CHAPTER 3: METHODS

Introduction

Gutting (2012) argued that “The strongest support for a theory comes from its ability to correctly predict data that it was not designed to explain.” (para. 7). Moreover, given the argument that community of inquiry framework (CoI framework) has already started to maturate into a theory (Garrison, 2011), and the need for continuous efforts of “explicating and validating” the CoI framework (Garrison, 2013, p. 2), it seems to be reasonable to focus on how the concept of presence might relate to the concept of cognitive load. Further, the relationship of the presences to both perceived learning and learner satisfaction (e.g., Akyol & Garrison, 2008) as well as the relationship between cognitive load and learning (e.g., Sweller et al., 2011) warrant inclusion of perceived learning and satisfaction in such an inquiry. As such, the present study purports to shed light on the relationships between the presences and cognitive load on the one hand, and between the presences, cognitive load, and perceived learning and satisfaction with the course. For this purpose, the following issues are addressed:

* Which is the best predictor of cognitive load at the beginning of an online learning experience: social presence, teaching presence or cognitive presence?
* Which is the best predictor of cognitive load at the end of an online learning experience: social presence, teaching presence or cognitive presence?
* Which is the best predictor of perceived learner satisfaction: social presence, teaching presence, cognitive presence or cognitive load?
* Which is the best predictor of perceived learning: social presence, teaching presence, cognitive presence or cognitive load?

Based on previous work pointing to the relationship between learning: (a) and cognitive presence (e.g., Akyol & Garrison, 2011b; Garrison et al., 2000, 2001); (b) and teaching presence (e.g., Garrison & Akyol, 2013a; Garrison & Arbaugh, 2007); (c) and social presence (e.g., Garrison & Akyol, 2013a; Liu, Gomez, & Yen, 2009; Swan & Shih, 2005); (d) and cognitive load (e.g., Sweller, Ayres, & Kalyuga, 2011), the first hypothesis predicted that there would be strong associations between the presences, cognitive load and perceived learning without a specific identification of the best predictor (Hypothesis 1). Further, resting upon the literature referring to the relationship between learner satisfaction and (a) cognitive presence (e.g., Akyol &Garrison, 2008; Akyol & Garrison, 2011b); (b) teaching presence (e.g., Arbaugh, 2010; Garrison & Arbaugh, 2007); (c) social presence (e.g., Gunawardena & Zittle, 1997; Richardsan & Swan, 2003); (d) cognitive load (e.g., Bradford, 2011), the second hypothesis suggested strong relationships between the presences, cognitive load and learner satisfaction with an online course without specifying the best predictor (Hypothesis 2).

Moreover, all these suggest that if teaching, cognitive and social presences and cognitive load can relate to learning and satisfaction, they can also relate to each other whereby possibly mediating each other`s relation to learning and satisfaction in the end. In this regard, one theoretical possibility is that the presences can relate to cognitive load significantly. As such, combined with the assumption that the point is not to annihilate cognitive load but keep it at such a level that it fosters but does not harm learning (e.g., van Gog, 2008), it is reasonable to assume that especially teaching presence and social presence can help optimize cognitive load to some extent. Since cognitive presence somehow refers to being cognitively involved in learning, it is reasonable for it to increase cognitive load to a certain extent, which can be calibrated by teaching and social presences.

However, the positive correlational (e.g., Akyol & Garrison, 2008) and causal (e.g., Garrison, Cleveland-Innes, & Fung, 2010, Shea & Bidjerano, 2009b) relationships between and among the presences also imply that the relationships between the presences and cognitive load can be non-linear. That is, the presences can relate to increased cognitive load, say, at the beginning of a learning activity, and to decreased cognitive load afterwards. As a result, the two-fold third hypothesis, expected to find a negative relationship between teaching presence and cognitive load, and between social presence and cognitive load while expecting a positive relationship between cognitive presence and cognitive load especially at the end of an academic online semester or session (Hypothesis 3a) as well as a positive relationship between cognitive load and the presences at the beginning of it (Hypothesis 3b). Figure 1 on the next page presents these assumed relationships:

Towards end

Reasonably high

Cognitive load

Cognitive presence

Beginning

of a learning experience

Social presence

Teaching presence

Low

*Figure 1.* Assumed relationships between cognitive load and the presences

Research Design

This study has a correlational explanatory design. It also has an exploratory aspect since it is testing the interrelationships between presence and cognitive load for the first time. Creswell (2005) described explanatory design as “a correlational design in which the researcher is interested in the extent to which two variables (or more) co-vary, that is, where changes in one variable are reflected in changes in the other” (p. 327). Creswell (2005) also highlighted that an explanatory design can yield insights into the direction and strength of relationships between variables despite the lack of providing cause and effect relationships. Similarly, Field (2009) stated that correlational insights have an innate problem of a third variable named “tertium quid” or confounding variable that refers to the possible existence of some other controlled or uncontrolled variables (p. 14). In order to deal with this problem to some extent, the present study implements ordinal regression analyses that would provide the best predictor of a given dependent variable.

Context

The online Master`s of Science Program is a relatively new (i.e., three years old) component of the Learning, Design and Technology Program at a Midwestern US university. The program also offers a doctoral degree in which doctoral students take both face-to-face and online courses of which face-to-face has a higher weighting. For the purpose of this study, online Master`s of Science courses has been chosen as the study context. The online courses are offered in two 8-week online sessions in a given academic semester in the program. There were six graduate-level courses through which overall data were collected in Fall 2013 semester for this study. Table X below displays the descriptive information for these courses:

Table X

*Brief Description of Online Graduate Courses*

|  |  |
| --- | --- |
| Course | Description |
| Foundations of Educational Technology | This course presents a historical background of educational technology and instructional design as well as professional-level knowledge, skills and attitudes. |
| Strategic Assessment and Evaluation | This course focuses on both individual learner and program evaluation incorporating steps ranging from planning to conveying the results. |
| Introduction to Learning Systems Design | This is a project-based course with a specific focus on effective learning systems or contexts in the classroom or workplace. |
| Instructional Development Practicum | This is a practice-oriented course aiming at application of knowledge built through previous courses in practical and supervised field experience. |
| Educational Applications of the Internet | Focusing on student-centered learning, this course examines the Internet as medium of teaching and learning. |
| Foundations of Distance Learning | Examining core concepts and principles of distance learning as well as theory and research, this course provides an introduction. |

As for the information regarding enrollment in each course, Table X provides number of students enrolling in each course as well as corresponding percentage values. These numbers reflect overall enrollment rate in each course without eliminating the number of students who might have enrolled in more than one course.

Table X

*Course Enrollments*

|  |  |  |
| --- | --- | --- |
| Course | N | % |
| Foundations of Educational Technology |  |  |
| Strategic Assessment and Evaluation |  |  |
| Introduction to Learning Systems Design |  |  |
| Instructional Development Practicum |  |  |
| Educational Applications of the Internet |  |  |
| Foundations of Distance Learning |  |  |

Finally, the online program offers the professional practitioners the chance to get a Master`s degree basically in (a) instructional design; (b) program evaluation and assessment; (c) performance improvement. It is also aimed at providing those students who do not have professional experience with knowledge and practice of skills the market requires. Consequently, the latter also had the chance to meet those who were already in the business sector.

Sampling

Regarding sample and sampling method, the present study employed purposive sampling in that participants were graduate students enrolling in a larger Midwestern university`s online Learning, Design and Technology Master of Science program. The aim behind purposive sampling was to increase external validity or generalizability of the findings to similar online learning environments.

Participants

X fully online and on-campus graduate students of Learning, Design and Technology enrolling in 6 online courses at a large Midwestern university in the US contributed to the present study. Most of these students were off-campus online students (*n* = X, X %) while a portion of them were on-campus master`s of science (*n* = X, X %) or doctoral students (*n* = X, X %) who enrolled in the same program. The off-campus students are generally non-traditional students partly because they already might have an instructional-design related job experience or they are professionals working in the business world already.

In order to prevent the loss of participants, they were given 5% of total credit points offered by each course as compensation. There were X female (X %) and X male (X %) participants with a mean age of X (*SD* = X). Besides, there were X doctoral (X%) and X on-campus master`s of science students (X%) who participated in the presence study.

