INTERNATIONAL JOURNAL OF ACADEMIC RESEARCH IN BUSINESS & SOCIAL SCIENCES

Vol 14, Issue 11, (2024) E-ISSN: 2222-6990

Exploring the Impact of the Community of Inquiry (CoI) Framework on Student Engagement in Online Courses

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To Link this Article: http://dx.doi.org/10.6007/IJARBSS/v14-i11/23597 DOI:10.6007/IJARBSS/v14-i11/23597

Published Date: 11 November 2024

Abstract

Background: Over the past two decades, the Community of Inquiry (CoI) framework by Garrison et al. has significantly influenced online learning, offering a systematic approach to evaluating educational interactions. Aim: Despite its established role, a specific understanding of how CoI research will evolve and its exact impact on student engagement in online settings remains unclear. Methods: Using the PRISMA method to look at 23 scholarly articles, this Systematic Literature Review (SLR) finds a clear trend in CoI research toward incorporating theories that have a direct effect on student engagement, such as the Unified Theory of Acceptance and Use of Technology (UTAUT). Findings: The review reveals a shift in focus towards experimental studies and mixed methods designs to fill existing knowledge gaps, particularly in understanding CoI's role in motivating students, technology acceptance, and readiness for educational technology. While existing studies primarily focus on students, there is an identified need for research on instructors and diverse student populations. Suggestions: The findings suggest a need for future CoI research to broaden its scope, integrate both qualitative and quantitative methods, and consider cognitive, social, and instructional presence in CoI. The study acknowledges potential biases in the selected papers and limitations in the PRISMA method that could influence the review's comprehensiveness. Recommendations: Contributions from regions like Asia, Africa, and Europe are anticipated to enhance the global understanding of CoI, especially in the context of remote education and the expanding scope of online learning courses.

Keywords: The community of inquiry (CoI), Students' Engagements, Online Courses, SLR

Introduction

Online courses are growing in higher education worldwide. Online course offerings were expected to develop, but the COVID-19 pandemic forced a swift move to online learning to provide students with safe learning environments (Hodges et al., 2020). The outbreak in

March 2020 forced most higher education institutions worldwide to switch to online-only programs (Marsicano, 2020). In recent years, researchers have debated whether educational institutes should offer online courses and programs. These study topics included whether online classrooms were as equivalent to face-to-face classrooms (Wisneski et al., 2017), if faculty were equipped to teach online (Martin et al., 2018), and whether campus-enrolled students could attend online courses for degree completion (Wavle & Ozogul, 2019). However, with the COVID-19 pandemic, many higher education institutions are delivering online courses and degree programmes totally online (Xie et al., 2020), since the goal is now to promote continuity of teaching and a range of audiences (Lockee, 2021).

Online course research often uses Community of Inquiry (CoI) theory. The Community of Inquiry framework, initially proposed by Garrison, Anderson, and Archer in 2000 (Garrison et al., 2000), offers a comprehensive theoretical perspective on the dynamics of online learning environments. Rooted in the philosophical tradition of inquiry, the CoI framework asserts that successful online learning is contingent upon the development of a community where cognitive presence, social presence, and teaching presence intersect. These three elements are believed to be fundamental in creating an engaging and intellectually stimulating online learning experience. Over the past two decades, the CoI framework has gained significant traction in both research and practice in the field of online education. It has been applied across various educational contexts, including higher education, K-12, corporate training, and lifelong learning.

This research rational is to determine the effect that CoI has on the engagement of online students. The future trajectory and research developments of the CoI framework, which has played a crucial role in defining online learning, are not entirely clear. This is especially true with respect to its influence on student involvement in online learning settings. A tendency in CoI research, such as the incorporation of several theories and models that are directly associated with student participation in online learning, are identified via the analysis of 23 academic publications in this SLR. Furthermore, to address the existing research void and include theoretical frameworks. The SLR seeks to address knowledge gaps on the theoretical integration of CoI in online courses. The study's primary inquiries encompass the identification of prevalent theories that are integrated with CoI, the classification of online learning modules and educational environments that are linked to CoI, the sample types utilised in previous research, the methodologies and approaches utilised for research and analysis, and the geographic dispersion of the studies. Additionally, the research examines the future course of action suggested by prior studies, such as (Abuhassna & Alnawajha, 2023a; Abuhassna & Alnawajha, 2023b) Notably, the SLR uncovers that most publications amalgamate CoI with other frameworks or theories, suggesting a trend towards incorporating CoI with more pertinent theories that are specifically pertinent to student involvement in online learning. This phenomenon underscores the need of broadening the scope of CoI research to include supplementary variables, including student motivation, acceptance of technology, and preparedness for technology integration in education. Accordingly, a rich and relevant online learning environment is often described by Garrison et al. (Garrison et al., 2010), CoI model, which combines cognitive, social, and teaching presence (Garrison et al., 2010) The degree to which members of a certain configuration of an inquiry community may construct meaning via protracted dialogue is called cognitive presence (Garrison et al., 2010). Online students' social presence is their emotional and social connection to one other

(Garrison et al., 2010) Teaching presence is the design, facilitation, and direction of cognitive and social processes to generate personally relevant and educationally worthwhile learning outcomes (Garrison et al., 2010)

This systematic literature review aims to provide a comprehensive examination of the CoI framework's evolution, its application in diverse educational settings, and the empirical evidence supporting its efficacy in enhancing student engagement through online learning. A rich and relevant online learning environment is often described by Garrison et al. (Garrison et al., 2010) CoI model, which combines cognitive, social, and teaching presence (Garrison et al., 2010) The degree to which members of a certain configuration of an inquiry community may construct meaning via protracted dialogue is called cognitive presence (Garrison et al., 2010) Online students' social presence is their emotional and social connection to one other (Garrison et al., 2010) Teaching presence is the design, facilitation, and direction of cognitive and social processes to generate personally relevant and educationally worthwhile learning outcomes (Garrison et al., 2010) Figure 1 illustrates the CoI model and the combination of cognitive, social, and teaching presence.

Figure 1. The CoI model and the combination of cognitive, social, and teaching presence.

Student connection and commitment to learning goals make engagement a critical component of educational environments (Swan, 2001). Engaged students are more likely to learn and be happy while taking courses online (Anderson et al., 2001). Instructors' interest and passion for teaching, establishing course content relevance to learners, and promoting a shared responsibility for the teaching, and learning process were found to have the greatest impact on students' engagement and intellectual curiosity in a structured online learning environment (Richardson & Newby, 2006). Researchers (Kucuk & Richardson, 2019) discovered that chat roles and group reflections improved student-student engagement throughout four synchronous chat exchanges in an introductory course on sustainability. According to (Orcutt & Dringus, 2017), students were more interested in discussing and

debating controversial issues that had direct applications to their lives. According to the results of a student poll, (Truhlar et al., 2018) interaction techniques between students and teachers are the most well-liked.

The purpose of this study was to examine how the CoI framework influences participation in online classes. Therefore, the purpose of this study is to perform an SLR that fills in the gaps in knowledge on the research needs of CoI in online learning courses and the integration of theory into future aims. With this in mind, we've come up with the following study questions.

