Does Disciplinary Epistemology Influence Cognitive Presence? Evidence from a Community of Inquiry Study in Hybrid Learning

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Abstract

Cognitive presence is the principal component of the Community of Inquiry (CoI) framework. It indicates the scope to which students engage in critical thinking through reflection and discourse in an online learning setting. Previous studies indicate that disciplinary epistemology may impact the nature of leaders' collaborative learning experience. A less studied research area is the impact of epistemology on cognitive presence. This study examined whether epistemological differences between hard-pure (mathematics) and soft-pure (communication) disciplines lead to significant variations in cognitive presence in a hybrid learning environment. A validated CoI survey instrument was used for data collection. The survey instruments were sent to 1,592 students enrolled in technology-mediated undergraduate courses in mathematics and communication courses, representing soft pure and hard pure disciplines, respectively. From the sample received, 92 were usable for analysis. A one-way ANOVA was conducted, which found no statistically significant difference in cognitive presence between the sample population, with a small effect size. These results suggest that disciplinary epistemology alone may not significantly influence cognitive presence. This study contributes empirical evidence to the literature, challenging assumptions about discipline-based differences in higher-order learning within collaborative settings. It also advances the CoI framework by emphasizing the potential mediating roles of teaching presence and social presence in decisive cognitive outcomes. The findings indicate the CoI frameworks' generalizability across disciplines and the vitality of the teaching presence in directing purposeful dialogues that promote interaction, discourse, and metacognitive engagement. The study highlights the importance of pedagogical design in supporting cognitive presence across academic fields and calls for further cross-disciplinary and design-focused research in hybrid learning environments.

Keywords: cognitive presence, community of inquiry, academic disciplinary effect, collaborative learning, educational technology

1. Introduction

According to Bruner (1960), the central aim of education is to foster deep, meaningful learning. Each discipline has a unique structure of academic knowledge that enables the knowledge-building and knowledge-validation processes, known as epistemology. However, Biglan (1973) found that, based on epistemology, courses can be classified as hard, soft, pure, or applied. This foundational, seminal study categorized courses based on their commonalities and differences. Hativa and Marincovich (1995) postulated that epistemological differences between disciplines can influence the meaningfulness of higher-order learning. Furthermore, Arbaugh (2013) noted that in online and hybrid learning settings, epistemology can influence deep and meaningful learning. Furthermore, Huang et al. (2019) argue that previous studies have highlighted the significance of these three presences in the CoI framework. However, recent scholarship has emphasized a gap in the literature: the question of whether epistemic beliefs — the nature of knowledge and the validation process — shape the CoI experience. The above study employed multiple linear regression, which indicated that epistemic beliefs are likely to moderate the relationship between learners' perceived teaching presence and cognitive presence. The study urges future researchers on CoI and learners' epistemic beliefs to consider the findings for further exploration. This study attempts to fulfill the research gap by investigating whether epistemological differences influence cognitive presence in a hybrid learning community.

Garrison and Archer's (2000) Community of Inquiry (CoI) presence framework is frequently employed to identify

critical thinking within online learning environments. This study examined whether cognitive presence levels differed significantly between the hard pure) and the soft pure courses in a hybrid educational context.

According to Garrison and Archer (2000), the CoI framework holds three interactive elements: social presence, teaching presence, and cognitive presence. The researcher argues that knowledge is gained through interactions among the above-mentioned elements. This theory is well utilized in online learning settings; however, not much in hybrid settings. According to Garrison (2016), the cognitive presence construct is rooted in Dewey's concept of scientific inquiry, which was developed using general principles of education. Hence, the framework is not limited to online learning. It is equally applicable to hybrid learning, provided the course has technology-mediated collaborative learning opportunities. Therefore, the study seeks to expand the scholarly knowledge on the application of a theoretical framework in a technology-mediated hybrid collaborative learning setting. In addition, Garrison (2016) urged researchers to conduct more quantitative research using the framework to provide depth and versatility in findings.

This study used a survey research design. A validated survey instrument was distributed to undergraduate students enrolled in introductory mathematics and communication courses at a Midwestern university in the United States. The data were analyzed using inferential statistical methods. Through this empirical investigation, the study seeks to advance the Community of Inquiry framework by examining whether disciplinary differences influence cognitive presence in hybrid learning settings.

The findings revealed no statistically significant difference in the dependent variable, cognitive presence, between soft-pure and hard-pure courses, with a small effect size. The findings offer a meaningful counterpoint to prior inconsistent results and extend current understanding of the generalizability of the theoretical framework across disciplines. Moreover, a review of the CoI literature underscores the need for additional quantitative and cross-disciplinary studies (Garrison & Arbaugh, 2007). Accordingly, this study endeavors to address the above-mentioned research gap in the literature.

2. Literature Review

Building on prior research, this study is theoretically grounded in two foundational frameworks: Biglan's (1973) academic discipline categorization and Garrison and Archer's (2000) Community of Inquiry framework. Together, these models offer a conceptual lens for investigating how disciplinary epistemology influences cognitive presence.