Moreover, participants indicated that (a) they use Blackboard X-X times a week on average (*SD* = X); (b) their keyboarding skill level is X out of X on average (*SD* = X); (c) their Internet usage skill level is X out of X on average (*SD* = X); (d) their familiarity with Blackboard is X out of X on average (*SD* = X); (e) they took X number of online courses before the experiment on average (*SD* = X).

Instrumentation

Self-reported Likert-type scales or survey instruments were used during data collection. Focusing on subjective workload measures, Zhang and Luximon (2005) underlined the a variety of pros associated with such measures ranging from ease of use to non-intrusiveness to sensitivity, and stated that despite the subjectivity debates “…subjective mental workload measures are the best mental workload measures available at the present” (p.201). Furthermore, the following instruments were used for data collection purposes.

Filtering Survey

In order to prevent possible data duplication from one participant due to such reasons as taking more than one course, a one-question survey (see Appendix A) asking for what course a participant would complete surveys were presented at the very beginning using Qualtrics. This survey also asked participants not to move on if they had already completed the surveys for another course previously (see Appendix A). The survey was employed at the end of the first two weeks of the first session. The same survey with different courses was also applied at the end of the first two weeks of the second session (see Appendix B).

Moreover, in order to prevent the possibility that the students would complete the surveys for different courses at the beginning and end of each session, a list of students matching their last 5 digits of PUID numbers with the course for which they completed the survey at the end of the second week were presented on the filtering surveys applied at the end of both Fall 1 (see Appendix C) and Fall 2 (see Appendix D) sessions. Participants were asked to (a) check the list; (b) find out for what course they completed the surveys at the end of the second week; (c) complete the surveys for that particular course if they had not done so already.

Likewise, the same students might have taken courses both in the first 8-week session (i.e., Fall 1) and the second 8-week session (i.e., Fall 2), which might have at least doubled data coming from one student. Therefore, the same one-question survey that was asking for what course a participant would complete the surveys and that was employed both at the end of the first two weeks (see Appendix B), and at the end of the eighth week in Fall 2 session (see Appendix D) specified timeline as follows: “Since August 19, 2013 including Fall 1 session as well”. After all, data were collected in the second session as well due to possible existence of newcomers or students who started the online program at the beginning of the second 8-week session.

Additionally, filtering surveys asked participants not to proceed if they had already completed the surveys before. In order to prevent data loss because of this (this covers completing the surveys at the end of the second week of both sessions as well), the filtering surveys applied at the end of the sessions (see Appendix C and D) stated that this rule does not apply to the courses for which they completed the surveys at the end of the second week of both sessions.

Despite these precautions, on the demographics survey, X number of participants indicated at the end of each 8-week session that they completed the surveys more than once. There were X number of such cases in Fall 1 session and X in Fall 2 session. Besides, there were X participants referring to multiple survey completion at the end of the first two weeks of Fall 1 session and X participants at the end of the first two weeks of Fall 2 session. Based on the last five digits of their university student identity number, these were detected, and only one survey of such students was randomly selected for further analyses.

Cognitive Load Scale

van Gog and Paas (2008) claimed that subjective ratings applied after learning phase and testing phase provide different sorts of information. Specifically, while after-testing ratings give insights into learning consequences, ratings done after learning informs us of instructional or training process (van Gog & Paas, 2008). This distinction may not hold for online learning contexts since a learning activity and an assessment activity would be situated in each other. For instance, a learner`s postings in online discussions may be a learning activity by providing feedback or clarifying some possible misunderstandings etc. through what others post. It may also be an assessment item since the instructor might have a rubric to assess quality of the content of learner posts. Therefore, in the present study, a one-item adapted version of Paas’ (1992) scale was used (see Appendix E and Appendix F). Paas (1992) claimed that the amount or intensity of mental effort is an indicator of cognitive load (CL). The scale is a one-dimensional scale in that it has one item asking people to indicate the amount of mental effort they have invested in answering questions or learning. The scale includes 9 points ranging from *very, very low mental effort* (1) to *very, very high mental effort* (9).

Moreover, Paas, van Merriënboer, and Adam(1994) established the reliability and sensitivity of Paas` (1992) CL rating scale. Similarly, Burkes (2007) asserted that the reliability and sensitivity and the ease of the use of Paas` (1992) scale “have made this scale, and variants of it, the most widespread measure of working memory load within CLT research” (p. 17). Finally, Gimino’s (2000) study also provided reasonable evidence for the reliability as well as the convergent, construct, and discriminate validity of the scale. Participants` ratings on the Paas` (1992) scale in the present study ranged from X to X (*M* = X, *SD=* X). As for internal consistency, since CL scale consists of one single item, Cronbach`s Alpha was not checked for it.

Community of Inquiry Scale

The community of inquiry (CoI) survey developed by Arbaugh et al. (2008) was used in the present study (see Appendix G and Appendix H). The CoI survey is a 34-item and 5-point-scale (1=strongly disagree; 2=disagree; 3=neutral; 4=agree; 5=strongly agree) instrument developed by Arbaugh et al. (2008) and validated by Swan et al. (2008). This measurement has been extensively used in both research and practice showing that CoI framework has the ability to both predict and affect learning outcomes ranging from student learning to retention (e.g., Akyol et al., 2009; Boston, et al., 2009; Shea & Bidjerano, 2009b). There are thirteen items addressing teaching presence (a range of 0-65), nine items for social presence (a range of 0-45), and twelve items for cognitive presence (a range of 0-60).Participants` ratings in each subsection of the survey were summed thereby constituting the overall index for teaching presence, social presence and cognitive presence. Participants` ratings varied from X to X (*M*= X, *SD*= X) on teaching presence section, from X to X (*M*= X, *SD*= X) on social presence section, and from X to X (*M*= X, *SD*= X) on cognitive presence section. Finally, Cronbach`s Alpha was computed for each subsection of the CoI survey (teaching presence, social presence, cognitive presence) separately as well as for the whole survey.

Learner Satisfaction and Perceived Learning

Adopted from Akyol & Garrison (2008, p.22), one item for learner satisfaction (see Appendix J) and one item for perceived learning (see Appendix K) were also assessed. Having a 5-point scale, these two ranged from *strongly disagree* (1) to *strongly agree* (5). The range for the perceived satisfaction with the online course was from X to X (*M*= X, *SD*= X), and was X to X (*M*= X, *SD*= X) for perceived learning.

Demographics

Two types of demographics information were utilized in the present study: (a) participant related; (b) instructor and course-related. These are described below:

Participant-Related Demographic Information

Such characteristics as gender (Rovai, 2002b), age (Akyol, Ice, Garrison, Mitchell, 2010), multiple enrollment in the experiment due to the number of courses taken (Arbaugh, 2005b) in a semester, skill level of keyboarding (Ko, 2012) measured through 5-point scale ranging from *poor* (1) to *excellent* (5), weekly Blackboard usage based on “the number of days a week” (Arbaugh, 2005a, p. 64) , skill level of the Internet usage (Chen, 2001) measured through 5-point scale ranging from *poor* (1) to *excellent* (5), familiarity with the learning technology (Alavi, Marakas, & Yoo, 2002) or Blackboard measured through a 5-point scale ranging from *far too little* (1) to *far too much* (5), satisfaction with the learning management system (Rubin, Fernandes, Avgerinou, 2013) or Blackboard measured through a 5-point scale from *strongly disagree* (1) to *strongly agree* (5), and number of online courses taken before (Mykota & Duncan, 2007) were included in the demographics survey (see Appendix L) in order to produce the descriptive information related to participants.

Instructor and Course-Related Demographic Information

In addition to participant-related demographic items, some descriptive characteristics such as instructor`s socio-epistemological orientation (Akyol et al., 2010), instructors` previous online learning experience in terms of number of online courses taught before (Arbaugh, 2005b) were collected through two open-ended questions presented on a survey. Moreover, online class size (Tomei, 2006) information was collected from the instructors based on this survey (see Appendix M). Finally, “the number of credit hours” and whether a course is must or elective (Arbaugh, 2008, p. 9) were collected regarding courses. This information was got from online program guide published on the internet.

