the CoI and online and blended learning environments (Rovai et al., 2009).

**Blended Learning**

Thousands of school districts across America are making the change to blended learning for K-12 students because of the desire for personalization and access and to control costs (Horn & Staker, 2015). Blended learning is considered a promising practice as it’s the best of both the traditional and the online worlds, providing the convenience of online courses while still maintaining the elements of traditional learning (Lyons & Evans, 2013). Three elements are always implicitly or explicitly present in blended learning: (a) some face-to-face contact with an instructor, (b) some use of electronically delivered instruction, and (c) a deliberately designed effort to combine both to achieve defined learning objectives (Rose & Ray, 2011).

Rovai and Jordan (2004) stated that blended learning is a more robust educational experience than traditional or online learning due to the flexible approach to course design, offering the conveniences of fully online courses without the complete loss of face-to-face contact. It is important to note, however, that the online component of blended learning should be a natural extension of traditional classroom learning (Colis & Moonen, 2001). Blended learning does not simply add on to the existing face-to-face instruction and is not a fully Internet-based learning experience; however, how little or how much online learning is inherent to blended learning is not clear (Garrison & Kanuka, 2004).

Research has indicated that using the method of blending both online learning and traditional face-to-face learning is more effective than solely online or solely face-to-face learning (Akyol et al., 2009; Scida & Saury, 2006; Sethy, 2008; Wold, 2013). High school students in a blended learning setting as compared to a traditional learning environment have shown increased academic achievement (Kazu & Demirkol, 2014). Blended learning provides a physical place for high school students and a place to receive help from teachers while also weaving in online learning (Horn & Staker, 2015). Additionally, blended learning effectively facilitates a CoI by adding numerous forms of communication, which contribute to an important reflective component (Akyol & Garrison, 2011).

This study examined how blended learning influences high school learners. To add to the research on high school students and blended learning, this study determined if a difference exists between cognitive presence, social presence, teaching presence, and perceived learning in high school students who are enrolled in a blended learning course as compared to those enrolled in an online course. Because blended learning merges the best elements of in-class teaching with the best elements of online learning (Oliver & Stallings, 2014), the advantages such as decreased dropout rates (Lopez-Perez et al., 2011) and increased effectiveness in students’ learning (Lieser & Taff, 2013) are vast for institutions, faculty, and students (Rose & Ray, 2011). Understanding the definitions and benefits of blended learning is important in order to understand and identify how the two delivery formats, online learning and blended learning, are different in their effectiveness in students’ learning (Lim et al., 2007).

**Methodology**

An ex post facto, causal comparative design was selected to identify the possible cause-and-effect relationships between a non-manipulated independent variable (type of learning environment) and four dependent variables (social presence, cognitive presence, teaching presence, and perceived learning) (Campbell & Stanley, 1963). The research questions for this study were as follows: (1) Does a difference exist between high school students’ social presence, cognitive presence, and teacher presence when enrolled in a blended course as compared to an online course?; and (2) Does a difference exist between high school students’ perceived learning when enrolled in a blended course as compared to an online course?

**Participants and Setting**

Archival data was collected on a total of 172 participants—46 students enrolled in blended learning courses and 126 students enrolled in online learning courses. Participants were high school students enrolled in 9th-12th grade English 1, English 2, English 3, or English 4 courses at an online public charter school in the southeastern United States. The English courses were all taught as online or blended courses. In order to be included in the data analysis, all participants were verified as having been enrolled in the online only or blended only programs of study for the 2015-2016 academic year.

To further control for extraneous variables, a chi square analysis was conducted on the demographics of the teachers to ensure no statistically significant difference between the online and blended teachers (four teachers and
one teacher, respectively). The variables used for the chi square analysis were degree obtained, number of certifications obtained, age, ethnicity, total years of teaching experience, and years of online teaching experience. The Pearson Chi-Square value for each was higher than .05. Therefore, the results were not significant.

