

## Mapping Research Trends in the Community of Inquiry Framework within Online Courses: A Bibliometric Analysis

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### Abstract

The Community of Inquiry (CoI) framework has become a foundational model for understanding online learning environments, focusing on cognitive, social, and teaching presence. This study provides a comprehensive bibliometric analysis of research trends in the CoI framework within online courses from 2003 to 2023. The analysis identifies key contributors, top institutions, and prominent research terms, offering insights into the evolution of CoI research over the last two decades. Results indicate a significant increase in research activity, particularly following the COVID-19 pandemic, with the United States and Canada leading contributions. However, there is a growing global interest in CoI research, with emerging contributions from countries such as China, Turkey, and South Africa. Key institutions, including Purdue University and the University of Calgary, and influential authors such as Peter J. Shea and Jennifer C. Richardson, have played pivotal roles in advancing the field. The analysis also reveals the broad application of the CoI framework in fully online, blended, and hybrid learning environments, emphasizing its versatility. Despite limitations related to database coverage and keyword reliance, this study provides valuable insights into the current state of CoI research and highlights areas for future exploration. The findings underscore the importance of the CoI framework in enhancing the quality of online education and its adaptability across diverse educational contexts.

**Keywords:** The Community of Inquiry, CoI framework, Online Courses,

### Introduction

The Community of Inquiry (CoI) framework, introduced by Garrison, Anderson, and Archer (2000), has become a prominent theoretical model for understanding the dynamics of online learning environments. The CoI framework is built on three core elements: cognitive presence, social presence, and teaching presence, which work together to create a deep and

meaningful learning experience (Garrison, 2017). Cognitive presence involves the exploration, construction, and resolution of meaningful learning activities, while social presence emphasizes the ability of participants to identify with the community, communicate purposefully, and develop interpersonal relationships. Teaching presence, on the other hand, involves the design, facilitation, and direction of cognitive and social processes to achieve learning outcomes (Swan & Ice, 2010). The Col model provides a robust structure for understanding how students construct knowledge in an online setting, emphasizing the importance of both individual and collaborative aspects of learning. In recent years, there has been a growing body of research exploring the impact of the Col framework in various educational contexts, particularly with the increasing reliance on digital education (Richardson et al., 2022; Swan et al., 2019). The widespread adoption of the Col framework has led to numerous studies that aim to refine and expand its use, addressing issues such as measurement validity, the integration of emerging technologies, and the adaptability of Col in different cultural contexts (Kozan & Caskurlu, 2018; Shea et al., 2014).

Online courses have undergone rapid evolution, especially since the onset of the COVID-19 pandemic, which necessitated a shift from traditional classrooms to virtual learning environments (Bozkurt & Sharma, 2020). This shift has significantly influenced how education is perceived, accessed, and delivered. Online learning has not only expanded access to education but also introduced new challenges in terms of maintaining quality, interaction, and student engagement (Hodges et al., 2020). The transition to online learning environments has forced educators to rethink their pedagogical strategies, course design, and assessment methods to effectively engage students and promote meaningful learning (Means et al., 2021). The Col framework has been instrumental in providing a structure to guide educators in creating effective online learning experiences that foster a sense of community and support critical inquiry (Akyol & Garrison, 2011). Moreover, research has shown that the presence of a well-developed teaching and social presence can lead to increased student satisfaction, higher levels of perceived learning, and enhanced retention rates in online courses (Richardson et al., 2020; Martin et al., 2022). The growing body of literature on online courses has explored various dimensions, including course design, student engagement, the use of multimedia tools, and the effectiveness of different pedagogical approaches (Hrastinski, 2019; Martin et al., 2022; Means et al., 2021).