Procedures

The procedures implemented consisted of data collection and data analysis mainly each of which is presented below:

Data Collection

Since the current research focuses on online higher education, the data were collected online as well through 8-week online courses. In other words, overall research data were collected in Fall 2013 academic semester including two sessions of online courses in order to achieve enough number of participants: Fall 1 and Fall 2. It should be noted here that collecting data in two consecutive 8-week sessions might have resulted in duplication of data originating from one participant due to such reasons as taking courses in both sessions. In order to proactively rule out this, participants were asked not to complete surveys if they had already done so regarding a course previously. The instrumentation part provides more details on this.

Cognitive load and presence surveys were implemented two times: (a) at the end of the second week; (b) at the end of the semester. More specifically, an adapted version of Arbaugh et al.’s (2008) CoI survey and Paas` (1992) cognitive load survey were used at the end of the first two weeks by asking participants to indicate their level of presence and cognitive load over the first two weeks. The participants first completed the cognitive load scale, and then, the CoI survey. The same instruments were used at the end of the semester to address the whole semester as well. Moreover, in order for the participants not to feel obliged to provide an answer to any question, instructions of the surveys asked them to circle the numbers that first popped into their minds, and not think too much and not answer if they felt unsure.

Perceived learning, perceived satisfaction and demographics surveys were applied at the end of the semester only. Perceived learning and satisfaction surveys were applied at the end of the semester only in order to give enough time to participants so that they could develop their perceived level of satisfaction and they could learn enough. Demographics survey was applied at the end of the semester only in order not to make first end-of-the-second-week administration of the surveys too long and in case some participants might have not filled out the end-of-the-semester survey. Overall, the surveys were presented in the following order: (a) cognitive load survey (one-item); (b) perceived learning survey (one-item); (c) satisfaction survey (one-item); (d) CoI survey.

After getting corresponding permission of Institutional Review Board (IRB), the instructors were contacted by email and informed of the study before the semester (Fall, 2013-2014) when data collection was started. They were also sent the links to the surveys and were asked to put them in Blackboard page of the online course(s) they were teaching without activating them until they got notified to do so. All scales as well as demographics survey were administered using Qualtrics online survey development tool. Consent forms were collected in exactly the same manner.

Since the online program includes two 8-week sessions covered throughout the academic semester Fall 2013, data were collected separately (i.e., two times) in these two sessions. Specifically speaking, by the end of the first week (August X, 2013; October X, 2013) of the semester, all instructors were contacted via email, and asked to email their students about participating in the study, and to activate or make the links visible to participants only on the final day of the second week after 5 PM. They were also asked to mark the date on which the first data collection session was run (the very last day of the second week plus weekend, August X -X, 2013; October X-X, 2013).

Considering that most of the online Learning Design and Technology master`s of science (MS) students had off-campus jobs, the weekend following the second week was also included. Following van Gog, Kirschner, Kester and Paas (2012), the links also included information about the aims of the study so that they would know what is expected of them and could monitor their perceived level of presence and cognitive load more accurately. This part also highlighted that their individual opinions were of particular interest, and they were asked not to collaborate with anyone while completing the survey.

Upon request, the day before the end day of the second week of the semester (August X, 2013; October X, 2013), the participants received another reminder email from their instructors that informed them that the survey links would be activated by the end of the final day of the second week (after 5 PM), and they would have time to fill it out by the end of next Sunday (August X, 2013; October X, 2013), 11:59 PM. On the end day of the second week (August X, 2013; October X, 2013) afternoon, instructors were reminded to activate the links sometime after 5 PM via email. After Sunday (August X, 2013; October X, 2013) 11:59 PM, the instructors were asked to de-activate the links via email. Please note that in order to give the participants enough time to get accustomed to the course and online learning environment (McQuaid, 2010), the initial round of surveys will be employed after the first two weeks.

By the end of the seventh week (the week before the final week due to the 8-week semester structure of the online program), the instructors were sent links to the surveys by email again, and asked to put them in Blackboard without activating them (October X, 2013; December, 2013). Demographics survey was included this time as well. Further, a final item asking participants to add anything they would like to add was attached to the end of the surveys. They were also asked to email their students to remind them of the second session of the experiment.

On the day before the final day of the eighth week (October X, 2013; December X, 2013), at the researcher`s request, the instructors emailed their students about second session of the study that would occur the next day. On the last day of the eighth week (October X, 2013; December, 2013), afternoon, and instructors were emailed to activate the surveys after 5 PM. This time, instructions to the surveys notified participants that they could participate in the second session only if they had participated in the first session, and that they had time to complete the survey by the end of next Sunday (October X, 2013; December, 2013) 11:59 PM. After Sunday (October X, 2013; December, 2013) 11:59 PM, instructors were contacted via email to deactivate the survey link.

As for demographic information regarding the instructors, the instructor survey (see Appendix H) was emailed to the instructors at the beginning of the semester. Information about the context or the online courses was gathered through a small-scale content analysis of the graduation guideline document by the researcher at the beginning of the semester. The overall data collection timeline is provided by Table 1 and Table 2 below:

Table 1

*Data Collection Timeline during the Semester*

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Activity | Fall 2013 semester | | | | | | | | | | | | | | | |
| Session 1 (Aug.-Oct.) | | | | | | | | Session 2 (Oct.-Dec.) | | | | | | | |
| Weeks | | | | | | | | Weeks | | | | | | | |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| Contacting instructors via email |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Reminders sent to students.  Reminders sent to instructors |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Data collection first round |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Contacting instructors via email about the second round |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Reminders sent to students  Reminders sent to instructors |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Data collection second round |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |

Table 2

*Data Collection Timeline before the Semester*

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Activity | Before Fall 2013 Semester  (Week of August 12-19, 2013) | | | | | | | |
| Day1 | Day2 | Day3 | Day4 | Day5 | Day6 | Day7 | Day8 |
| Instructor survey delivered to instructors |  |  |  |  |  |  |  |  |
| Instructor-related demographics collection |  |  |  |  |  |  |  |  |
| Content analysis of the program guideline |  |  |  |  |  |  |  |  |

Data Analysis

All analyses were run on the Statistical Package for the Social Sciences (SPSS) 16. Data analysis started with checking whether courses or course sections differed from each other significantly based on some participant characteristics described above. In order to check whether these would differ significantly across the online courses employed by the present study, separate one-way analyses of variance (ANOVA) with course as the between-groups variable and with a Bonferroni adjustment (*p =* .05/5= .010) (in order to control familywise Type 1 error as much as possible) were conducted on each of these. None of these statistical analyses revealed significant differences between and among the courses (*p’s* > .05) implying that courses did not differ from each other in terms of participants characteristics. In the same line of logic, similar ANOVA analyses with course sections as the between-groups variable was also run on the participants` demographic information variables. These results were also non-significant either (*p*`s > .05).

Moreover, measuring whether independent variables would predict perceived learning and learner satisfaction provide predictive validity. The four hypotheses or the research questions of the present study tested using ordinal multiple regression analyses. The reason for this is that the dependent variables used in each hypothesis (i.e., cognitive load measured both at the end of the second week, and when the online courses were over, satisfaction with the course measured at the end only, and perceived learning measured at the end only) were measured through one single item and had an ordinal scale. Based on the number of the four hypotheses tested simultaneously in the present study Bonferroni adjustment was applied to the critical alpha value of .05. In other words, an alpha value of .012 (.05/4) was used for detecting any statistical significance. The regression model equations were used in regard to each hypothesis employed after proper link functions were determined based on the data collected. The following equation was used for prediction of cognitive load based on the social presence (SP), teaching presence (TP), and cognitive presence (CP) data collected at the end of the second week: link ( γij ) = *θj* - [*β*1\*(CP)i1+ *β*2\*(TP)i2+ *β*3\*(SP)i3+ *β p*xiJ]. As for the prediction of cognitive load, perceived learning and satisfaction as based on the data collected at the end of the semester, the following regression equations emerged respectively:

* link ( γij ) = *θj* - [*β*1\*(CP)i1+ *β*2\*(TP)i2+ *β*3\*(SP)i3+ *β p*xiJ]
* link ( γij ) = *θj* - [*β*1\*(CL)i1+ *β*2\*(CP)i2+ *β*3\*(TP)i3+ *β*3\*(SP)i3 + *β p*xiJ]
* link ( γij ) = *θj* - [*β*1\*(CL)i1+ *β*2\*(CP)i2+ *β*3\*(TP)i3+ *β*3\*(SP)i3 + *β p*xiJ]

Evaluation of the overall models was done through R2, adjusted R2, and the percentage of variance explained as well as the critical alpha value. In the case of the violations of the assumptions, instead of a regression analysis, separate appropriate non-parametric analyses were run due to the ordinal nature of the dependent variables after creating categorical independent variables based on a median-split procedure. Finally, possible non-response bias was addressed in the following way: Some of the target participants were contacted via email by their instructors, and were asked to respond to some of the questions on the survey. Afterwards, their answers were compared to those of the original respondents, and results were reported in a comparative format.