2.1 Academic Discipline

Biglan (1973) was among the early researchers to study the nature of inquiry and processes of knowledge validation. He classified academic disciplines into four categories: hard, soft, pure, and applied. For the literature review, this study draws upon subsequent research that extended Biglan's work. According to Neumann (2003), hard disciplines are characterized by clearly defined assumptions and theories, with knowledge development following a linear trajectory. In contrast, soft disciplines feature general principles and philosophies that are less clearly delineated and more nonlinear. Pure disciplines underscore the conventionality of their theoretical foundations rather than the instantaneous pertinence of their theories. Lastly, applied disciplines prioritize the real-world implementation of theories to address the problems. The present study focuses specifically on Biglan's (1973) framework of soft pure and hard pure academic discipline categories.

2.2 Conceptual Framework of the Cognitive Presence of the Community of Inquiry

According to Garrison and Archer (2000), cognitive presence is the extent to which learners engage in critical thinking through hypothesis testing, reflection, and discourse. The construct of cognitive presence is operationalized using practical inquiry, which is adapted from Dewey's concept of scientific inquiry (Dewey, 1938). Within this framework, higher-order critical thinking in an educational community develops from the initial state of idea generation by an individual from their knowledge or life experience. This triggering of ideas then progresses into exploration of the scope of the problem, integration, and resolution. At this stage, the learners attempt to discover information to address the intellectual conflict, which is defined as a pre-reflective situation. After this stage, learners evaluate the extent and the nature of the problem. The second stage of inquiry is exploration. In this phase, learners encounter difficulties in integrating various information into logical and coherent thoughts concerning the problem. In the third phase, learners bid to formulate potential resolutions, based on data collected to be discussed in the learning community. In the process, learners alter their hypotheses before testing. This is known as a recursive process where individuals test the hypotheses scientifically and thoroughly, which is labelled as a post-reflective situation (Dewey, 1938). The last phase is from the recursive process, where learners identify solutions rooted in the

context. As said, it is interesting that in real-world learning communities, inquiry never ends because a potential resolution would trigger another cycle of practical inquiry (Dewey, 1938; Garrison & Archer, 2000).

In addition to cognitive presence, the Community of Inquiry framework includes two other elements: social presence and teaching presence. Teaching presence involves instructional skills such as course design, organization, facilitation of discourse, and direct instruction. Social presence refers to the creation of a respectful and caring educational environment within the learning community, enabling learners to participate freely without fear of judgment (Garrison & Archer, 2000). All the mentioned sub-components support productive collaborative learning (Garrison & Arbaugh, 2007). Figure 1 illustrates the cyclical nature of critical thinking within the practical inquiry model. This figure is reproduced with permission; see Appendix B.

According to Arbaugh et al. (2010), the nature of critical thinking varies by discipline. In a soft, pure discipline, it typically requires divergent thinking supported by abstract thinking and scholarly knowledge to arrive at generalizable solutions. On the contrary, hard disciplines accentuate convergent thinking intended at developing context-specific solutions. Both approaches are closely tied to the structure of the inquiry process. Dialogues in hard disciplines are predominantly fact- and data-driven, oriented toward resolving context-specific problems. On the contrary, pure disciplines aim at scholarly understanding to arrive at generalizable solutions (Garrison, 2016). Garrison and Archer (2000) claim that attaining the resolution phase represents the high point of community-based learning. However, Garrison also notes a significant challenge for the above, as dialogues often fail to spark higher-order critical thinking at this advanced stage, probably due to increasing intellectual demands, which can result in decreased learner engagement. Furthermore, achieving resolution is highly reliant on the learning community's drive toward specific learning outcomes. To illustrate, Rourke and Kanuka (2009) conducted a comprehensive literature review of 252 research articles and found that more than half of the dialogue time was focused at the exploration stage, with only 1% advancing to the resolution stage; some studies reported no progression to resolution at all. Additionally, Richardson and Ice (2010) found that students' achievement of higher levels of critical thinking largely depends on the instructional strategy employed. Their study compared three instructional methodologies: case studies, debates, and open-ended discussions. Of these three approaches, students favoured open-ended discussions; however, they found cognitive presence to be the least. Conversely, the case-study method, which was less preferred by the students, indicated a higher cognitive presence over the other two pedagogies. The same study also found that, besides the instructional methodology used. There was a strong correlation between learners' attainment of cognitive levels and the instructor's high expectations to display critical thinking.

Garrison (2016) proposes that shared metacognition is a form of learning outcome that arises within a community. Shared metacognition is the process of the intersection between personal and community knowledge.

In an inquiry-based community, learners collaboratively evaluate problems and solutions while trading their understanding with peers. This process involves self-regulation and co-regulation of learning at the metacognitive level. Both aspects are vital in learning communities across disciplines. Providing further context, Garrison et al. (2001) suggest that educators assume multiple roles to facilitate shared metacognition, such as designing educational experiences, co-creating learning environments, and serving as content experts and scaffolding agents for student learning, which indicates the role of instructors in shared metacognition.