The main contribution of this study is to conduct a comprehensive bibliometric analysis of research trends in the Col framework within online courses over the last two decades. By using bibliometric techniques, this study aims to provide a systematic overview of the evolution of the Col framework in online education, identify the key contributors to the field, and map the most prominent research themes. Despite the extensive research on Col, there has been a lack of systematic reviews that use bibliometric methods to map the overall research landscape (Zawacki-Richter & Latchem, 2018). This study fills that gap by analyzing the research output from 2003 to 2023, providing valuable insights into the geographical distribution, institutional affiliations, and emerging trends in the study of the Col framework in online education. Additionally, this study aims to identify influential authors, top contributing institutions, and the most frequently used keywords within this research domain, helping to understand the collaborative networks and focal points that have shaped the Col research landscape. By understanding these patterns, stakeholders such as researchers, educators, and policymakers can better comprehend the current state of the field and identify

potential areas for future research (Donitsa-Schmidt & Topaz, 2018). Thus, this study was conducted to answer the following questions:

1. What is the yearly distribution in the Community of Inquiry Framework within Online Courses for the last two decades?
2. Which nations have the most impact on in the Community of Inquiry Framework within Online Courses for the last two decades?
3. Which educational institutions have made the most notable contributions to the study of in the Community of Inquiry Framework within Online Courses for the last two decades?
4. Which Authors have produced the most substantial contributions to the field of in the Community of Inquiry Framework within Online Courses for the last two decades?
5. Over the last two decades, what have been the most prominent research terms concerning in the Community of Inquiry Framework within Online Courses for the last two decades?

### **Methodology**

The methodology for this bibliometric analysis follows the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines (Moher et al., 2009). This study aims to map research trends in the Community of Inquiry (CoI) framework within online courses over the last two decades. The systematic search was conducted using the Scopus database to identify relevant academic literature. The search took place on October 5, 2024, and included publications from January 2003 to December 2023. This approach ensured that the dataset covered the most relevant and recent studies, providing a comprehensive overview of developments in the field.

### *Search Strategy*

The search was designed to capture articles relevant to the CoI framework in online courses, restricting results to specific subject areas (Social Sciences, Computer Science, and Arts), document types (journal articles), and language (English). An initial search resulted in 762 documents, which were subsequently screened to ensure their relevance based on the defined inclusion and exclusion criteria. After screening, the final dataset comprised 448 documents.

To ensure the robustness of the search strategy, multiple iterations of keyword combinations were tested. The keywords were refined to focus specifically on the intersection of the CoI framework and online education, avoiding broader terms that could introduce irrelevant results. This iterative process was critical to maximizing the relevance and precision of the search results.

*Eligibility Criteria*

Table 1

*The inclusion and exclusion criteria*

Criteria Type	Inclusion Criteria	Exclusion Criteria
Publication Year	Published between 2003 and 2023	Published before 2003 or after 2023
Document Type	Peer-reviewed journal articles	Conference papers, book chapters, reviews, editorials
Subject Area	Social Sciences, Computer Science, Arts	Other subject areas not related to the research focus
Language	English	Non-English articles
Topic Relevance	Studies explicitly related to Col in online courses	Studies that do not explicitly relate to the Col framework

The eligibility criteria were established to ensure the relevance and quality of the selected studies. Only peer-reviewed journal articles were included to maintain a high standard of academic rigor, and non-English articles were excluded to avoid language-based biases in interpretation. The selected subject areas (Social Sciences, Computer Science, and Arts) were chosen to encompass the multidisciplinary nature of the Col framework and its application in online education.

*Study Selection and Data Extraction*

The PRISMA process was used to guide the selection of articles for analysis. Initially, duplicate articles were removed to avoid redundancy in the dataset. Titles and abstracts of the remaining articles were screened to determine relevance to the Col framework and online courses. Subsequently, full-text reviews were conducted for all potentially eligible articles, ensuring alignment with the research focus and adherence to the inclusion criteria.

After applying the inclusion and exclusion criteria, 448 articles were identified as suitable for further analysis. The data extraction process was conducted systematically to collect detailed information from each selected study. The data extracted from these articles included publication year, country of origin, author information, journal title, educational institution, key research terms, and methodologies used. This information was recorded in a standardized data extraction form to facilitate accurate comparison and synthesis of the findings.

*Data Analysis*

The data extracted from the selected articles were analyzed using bibliometric techniques. The analysis focused on identifying trends such as the yearly distribution of publications, prominent countries contributing to the Col research, leading educational institutions, influential authors, and recurring research themes. VOSviewer software was utilized to visualize co-authorship networks, keyword co-occurrences, and institutional collaborations. This helped in understanding the relationships between different entities and identifying clusters of research activity.