Validity

There are some threats to both internal and external validity of the results of the present study for which it should be approached with caution. First, there could be some contaminating or extraneous factors that would have mediated the results and that were not under control. Despite the impossibility of controlling for all such variables, literature review identified certain variables that would affect similar research previously. These referred to the characteristics of participants, instructors and courses. These were included in the demographic part of the survey, and statistical analyses were done to make comparisons across courses. Further, some verbal or qualitative data regarding instructors, class size and courses were also presented as descriptive information.

Second, Garrison (n. d.) highlighted one specific concern about research on the CoI framework: It is the assumption that all learning environments studied are real learning communities or communities of inquiries despite possibly low levels of the presences. Matthews, Bogle, Boles, Day, and Swan (2013) diagnosed CoI survey items that were rated “less than 3.75, or slightly less than “agree” (4)” on average were diagnosed as problematic (p. 493). Following this, firstly, minimum cut-off points for each presence were determined per course section as follows: (a) since there were thirteen items in teaching presence subsection, the cut-off point was 52 (13X4); (b) nine items in the social presence section meant a cut-off point of 36 (9X4): (c) twelve cognitive presence items lead to a cut-off point of 48 (12X4). Next, these were added up to get the minimum total point for each course section to be included in data analysis: 52 + 36 + 48 = 136. The course sections whose average total rating was below 136 could not enter data analysis since these were suspected of not forming a real community of inquiry. In other words, any course section that got an average rating below the cut-off point for a presence type was eliminated.

Possible instructor effects may have constituted another form of threat. Since participants were given extra credit points, and that they were emailed by their instructors throughout the experiment as their primary contact, they would have had a tendency to provide socially desirable ratings. In order to rule out this, participants were encouraged to use the last five digits of their student identity numbers throughout the data collection process, and ensured that their instructors would have no access to their ratings.

There can also be some design-related threats to validity in the present study. For example, since the current research design is non-experimental and the purpose is not to identify causal relationships, there could be some levels of ambiguous temporal precedence threat in that the direction of causation between and among variables cannot be specified. Moreover, since participants completed the scales at their own pace and online not in a controlled environment, there could be some sort of history effect impacting the results. As a potential solution, instructions to the surveys asked participants to pay attention to such factors and complete the survey when they felt they could really fill out the survey as objectively as possible.

Finally, focusing on one single graduate program at one university limits the population and ecological validity of the results thus restricting the generalizability or external validity. Even so, a minimum number of participants needed for statistical analyses employed were determined based on some scholarly statistics resources. In this regard, these numbers were also confirmed through priori power analysis run on G\*Power 3.1 software. The latter revealed that (a) under the assumption of a fixed linear model and regression coefficient; (b) having a large targeted effect size value (i.e., .15); (c) using four predictors and an alpha value of .012, the total sample size needed is 104. Temporal validity would be another concern to some extent since data were collected in one single semester, which warrants further research.

Limitations

As stated right in the last paragraph of the previous section, the current study was conducted at one single university and in a specific graduate online program. This also explains the purposive sampling used. As a result, the generalizability of the results to other online learning populations including other university settings and online graduate programs is quite restricted. These also limit the content areas to which the results may apply despite employing more than one course. Likewise, the data were collected in one single semester, which would have also limited the generalizability of the results. All these warrant further research which would have the same design but can be run at different institutions or online learning environments over different semesters.

Another limitation could relate to the subjective nature of data collection. Data were collected through subjective ratings scaled that would have been vulnerable to the effects of participants` mood and other similar factors while completing the surveys. Future research could employ more data triangulation including but not limited to quantitative content analysis in order to back up survey results. Such an approach would be more applicable when a larger amount of time is available for researchers. Similarly, regression analysis refer to relationships not cause-and-effect results, which indicates that research interested in cause-and-effect relationships or comparing groups can use other techniques such as structural equation modeling and different types of ANOVA.

Moreover, the order of the scales presented on the survey was fixed and followed this pattern: CL item, perceived learning item, satisfaction item, and CoI scale. This order might have confounded participants` responses to some extent in that rating on a specific item (e.g., CL item) might have informed rating of another different item (satisfaction item). In the future, counterbalancing the order of the items can be put on the research agenda.

Finally, the results are delimited in that it was assumed that participants completed the survey instrument as honestly and accurately as possible without having any understanding problems, but having enough motivation or willingness, and that they were in a comfortable environment while completing the survey.

Summary

The present correlational non-experimental study was employed in the context of a particular online graduate program at a Midwestern US university. The basic aim was to understand how the constructs of presence and CL relate to each other, and to learners` perceived learning and level of satisfaction with the online course. Consequently, research data were collected at the beginning and end of a single academic semester using subjective rating scales. All these resulted in some validity threats including but not limited to some confounding or extraneous variables, and some limitations ranging from subjectivity involved in data collection to generalizability. Finally, data analyses were done after checking relevant statistical assumptions, and analysis techniques were chosen based on the results of these. An overview of variable information, and that of the research questions and relevant procedures followed can be found in Table X and Table X below consecutively:

Table X

*Variable Information*

|  |  |  |
| --- | --- | --- |
| Variable | Operationalization | Level/Type |
| Cognitive load | Subjective ratings on Paas`s (1992) scale | Continuous ordinal scale with 9 points. |
| Teaching presence | Total rating of the participants` subjective ratings in the teaching presence section of the CoI survey | Continuous  (13-65) |
| Social presence | Total score of the participants` subjective ratings in the social presence section of the CoI survey | Continuous  (9-45) |
| Cognitive presence | Total of the participants` personal ratings in the cognitive presence part of the CoI survey | Continuous  (12-60) |
| Learner Satisfaction with the online course | Participants` subjective rating on the satisfaction scale item | Five-point Likert- type, ordinal |
| Perceived learning | Participants` subjective ratings on the perceived learning scale item | Five-point Likert- type, ordinal |

Table X

*Research Questions and Corresponding Procedures*

|  |  |  |  |
| --- | --- | --- | --- |
| Research Question | Hypothesis | Data Analysis Technique | Data Collection  Instrument |
| Which is the best predictor of cognitive load: social presence, teaching presence or cognitive presence? | A negative relation between cognitive load, and both teaching and social presences were expected as well as the positive relationship between cognitive load and cognitive presence. | Ordinal multiple regression | Multi-component Likert-type survey/scale |
| Which is the best predictor of perceived learning: social presence, teaching presence, cognitive presence or cognitive load? | It was assumed that there would be strong interrelationships between the presences, cognitive load and perceived learning. | Ordinal multiple regression | Multi-component Likert-type survey/scale |
| Which is the best predictor of perceived learner satisfaction: social presence, teaching presence, cognitive presence or cognitive load? | It was expected to find strong associations between the presences, cognitive load, and learner satisfaction with the online course. | Ordinal multiple regression | Multi-component Likert-type survey/scale |

References

Akyol, Z., & Garrison, D. R. (2008). The development of a community of inquiry over time in an online course: Understanding the progression and integration of social, cognitive and teaching presence. *Journal of Asynchronous Learning Networks, 12*(3- 4), 3-22.