Cho and Tobias (2016) studied student perceptions of cognitive presence in relation to three subcomponents of teaching presence: instructional design and course organization, direct instruction, and facilitated discourse. Findings indicated that student perceptions of cognitive presence and teaching presence were consistent across blended and face-to-face classroom environments. A key element of efficacious collaborative learning was the instructors' ability to facilitate discourse. To further the above study, Chen et al. (2017) proposed implementing structured protocols to enhance student communication and increase the quality of online discussions. The intervention protocol included integration of design elements of teaching presence, such as grading rubrics, exemplary student submissions, and due-date reminders. Analysis revealed that the application of this protocol was significantly associated with increased cognitive presence. The subsequent literature connects the discipline perspective and cognitive presence in the community of inquiry.

2.3 Cognitive Difference in Hard Pure and Soft Pure Disciplines

This section examines the cognitive dimensions of academic disciplines. Bruner (1960) posited that curricula should prioritize practical applications and real-world solutions throughout the inquiry process. Achieving such practical outcomes requires mastery of the foundational philosophy unique to each discipline. The mastery of general and foundational principles is approached differently across disciplines, shaping how learners are encouraged to apply

their knowledge (Garrison & Cleveland-Innes, 2005). For instance, Neumann (2003) observed that applications within hard disciplines are predominantly context-specific and exhibit limited transferability. Furthermore, pedagogy in hard disciplines often relies on substantial direct instruction from instructors.

Arbaugh et al. (2010) found that an increase in direct instruction is associated with a decrease in learners' cognitive presence. The same study noted that, in contrast to hard disciplines, soft disciplines operate from a philosophical foundation in which instructors and students collaborate to co-create knowledge. Consequently, fields such as the humanities and social sciences are more likely than hard disciplines to foster higher levels of cognitive presence (Arbaugh et al., 2010; Neumann, 2003). However, Gorsky et al. (2010) reported findings that contradicted this perspective. Their study identified significant differences favoring hard, pure disciplines, where discussions tend to be more fact- and data-driven. As a result, dialogues in hard, pure disciplines are often more likely to achieve higher-order learning objectives (Gorsky et al., 2010). However, Lim and Richardson (2024) conducted a multiple-case study investigating disciplinary differences in web-based course design through the lens of the CoI framework, with particular attention to instructors' design decisions. Twelve cases were purposefully selected to represent Biglan's (1973) four disciplinary categories: hard-applied, soft-applied, soft-pure, and hard-pure. A qualitative data collection methodology was used. Analytical procedures focused on identifying patterns across disciplines. The findings demonstrated that the CoI framework was broadly applicable across all disciplines, though variations in the application of CoI indicators were observed. These differences likely reflect the unique values and pedagogical emphases inherent in each discipline and in individual instructors. Additionally, Melka (2025) examined how teaching, social, and cognitive presence interacted within online MBA programs at five private universities in Ethiopia. In the survey, 245 students participated. A multiple linear regression analysis showed that teaching presence was a stronger precursor of cognitive presence than social presence.

3. Methodology

The study aimed to explore whether epistemic variances in academic disciplines would influence cognitive presence using the CoI framework. Cognitive presence was an indicator of critical thinking in the learning community. To study the objective, the null hypothesis was tested at the $p < 0.05$ level of significance.

This study was exploratory research using a validated survey instrument developed by Arbaugh et al. (2008). According to Arbaugh et al. (2008), cognitive presence is one of the dimensions of CoI. The cognitive dimension of the instrument consisted of 12 items, and for the study, a 5-point Likert scale was used. The scale was from 'strongly disagree' to 'strongly agree'. The instrument was intended to assess the four stages of practical inquiry: triggering, exploration, integration, and resolution. The instrument held a Cronbach's alpha value of above 0.70, which implied an acceptable level of reliability of the instrument.

The study used Biglan's (1973) academic discipline framework. Cognitive presence as the dependent variable and the academic discipline—hard pure and soft pure disciplines as the independent variable. Students in a technology-mediated hybrid course, Principles of Statistics, were used to represent hard pure discipline, and Introduction to Public Communication was used to represent soft pure discipline. The data were collected from students enrolled in the technology-mediated course for the above two courses. Both courses were offered at a midwestern university in the United States of America.

After receiving approval from the institutional review board. An electronic invitation to participate along with a survey link was sent to 1,592 students registered for mathematics and communication courses. Of which received 92 valid usable responses, that is 5.08 percent of the response rate, with a total of 72 missing data, which could not be used for the study due to non-completion of the survey. Invitations were sent via the student's official university email distribution list. The email contained a direct link to the Qualtrics survey and an embedded letter of consent, which outlined the study's purpose, participant rights, and data confidentiality. Participation was voluntary, and implied consent was obtained upon completion of the survey. All responses were collected anonymously to ensure confidentiality.