The online courses were taught in an asynchronous environment where students engaged in learning with no face-to-face interaction with the teacher via eSchoolware™ learning management system (LMS) and Adobe Connect™. The online courses required individual written assignments, daily and unit assessments, and course participation. Students were given the opportunity to attend a weekly synchronous lesson provided by the teacher, but attendance in the synchronous lesson was not required. Although attendance was not required, students were required to watch the recording if they did not attend.

The blended courses were taught in a synchronous environment in which students participated in online assignments via eSchoolware™ LMS and attended a learning center daily where they received face-to-face instruction from a certified English teacher. The blended learning courses were equivalent to the online learning courses in regards to content, instructional objectives, learning outcomes, assignments, and assessments. The blended courses required the same individual written assignments, daily and unit assessments, and course participation as the online learning courses. The sole difference between the learning environments was that the blended learning students were at a brick and mortar establishment for three hours per day with a face-to-face instructor whereas the online students completed their work solely online with interaction only with an online instructor.

For both environments, participants completed the simplified CoI survey (P. Ice, personal communication, March 23, 2015) to assess participants’ perceived sense of social presence, cognitive presence, and teaching presence and the CAP Perceived Learning Scale (Rovai et al., 2009) to assess participants’ levels of perceived learning. Both instruments have demonstrated validity and reliability in previous study. Results of both assessments were retrieved and analyzed for this study as archival data.

Results

A multivariate analysis of covariance (MANCOVA) was used to analyze data for research question one. All assumption tests were tenable, although gender and ethnicity were determined to be covariates. Pillai’s Trace was used to interpret results of the MANCOVA analysis (Tabachnick & Fidell, 2007). Results of the analysis, Pillai’s Trace = .107, $F (3, 165) = 6.605$, $p = .000$, partial eta squared = .107, revealed a significance different in the composite CoI score between the blended and online group, with a medium to large effect size ($\eta^2 = .107$) (Tabachnick & Fidell, 2007). Since a statistically significant difference was found, tests of between-subjects effects were calculated using a Bonferroni adjusted alpha level of .017 (Tabachnick & Fidell, 2007). Results demonstrated that social presence was the only dependent variable with a statistically significant value ($p = .002$). Overall, social presence explained only 5.7% of the variance.

A one-way between-groups analysis of covariance (ANCOVA) was conducted to analyze data for research question two. Assumption testing indicated a slightly negatively skewed distribution for perceived learning. However, ANCOVA analysis is generally robust against violations of normality (Tabachnick & Fidell, 2007). Results of the ANCOVA analysis demonstrated that there was no statistically significant difference between the two groups on the CAP Perceived Learning Scale scores, $F (1, 168) = .013$, $p = .908$, partial eta squared = .000, with a very small effect size ($\eta^2 = .000$).

Discussion

Research question one was as follows: Do differences exist among the social presence, cognitive presence, and teacher presence of high school students enrolled in a blended course as compared to those enrolled in an online course? Results indicated the blended learning students and online learning students did differ in their community of inquiry as there was a statistically significant difference in the composite CoI score between the groups. Examination of the separate dependent variables (cognitive presence, teaching presence, and social presence) indicated that the only significant difference between blended learning students and online learning students was their social presence. No statistically significant differences were found for blended learning and online learning students’ cognitive presence or teaching presence.

The findings of the current study are partially consistent with the findings of Akyol et al. (2009) and Akyol and Garrison (2011) who both administered the CoI survey to blended and online graduate students. Akyol et al. (2009) found that blended learning students showed higher perceptions of social presence and teaching presence than the online learning students while Akyol and Garrison (2011) found that blended learning students had higher perceptions of all of the presences. A difference in social presence could be attributed to the presence of a face-to-
face teacher for the blended learning students. Emotional expression, a dimension of social presence, such as humor is not commonly found in online learning environments that are primarily text-based (Garrison & Anderson, 2003). Additionally, research has suggested that social presence is positively affected by establishing group trust and group identity through face-to-face interaction (Garrison & Vaughan, 2008).

While the current study found a statistically significant difference in social presence, it did not find a difference in teaching presence or cognitive presence for the two groups. These findings support research that the components and indicators of teaching presence vary and depend on the learner level (Kupczynski et al., 2010). For lower-level learners, the more objectivist elements of instructional design and organization were perceived to have the greatest impact on teaching presence. The instructional design and organization was equivalent for both the blended and online learners of the current study; therefore, the research of Kupczynski et al. (2010) is supported by the results of the current study that did not show a difference between the two groups.