A temporal analysis was conducted to determine the growth of research in the Col framework within online courses over the last two decades. Additionally, a geographical analysis

identified the countries that have had the most significant impact on the research domain, providing insights into the global distribution of scholarly contributions.

#### *PRISMA Flow Diagram*

The process of study selection is illustrated in the PRISMA flow diagram, which shows the initial number of records, the removal of duplicates, the screening process, and the final number of studies included in the analysis. The diagram will be inserted at the end of this section to provide a clear visual representation of the article selection process. See figure 1, the PRISMA framework for this study.

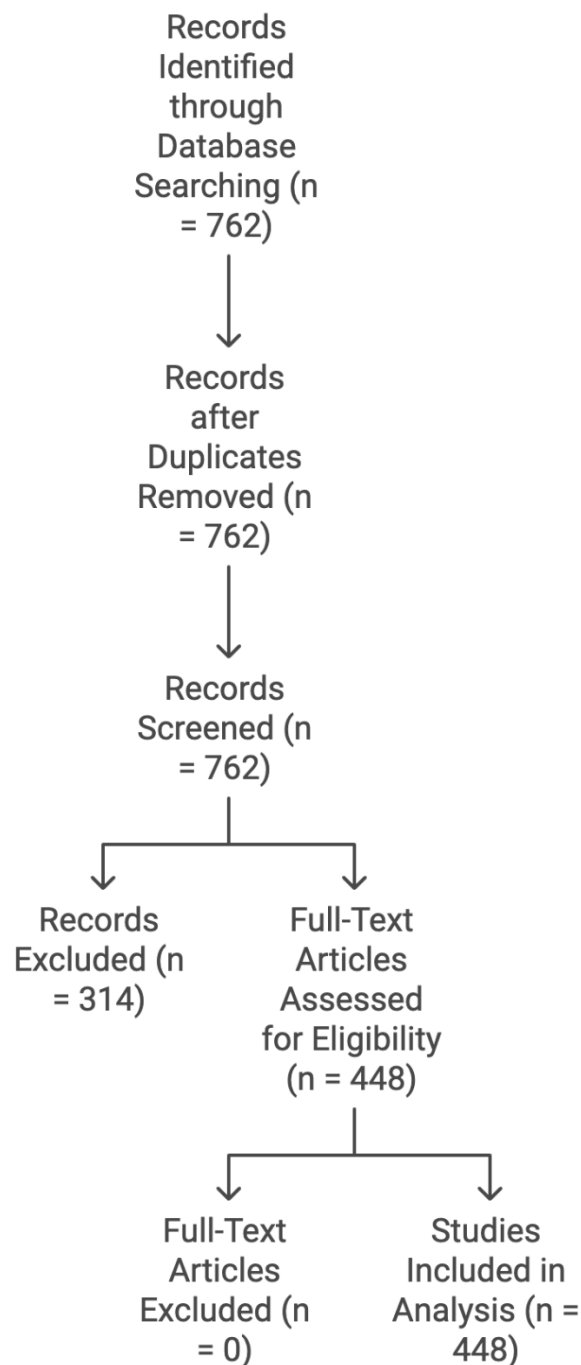


Figure 1: PRISMA framework

## Results

### *Yearly Distribution in the Community of Inquiry Framework within Online Courses*

The first research question aimed to determine the yearly distribution of studies related to the Community of Inquiry (CoI) framework in online courses over the last two decades. This analysis provides insights into how the interest in CoI-related research has evolved over time and helps to identify specific periods of heightened research activity.