An ANOVA test was performed to examine whether statistically significant differences existed between representative sample groups. The study aimed to compare cognitive presence across different academic disciplines as independent variables. This approach, which examines differences between independent variables, is referred to as between-subjects variable research.

This study adhered to all the institutional and international standards. The ethical rigor of the study was reviewed and approved by the Institutional Review Board of a major Midwestern University in the USA. All individuals included

in the study provided informed consent before participating. Please see Appendix A. Participants were assured of anonymity, confidentiality, and written assurance that their participation was voluntary. Data collection commenced following the approval from the Institutional Review Board dated 26/08/2019 (IRBNet ID-1203039-2).

The research question examined:

Is there a statistically significant difference in the cognitive presence between hard pure and soft pure academic courses in the College of Arts and Sciences?

$H_0$1. There is no statistically significant difference in the cognitive presence between hard pure and soft pure academic courses in the College of Arts and Sciences.

4. Results

After the data collection was performed using the Qualtrics survey tool, the CSV file was exported to the JASP research software for analysis. An ANOVA test was conducted to assess whether a statistically significant mean difference exists in cognitive presence between soft pure and hard pure disciplines. Table 1 provides descriptive statistics on the communication and mathematics sample population.

Table 1. Descriptive Statistics

	Cognitive_presence	
	Communication	Mathematics
Valid	45	47
Missing	33	39
Median	4.000	3.833
Mean	3.926	3.819
Std. Deviation	0.661	0.648
Skewness	-0.041	0.050
Std. Error of Skewness	0.354	0.347
Kurtosis	-0.532	-0.744
Std. Error of Kurtosis	0.695	0.681
Minimum	2.500	2.583
Maximum	5.000	5.000

Of the 1,592 students invited to participate, 92 usable, valid responses were received (5.08 percent response accepted). Descriptive statistics revealed 33 missing data points in the communication course and 39 in the mathematics course. Additionally, descriptive statistics indicated that students in Communication (n = 45) reported slightly higher levels of cognitive presence (M = 3.93, SD = 0.66) than students in Mathematics (n = 47, M = 3.82, SD = 0.65). The variability of scores was comparable across groups, with coefficients of variation of 0.17 for both disciplines. Additionally, this table indicates the skewness for the communication course (-0.041) and the mathematics course (0.050), both within the acceptable range of -1 to 1. Kurtosis of the communication course (-0.532) and mathematics course (-0.744), which is under the acceptable range between positive 2 and negative 2 (Kim, 2013). Hence, normal distribution can be assumed. Therefore, a one-way ANOVA was performed to identify significant differences among the dependent variables. Below is Table 2: ANOVA results provide insight into the significance value.

Table 2. ANOVA - Cognitive_presence

Cases	*SS*	*df*	*MS*	*F*	*p*
Academic_Discipline	0.261	1	0.261	0.608	.438
Residuals	38.590	90	0.429		

Note. Significance inferred from p-value.

**p < .05*

A one-way analysis of variance (ANOVA) was performed to examine differences in cognitive presence across academic disciplines. Results indicated that the effect of academic discipline on cognitive presence was not statistically significant, $F(1, 90) = 0.61$, $p = .438$. Therefore, the null hypothesis was not rejected. In addition, a One-Way ANOVA was performed to test potential differences in the sub-elements of cognitive presence. The study found no statistically significant difference between the independent and dependent variables.

In addition to the above key variables. A series of one-way ANOVAs was conducted to examine whether the four subcomponents of cognitive presence — triggering event, exploration, integration, and resolution — differed between hard pure (Mathematics) and soft pure (Communication) academic courses. Results indicated no statistically significant between-group differences on any subscale: triggering event, $F(1, 90) = 2.47$, $p = .119$, $\eta^2 = .027$; exploration, $F(1, 90) = 1.90$, $p = .172$, $\eta^2 = .021$; integration, $F(1, 90) = 0.01$, $p = .919$, $\eta^2 < .001$; and resolution, $F(1, 90) = 0.03$, $p = .854$, $\eta^2 < .001$. Effect sizes were uniformly small across all subcomponents, and both disciplinary groups reported above-midpoint means on every phase of the Practical Inquiry Model described by (Garrison et al., 2001). Table 3 provides insight into Post Hoc Comparisons - Academic Discipline.

Table 3. Post Hoc Comparisons - Academic_Discipline

		Mean Difference	SE	df	t	Cohen's d	p_{tukey}
Communication	Mathematics	0.106	0.137	90	0.779	0.163	.438

A post hoc comparison using Tukey's HSD test indicated that the mean difference between Communication and Mathematics students was small and nonsignificant (Mdiff = 0.11, $SE = 0.14$, $t(90) = 0.78$, $p = .438$). The associated effect size was small (Cohen's $d = 0.16$), confirming the non-significant difference in cognitive presence between the two academic disciplines. Below is the exploration of the reasons behind the results found.