Akyol, Z., & Garrison, D. R. (2011b). Understanding cognitive presence in an online and blended community of inquiry: Assessing outcomes and processes for deep approaches to learning. *British Journal of Educational Technology, 42*(2), 233- 250.

Akyol, Z., Garrison, D. R., & Ozden, M. Y. (2009). Online and blended communities of inquiry: Exploring the developmental and perceptional differences. *The International Review of Research in Open and Distance Learning, 10,* 65-83.

Akyol, Z., Ice, P., Garrison, R., & Mitchell, R. (2010). The relationship between course socio-epistemological orientations and student perceptions of community of inquiry. *The Internet and Higher Education, 13,* 66-68.

Alavi, M., Marakas, G. M., Yoo, Y. (2002). A comparative study of distributed learning environments on learning outcomes. *Information Systems Research, 13*(4), 404- 415.

Annett, J. (2002). Subjective rating scales: science or art? *Ergonomics, 45*(14), 966- 987.

Arbaugh, J. B. (2005a). Is there an optimal design for on-line MBA courses? *Academy of Management Learning & Education, 4*(2), 135-149.

Arbaugh, J. B. (2005b). How much does “subject matter” matter? A study of disciplinary effects in on-line MBA courses. *Academy of Management Learning & Education, 4*(1), 57-73.

Arbaugh, J. B. (2008). Does the community of inquiry framework predict outcomes in online MBA courses? *International Review of Research in Open and Distance Learning, 9*(2), 1-21.

Arbaugh, J. B. (2010). Sage, guide, both, or even more? An examination of instructor activity in online MBA courses. *Computers & Education, 55,* 1234-1244.

Arbaugh, B., Cleveland-Innes, M., Diaz, S., Ice, P., Garrison, D. R., Richardson, J. C., & Shea, P., & Swan, K. (2008). Developing a community of inquiry instrument: Testing a measure of the Community of Inquiry Framework using a multi- institutional sample. *The Internet and Higher Education, 11*(3-4), 133-136.

Boston, W., Diaz, S., Gibson, A., Ice, P., Richardson, J., & Swan, K. (2009). An exploration of the relationship between indicators of the Community of Inquiry Framework and retention in online programs. *Journal of Asynchronous Learning Networks, 13*(3), 67-83.

Bradford, G. R. (2011). A relationship study of student satisfaction with learning online and cognitive load: Initial results. *The Internet and Higher Education, 14,* 217- 226.

Burkes, K. M. E. (2007). *Applying cognitive load theory to the design of on-line learning.* Unpublished doctoral dissertation,University of North Texas. Retrieved from http://digital.library.unt.edu/permalink/meta-dc-3698:1

Chen, Y. J. (2001). Transactional distance in World Wide Web learning environments. *Innovations in Education and Teaching International, 38*(4), 327-338.

Creswell, J. W. (2005). Educational research: Planning, conducting, and evaluating quantitative and qualitative research (2nd ed.). Upper Saddle River, N.J.: Merrill.

Field, A. (2009). *Discovering statistics using SPSS* (3rd ed.). London: Sage Publications.

Garrison, D. R. (n. d.). A response to David Annand – Social presence within the community of inquiry framework The International Review of Research in Open and Distance Learning, 2011. Retrieved from http://communitiesofinq

uiry.com/node/20

Garrison, D. R. (2003). Cognitive presence for effective asynchronous online learning: The role of reflective inquiry, self-direction and metacognition. In J. Bourne & J. C. Moore (Eds.), *Elements of quality online education: Practice and direction* (Vol.4, pp. 29-38). Needham, MA: The Sloan Consortium.

Garrison, D. R. (2011). *E-learning in the 21st century: A framework for research and practice* (2nd ed.) [Kindle Fire version]. Retrieved from http://www.amazon.com

Garrison, D. R. (2013). Theoretical foundations and epistemological insights of the community of inquiry. In Z. Akyol & D. R. Garrison (Eds.), *Educational communities of inquiry: Theoretical framework, research, and practice* (pp. 1-11). Hershey, PA: IGI Global.

Garrison, D. R., & Akyol, Z. (2013a). The community of inquiry theoretical framework. In M. G. Moore (Ed.), *Handbook of distance education* (pp. 104-119). New York, NY: Routledge.

Garrison, D. R., Anderson, T., Archer, W. (2000). Critical inquiry in a text-based environment: Computer conferencing in higher education. The Internet and Higher Education, 2(2-3), 87-105.

Garrison, D. R., Anderson, T., Archer, W. (2001). Critical thinking, cognitive presence, and computer conferencing in distance education. The American Journal of Distance Education, 15(1), 7-23.

Garrison, D. R., & Arbaugh, J. B. (2007). Researching the community of inquiry framework: Review, issues, and future directions. *The Internet and Higher Education, 10*(3)*,* 157-172.

Garrison, D. R., Cleveland-Innes, M., & Fung, T. S. (2010). Exploring causal relationships among teaching, cognitive and social presence: Student perceptions of the community of inquiry framework. *The Internet and Higher Education, 13,* 31-36.

Gimino, A. E. (2000). Factors that influence students` investment of mental effort in academic tasks: A validation and exploratory study. Retrieved from ProQuest Digital Dissertations. (AAT 3018083)

Gunawardena, C. N., & Zittle, F. J. (1997). Social presence as a predictor of satisfaction within a computer-mediated conferencing environment. *The American Journal of Distance Education, 11*(3), 8-26.

Gutting, G. (2012, May 17). How reliable are the social sciences? *The New York Times.*

Retrieved from http://opinionator.blogs.nytimes.com/2012/05/17/how-reliable- are-the-social-sciences/?smid=fb-share

Ko, C. –J. (2012). A case study of language learners` social presence in synchronous CMC. *ReCALL, 24*(1), 66-84.

Kozan, K. (2013). Presence and cognitive load in a graduate-level social computing course. *Paper submitted to AECT 2013, October 29-November 2,* Anaheim, CA, USA.

Liu, S. Y., Gomez, J., & Yen, C. –J. (2009). Community college online course retention and final grade: Predictability of social presence. *Journal of Interactive Online Learning, 8*(2), 165-182.

Matthews, D., Bogle, L., Boles, E., Day, S., & Swan, K. (2013). Developing communities of inquiry in online courses: A design-based approach. In Z. Akyol & D. R. Garrison (Eds.), *Educational communities of inquiry: Theoretical framework, research, and practice* (pp. 490-508). Hershey, PA: IGI Global.

McQuaid, J. W. (2010). Using cognitive load to evaluate participation and design of an asynchronous course. *The American Journal of Distance Education, 24,* 177-194.

Mykota, D., & Duncan, R. (2007). Learner characteristics as predictors of online social presence. *Canadian Journal of Education, 30*(1), 157-170.

Paas, F. (1992). Training strategies for attaining transfer of problem-solving skill in statistics: A cognitive load approach. *Journal of Educational Psychology, 84,* 429-434.

Paas, F., van Merriënboer, J. J. & Adam, J. (1994). Measurement of cognitive load in

instructional research. *Perceptual and Motor Skills, 79,* 419-430.

Pallant, J. (2007). *SPSS survival manual: A step by step guide to data analysis using SPSS for windows* (3rd ed.). Englad: Open University Press.

Richardson, J. C., & Swan, K. (2003). Examining social presence in online courses in relation to students` perceived learning and satisfaction. *Journal of Asynchronous Learning Networks, 7*(1), 68-88.

Rovai, A. P. (2002b). Sense of community, perceived cognitive learning, and persistence in asynchronous learning networks. *The Internet and Higher Education, 5,* 319- 332.

Rubin, B., Fernandes, R., & Avgerinou, M. D. (2013). The effects of technology on the Community of Inquiry and satisfaction with online courses. *The Internet and Higher Education, 17,* 48-57.

Shea, P., & Bidjerano, T. (2009a). Cognitive presence and online learner engagement: A cluster analysis of the community of inquiry framework. *Journal of Computing in Higher Education, 21,* 199-217.