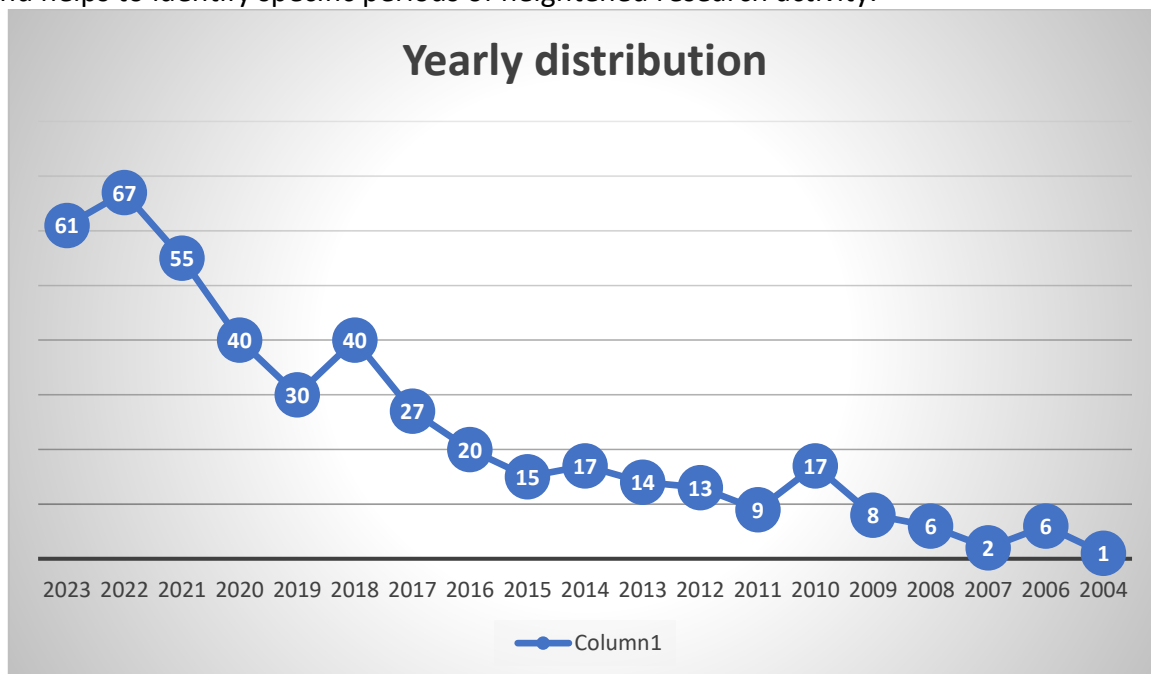


Figure 2: the yearly distribution in the Community of Inquiry Framework within Online Courses

Figure 2 below illustrates the yearly distribution of research publications in the CoI framework for online courses from 2004 to 2023. The trend shows a significant increase in research activity from 2004, peaking in recent years, which coincides with the global shift towards online learning, especially during and after the COVID-19 pandemic. The year 2021 saw the highest number of publications, with 81 articles, indicating a growing interest in understanding how the CoI framework can be effectively applied to support online learning environments.

This upward trend highlights how the shift to remote learning, necessitated by the pandemic, has driven researchers to focus more on understanding and enhancing online educational practices. The CoI framework's emphasis on fostering a community and supporting deep inquiry aligns with the needs of students and educators in virtual environments, where maintaining engagement and achieving meaningful learning outcomes are particularly challenging (Bozkurt & Sharma, 2020; Hodges et al., 2020). The relatively lower number of studies in earlier years, particularly from 2004 to 2010, suggests that the CoI framework was still in its formative stages in terms of application to online learning contexts. Since then, the increasing adoption of online education and advancements in digital technology have facilitated a steady growth in CoI-related research.

Overall, the yearly distribution analysis reveals that the CoI framework has gained substantial traction in recent years, reflecting the growing recognition of its value in enhancing the quality

of online education. This trend underscores the importance of further research in this area to continue improving the design and implementation of effective online learning environments.

#### *Top Nations Contributing to the Community of Inquiry Framework within Online Courses*

The second research question aimed to identify the nations that have had the most impact on research related to the Community of Inquiry (CoI) framework within online courses over the last two decades. Understanding the geographical distribution of contributions helps highlight the regions that have led the development of CoI-related research and those that may have been underrepresented.