5. Discussion

As defined by Garrison and Archer (2000), CoI is a popular framework to study attainment of higher-order learning in online and hybrid collaborative learning environments. According to the theory, learning happens through the interaction among three elements: cognitive presence, social presence, and teaching presence. Cognitive presence is the key indicator of students' achievement of critical thinking and problem-solving skills in a learning community. This study investigated whether cognitive presence, as conceptualized within the Community of Inquiry framework (Garrison & Archer, 2000), differed between students enrolled in hard pure (Mathematics) and soft pure (Communication) academic courses in the College of Arts and Sciences. The results of a one-way ANOVA indicated no statistically significant difference between the two groups, $F(1, 90) = 0.608$, $p = .438$, leading to the retention of the null hypothesis. Both disciplinary groups reported mean cognitive presence scores above the Likert scale midpoint — Mathematics (M = 3.82, SD = 0.65) and Communication ($M = 3.93$, $SD = 0.66$) — suggesting that students in both disciplines perceived comparably meaningful levels of critical inquiry in their courses. This pattern of equivalence was consistent across all four subscales of the Practical Inquiry Model (Garrison et al., 2001), including triggering event, exploration, integration, and resolution, none of which yielded significant between-group differences.

This study indicates an equivalence in cognitive presence across disciplines. A reasonable empirical evidence for Garrison's (2016) assertion that the Community of Inquiry framework was purposely designed as a generic model using general principles of education rooted in Dewey's practical inquiry and Vygotsky's educational scaffolding by the better learners in the community, which transcends the epistemological conventions of academic disciplines.

To illustrate, Biglan's (1973) framework classified Mathematics and Communication at opposite ends of the hard/soft dimension, distinguished by their respective emphases on linear, quantitative exactness versus interpretive flexibility, and on the co-creation of knowledge by learners and instructors. Additionally, Becher (1994) and Kolb (1981), prominent researchers in education, hold the view that every discipline has a unique characteristic approach to learning. Mathematics courses, which represent the hard-pure disciplines, may rely more on assimilation-based learning that involves abstract conceptualization and reflective observation. Conversely, communication courses, which represent soft-pure disciplines, may favor a more divergent learning style, emphasizing concrete experience and reflective observation. Despite these fundamental epistemological and learning-style differences, students in both disciplines reported equivalent levels of cognitive presence in this study, as measured by the CoI instrument. This finding suggests that the Practical Inquiry Model's four cognitive phases, from triggering event to applying knowledge to resolve the identified problem, may represent a universal epistemic process that is stimulated by the

quality of the instruction and design of the course rather than by the epistemology of the specific discipline (Garrison et al., 2001; Richardson et al., 2022). For example, in both disciplines, the stage of the triggering event is essential, as it is the starting point of inquiry. At this stage, learners identify issues that need to be resolved from their personal experiences or studies. Which then moved to exploration, integration, and resolution, regardless of the discipline (Garrison, 2011).

It is vital to observe that there exists an epistemological difference between courses. Learning in soft disciplines is more abstract, and the overall progression through the inquiry stages is often slower than in hard disciplines. These epistemological differences might suggest a significant gap in cognitive presence between fields. However, the central elements of collaborative learning as suggested by Dewey, are the continuity of interaction and the scaffolding of learning proposed by Vygotsky. Hence, the assertion that the CoI framework is rooted in generic principles of education holds (Dewey, 1938; Vygotsky,1978).

The present findings converge with a growing body of evidence suggesting that disciplinary membership does not reliably predict cognitive presence in web-based learning environments. Lau et al. (2021), in a study of engineering and business students during the COVID-19 pandemic, reported no significant differences in cognitive presence between disciplines ($p = .258$), concluding that the quality of the learning community was a more powerful predictor than academic field. Similarly, Mutezo and Mare (2023) found no significant main effect of discipline on cognitive presence in their mediation analysis comparing science and humanities students. Sadaf et al. (2022) indicated that co-regulation was the stronger predictor of cognitive presence rather than disciplinary classification across STEM and humanities online courses. The above inferences, alongside the present findings, suggest that the disciplinary moderation of cognitive presence as hypothesized by Arbaugh (2013) may be less robust empirically than previously assumed, at least at the level of overall composite scores.

It is sensible to believe that discipline does matter. However, looking at the context of the results is important. Yildirim and Seferoglu (2021) indicated that hard disciplines demonstrated a stronger relationship between teaching presence and cognitive presence when compared to soft disciplines. On the contrary, Garrison and Akyol (2008) debated theoretically that the integration and resolution phases are more likely to be achieved in soft disciplines because knowledge is contested and constructivist pedagogy is used. Lim and Richardson (2024), in their multiple case study of online course design across all four Biglan categories, concluded that students' perceptions of CoI presence varied significantly by discipline. However, these studies largely examined discipline as a moderator of instructional relationships rather than as a direct predictor of cognitive presence outcomes. The methodological distinction may account for the visible divergence from the present study's null findings.