- What are the key theoretical approaches used in conjunction with the (CoI) framework?
- What are the common online learning modules associated with (CoI) framework?
- What is the common educational context integrated with (CoI) framework?
- What kinds of samples were used in the prior studies with (CoI) framework?
- What research methods were used for the preceding studies with (CoI) framework?
- What analyses approaches were used for the preceding studies with (CoI) framework?
- In which geographical regions have studies related to the (CoI) framework been conducted?
- What is the future agenda recommended by preceding studies with (CoI) framework?

Materials and Methods

In conducting this SLR, we adopted the PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) framework as our guiding methodology. PRISMA, developed by Moher, Liberati, Tetzlaff, and Altman (Moher et al., 2009), offers a robust and standardized approach for identifying, evaluating, and synthesizing research findings in systematic reviews and meta-analyses. The choice of PRISMA for this study is driven by its well-established efficacy in ensuring the comprehensiveness and transparency of literature reviews. By adhering to the PRISMA checklist and flow diagram, our review process aims to minimize bias and maximize the reliability of findings, thereby offering a clear and replicable methodology for analyzing the evolution and application of the CoI framework in online learning. This systematic approach allows for a detailed and unbiased examination of existing literature, ensuring that the review encompasses a broad spectrum of studies and provides a balanced understanding of the CoI framework's impact on student engagement in online educational settings.

Exclusion and Inclusion Criteria

To align closely with our research objectives, the inclusion criteria were tailored to select studies that explicitly discuss the CoI framework in various online learning contexts. This approach was vital to address our research questions about the key theoretical approaches, online learning modules, and educational contexts integrated with CoI. Conversely, studies that did not directly engage with the CoI framework or were outside the scope of online learning were excluded. All the eligibility requirements for this SLR are shown in Table 1.

Table 1
The criteria for inclusion and exclusion in this analysis

Inclusion criteria	Exclusion criteria
CoI research in online learning courses	Book chapters, thesis, blogs
CoI presences	Any other languages than English is excluded
Cognitive presence	Publications in 2023 have been excluded
Social presence	
Teaching presence	
Students' engagement	
Limited to articles only	
Limited to English language only	
The period of 2010 to 2022	

Data Sources and Search Techniques

In August 2023, we conducted a thorough search across Scopus database. Key search terms used were 'Community of Inquiry', 'online learning', and 'student engagement', among others. This process ensured a wide net was cast to capture all relevant literature in the field. All articles from 2010 through 2022 that were found in the proper databases were analyzed; 2023 was left out since it was not yet complete. In order to get access to the appropriate articles, the phrase "PUBYEAR > 2009 AND PUBYEAR 2023" was utilized. Scopus was chosen as a data source since it is one of the most widely used indexing services in the world. This SLR ensures comprehensive coverage of the relevant academic literature by using a precise and exhaustive list of keywords and search terms. Title-Abbreviation-Keyword combinations like "students' involvement," "community," "of," and "inquiry" were employed.

Initially, 455 articles were identified. This number was first reduced to 95 based on titles and abstracts that closely aligned with our research questions. Further screening based on full-text reviews, focusing on relevance and study quality, narrowed the pool to 66 articles. The final selection of 23 articles was based on stringent criteria that included the depth of CoI framework discussion and empirical evidence supporting its impact on online learning.

The researchers, for use in this study afterward, retrieved the article data produced by Scopus. Initially, there were 455 articles, but after applying the inclusion and exclusion criteria the refined papers came to 95 papers. For instance, the publications were limited to three main subject areas, "social science", "computer science" and "arts", the filter was applied is (LIMIT-TO (SUBJAREA, "SOCI") OR LIMIT-TO (SUBJAREA, "COMP") OR LIMIT-TO (SUBJAREA, "ARTS"). Second document type was limited to "articles" only, (LIMIT-TO (DOCTYPE, "ar"). Thirdly, language was set to "English language only", (LANGUAGE, "English"). then, source type was limited to "journals" only, (LIMIT-TO (SRCTYPE, "j")) AND (LIMIT-TO (PUBSTAGE, "final"). Moreover, the refined papers were 95. Then, we went through each of the 95 included papers and downloaded their whole articles. Only 66 of the 95 items were successfully extracted despite our best efforts.

The present research used a manual review approach to reduce the original selection of articles from 95 to 66, in accordance with predetermined inclusion and exclusion criteria. The validity of the research was assessed according to these criteria, which included their geographical coverage, statistical methodologies, sample composition, and viewpoints

toward the incorporation of the Community of Inquiry (CoI) framework. Notwithstanding the extensive array of subjects addressed, the investigation endeavoured to maintain a focus on CoI.

The exclusion criteria were crucial in the selection process's further refinement. A considerable proportion of the articles, precisely 43, were omitted on the grounds that they failed to integrate the CoI framework into their investigations, addressed a community idea distinct from CoI, or used sources that were unconventional in academic research environments. By rigorously applying the exclusion criteria, it was guaranteed that the remaining 23 articles adhered to the rigorous academic standards anticipated in the area and were directly pertinent to the CoI framework. The approach was led by the PRISMA checklist, which is shown in Figure 2 of the research. The ultimate selection of articles for inclusion was reached by unanimous agreement among all authors.