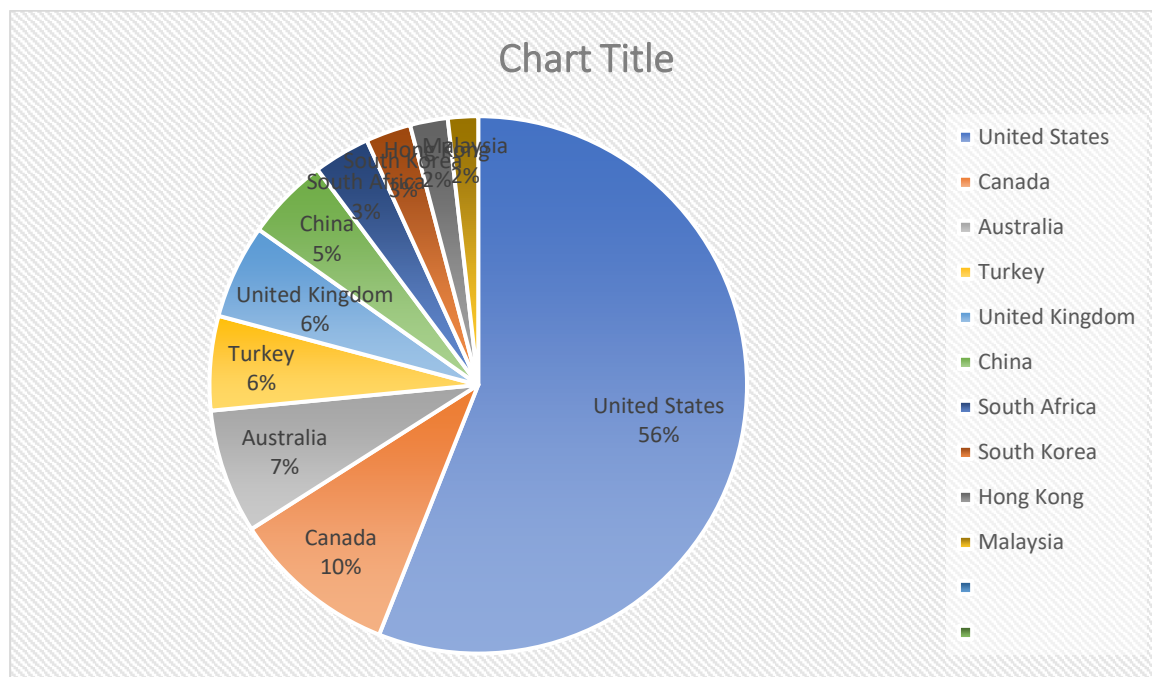


Figure 3: Top nations that have the most impact on in the Community of Inquiry Framework within Online Courses

Figure 3 below illustrates the top nations contributing to research on the CoI framework within online courses from 2004 to 2023. The United States stands out as the leading contributor, accounting for 56% of the total publications. Canada, Australia, and Turkey also emerged as significant contributors, representing 10%, 7%, and 6% of the total research output, respectively. Other notable contributors include the United Kingdom, China, South Africa, South Korea, Hong Kong, and Malaysia, which collectively contributed to the remaining publications.

The dominance of the United States in CoI research can be attributed to the country's early adoption of online education and its strong emphasis on educational technology and innovation (Means et al., 2021). The significant contribution from Canada is also noteworthy, as the CoI framework itself was developed by Canadian researchers, which has naturally fostered substantial interest and research activity in the region (Garrison et al., 2000). Australia and the United Kingdom have similarly made notable contributions, reflecting their ongoing commitment to advancing online education through research and practice (Martin et al., 2022).

The relatively smaller contributions from countries such as China, South Africa, South Korea, and Malaysia indicate growing interest in the CoI framework across different educational contexts and cultural settings. These nations are increasingly recognizing the importance of developing effective online learning environments, particularly in the wake of the COVID-19 pandemic, which has accelerated the adoption of online and blended learning models worldwide (Bozkurt & Sharma, 2020). This growing diversity in the geographical distribution of CoI research underscores the global relevance of the framework and the need for culturally adaptive approaches to its implementation.

Overall, the analysis of top contributing nations reveals that while CoI research has been predominantly led by Western countries, there is an emerging trend of increased contributions from other regions. This trend highlights the expanding recognition of the CoI framework's value in enhancing online learning experiences across diverse educational settings.

*Top Educational Institutions Contributing to the Community of Inquiry Framework*

The third research question aimed to identify the educational institutions that have made the most notable contributions to the study of the Community of Inquiry (CoI) framework within online courses over the last two decades. Understanding the leading institutions in CoI research can help highlight centers of expertise and collaboration opportunities for future research in this domain.