A plausible mechanism for the observed disciplinary equivalence is the homogenizing influence of structured online pedagogy. When courses are delivered within a shared institutional learning management system with standardized discussion requirements, assessment formats, and faculty development standards, the mediating role of teaching presence may reduce discipline-level variation in students' cognitive experience. This interpretation is consistent with the broader finding that teaching presence is the strongest predictor of cognitive presence (Maranna et al., 2022). Maranna et al. (2022) examined 50 sample studies and found that teaching presence played an instrumental role in supporting learners in developing cognitive presence, potentially overriding the epistemological differences between hard and soft pure disciplines.

For institutional stakeholders and curriculum designers, these results carry an important practical implication: CoI-informed instructional strategies — structured inquiry sequences, deliberate triggering activities, integration-oriented assessments — may be deployed equitably across hard and soft pure disciplines without requiring discipline-specific modifications. Faculty development programs need not bifurcate their CoI training along disciplinary lines.

6. Conclusion

This study is grounded in the Community of Inquiry framework (Garrison & Archer, 2000) and Biglan's (1973) disciplinary categorization framework. The study examined whether cognitive presence differed between hard pure and soft pure academic courses offered in a Midwest university in the United States. The one-way ANOVA and Tukey HSD post hoc analysis yielded a non-significant result with a small effect size, providing empirical support for retaining the null hypothesis and for the disciplinary universality of the CoI framework and its cognitive presence construct. The research advances the understanding of the CoI framework by offering one of the few direct empirical comparisons of cognitive presence across pure disciplinary categories, demonstrating that students' engagement in the critical inquiry process does not appear to be determined by the epistemological character of their academic

discipline. This study is not without limitations; the usable response rate was low, and there was much missing data from both disciplines. The data were collected a few weeks before the mid-term examination, which may have influenced the participation rate. These results have practical implications for web-based and hybrid course design, faculty development, and institutional policy, suggesting that CoI-based pedagogical approaches represent a discipline-neutral investment in educational quality. Future research is suggested with larger, multi-institutional samples, longitudinal designs, and mixed methods to examine the boundary conditions of this disciplinary equivalence and to explore the instructional and co-regulatory mechanisms that sustain cognitive inquiry across the disciplinary landscape. As technology-mediated teaching and learning continue to increase across higher education, the CoI framework positions itself as an enduring construct that scaffolds deep and meaningful learning, transcending epistemological differences.

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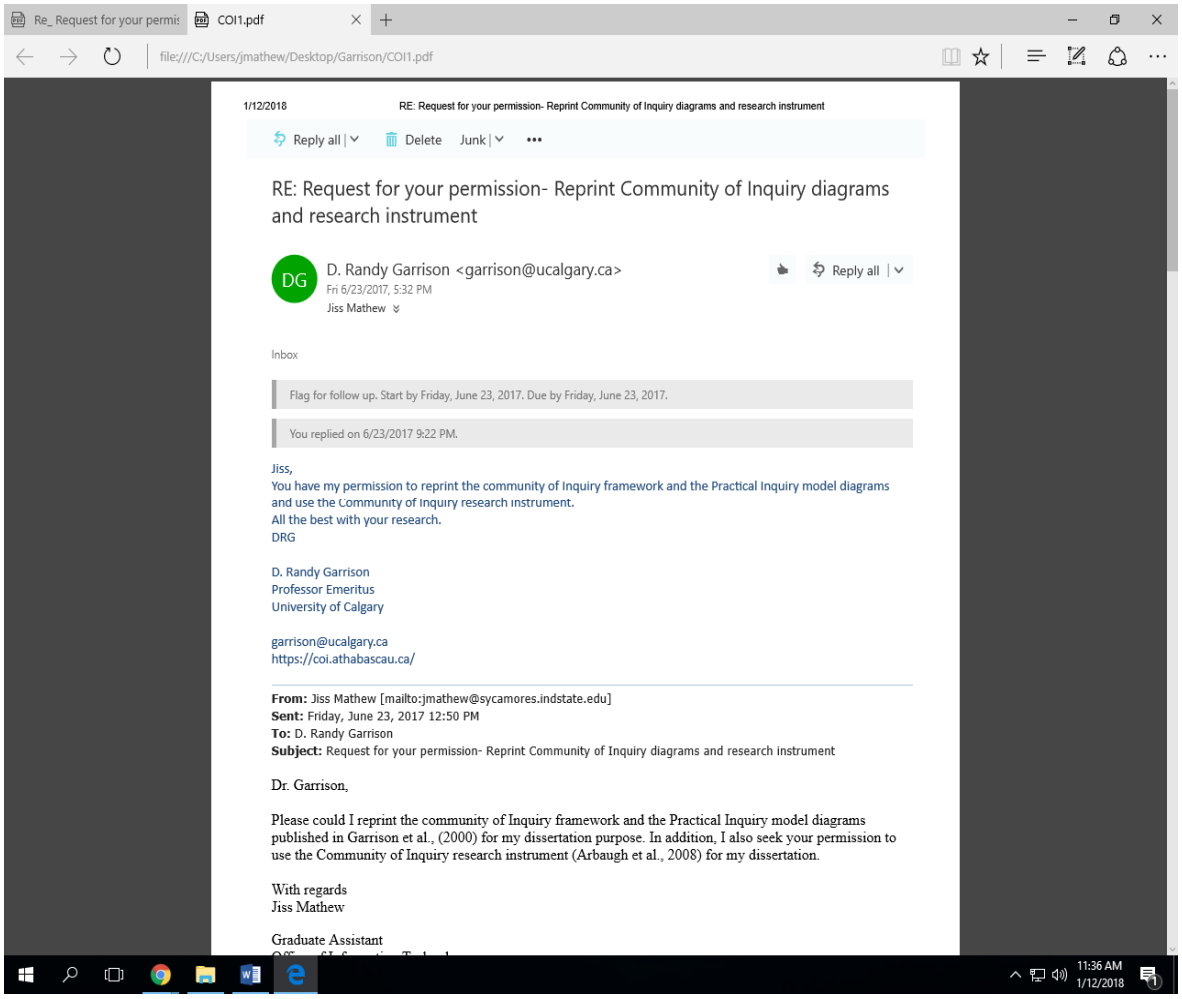
APPENDIX A: LETTER OF CONSENT FOR DIAGRAMS AND SURVEY INSTRUMENT