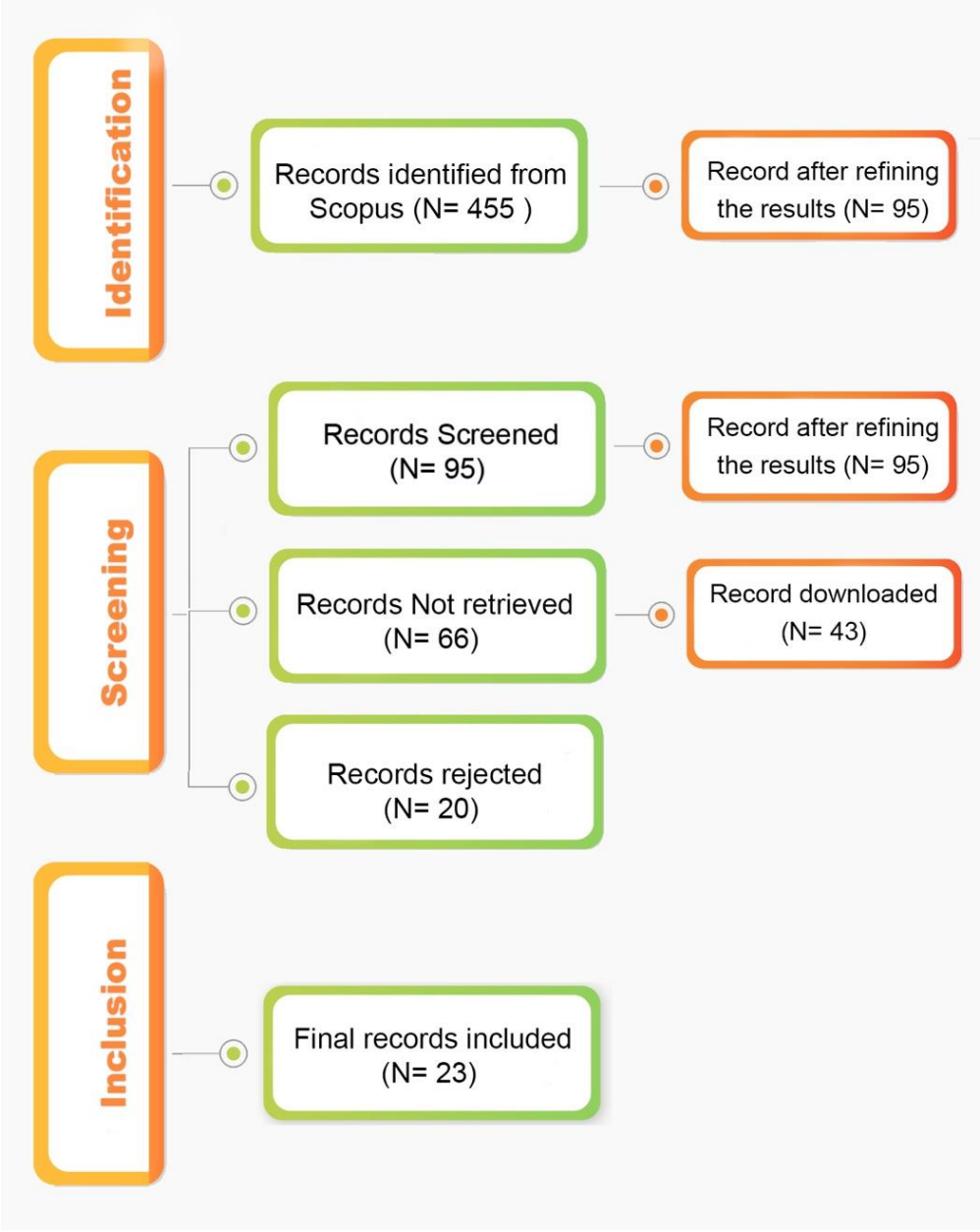

Figure 2. The PRISMA framework for this analysis.

Results

To achieve the goal of this study, we conducted a critical and analytical literature review of the 23 publications uncovered, analyzed, and incorporated by PRISMA (Moher et al., 2009) to determine the current state and future agenda of the community of inquiry (CoI) framework and its connection to students' interactions in online courses. Appendices A and B include an exhaustive bibliography of the articles consulted for this research.

Theories integrated with CoI

Most articles combine CoI with other theories or frameworks. 13 out of 23 articles, or 56.5% of the total, feature additional theories or frameworks besides the CoI. Based on the systematic analyses most of the papers (n=13) built their studies based on CoI. Moreover, there were few studies that integrated CoI with different framework for instance, (Page et al., 2021) study utilized Vygotsky's zone of proximal development, cognitive and mind tools, Constructivist theory of cognitive apprenticeship, and CoI. Moreover, (Chen, 2022) utilized CoI and ICAP as the theoretical framework of the study. A study (Wilkinson, 2022) used CoI and self-identity theory. A study by (Nasir & Ngah, 2022) used CoI and UTAUT model. A study by (Parrish et al., 2021) utilized CoI And the conceptualization of learning engagement. A study by (Bamoallem & Altarteer, 2022) used CoI and FOLE engagement. (Cancino & Avila, 2021) utilized the Integrated Methodological Framework (IMF) Communities of Practice (CoP) and Community of Inquiry (CoI) frameworks. Moreover, (Kucuk & Richardson, 2019) utilized the Constructivism, Andragogy and heutagogy, Digital learning presence and CoI. Finally, (Jan & Vlachopoulos, 2018) used the integration of the conceptualization of Pedagogical Content Knowledge (PCK), The scientific inquiry, and the 5E Instructional Model of the Biological Sciences Curriculum Study. Table 2 illustrates the common theories integrated with CoI.

Table 2

The common theories integrated with COI.

CoI Framework (56.5%), (n=13) was used as a theoretical framework	Theory integration (43.5%), (n=10)
CoI Framework without any integration	Vygotsky's zone of proximal development.
	Cognitive and mind tools.
	Constructivist theory of cognitive apprenticeship
	ICAP
	Self-identity theory
	UTAUT model.
	The conceptualization of learning engagement
	FOLE engagement
	Integrated Methodological Framework (IMF)
	Communities of Practice (CoP)
	Constructivism
	Andragogy and heutagogy
	Digital learning presence
	The conceptualization of Pedagogical Content Knowledge (PCK)
	The scientific inquiry.
	the 5E Instructional Model of the Biological Sciences Curriculum Study.

Online Learning Modules Integrated with CoI

This section is meant to describe in detail the online learning integrated with COI. The CoI method aggregates scores from first-order constructs including generating and organizing, facilitating, and directing instruction to assess instructional presence. In another second-order concept, "social presence," first-order structures include expressing emotions online with friends, sharing knowledge, and creating rapport with a group. Cognitive presence, like the previous concept, is a second-order construct that defines how students learn and apply course information. In this analysis, we divided the article into sections according to the types of online learning modules that have been used. After carefully examining all 23 articles, we found that each one made use of a unique set of modules, such as hybrid or online delivery Buelow et al (2018), or a blended learning module (the social networking site "Facebook"). Then Page et al (2021), used an e-learning environment and the Structured Peer Evaluation System. Goode et al (2022), used an online environment using interactive content and strategies. Chen (2022), used MOOC asynchronous courses in addition to discussion forums. On the other hand, Wilkinson (2022), utilized the online digital approach; next, Rosser-Majors et al (2022), applied discussion forum posts; in the meantime, both Farrow et al (2021); Suriagiri et al (2022), haven't mentioned any information about the methodologies applied in their studies. A study by Ozogul et al (2022), applied virtual learning environments (VLE). Then Rioch & Tharp (2022), utilized community-based learning (CBL). Moreover, (Duha et al., 2022) utilized the Integrated Online—Team-Based Learning (IO-TBL) model. In addition, Nasir & Ngah (2022), utilized remote online learning. Then a study by Thabethe & Reddy,(2021), followed the online and blended subjects. Another study (Parrish et al., 2021) used the technology of recorded courses, named “Air Class," on China Education Television (CETV). Moreover, a study by Bamoallem & Altarteer (2022) used both the Learning Management System (LMS) computer and Assisted Language Learning (CALL). Thus, this study Fan et al (2021) used online learning environments. Moreover, Li et al (2021), applied community-building strategies to the virtual classroom and Cancino & Avila (2021), utilized community-based learning, Moreover, the study by (Kucuk & Richardson, 2019) used the integration of blogs, discussion boards, wikis, and 3D virtual worlds. Both Berry (2019); Jan & Vlachopoulos (2018), used online discussion. and, finally Gregory & Bannister-Tyrrell (2017), utilized Moodle and Wallwisher in their study. The online learning modules that have been implemented, as well as the specifics of their implementation plan, are shown in Table 3.

Table 3
The online learning modules and the Modules tools and activities.