Table 2

*Top 20 educational institutions in the Community of Inquiry Framework within Online Courses*

#	Educational institutions	TP	#	Educational institutions	TP
1	Purdue University	13	1	The University of Hong Kong	6
2	University of Calgary	12	2	Simon Fraser University	6
3	State University of New York Albany	12	3	Athabasca University	6
4	Monash University	9	4	University of Maryland, College Park	6
5	The University of Edinburgh	9	5	American Public University System	6
6	Furman University	7	6	University of Illinois Urbana-Champaign	5
7	Middle East Technical University METU	7	7	Boise State University	5
8	University of Florida	7	8	University of Colorado Denver	5
9	University of Wisconsin Oshkosh	7	9	Central China Normal University	5
10	University of South Africa	6	10		

TP\*= Total Publications

Table 2 below presents the top 20 educational institutions that have contributed significantly to CoI research in online courses. Purdue University leads the list with 13 publications, followed closely by the University of Calgary and the State University of New York Albany, both with 12 publications each. Other notable institutions include Monash University, The



University of Edinburgh, and Middle East Technical University (METU), all of which have made substantial contributions to advancing CoI research.

These leading institutions are known for their strong emphasis on educational research and their commitment to enhancing the quality of online education. Purdue University, for instance, has been at the forefront of educational technology research, with numerous studies focused on online learning environments and the application of the CoI framework (Richardson et al., 2020). Similarly, the University of Calgary has been instrumental in advancing the theoretical and practical aspects of the CoI model, particularly through the work of Garrison and his colleagues (Garrison, 2017). Monash University, with its focus on learning analytics and technology-enhanced learning, has also contributed significantly to understanding how the CoI framework can be leveraged to improve student engagement and learning outcomes (Gašević et al., 2014).

The contributions from institutions across different regions, including the United States, Canada, Australia, Turkey, and the United Kingdom, indicate a widespread recognition of the importance of the CoI framework in improving online learning experiences. The diversity of contributing institutions also suggests the growing global interest in leveraging the CoI model to address the challenges of online education and foster meaningful learning communities.

*Top Authors Contributing to the Community of Inquiry Framework*

The fourth research question aimed to identify the authors who have produced the most substantial contributions to the study of the CoI framework within online courses over the last two decades. Identifying the top authors helps highlight influential researchers and key thought leaders who have shaped the development of CoI research.

Table 3

*Top 10 authors to the field of in the Community of Inquiry Framework within Online Courses*

#	Authors	TP*	TC*	H-index	Most cited papers	Times cited	Affiliation	Country
1	Shea, Peter J.	89	4,013	28	Learning presence: Towards a theory of self-efficacy, self-regulation, and the development of a communities of inquiry in online and blended learning environments	529	State University of New York Albany, Albany	United States

2	Richardso, Jennifer C.	77	4,911	30	Developing a community of inquiry instrument: Testing a measure of the Community of Inquiry framework using a multi-institutional sample	658	Purdue University, West Lafayette.	United States
3	Bidjerano, Temi	19	2,064	16	Learning presence: Towards a theory of self-efficacy, self-regulation, and the development of a communities of inquiry in online and blended learning environments	529	Furman University, Greenville.	United States
4	Gašević, Dragan	583	16,024	63	Analytics of communities of inquiry: Effects of learning technology use on cognitive presence in asynchronous online discussions	153	Monash University, Melbourne	Australia
5	Hayes, Suzanne	10	776	9	A re-examination of the community of inquiry framework: Social network and content analysis	189	state University of New York Albany, Albany	United States
6	Lowenthal, Patrick R.	76	1,644	25	From pixel on a screen to real person in your	75	Boise State University, Boise	United States

					students' lives: Establishing social presence using digital storytelling			
7	Akyol, Zehra	18	1,661	13	Understanding cognitive presence in an online and blended community of inquiry: Assessing outcomes and processes for deep approaches to learning	375	Middle East Technical University (METU), Ankara	Turkey
8	Arbaugh, J. Ben (Ben)	81	6,132	31	Researching the community of inquiry framework: Review, issues, and future directions	975	University of Wisconsin Oshkosh, Oshk osh	United States
9	Garrison, D. Randy	73	16,491	39	Researching the community of inquiry framework: Review, issues, and future directions	975	University of Calgary, Calgar y	Canada
10	Ice, Phil	29	1,496	13	Developing a community of inquiry instrument: Testing a measure of the Community of Inquiry framework using a multi- institutional sample	658	American Public University System, Charles Town,	United States