Re_ Request for your permis | COI1.pdf

file:///C:/Users/jmathew/Desktop/Garrison/COI1.pdf

1/12/2018 RE: Request for your permission- Reprint Community of Inquiry diagrams and research instrument

Reply all | Delete Junk | •••

RE: Request for your permission- Reprint Community of Inquiry diagrams and research instrument

DG D. Randy Garrison <garrison@ucalgary.ca> Reply all

Fri 6/23/2017, 5:32 PM

Jiss Mathew

Inbox

Flag for follow up. Start by Friday, June 23, 2017. Due by Friday, June 23, 2017.

You replied on 6/23/2017 9:22 PM.

Jiss,
You have my permission to reprint the community of Inquiry framework and the Practical Inquiry model diagrams and use the Community of Inquiry research instrument.
All the best with your research.
DRG

D. Randy Garrison
Professor Emeritus
University of Calgary

garrison@ucalgary.ca
https://coi.athabascau.ca/

From: Jiss Mathew [mailto:jmathew@sycamores.indstate.edu]
Sent: Friday, June 23, 2017 12:50 PM
To: D. Randy Garrison
Subject: Request for your permission- Reprint Community of Inquiry diagrams and research instrument

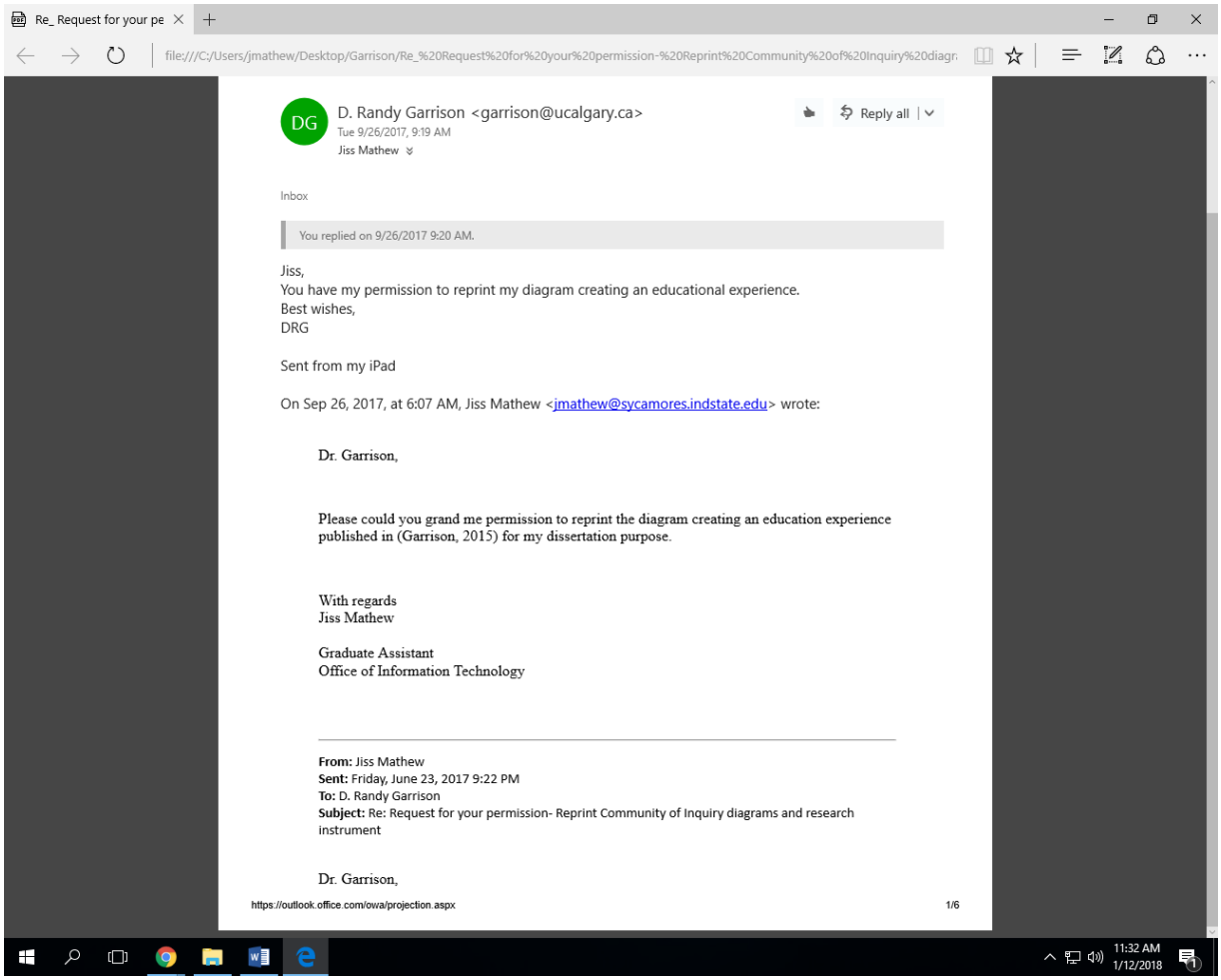
Dr. Garrison,

Please could I reprint the community of Inquiry framework and the Practical Inquiry model diagrams published in Garrison et al., (2000) for my dissertation purpose. In addition, I also seek your permission to use the Community of Inquiry research instrument (Arbaugh et al., 2008) for my dissertation.

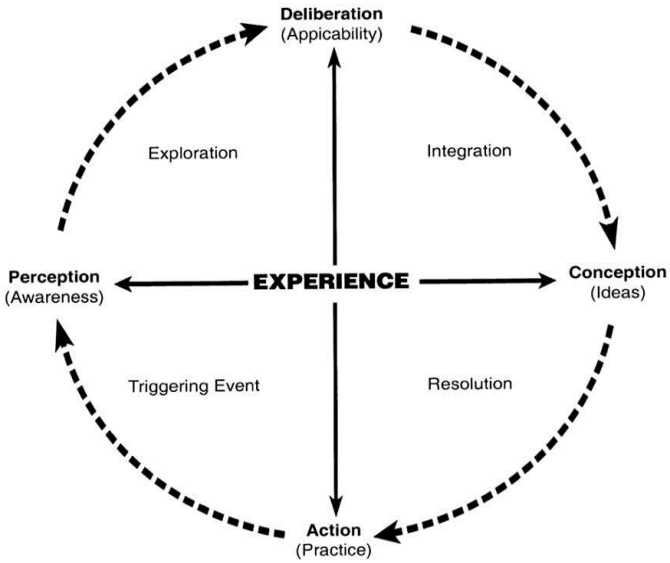
With regards
Jiss Mathew

Graduate Assistant

11:36 AM 1/12/2018



APPENDIX B: THE PRACTICAL INQUIRY MODEL



Note. Adapted from *E-Learning in the 21st Century: A Framework of Research and Practice,* by D. R. Garrison, 2011, p. 46. Copyright 2017 by Garrison et al. Reprinted with permission.

Acknowledgments

I greatly appreciate the valuable contributions of my dissertation chair and the other faculty members who guided me.

Authors contributions