Article	Online modules	Modules tools and activities
(Buelow et al., 2018)	hybrid or online delivery	quizzes, interactive videos, slides, Mentimeter, and Microsoft Forms polls. Active, guided Zoom or Blackboard.
(Martin	blended learning module (Social networking site Facebook)	Facebook learning course
(Page et al., 2021)	e-learning environment the Structured Peer Evaluation System	Learning Module Options, Sixty Seconds of Knowledge: Video Clips, Navigating the Peer Review Process: Support Tools, Interactive Learning Activities, Getting Started: Questions & Prompts, and Final Project Rubric Reminder were the modules.
(Goode et al., 2022)	online environment using interactive content and strategies	Module 1: Introduction to Instructor Presence\ Module 2: Cognitive Presence Part One\ Module 3: Cognitive Presence Part Two\ Module 4: Social Presence Part One\ Module 5: Social Presence Part Two\ Module 6: Teaching Presence\ Module 7: Applying All Three Areas of Presence (Included a post-assessment)
(Chen, 2022)	MOOC asynchronous course discussion forums	• Constructive reasoning: explaining course material. • Constructive extending: suggesting ideas, giving resources, or asking questions outside course subject. Paraphrasing or asking questions about course material is active targeted. • Active general: exhibiting additional course engagement indications.
(Wilkinson, 2022)	online digital approach	(interest/enjoyment, competence, autonomy, and belongingness) affect digital engagement and online class satisfaction vs on-campus psychological engagement and physical class satisfaction.
(Rosser-Majors et al., 2022)	discussion forum posts	discussion postings hosted in-class activities (e.g., case discussion, guest speaker discussion, evaluation concepts, evaluation models discussion).
(Farrow et al., 2021)	N\A	N\A
(Suriagiri et al., 2022)	N\A	N\A
(Ozogul et al., 2022)	virtual learning environments (VLE)	virtual learning environments (VLE)
(Rioch & Tharp, 2022)	community-based learning (CBL)	1) Introduction to Community Development, 2) Institutions, 3) Development Theories, 4) Local Economic Development, 5) Project Planning, 6) Community Profiling, 7) Local Government and Community Development, 8) CBL, 9) Contemporary Issues, and 10) Population and Community Development.
(Duha et al., 2022)	Integrated Online—Team-	IO-TBL implements through LMS

	Based Learning (IO-TBL) model	
(Nasir & Ngah, 2022)	remote online learning	Design studio classes, Hands-on courses.
(Thabethe & Reddy, 2021)	Online and blended subjects	Course Content (CC) and Teacher Input (TI) and indicators of student engagement (SE).
(Parrish et al., 2021)	recorded courses, named "Air Class" China Education Television (CETV)	Classes on China Education Television (CETV), PowerPoint presentations and text-based conversations were used in live courses. QQ, DingTalk, WeChat, and Seewo are the most popular online education platforms.
(Bamoallem & Altarteer, 2022)	Learning Management System (LMSs) Computer Assisted Language Learning (CALL)	This web conferencing LMS, Blackboard Collaborate simulates an online classroom for students and instructors. Features include screen sharing, virtual hand raising, on-screen conversation, and document sharing.
(Fan et al., 2021)	online learning environments	Online learning environment.
(Li et al., 2021)	Community-Building Strategies for the Virtual Classroom	Web conferencing software Adobe Connect hosted courses.
(Cancino & Avila, 2021)	Community-Based Learning	The training Course has three 3-week discussion forums, and Moodle interaction
(Kucuk & Richardson, 2019)	Blogs, Discussion boards, Wiki, 3D virtual worlds	Face-to-face observations, online postings on discussion boards, wikis, and 3D virtual worlds.
(Berry, 2019)	Online Discussion	The program employed topic experts' template courses.
(Jan & Vlachopoulos, 2018)	Online Discussion	IDEA Student Ratings of Instruction (SRI) Diagnostic Feedback course assessment instrument.
(Gregory & Bannister-Tyrrell, 2017)	Moodle and Wallwisher	Users of Wallwisher may submit brief queries and get rapid replies. The instructors in our research used Moodle for group discussions and as a repository for materials and activities, while they utilized Wallwisher to post short queries, share or reply to ideas.

Educational Context Integrated with COI

After conducting an in-depth analysis of 23 research papers, we came to the conclusion that the current educational environment can be broken down into three primary categories: distance learning, blended learning, and online learning. In addition, it was discovered that the majority of the papers that were examined make use of "online learning" as the educational context for their work (N = 14), with a percentage of 60%, for example having utilized online learning as the educational context in their studies. In the second category, six studies utilized "blended learning" as the educational context of their studies (N = 6), with a percentage of 26%. For instance, (Martin & Bolliger, 2018) utilized blended learning (face-to-face and online Facebook groups). In addition, (Wilkinson, 2022) used both online and on-campus, (Nasir & Ngah, 2022) used blended learning, (Kucuk & Richardson, 2019) used online and face-to-face, (Gregory & Bannister-Tyrrell, 2017) used blended learning environments,

and finally, (Thabethe & Reddy, 2021) used online and blended courses. as the third category (N = 3) with a percentage of 14%. (Page et al., 2021) utilized online and continuing education, and (Chen, 2022) used distance learning as the educational context. Finally, one study (Jan & Vlachopoulos, 2018) did not identify the educational context utilized in their study. Figure 3 presents a breakdown, by percentage of utilization, of the educational contexts that have been integrated with CoI.

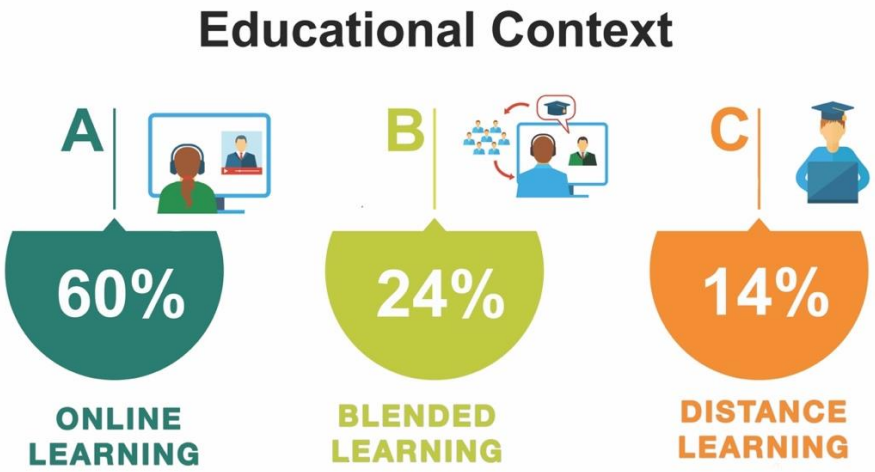

Figure 3. The educational contexts that have been integrated with CoI.

Types of Samples

For future research to be justified and the current knowledge gap in COI framework and student engagement in online courses to be understood, it is crucial to have a firm grasp on the kind of sample being used. Since the goal of CoI is to enhance students' experiences in online learning environments, all research on the topic is done among students, instructors, and administrators. We can state with some certainty that students make up the great majority of samples in CoI research and student engagement in online courses. Based on our analysis of the samples utilized in the chosen articles, sixteen (N = 16) samples were collected in total, with 70% coming from students. For instance, all these studies sampled students . Only three (N = 3) studies (13%) had samples of instructors. Also, one study (Rioch & Tharp, 2022), had students and an academic coordinator as samples.

Moreover, (Kucuk & Richardson, 2019) used undergraduate pre-service teachers and postgraduate education students as samples for the study. And (Jan & Vlachopoulos, 2018) had one senior institutional manager, one senior research professor specializing in distance education, one senior methodologist, and one distance education consultant specialist. Finally, the (Gregory & Bannister-Tyrrell, 2017) study had both instructors and students as samples.