Shea, P., & Bidjerano, T. (2009b). Community of inquiry as a theoretical framework to foster “ epistemic engagement” and “cognitive presence” in online education. *Computers and Education, 52*(3), 543-553.

Swan, K., & Shih, L. F. (2005). On the nature of development of social presence in online discussions. *Journal of Asynchronous Learning Networks, 9*(3), 115-136.

Sweller, J., Ayres, P., & Kalyuga, S. (2011). *Cognitive load theory.* New York: Springer.

Tomei, L A. (2006). The impact of online teaching on faculty load: Computing the ideal class size for online courses. *Journal of Technology and Teacher Education, 14*(3), 531-541.

van Gog, T., Kirschner, F., Kester, L., & Paas, F. (2012). Timing and frequency of mental effort measurement: Evidence in favour of repeated measures. *Applied Cognitive Psychology, 26,* 833-839.

van Gog, T., & Paas, F. (2008). Instructional efficiency: Revisiting the original construct in educational research. *Educational Psychologist, 43*(1), 16-26.

Zhang, Y., & Luximon, A. (2005). Subjective workload measures. *Ergonomia, 27*(3), 199-206.

APPENDICES

Appendix A: Filtering Survey (After the 2nd week of the first session)

Below please indicate for what course you will complete the surveys. PLEASE NOTE THAT IF YOU COMPLETED THE SURVEYS FOR ANOTHER COURSE PREVIOUSLY (SINCE AUGUST 19, 2013) DO NOT MOVEN ON AND QUIT THE WEBSITE BY CLICKING THE “QUIT” BUTTON BELOW.

QUIT

IF THIS IS THE FIRST TIME YOU WILL BE COMPLETING THE SURVEYS, PLEASE (A) ENTER THE LAST 5 DIGITS OF YOUR PUID; (B) ANSWER THE QUESTION BELOW, AND THEN CLICK THE “MOVE ON” BUTTON.

Last 5 digits of your PUID:

For what course, will you complete the surveys?

1. EDCI 51300, Foundations of Educational Technology
2. EDCI 57700, Strategic Assessment and Evaluation
3. EDCI 57300, Instructional Development Practicum

MOVE ON

Appendix B: Filtering Survey (After the 2nd week of the second session)

Below please indicate for what course you will complete the surveys. PLEASE NOTE THAT IF YOU COMPLETED THE SURVEYS FOR ANOTHER COURSE PREVIOUSLY (SINCE AUGUST 19, 2013 including FALL 1 SESSION as well) DO NOT MOVEN ON AND QUIT THE WEBSITE BY CLICKING THE “QUIT” BUTTON BELOW.

QUIT

IF THIS IS THE FIRST TIME YOU WILL BE COMPLETING THE SURVEYS, PLEASE (A) ENTER THE LAST 5 DIGITS OF YOUR PUID; (B) ANSWER THE QUESTION BELOW, AND THEN CLICK THE “MOVE ON” BUTTON.

Last 5 digits of your PUID:

For what course, will you complete the surveys?

1. EDCI 57200, Introduction to Learning Systems Design
2. EDCI 56800, Educational Applications of the Internet
3. EDCI 57500, Foundations of Distance Learning

MOVE ON

Appendix C: Filtering Survey (After the 8th week of the first session)

Below please indicate for what course you will complete the surveys. PLEASE NOTE THAT IF YOU COMPLETED THE SURVEYS FOR ANOTHER COURSE PREVIOUSLY (SINCE AUGUST 19, 2013), EXCEPT FOR THE COURSE FOR WHICH YOU COMPLETED THEM AT THE END OF THE SECOND WEEK OF FALL1 SESSION, DO NOT MOVEN ON AND QUIT THE WEBSITE BY CLICKING THE “QUIT” BUTTON BELOW.

QUIT

OTHERWISE, FIRST PLEASE (A) CHECK THE LIST BELOW TO FIND OUT FOR WHAT COURSE YOU COMPLETED THE SURVEYS AT THE END OF THE SECOND WEEK BASED ON 5 LAST DIGITS OF YOUR PUID; (B) ANSWER THE QUESTION BELOW (CHOOSE THE SAME COURSE FOR WHICH YOU COMPLETED THE SURVEYS BEFORE); THEN (C) CLICK THE “MOVE ON” BUTTON.

|  |  |
| --- | --- |
| PUID Last five digits | Previously, surveys completed for |
| XXXXX | EDCI 51300, Foundations of Educational Technology |
| XXXXX | EDCI 57700, Strategic Assessment and Evaluation |
| XXXXX | EDCI 57300, Instructional Development Practicum |
| … | … |

For what course, will you complete the surveys?

MOVE ON

1. EDCI 51300, Foundations of Educational Technology
2. EDCI 57700, Strategic Assessment and Evaluation
3. EDCI 57300, Instructional Development Practicum

Appendix D: Filtering Survey (After the 8th week of the second session)

Below please indicate for what course you will complete the surveys. PLEASE NOTE THAT IF YOU COMPLETED THE SURVEYS FOR ANOTHER COURSE PREVIOUSLY (SINCE AUGUST 19, 2013 including FALL 1 SESSION as well), EXCEPT FOR THE COURSE FOR WHICH YOU COMPLETED THEM AT THE END OF THE SECOND WEEK OF FALL2 SESSION, DO NOT MOVEN ON AND QUIT THE WEBSITE BY CLICKING THE “QUIT” BUTTON BELOW.

QUIT

OTHERWISE, FIRST PLEASE (A) CHECK THE LIST BELOW TO FIND OUT FOR WHAT COURSE YOU COMPLETED THE SURVEYS AT THE END OF THE SECOND WEEK BASED ON 5 LAST DIGITS OF YOUR PUID; (B) ANSWER THE QUESTION BELOW (CHOOSE THE SAME COURSE FOR WHICH YOU COMPLETED THE SURVEYS BEFORE); THEN (C) CLICK THE “MOVE ON” BUTTON.

|  |  |
| --- | --- |
| PUID Last five digits | Previously, surveys completed for |
| XXXXX | EDCI 57200, Introduction to Learning Systems Design |
| XXXXX | EDCI 56800, Educational Applications of the Internet |
| XXXXX | EDCI 57500, Foundations of Distance Learning |
| … | … |

For what course, will you complete the surveys?

1. EDCI 57200, Introduction to Learning Systems Design

MOVE ON

1. EDCI 56800, Educational Applications of the Internet
2. EDCI 57500, Foundations of Distance Learning

Appendix E: Paas (1992) Cognitive Load Scale (After the second week)

NO collected information will be shared with a third person or persons. If you are NOT comfortable with this or with the current study by and large, please do NOT complete the scale. Whether you choose to complete or not, thanks in advance for your time.

For the statement below, please indicate on a 9-point scale, the amount of mental effort you invested. Please select the appropriate number which MOST accurately represents the level of mental effort you spent. Please answer the questions as naturally and honestly as possible, in a way that shows how the learning experience REALLY was, NOT how you think it should have been. The FIRST answer that pops into your mind is of CRUCIAL importance to the study, so, please do your best NOT to spend too much time thinking about what number to mark. If you do NOT feel sure about your answer, please do NOT select any numbers. It is of great importance to keep in mind that the question below is related to the first TWO weeks of the current academic session.

In participating in the learning activities (e.g., online discussions, term papers etc.) of EDCI XXXXX over the first TWO weeks, as a WHOLE, I invested:

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Very very low  Mental effort |  |  |  |  |  |  |  | Very very high  Mental effort |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |

Anything you would like to add:

Appendix F: Paas (1992) Cognitive Load Scale (After the eighth week)

NO collected information will be shared with a third person or persons. If you are NOT comfortable with this or with the current study by and large, please do NOT complete the scale. Whether you choose to complete or not, thanks in advance for your time.

For the statement below, please indicate on a 9-point scale, the amount of mental effort you invested. Please select the appropriate number which MOST accurately represents the level of mental effort you spent. Please answer the questions as naturally and honestly as possible, in a way that shows how the learning experience REALLY was, NOT how you think it should have been. The FIRST answer that pops into your mind is of CRUCIAL importance to the study, so, please do your best NOT to spend too much time thinking about what number to mark. If you do NOT feel sure about your answer, please do NOT select any numbers. It is of great importance to keep in mind that the question below is related to the WHOLE EIGHT weeks of the current academic session.