This is a single-author research paper involving all dimensions of the research, including identification of the topic, literature review, data collection, analysis, and writing the conclusion. My research aims to advance our understanding of the cognitive presence in the community of inquiry framework.

Funding

The author declares that no financial support was received during or after the conduct of this study. The author further reports no competing interests related to this research. This study was undertaken solely to address an identified research gap.

Competing interests

The author declares that there are no known competing financial interests or personal relationships that could have influenced the work reported in this paper. This research was conducted solely to advance competency-based, outcome-based education on campus.

Disclosure of AI Use

I used an AI tool to learn about the latest publications on the topic.

Informed consent

Obtained.

Ethics approval

The Publication Ethics Committee of the Sciedu Press.

The journal's policies adhere to the Core Practices established by the Committee on Publication Ethics (COPE).

This study adhered to established ethical standards and best practices. No personal data were collected, and all data analysis and reporting were based solely on aggregated responses. Data collection commenced only after the research had undergone a thorough review and received approval from the ethics committee. Potential participants were informed of the study's purpose, any potential risks, and their rights as participants, and explicit informed consent was obtained before participation. Details of the Institutional Review Board approval are provided in the manuscript.

Provenance and peer review

Not commissioned; externally double-blind peer reviewed.

Data availability statement

The data that support the findings of this study are available on request from the corresponding author. The data are not publicly available due to privacy or ethical restrictions.

Data sharing statement

No additional data are available.