Samples from both students and teachers might be part of an investigation of what drives the online learning process from the perspective of the learner and the teacher. In addition, students will work closely with module coordinators under the supervision of faculty administrators to get a thorough understanding of the essential elements of course design principles based on the COI framework and student participation in online courses. Figure 4 illustrates the sample distribution of the study.

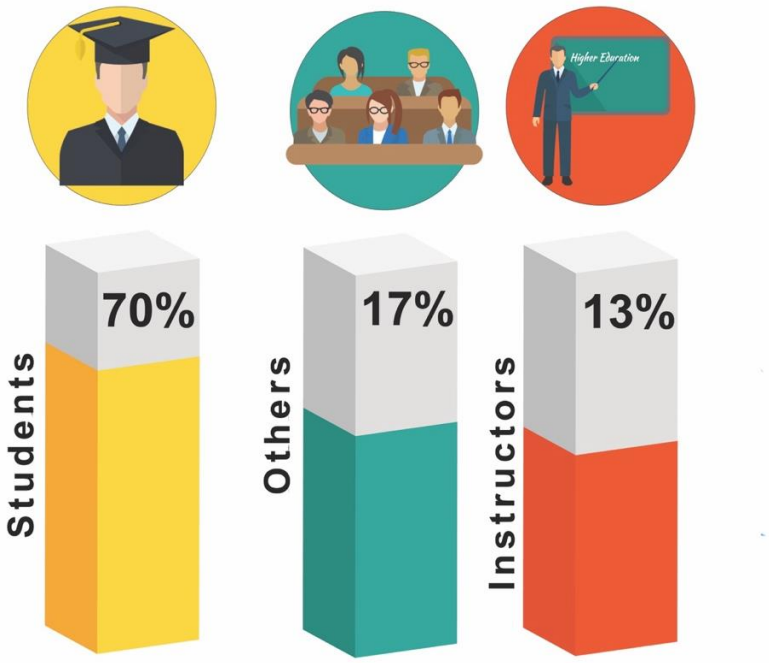

Figure 4. The sample distribution of the study.

Research Methods and data Analysis Approaches

Early in CoI development, various research methods were used to determine the relationships between CoI components which are cognitive, social, and teaching presence. In this analysis, we have found that the methodologies that were used may be broken down into three primary classifications: quantitative, Qualitative, and Mixed methods. Both quantitative and qualitative approaches were used in equal measure. For example, nine papers used qualitative methods (N = 9), accounting for 39% .In addition, few studies specified the type of qualitative study they employed; for instance, Chen (2022), utilized discussion forum messages, Parrish et al (2021) , employed semi-structured interviews and observations, (Li et al., 2021) employed a case study, (Jan & Vlachopoulos, 2018) employed a hermeneutic textual analysis, and [41] employed an interpretive methodology as the research design. In addition, in the second category, nine quantitative techniques were used by nine studies (N = 9), representing 39%.

Lastly, the third group is the mixed method, which consists of just five studies (N = 5) and a proportion of 22%; these investigations Page et al (2021), use combined methodologies to design quantitative and qualitative approaches. Rosser-Majors et al (2022), used a mixed-methods approach, including a survey, an interview, and online discussion boards. Bamoallem & Altarteer (2022), used a questionnaire and a semi-structured interview as part of mixed-methods exploratory research. Kucuk & Richardson (2019), employed mixed methods, quantitative and qualitative; Berry (2019), utilized mixed methods, quantitative post-hoc analysis, and qualitative. Figure 5 illustrates the methodology approaches.

Second, we examined the studies' reliance on statistical analysis and tests. First, the methods of analysis used to sift through qualitative papers ranged from thematic to cluster to interview to handwritten notes from the researcher. Method of Post-Term Questionnaires, Discussion

thread content, Data gathered from student responses, online postings, classroom observations, and teacher notes. In addition, questionnaires were widely employed as the primary data collection method in quantitative investigations.

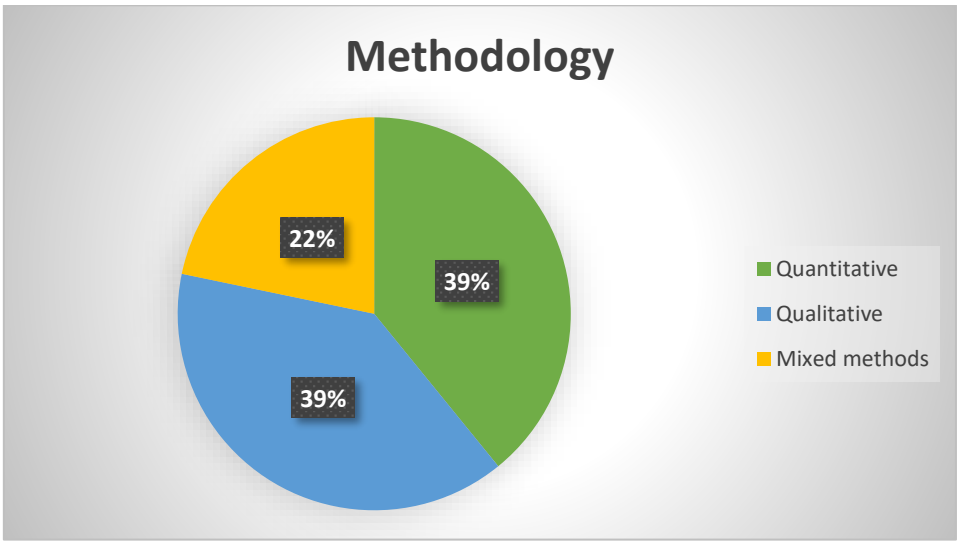

Figure 5. The methodology approaches.

Geographical Locations

The research on the COI framework and student engagement in online courses spans a wide range of locations. Therefore, specific locations are not emphasized. Despite this, there are several signs of intense scientific activity in the United States. Seven studies (N=7), or 30% . were carried out in the United States. Australia accounted for 17% of the studies (N=4) .The United Kingdom has two studies (N=2), with a combined 9 %. South Africa also hosted two more studies (N=2), for a total of 9% [29, 40]. Nine studies were undertaken in different parts of the globe, accounting for 35% of the total. Of these took place in Indonesia, Malaysia, Taiwan, Saudi Arabia, China, The Republic of Chile, Turkey, and New Zealand. Figure 6 illustrates the geographical distribution of the COI framework and student engagement in online courses.