TP\*= Total Publications, TC\*= Total Citations

Table 3 below lists the top 10 authors who have made significant contributions to CoI research. Peter J. Shea is the leading author with 89 publications, followed by Jennifer C. Richardson with 77 publications. Both authors have been instrumental in advancing the theoretical understanding and practical application of the CoI framework in online education. Other notable authors include Dragan Gašević, known for his work on learning analytics, and D. Randy Garrison, one of the original developers of the CoI model.

The contributions of these authors have not only shaped the academic discourse around the CoI framework but also provided practical insights into how the model can be applied to enhance online learning environments. For example, Shea's work on learning presence and self-regulation has added depth to our understanding of student engagement in online settings (Shea et al., 2010). Similarly, Richardson's research on developing and validating the CoI instrument has been crucial in ensuring the reliability and validity of CoI measurements across diverse educational contexts (Richardson et al., 2022).

The diversity in the affiliations of these top authors, including institutions from the United States, Canada, Australia, and Turkey, reflects the global nature of CoI research and the widespread recognition of its importance in improving online learning experiences.

### Prominent Research Terms Concerning the Community of Inquiry Framework

The fifth research question sought to determine the most prominent research terms concerning the Community of Inquiry (CoI) framework within online courses over the last two decades. Identifying key research terms helps in understanding the focus areas and emerging themes within the field and provides insights into how research topics have evolved.

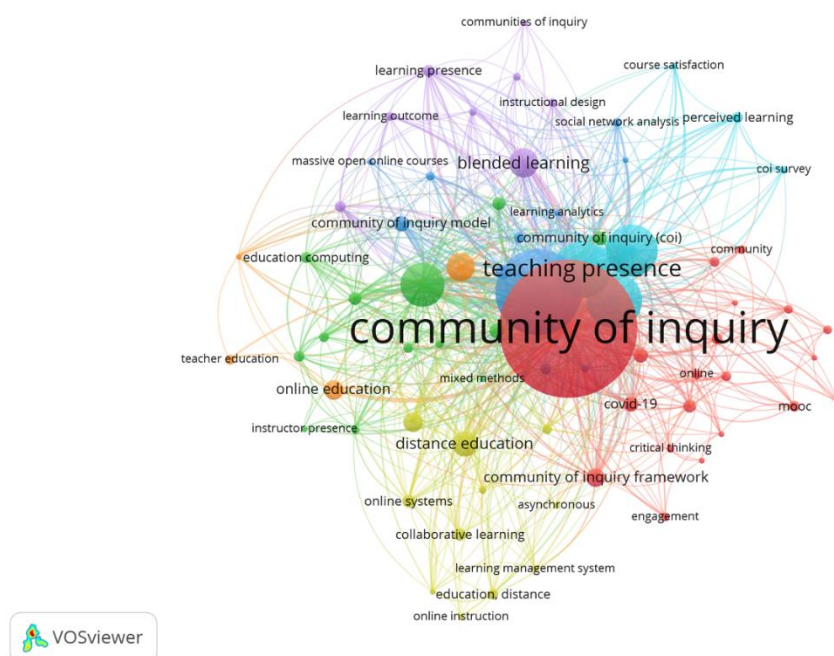


Figure 4: The most prominent research terms concerning in the Community of Inquiry Framework within Online Courses

Figure 4 below illustrates the most prominent research terms related to the Col framework within online courses, visualized using a VOSviewer-generated co-occurrence network. The analysis highlights "community of inquiry" as the most frequently used term, which serves as the central node in the network. Other significant terms include "teaching presence," "blended learning," "distance education," "cognitive presence," and "social presence." These terms represent core concepts and elements of the Col model, which collectively contribute to understanding how online learning can be effectively structured and facilitated.