Research question two was as follows: Does a difference exist between perceived learning of high school students enrolled in a blended course as compared to that of those enrolled in an online course? The results indicated that there were no statistically significant differences between the two groups on the CAP Perceived Learning Scale scores. These findings support research that indicates that no difference exists in perceived learning in blended and online learning groups. Lim et al. (2007) found that no significant differences existed for perceived and actual learning in the two different delivery methods, and therefore the researchers concluded that the instructional delivery format may not affect learners’ learning. The findings of Lim et al. (2007) and the current study were consistent with media comparison research. Regardless of how the instruction is delivered, blended or online, when the instruction methods remain essentially the same, so does the learning (Clark & Mayer, 2008).

The findings of the current study contradicted the findings of Akyol and Garrison (2011) that indicated that students in a graduate-level, blended learning course showed higher levels of perceived learning than students in an equivalent, online graduate course. The researchers also found that cognitive presence in higher education is strongly associated with high levels of perceived learning. The current study did not find a statistically significant difference in cognitive presence in the two delivery formats. If a strong relationship exists between cognitive presence and perceived learning (Akyol & Garrison, 2011), the results of the current study supported this conclusion, as a difference was not found for either cognitive presence nor perceived learning. The current study, as aforementioned, indicated a statistically significant difference in social presence between the blended learning and online learning groups. Social presence has been shown to have a lesser impact on perceived learning than cognitive presence and teaching presence (Akyol & Garrison, 2011).

In discussing the results of the current study, it is important to note that the existing CoI framework and perceived learning research focuses on higher education rather than K-12 blended or online learners. K-12 learners tend to be less motivated and less autonomous than higher education students (Borup et al., 2014). Because of learner differences, it is recommended to use caution when applying the findings of higher education research to K-12 settings (Morgan, 2015).

Implications and Conclusion

Blended and online learning for K-12 students has grown remarkably in recent years (Archambault, DeBruler, & Friedhoff, 2014; Toppin & Toppin, 2015); therefore, the quality of online learning and blended learning is especially important (Picciano et al., 2012). Research has indicated that high quality online learning and blended learning can provide benefits to students, schools, and states at the K-12 level by providing new opportunities that lead to improved student outcomes (Oliver & Stallings, 2014). The CoI framework provides guidelines for quality online and blended learning (Akyol & Garrison, 2011; Szeto, 2015) and can provide insights for K-12 online learning (Murphy & Rodriguez-Manzanares, 2009). Research on K-12 online and blended learning is a dire need, as the growth of online learning has out-paced the production of valid and reliable research (Toppin & Toppin, 2015).

The findings of the current study indicated that the blended and online learning groups differ with social presence, the extent to which participants feel affectively connected to one another (Garrison et al., 2000). Social presence is described as a continuous process of identifying with the community, maintaining relationships, and being involved in meaningful and trustful communication (Kozan & Richardson, 2015). Social presence should be equally present in blended and online learning groups, as the difference in a true community of inquiry lies in the quality of the communication (Garrison et al., 2000); therefore, increasing emotional expression, open communication, and group cohesion in the online learning setting is recommended for future practice. Increasing social presence has the option to increase the quality of blended and online learning and, therefore supports a diverse population that may include minorities, troubled teens, and pregnant and parenting students.
The findings of the study could support online and blended learning students that include troubled teens, minorities, pregnant, and parenting students. Researching the CoI and perceived learning will provide a better understanding of the differences between online and blended learning environments in high school, and will therefore promote the development of more effective secondary educational environments. Further researching the CoI and K-12 online and blended learning environments could increase the quality of these educational environments (Akyol & Garrison, 2011; Szeto, 2015).

References


Todhunter, B. (2013). LOL- limitations of online learning- are we selling the open and distance education message short? *Distance Education, 34*(2), 232-252. doi: 10.1080/01587919.2013.802402