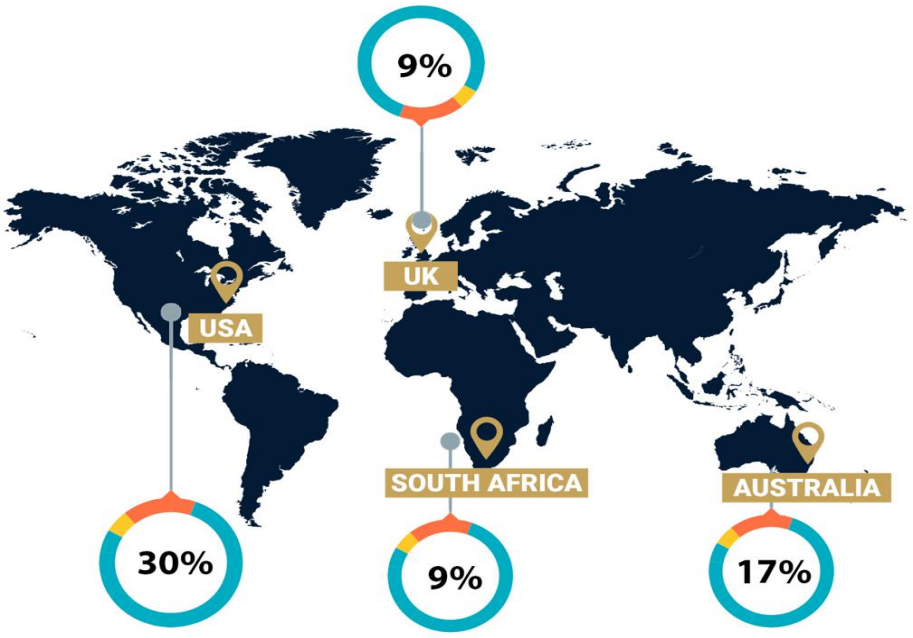

Figure 6. The geographical distribution of the COI framework and student engagement in online courses.

Geographical Locations

To begin, Buelow et al (2018), suggests providing students with access to a variety of high-quality synchronous and asynchronous activities based on active learning and communities of inquiry to boost student learning, engagement, and achievement. Page et al (2021), Students' ability to understand and take part in peer review is enhanced through structured learning, scaffolded learning, and supplementary tools and resources. Rosser-Majors et al (2022) , Students in this asynchronous online course were able to maintain their cognitive engagement thanks to the instructor's active participation in discussions, the course's emphasis on hands-on projects, the weekly recap and orientation videos, the feedback, the case-based discussions, and the overall teacher presence. There is no correlation between the quality of an online course and student outcomes like satisfaction, engagement, and attendance. The ramifications are discussed. Ozogul et al (2022), To better the literature on the first order subcategories of each second-order presence variable and course satisfaction, it is recommended to research presence and other relevant components. There is a lack of literature and a lack of clarity around the manifestation of the presence and satisfaction parts of the CoI model in LMS. The studies on presence and distance education have varying degrees of quality. While there is some evidence that being present might improve your mood, level of engagement, and ability to learn, there are still many questions that could be explored further and inspire new works of literature.

Community engagement academics should use CBL as a teaching tool (Rioch & Tharp, 2022). Duha et al (2022), While online synchronous meetings have advantages, The mix of synchronous meetings and student teams was crucial without IO-TBL. The CoI framework should emphasize the learner's efforts and the technology employed. Integrating quantitative and qualitative data may provide a more complete picture of student involvement, cognitive comprehension, and knowledge building. Bamoallem & Altarteer (2022), In online learning

contexts like those studied in this study, teacher training on technological skills and online pedagogical modifications is even more important. Fan et al (2021), Thus, online instructors and instructional designers should use CoI framework teaching and cognitive presence tactics. Li et al (2021), Exploring online teaching approaches is a crucial first step to improve online learning, but more study is needed on students' evaluations of their effectiveness. More study is required on how teachers' cognitive presence tactics affect students' community. Cancino & Avila (2021), Last but not least, group proactive messages or postings appear to get more reaction. Tutors should address the whole group in their contributions, at least at the start of a discussion forum. The CoI framework showed us how networked environments may be utilized to build hybrid spaces that extend classroom engagement and add additional levels of knowledge production to support students' rising authority and responsibility for their learning.

Discussion

The COI framework has seen significant use in the realms of online education, remote learning, and education generally. COI's widespread acceptance means it's being used by a wide range of schools throughout the globe to improve their knowledge of online education, design effective classroom settings, and prepare for the widespread rollout of these initiatives. When it comes to online education, there is a gap in our understanding of the future of the COI framework, its current state of development, and the areas in which more study is required. This SLR thus makes an effort to describe the development and planned outcomes of the CoI structure and how they relate to student participation in online classes. The Contributions of the COI Framework to Our Understanding of Virtual Learning Environments. Experts in the field will benefit from this study since it would provide light on the future direction of the COI framework and highlight any research gaps that might be exploited to launch fresh new initiatives.

Theories Integrated with COI

The use of this SLR led to the discovery of various fascinating and important features. According to the findings of our investigation, the majority of published publications combine CoI with other theoretical frameworks or models. Despite this, there seems to be a rising trend away from incorporating CoI into broader theoretical frameworks. Integration of CoI with other theories was, for some reason, to explore some external factors that are missing in CoI; these factors are directly related to students in online learning contexts, such as the need for educators to provide a range of high-quality synchronous and asynchronous experiences based on active learning and inquiry-based pedagogies, as evidenced by the sample under consideration. Students' prior exposure to online learning did not predict their current levels of satisfaction with enthusiasm for, or cognitive and pedagogical presence in the classroom (Buelow et al., 2018).

In light of the fact that the publications under consideration included additional theoretical frameworks into CoI, for instance, Chen (2022), used CoI and ICAP as the theoretical framework for the research they conducted. CoI and self-identity theory were used in an investigation (Wilkinson, 2022). In their research, Nasir & Ngah (2022), employed both the CoI and UTAUT models. CoI and a conceptualization of learner engagement were both applied in research that was referred to as (Parrish et al., 2021). Bamoallem & Altarteer (2022), conducted research that included both CoI and FOLE involvement. Cancino & Avila (2021),

made use of the Communities of Practice (CoP) and Community of Inquiry (CoI) frameworks that are included in the Integrated Methodological Framework (IMF). In addition, Kucuk & Richardson (2019), made use of constructivism, andragogy and heutagogy, digital learning presence, and the community of inquiry (CoI). In the end, (Jan & Vlachopoulos, 2018) used the combination of The Conceptualization of Pedagogical Content Knowledge (5E Instructional Model), The Scientific Inquiry, and the 5E Instructional Model in their Biological Sciences Curriculum Study.

It is expected that our recommendations for future research in CoI in the context of students' engagement through online learning courses will place a greater emphasis on the integration of Coi with other theories and models, such as the technology acceptance model, in order to investigate students' acceptance of the technology itself, along with their readiness and willingness to use it in the learning process. The results of this rigorous investigation provide the basis for these predictions.

Online Learning Modules Integrated with CoI

Online learning modules integrated with a Community of Inquiry (CoI) framework can enhance the quality of online education by promoting a sense of community, meaningful interaction, and critical thinking among learners. The CoI framework, developed by Garrison, Anderson, and Archer (Garrison et al., 2000), consists of three essential components:

Cognitive Presence: This refers to the extent to which learners are able to construct meaning through sustained communication .In the context of online learning modules, here's how to integrate cognitive presence: Problem-Based Learning: Design learning modules that present real-world problems or scenarios that require critical thinking and problem-solving. Encourage learners to discuss and explore these problems within the online community. Collaborative Activities: Include group projects, case studies, or collaborative assignments within the modules. These activities should prompt learners to engage in deep discussions, share ideas, and analyze information collectively. Reflective Activities: Integrate regular reflection exercises, such as journaling or discussion prompts, that encourage learners to connect their experiences and prior knowledge to the module content.