In participating in the learning activities (e.g., online discussions, term papers etc.) of EDCI XXXXX over the EIGHT-week session, as a WHOLE, I invested:

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Very very low  Mental effort |  |  |  |  |  |  |  | Very very high  Mental effort |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |

Anything you would like to add:

Appendix G: Arbuagh et al. (2008) CoI Survey (After the second week)

NO collected information will be shared with a third person or persons. If you are NOT comfortable with this or with the current study by and large, please do NOT complete the scale. Whether you choose to complete or not, thanks in advance for your time.

For the statements below, please indicate on a 5-point scale, the degree to which you agree or disagree. Please select the appropriate number which MOST accurately represents your level of agreement or disagreement. Please answer the questions as naturally and honestly as possible, in a way that shows how the learning experience REALLY was, NOT how you think it should have been. The FIRST answer that pops into your mind is of CRUCIAL importance to the study, so, please do your best NOT to spend too much time thinking about what number to mark. If you do NOT feel sure about your answer, please do NOT select any numbers. It is of great importance to keep in mind that the question below is related to the first TWO weeks of the current academic session.

**Community of Inquiry Survey**

|  |  |  |
| --- | --- | --- |
| The following statements relate to your perceptions of “**Teaching Presence**” -- your instructor’s course design, facilitation of discussion, and direct instruction -- in the course. Please indicate both your agreement or disagreement with each statement and how important you think it is. | | |
| # | **Statement** | **Agreement**  1 = strongly disagree, 2 = disagree, 3 = neutral, 4 = agree, 5 = strongly agree |
| 1 | The instructor clearly communicated important course topics. | **1 2 3 4 5** |
| 2 | The instructor clearly communicated important course goals. | **1 2 3 4 5** |
| 3 | The instructor provided clear instructions on how to participate in course learning activities. | **1 2 3 4 5** |
| 4 | The instructor clearly communicated important due dates/time frames for learning activities. | **1 2 3 4 5** |
| 5 | The instructor was helpful in identifying areas of agreement and disagreement on course topics that helped me to learn. | **1 2 3 4 5** |
| 6 | The instructor was helpful in guiding the class towards understanding course topics in a way that helped me clarify my thinking. | **1 2 3 4 5** |
| 7 | The instructor helped to keep course participants engaged and participating in productive dialogue. | **1 2 3 4 5** |
| 8 | The instructor helped keep the course participants on task in a way that helped me to learn. | **1 2 3 4 5** |
| 9 | The instructor encouraged course participants to explore new concepts in this course. | **1 2 3 4 5** |
| 10 | Instructor actions reinforced the development of a sense of community among course participants | **1 2 3 4 5** |
| 11 | The instructor helped to focus discussion on relevant issues in a way that helped me to learn. | **1 2 3 4 5** |
| 12 | The instructor provided feedback that helped me understand my strengths and weaknesses (relative to the course’s goals and objectives. ) | **1 2 3 4 5** |
| 13 | The instructor provided feedback in a timely fashion. | **1 2 3 4 5** |
| The following statements refer to your perceptions of “**Social Presence**” -- the degree to which you feel socially and emotionally connected with others -- in your course. Please indicate both your agreement or disagreement with each statement and how important you think it is. | | |
| # | **Statement** | **Agreement**  1 = strongly disagree, 2 = disagree, 3 = neutral, 4 = agree, 5 = strongly agree |
| 14 | Getting to know other course participants gave me a sense of belonging in the course. | **1 2 3 4 5** |
| 15 | I was able to form distinct impressions of some course participants. | **1 2 3 4 5** |
| 16 | Online or web-based communication is an excellent medium for social interaction. | **1 2 3 4 5** |
| 17 | I felt comfortable conversing through the online medium. | **1 2 3 4 5** |
| 18 | I felt comfortable participating in the course discussions. | **1 2 3 4 5** |
| 19 | I felt comfortable interacting with other course participants. | **1 2 3 4 5** |
| 20 | I felt comfortable disagreeing with other course participants while still maintaining a sense of trust. | **1 2 3 4 5** |
| 21 | I felt that my point of view was acknowledged by other course participants. | **1 2 3 4 5** |
| 22 | Online discussions help me to develop a sense of collaboration. | **1 2 3 4 5** |
| The following statements relate to your perceptions of “**Cognitive Presence**” -- the extent to which you are able to construct and confirm meaning – in this course. Please indicate both your agreement or disagreement with each statement and how important you think it is. | | |
| # | **Statement** | **Agreement**  1 = strongly disagree, 2 = disagree, 3 = neutral, 4 = agree, 5 = strongly agree |
| 23 | Problems posed increased my interest in course issues. | **1 2 3 4 5** |
| 24 | Course activities piqued my curiosity | **1 2 3 4 5** |
| 25 | I felt motivated to explore content related questions. | **1 2 3 4 5** |
| 26 | I utilized a variety of information sources to explore problems posed in this course. | **1 2 3 4 5** |
| 27 | Brainstorming and finding relevant information helped me resolve content related questions. | **1 2 3 4 5** |
| 28 | Discussing course content with my classmates was  valuable in helping me appreciate different  perspectives. | **1 2 3 4 5** |
| 29 | Combining new information helped me answer  questions raised in course activities. | **1 2 3 4 5** |
| 30 | Learning activities helped me construct explanations/solutions. | **1 2 3 4 5** |
| 31 | Reflection on course content and discussions  helped me understand fundamental concepts in  this class. | **1 2 3 4 5** |
| 32 | I can describe ways to test and apply the knowledge  created in this course. | **1 2 3 4 5** |
| 33 | I have developed solutions to course problems that  can be applied in practice. | **1 2 3 4 5** |
| 34 | I can apply the knowledge created in this course to my work or other non-class related activities. | **1 2 3 4 5** |

Anything you would like to add:

Appendix H: Arbaugh et al. (2008) CoI Survey (After the eighth week)

NO collected information will be shared with a third person or persons. If you are NOT comfortable with this or with the current study by and large, please do NOT complete the scale. Whether you choose to complete or not, thanks in advance for your time.

For the statements below, please indicate on a 5-point scale, the degree to which you agree or disagree. Please select the appropriate number which MOST accurately represents your level of agreement or disagreement. Please answer the questions as naturally and honestly as possible, in a way that shows how the learning experience REALLY was, NOT how you think it should have been. The FIRST answer that pops into your mind is of CRUCIAL importance to the study, so, please do your best NOT to spend too much time thinking about what number to mark. If you do NOT feel sure about your answer, please do NOT select any numbers. It is of great importance to keep in mind that the question below is related to the WHOLE EIGHT weeks of the current academic session.