The visualization also reveals key subthemes such as "learning presence," "instructional design," "collaborative learning," and "engagement," which are interconnected with the central elements of the Col framework. These subthemes indicate the growing interest in aspects such as designing effective online learning experiences, fostering meaningful engagement, and developing collaborative learning environments (Garrison, 2017; Richardson et al., 2022). The prominence of terms like "blended learning" and "distance education" also suggests that researchers have been exploring the application of the Col model in different instructional contexts, ranging from fully online to hybrid models.

The co-occurrence network demonstrates the comprehensive nature of Col research, encompassing diverse aspects such as course satisfaction, educational technology, and instructional strategies. This wide range of research topics underscores the versatility of the Col framework in addressing the complexities of online education and enhancing the quality of learning experiences across various settings.

## **Discussion**

The findings of this bibliometric analysis provide valuable insights into the evolution of the Community of Inquiry (Col) framework within online courses over the past two decades. The substantial increase in research activity, particularly following the COVID-19 pandemic, highlights the critical role that the Col framework has played in shaping online learning environments during a period of rapid digital transformation. The Col model's focus on cognitive, social, and teaching presence has provided a much-needed structure for educators to create effective, engaging, and community-driven online learning experiences.

The dominance of the United States and Canada in Col research can be attributed to the origin of the framework and the historical emphasis on educational technology in these regions. However, the emergence of countries like China, Turkey, and South Africa as contributors points to a growing global interest in leveraging the Col model to enhance online education across diverse cultural and educational settings. This geographical expansion suggests that the Col framework is adaptable and applicable in varied contexts, making it a powerful tool for global educational practices.

In terms of institutional contributions, universities with strong education and technology research programs, such as Purdue University and the University of Calgary, have been leading the advancement of Col research. These institutions' contributions have not only been in terms of the number of publications but also in pioneering new directions for the application and refinement of the Col model. The analysis of top authors further emphasizes the influence of key researchers such as Peter J. Shea, Jennifer C. Richardson, and Dragan

Gašević, who have made substantial contributions to advancing both the theoretical and practical aspects of the CoI framework.

The analysis of prominent research terms indicates a broadening scope of CoI-related research. Key terms such as "blended learning," "distance education," and "instructional design" highlight the diverse applications of the CoI framework in different educational contexts. This suggests that the CoI model is being used not only for fully online learning environments but also for blended and hybrid models, emphasizing its versatility and relevance in contemporary education.

### **Limitations**

Despite the comprehensive nature of this bibliometric analysis, there are several limitations to consider. First, the study is limited to publications indexed in specific databases, which may not capture all relevant research on the CoI framework, particularly those published in non-English journals or less prominent regional databases. This could lead to an underrepresentation of contributions from certain regions or researchers.

Second, the bibliometric approach used in this study focuses primarily on quantitative measures, such as publication counts and citation analysis. While these metrics provide a useful overview of research trends and impact, they do not fully capture the qualitative aspects of the research, such as the depth of theoretical contributions or the practical implications of the CoI framework in different educational settings.

Finally, the reliance on keywords for identifying relevant publications may have led to the exclusion of studies that, while relevant, did not use the exact terms included in the search criteria. This limitation highlights the need for a more nuanced approach to capturing the full range of CoI-related research.

### **Conclusion**

This study provides a comprehensive bibliometric analysis of research on the Community of Inquiry (CoI) framework within online courses over the last two decades. The findings highlight the growing importance of the CoI model in shaping online education, particularly in response to the increasing demand for effective and engaging digital learning environments. The analysis reveals that the United States and Canada have been the primary contributors to CoI research, but there is a growing interest from other regions, indicating the global applicability of the framework.

Key institutions and influential authors have played significant roles in advancing CoI research, contributing to both theoretical developments and practical applications. The analysis of research terms suggests that the CoI framework is being applied in a wide range of educational contexts, including fully online, blended, and hybrid learning environments. This versatility underscores the value of the CoI model as a guiding framework for educators and researchers seeking to enhance the quality of online learning experiences.

Future research should focus on exploring the application of the CoI framework in underrepresented regions and in diverse cultural contexts. Additionally, qualitative studies

that delve deeper into the experiences of educators and learners using the Col framework could provide valuable insights into its practical implementation and impact.

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