Social Presence: This involves the ability of learners to project their personal characteristics into the online community and establish a sense of belonging. To foster social presence: Icebreakers and Introductions: Start the module with icebreaker activities or introductions where learners can share their backgrounds, interests, and goals. This helps create a friendly and welcoming atmosphere. Discussion Forums: Use discussion forums or online platforms that facilitate both synchronous and asynchronous communication. Encourage learners to engage in meaningful discussions, share personal experiences, and support each other . Instructor Engagement: Instructors should actively participate in discussions, provide feedback, and create a supportive online presence. This helps build a sense of connection between learners and instructors.

Teaching Presence: This is the design and facilitation of online learning experiences. To integrate teaching presence effectively .Clear Learning Objectives: Ensure that module objectives and expectations are clearly communicated to learners. They should know what to expect from the module and how they will be assessed. Structured Learning Activities:

Organize the module content logically and provide a structured learning path. Use multimedia, interactive elements, and varied resources to engage learners. Facilitation and Feedback: Be an active facilitator by guiding discussions, providing timely feedback, and addressing learner questions or concerns. Encourage critical thinking by posing thought-provoking questions Assessment and Evaluation: Use diverse assessment methods that align with the learning objectives. Provide constructive feedback on assignments, quizzes, or projects to help learners improve .

In summary, integrating a Community of Inquiry framework into online learning modules requires thoughtful design, active facilitation, and the use of appropriate technologies to foster cognitive, social, and teaching presence. This approach can create a more engaging and effective online learning experience for students.

Educational Context Integrated with COI

When integrated CoI with an educational context, the CoI framework can enhance the quality of teaching and learning.

Community presence refers to the development of a supportive and collaborative learning environment. In an educational context, this means fostering a sense of belonging and connection among students and between students and instructors.

To integrate CoI with this aspect, educators can Create opportunities for students to interact with one another, such as through discussion forums, group projects, or collaborative activities. Foster a sense of trust and mutual respect among participants. Encourage open and respectful communication, it was discovered that most of the papers that were examined make use of online learning having utilized online learning as the educational context in their studies.

Cognitive Presence: Cognitive presence focuses on the intellectual aspects of learning. In an educational context, this means guiding students through the process of critical thinking, problem-solving, and knowledge construction. Thus, Blended learning was utilized as the educational context of their studies. For instance, Martin & Bolliger (2018), utilized blended learning (face-to-face and online Facebook groups). In addition, Wilkinson (2022), used both online and on-campus, Nasir & Ngah (2022), used blended learning, Kucuk & Richardson (2019), used online and face-to-face, Gregory & Bannister-Tyrrel, (2017), used blended learning environments, and finally, Thabethe & Reddy (2021), used online and blended courses. To integrate CoI with this aspect, educators can. Design learning activities that challenge students to think deeply about course content. Facilitate discussions that encourage exploration, inquiry, and reflection. Provide clear learning objectives and scaffolded support for students' cognitive development.

Teaching Presence: Teaching presence involves the role of the instructor in guiding and facilitating the learning process. Moreover, Chen (2022), used distance learning as the educational context. Finally, one study Jan & Vlachopoulos (2018), did not identify the educational context utilized in their study. In an educational context, this means taking an active role in course design, instruction, and assessment. To integrate CoI with this aspect, educators can Develop well-structured courses that align with learning outcomes, Provide

clear instructions and resources for students. Actively participate in discussions, clarify concepts, and provide feedback. Monitor and assess students' progress.

Our suggestion based on this analysis is that by integrating the Community of Inquiry framework into an educational context, instructors can create a more engaging and effective learning environment, whether in face-to-face or online settings. This approach helps learners feel connected to their peers and instructors, promotes deep thinking and knowledge construction, and ensures that teaching is effective and supportive. It's especially valuable in online education, where the sense of community can be more challenging to establish but is equally important for student success.

Types of Samples

When conducting research using the CoI framework, various types of samples can be employed to gather data and analyze the interactions within online or blended learning environments. Here are some common types of samples used in CoI research. Based on our analysis all research on the topic is done among students, instructors, and administrators. We can state with some certainty that students make up the great majority of samples in CoI research and student engagement in online courses. on the other hand, other research used instructors, administrators, and school principals.

Our suggestion is that the choice of sampling method depends on the research objectives, available resources, and the nature of the population being studied. Researchers must carefully consider the strengths and limitations of each sampling method to ensure the validity and generalizability of their findings in CoI research.

Research Methods and Data Analysis Approaches

Community of Inquiry (CoI) research is an educational research framework that focuses on understanding and improving the quality of online and blended learning environments. CoI research examines the interactions between three key elements within a learning environment.

Based on our analysis we conclude that research Methods in CoI Research can be categorized in:

Surveys and Questionnaires ·Researchers often use surveys and questionnaires to collect data on students' perceptions of cognitive, social, and teaching presence within an online or blended learning environment. These surveys may include Likert-scale questions and open-ended items to gather both quantitative and qualitative data.

Content Analysis :Content analysis involves examining the textual or multimedia content of online discussions, assignments, and other artifacts to assess the quality of cognitive and social presence. Researchers can analyze the depth of discussion, the use of critical thinking skills, and the nature of social interactions.

Interviews and Focus Groups :Qualitative research methods, such as interviews and focus groups, allow researchers to gain in-depth insights into students' experiences and perceptions within a community of inquiry. These methods are particularly useful for exploring nuanced aspects of social and cognitive presence.

Observational Studies :Observational studies involve direct observation of online interactions, including participation in discussion forums or virtual classrooms. Researchers

may use this method to gather real-time data on how cognitive and social presence develop during a course.
Moreover, based on our analysis we conclude that the Data Analysis Approaches in CoI

Research can be Categorized in
Qualitative Data Analysis: Qualitative data analysis techniques, such as thematic analysis or grounded theory, are often employed to analyze interview transcripts, focus group discussions, and content analysis findings. Researchers identify themes and patterns related to cognitive, social, and teaching presence.
Quantitative Data Analysis :Quantitative data collected through surveys can be analyzed using statistical methods like regression analysis, factor analysis, or structural equation modeling to explore relationships between variables related to CoI elements.
Mixed-Methods Analysis :Some CoI research studies employ a mixed-methods approach, combining both qualitative and quantitative data to provide a comprehensive understanding of the community of inquiry in online learning environments.
Community of Inquiry research is a multidisciplinary field that draws on principles from education, psychology, and communication. Researchers choose methods and data analysis approaches that align with their research questions and objectives, aiming to enhance the understanding of online and blended learning experiences and improve instructional practices.

Geographical Locations
The CoI framework has been applied and researched in various geographical locations around the world. based on our analysis there are some examples of research on the Community of Inquiry framework in different regions:

The CoI framework has been extensively researched in US higher education institutions. Researchers in the United States have conducted numerous studies to understand its effectiveness in online and blended learning environments .Australia has a strong presence in online and distance education. Researchers in Australian universities have conducted studies on the CoI framework to enhance online learning experiences for students .South Africa has explored the use of the CoI framework to improve access to education and enhance the quality of online and blended learning experiences. Several Asian countries, including Malaysia, Indonesia, and China, have conducted research on the CoI framework. This research often considers the unique challenges and opportunities of online and blended learning in the Asian context.