**Community of Inquiry Survey**

|  |  |  |
| --- | --- | --- |
| The following statements relate to your perceptions of “**Teaching Presence**” -- your instructor’s course design, facilitation of discussion, and direct instruction -- in the course. Please indicate both your agreement or disagreement with each statement and how important you think it is. | | |
| # | **Statement** | **Agreement**  1 = strongly disagree, 2 = disagree, 3 = neutral, 4 = agree, 5 = strongly agree |
| 1 | The instructor clearly communicated important course topics. | **1 2 3 4 5** |
| 2 | The instructor clearly communicated important course goals. | **1 2 3 4 5** |
| 3 | The instructor provided clear instructions on how to participate in course learning activities. | **1 2 3 4 5** |
| 4 | The instructor clearly communicated important due dates/time frames for learning activities. | **1 2 3 4 5** |
| 5 | The instructor was helpful in identifying areas of agreement and disagreement on course topics that helped me to learn. | **1 2 3 4 5** |
| 6 | The instructor was helpful in guiding the class towards understanding course topics in a way that helped me clarify my thinking. | **1 2 3 4 5** |
| 7 | The instructor helped to keep course participants engaged and participating in productive dialogue. | **1 2 3 4 5** |
| 8 | The instructor helped keep the course participants on task in a way that helped me to learn. | **1 2 3 4 5** |
| 9 | The instructor encouraged course participants to explore new concepts in this course. | **1 2 3 4 5** |
| 10 | Instructor actions reinforced the development of a sense of community among course participants | **1 2 3 4 5** |
| 11 | The instructor helped to focus discussion on relevant issues in a way that helped me to learn. | **1 2 3 4 5** |
| 12 | The instructor provided feedback that helped me understand my strengths and weaknesses (relative to the course’s goals and objectives. ) | **1 2 3 4 5** |
| 13 | The instructor provided feedback in a timely fashion. | **1 2 3 4 5** |
| The following statements refer to your perceptions of “**Social Presence**” -- the degree to which you feel socially and emotionally connected with others -- in your course. Please indicate both your agreement or disagreement with each statement and how important you think it is. | | |
| # | **Statement** | **Agreement**  1 = strongly disagree, 2 = disagree, 3 = neutral, 4 = agree, 5 = strongly agree |
| 14 | Getting to know other course participants gave me a sense of belonging in the course. | **1 2 3 4 5** |
| 15 | I was able to form distinct impressions of some course participants. | **1 2 3 4 5** |
| 16 | Online or web-based communication is an excellent medium for social interaction. | **1 2 3 4 5** |
| 17 | I felt comfortable conversing through the online medium. | **1 2 3 4 5** |
| 18 | I felt comfortable participating in the course discussions. | **1 2 3 4 5** |
| 19 | I felt comfortable interacting with other course participants. | **1 2 3 4 5** |
| 20 | I felt comfortable disagreeing with other course participants while still maintaining a sense of trust. | **1 2 3 4 5** |
| 21 | I felt that my point of view was acknowledged by other course participants. | **1 2 3 4 5** |
| 22 | Online discussions help me to develop a sense of collaboration. | **1 2 3 4 5** |
| The following statements relate to your perceptions of “**Cognitive Presence**” -- the extent to which you are able to construct and confirm meaning – in this course. Please indicate both your agreement or disagreement with each statement and how important you think it is. | | |
| # | **Statement** | **Agreement**  1 = strongly disagree, 2 = disagree, 3 = neutral, 4 = agree, 5 = strongly agree |
| 23 | Problems posed increased my interest in course issues. | **1 2 3 4 5** |
| 24 | Course activities piqued my curiosity | **1 2 3 4 5** |
| 25 | I felt motivated to explore content related questions. | **1 2 3 4 5** |
| 26 | I utilized a variety of information sources to explore problems posed in this course. | **1 2 3 4 5** |
| 27 | Brainstorming and finding relevant information helped me resolve content related questions. | **1 2 3 4 5** |
| 28 | Discussing course content with my classmates was  valuable in helping me appreciate different  perspectives. | **1 2 3 4 5** |
| 29 | Combining new information helped me answer  questions raised in course activities. | **1 2 3 4 5** |
| 30 | Learning activities helped me construct explanations/solutions. | **1 2 3 4 5** |
| 31 | Reflection on course content and discussions  helped me understand fundamental concepts in  this class. | **1 2 3 4 5** |
| 32 | I can describe ways to test and apply the knowledge  created in this course. | **1 2 3 4 5** |
| 33 | I have developed solutions to course problems that  can be applied in practice. | **1 2 3 4 5** |
| 34 | I can apply the knowledge created in this course to my work or other non-class related activities. | **1 2 3 4 5** |

Anything you would like to add:

Appendix J: Perceived Satisfaction with the Course (After the eighth week)

NO collected information will be shared with a third person or persons. If you are NOT comfortable with this or with the current study by and large, please do NOT complete the scale. Whether you choose to complete or not, thanks in advance for your time.

For the statement below, please indicate on a 5-point scale, the degree to which you agree or disagree. Please select the appropriate number which MOST accurately represents your level of agreement or disagreement. Please answer the questions as naturally and honestly as possible, in a way that shows how the learning experience REALLY was, NOT how you think it should have been. The FIRST answer that pops into your mind is of CRUCIAL importance to the study, so, please do your best NOT to spend too much time thinking about what number to mark. If you do NOT feel sure about your answer, please do NOT select any numbers. It is of great importance to keep in mind that the question below is related to the WHOLE EIGHT weeks of the current academic session.

|  |  |
| --- | --- |
| **Statement** | **Agreement**  1 = strongly disagree, 2 = disagree, 3 = neutral, 4 = agree, 5 = strongly agree |
| Overall, I was satisfied with this course: | **1 2 3 4 5** |

Anything you would like to add:

Appendix K: Perceived Learning (After the eighth week)

NO collected information will be shared with a third person or persons. If you are NOT comfortable with this or with the current study by and large, please do NOT complete the scale. Whether you choose to complete or not, thanks in advance for your time.

For the statement below, please indicate on a 5-point scale, the degree to which you agree or disagree. Please select the appropriate number which MOST accurately represents your level of agreement or disagreement. Please answer the questions as naturally and honestly as possible, in a way that shows how the learning experience REALLY was, NOT how you think it should have been. The FIRST answer that pops into your mind is of CRUCIAL importance to the study, so, please do your best NOT to spend too much time thinking about what number to mark. If you do NOT feel sure about your answer, please do NOT select any numbers. It is of great importance to keep in mind that the question below is related to the WHOLE EIGHT weeks of the current academic session.

|  |  |
| --- | --- |
| **Statement** | **Agreement**  1 = strongly disagree, 2 = disagree, 3 = neutral, 4 = agree, 5 = strongly agree |
| I learned much in this course. | **1 2 3 4 5** |

Anything you would like to add:

Appendix L: Demographics Survey (After the eighth week)

NO collected information will be shared with a third person or persons. If you are NOT comfortable with this or with the current study by and large, please do NOT complete the scale. Whether you choose to complete or not, thanks in advance for your time.

For the scale statements below or questions, please indicate your opinions or answers to the extent to which they reflect reality MOST. Please answer the questions as naturally and honestly as possible, in a way that shows what the REALITY is, NOT what you think it should be. Generally, the FIRST answer that pops into your mind is of CRUCIAL importance to the study, so, please do your best NOT to spend too much time thinking about your answers. If you do NOT feel sure about your answer, please do NOT answer.

Last 5 digits of your PUID:

1. On average, how many online courses have you taken so far?
2. What program are you in?
3. Online master`s of science LDT program
4. Face-to-face master`s of science LDT program
5. Doctoral LDT program.
6. When did you start with the program (month, year)?
7. What is your age?
8. How many times did you complete the surveys involved in the present study?
9. What is your skill level of keyboarding?

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| 1  Poor | 2 | 3 | 4 | 5  Excellent |

1. How many days per week do you use Blackboard?
2. What is your skill level of keyboarding?

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| 1  Poor | 2 | 3 | 4 | 5  Excellent |

1. How familiar are you with Blackboard?

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| 1  Far too little | 2 | 3 | 4 | 5  Far too much |



|  |  |
| --- | --- |
| **Statement** | **Agreement**  1 = strongly disagree, 2 = disagree, 3 = neutral, 4 = agree, 5 = strongly agree |
| Overall, I was satisfied with Blackboard: | **1 2 3 4 5** |

1. Gender: 1) Female 2) Male 3) Other (if you want, please specify):
2. Anything you would like to add (any information that is NOT private or you are COMFORTABLE sharing, and that you think might have affected your contribution to the present study):

Appendix M: Instructor Survey (Before each session started)

NO collected information will be shared with a third person or persons. If you are NOT comfortable with this or with the current study by and large, please do NOT complete the scale. Whether you choose to complete or not, thanks in advance for your time.

For the questions, please indicate your answers to the extent to which they reflect reality MOST. Please answer the questions as naturally and honestly as possible, in a way that shows what the REALITY is, NOT what you think it should be. Generally, the FIRST answer that pops into your mind is of CRUCIAL importance to the study, so, please do your best NOT to spend too much time thinking about your answers. If you do NOT feel sure about your answer, please do NOT answer.

1. What is your socio-epistemological orientation or approach to teaching?
2. Roughly, an average, how many online courses have you taught so far?
3. How many students are enrolled in EDCI XXXXX?