In the Middle East, researchers have yet to examine the CoI framework's applicability to online education, particularly in countries like the United Arab Emirates and Saudi Arabia, where online education has gained prominence. It's important to note that the Community of Inquiry framework is not limited to any specific geographical location and can be applied and studied in various educational settings worldwide. Research in different regions contributes to a more comprehensive understanding of how to create effective online and blended learning experiences and adapt the framework to diverse cultural and educational contexts.

Future Agenda

The field of community of inquiry (CoI) research has evolved over the years, and its future agenda should continue to adapt to the changing educational landscape and emerging technologies. Here are some recommendations and potential areas of focus for future CoI research:

Integration of Technology: Investigate how emerging technologies such as virtual reality, augmented reality, and artificial intelligence can be integrated into the CoI framework to enhance online and blended learning experiences. Explore the impact of technology on the different elements of the CoI model (cognitive presence, social presence, and teaching presence). Cultural and Contextual Factors: Examine how cultural and contextual factors influence the formation and maintenance of a CoI. Explore the ways in which different cultural backgrounds, educational systems, and institutional contexts impact the dynamics of online communities of inquiry. Assessment and Evaluation: Develop and validate innovative assessment methods and tools for evaluating the quality of CoIs in online and blended learning environments. Explore how the CoI framework can be used for formative and summative assessment of online courses. Professional Development: Investigate the effectiveness of professional development programs for educators in creating and sustaining CoIs in online and blended learning environments. Explore strategies for training faculty to facilitate meaningful online discussions and activities.

Student Engagement: Explore the relationship between student engagement and the presence of a CoI. Investigate how different teaching strategies, course designs, and communication tools can foster higher levels of engagement in online courses. Social Presence and Well-Being: Investigate the role of social presence in promoting a sense of belonging and well-being among online learners. Explore strategies for addressing issues related to loneliness and isolation in online learning environments. Learner Autonomy: Examine the intersection of learner autonomy and the CoI framework. Investigate how self-regulated learning and learner-driven interactions can enhance the CoI experience in online courses. Inclusivity and Accessibility: Explore strategies for making online CoIs more inclusive and accessible to diverse student populations, including those with disabilities. Investigate the use of universal design principles in online course development. Cross-Disciplinary Research: Encourage cross-disciplinary collaborations to apply the CoI framework in various educational contexts, including K-12, higher education, corporate training, and lifelong learning.

Longitudinal Studies: Conduct longitudinal studies to track the development and evolution of CoIs over time. Explore how CoIs change as students' progress through their educational journey. Ethical Considerations: Address ethical issues related to online communication, privacy, and data security within CoIs. Develop guidelines and best practices for promoting ethical behavior and discourse in online learning communities. Student-Centered Approaches: Investigate student-centered approaches to CoI development, where students play a more active role in shaping the community and the learning process. Global Collaboration: Promote international collaboration and research partnerships to gain insights into how CoIs function in different cultural and educational contexts. Meta-Analysis and Synthesis: Conduct meta-analyses and systematic reviews to synthesize existing research on CoIs, identify patterns, and provide evidence-based recommendations for educators and

instructional designers. Teacher Education: Explore how the CoI framework can be integrated into teacher education programs to prepare educators for effective online teaching. Continued research and exploration in these areas can help advance our understanding of how to create and sustain meaningful communities of inquiry in online and blended learning environments, ultimately enhancing the quality of online education.

Practical Implication of this Study

Based on our analysis we would suggest and highlight the following implication for this intensive SLR. Enhancing Online Course Design: This study highlights the importance of the Community of Inquiry (CoI) framework in fostering student engagement in online courses. Institutions and course designers can use these findings to refine their online course structures and methodologies to better align with the CoI framework, thereby improving student engagement. Faculty Development: The research suggests that educators play a pivotal role in creating a conducive CoI in online courses. This implies a need for faculty development programs that equip instructors with the necessary skills and strategies for facilitating meaningful online interactions and fostering a strong sense of community. Assessment and Evaluation: Future research can explore the development of assessment tools and rubrics to measure the presence of CoI elements in online courses. This can assist institutions in evaluating the effectiveness of their online courses and identifying areas for improvement in terms of fostering community, cognitive presence, and teaching presence. Pedagogical Strategies: Further investigations can delve into specific pedagogical strategies that effectively promote each element of the CoI framework. Identifying and disseminating best practices can help educators implement these strategies in their online teaching, ultimately leading to improved student engagement and learning outcomes. Cultural and Contextual Considerations: Understanding how cultural and contextual factors influence the implementation and effectiveness of the CoI framework in diverse educational settings is crucial. Future research can explore how the framework can be adapted and applied to different cultural and regional contexts. Technology Integration: With the increasing reliance on technology in education, there is a need to explore the role of various technological tools and platforms in supporting the CoI framework. Research can focus on how different technologies impact student engagement and interaction in online courses. Student-Centered Approaches: Investigating student perspectives and preferences regarding the CoI framework can provide valuable insights. Understanding how students perceive and experience online learning within the CoI framework can inform course design and instructional practices. Long-term Impact: It would be beneficial to examine the long-term effects of CoI-based online courses on students' academic success, retention rates, and career outcomes. Longitudinal studies can help assess the lasting impact of CoI-oriented education. Policy and Institutional Support: Institutions may need to adapt their policies and provide resources to encourage the adoption of the CoI framework. Research can shed light on the policy changes and institutional support structures necessary for widespread implementation. Interdisciplinary Research: Collaboration between researchers from diverse fields, including education, psychology, and technology, can lead to a comprehensive understanding of the CoI framework's implications and applications. Interdisciplinary research can offer holistic insights into improving online education. Comparative Studies: Comparing the effectiveness of the CoI framework with other online learning models and frameworks can provide a broader perspective on the advantages and limitations of different approaches to online education. Meta-Analysis: Conducting a meta-analysis of existing

research on the CoI framework can help consolidate findings and identify trends and gaps in the literature. This can guide future research efforts and provide a more comprehensive understanding of the framework's impact.

In conclusion, investigating the relationship between the Community of Inquiry framework and student engagement in online courses has significant implications for educators, institutions, policymakers, and researchers. This research has the potential to improve online education practices, enhance student learning experiences, and inform the design of future online courses.

Conclusion

The framework of CoI has been the focus of a lot of research and development for online education. As the prominence of online learning increased, so did the need for more information on its most recent innovations, promising future research directions, and current information shortages. This SLR analyzed the papers by their theoretical contribution, sample size, data analysis, methodology, focus on geography, and possibility for further study. It is suggested that future research integrate academics or a lecturer-student sample and combine COI with other theories and models. Quantitative studies like the structural equation model remain popular since the limitations of qualitative and mixed-methods research have not been well explored. The scientific community may be able to get a deeper and more nuanced understanding of COI in eLearning if research is undertaken on other continents, including Africa and Asia. To help fill up the gaps in our understanding, maybe future researchers will use experimental studies or mixed methods approaches. This SLR summed up the best practices for integrating CoI with emerging theories like UTAUT and others. CoI studies are likely to uncover other facets of CoI, such as cognitive presence, social presence, and instructional presence. The global knowledge of Coi and its relevance to the advancement of distance education and the creation of online learning courses is expected to be bolstered by future study in Asia, Africa, and Europe.

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