



# Research and Analysis of Blended Teaching based on the Community of Inquiry Model

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**Abstract.** Against the backdrop of rapid development in educational technology, blended teaching, as an emerging educational model, is attracting increasing academic attention. This article aims to explore the current research status of blended teaching and exploratory community of inquiry theory. The analysis results show that technology, evaluation, and design have become the focus topics of blended teaching, and keyword co-occurrence clustering analysis has discovered the research hot-spots of Community of Inquiry(COI) theory. The study further proposes a COI-based blended teaching framework, which integrate the teaching, social, and cognitive presence into the pre-class, in-class, and after-class teaching process. Finally, this study summarizes the issues worth further research in the future.

**Keywords:** blended teaching, community of inquiry, teaching presence, social presence, cognitive presence.

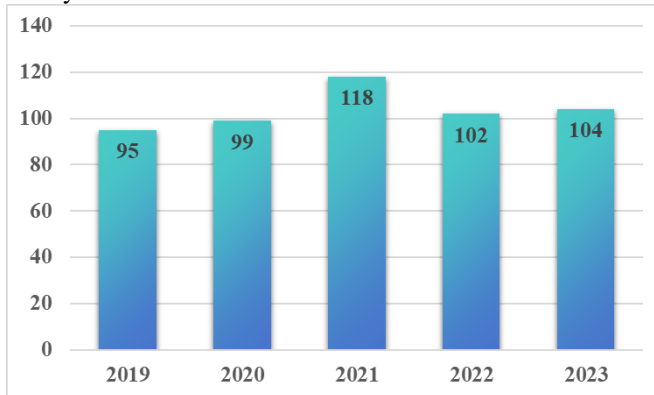
## 1 Introduction

Educational technology innovation has become a key force in promoting the transformation of teaching modes. Blended teaching, as a new teaching model that combines traditional teaching with online teaching, has received widespread attention from academia and educational practitioners. This article is aiming to explore the theory and practice of blended teaching, determine current research trends, challenges, and future development directions. Then, by reviewing a large number of domestic and foreign literature, a comprehensive analysis was conducted on the application of community of inquiry model in blended teaching research. The roles and impacts of core elements such as instructional design, teacher roles, learner interaction, and evaluation mechanisms in the implementation process were pointed out, providing constructive suggestions for the future research direction and practice of blended teaching. Through these comprehensive analyses and research discussions, this article not only provides practical guidance for educators, but also provides theoretical references for educational researchers, and provides useful insights for the development and optimization of blended teaching based on the community of inquiry model.

## 2 Research hot-spots and trends in blended teaching

### 2.1 Current research of blended teaching

Using "blended teaching" as the keyword, a total of 518 research articles were found in the Web of Science search over the past 5 years, as shown in Fig. 1. It can be seen that since 2021, the number of research literature on blended teaching has suddenly increased significantly, which may be due to the impact of the COVID-19. The number of online teachings has increased, and research on blended teaching has become popular in recent years.



**Fig. 1.** Number of literature on Blended Teaching research in Web of Science

At present, research on blended learning at home and abroad has covered various aspects such as theory, application, problems, effects, evaluation, influencing factors, etc., and the research results are relatively rich.

### 2.2 Exploring hot topics in blended teaching

On the basis of in-depth analysis of the aforementioned research literature, this article explores the hot issues of blended learning. Research hot-spots refer to topics that are widely studied and frequently discussed in the academic community within a certain period of time, and can reflect the forefront and focus of research in this field. This study conducted frequency statistics and analysis on frequently appearing keywords in the literature, as shown in Fig. 2. It was found that "technology", "evaluation", and "design" were the most frequently appearing keywords in the field of blended teaching.

The application of technology has become a hot topic that cannot be ignored in the research of blended teaching. With the popularization of the Internet and mobile devices, the continuous innovation of educational technology has provided more possibilities for blended teaching. The integration of artificial intelligence, big data analysis, and learning analysis technologies is driving the development of blended teaching towards greater intelligence and personalization. The application of these technolo-



includes three elements called presences: cognitive presence (CP), social presence (SP), and teaching presence (TP). According to Garrison's hypothesis, meaningful education is the result of the interaction of these three elements, shown in Fig.3. This theoretical framework is also considered one of the most successful and influential in the field of online learning in recent years[6]. Meanwhile, Garrison et al. also developed a practical indicators that matches the categories of COI model, as shown in Table 1[5].

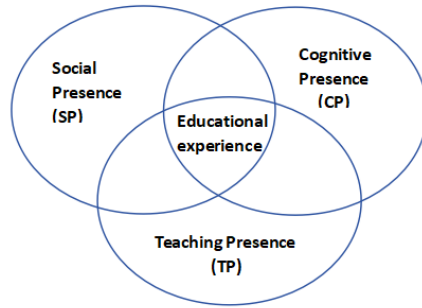


Fig. 3. Community of Inquiry Framework

Table 1. CoI categories and indicators

Categories	Indicators
Cognitive Presence (CP)	Triggering events
	Exploration
	Integration
	Resolution
Social Presence (SP)	Affective expression
	Open communication
	Group cohesion
Teaching Presence (TP)	Design and organization
	Direct instruction
	Facilitating discourse

### 3.2 Current research of COI

To explore the current research status of COI theory, this article uses keyword co-occurrence analysis to discover relevant research topics in this field. Keyword co-occurrence analysis involves counting the number of times a group of keywords appear together in the same literature, and conducting cluster analysis on these keywords to reflect their interrelationships[7]. This article mainly selects keywords with a frequency greater than or equal to 5, and uses VOSviewer to visually analyze the co-occurrence relationship of keywords in COI related literature from 2019 to 2023. The resulting co-occurrence network of keywords is shown in the Fig4. Each circle in the figure represents a keyword node. The larger the node area, the more times the key-



and engage in meaningful deep learning[12]. Teaching presence(TP) refers to the process in which teachers guide learners in an exploratory learning community, promote their interactive behavior, thereby enhancing their level of interaction and cognition, helping learners achieve learning goals, and enhancing learning effectiveness[13]. This category also include course design, environment and satisfaction, etc. Teachers play an important role in TP, creating a learning environment, designing teaching methods, presenting teaching content and arrangements, providing direct guidance to students, and promoting active learning.

#### **4 COI-based blended teaching mode**

In the past few years, blended teaching has become a hot topic of educational innovation. COI theory as an effective learning framework that promotes interaction and depth of learning is considered an important element in the construction of blended teaching environments. Exploring the three core elements of COI theory- CP, SP, and TP, which provides strong theoretical support for blended teaching. Based on this theory, the design of blended learning needs to consider how to promote student cognitive development, social interaction, and teacher teaching strategies through technology and methods. The teaching goal of the COI-based blended teaching is to create a blended teaching and learning environment with social, teaching, and cognitive presence, so that learners can improve their levels of social, teaching, and cognitive presence, thus achieve high learning satisfaction, and a comfortable and meaningful learning experience. The research objective of this article is to integrate COI and blended teaching into higher education, ultimately forming an effective teaching model. The COI-based blended teaching framework proposed in this article is as Fig.5.

- Teaching process: A blended teaching model based on the exploratory community theory model was designed in three stages: pre-class, in-class, and after-class. Social, teaching, and cognitive presence were integrated into the teaching process.
- Role Transformation: In the entire blended teaching process, students are the main learners, independent learners, explorers, and collaborators, while teachers are the assistants, organizers, guides, and facilitators of students' learning.

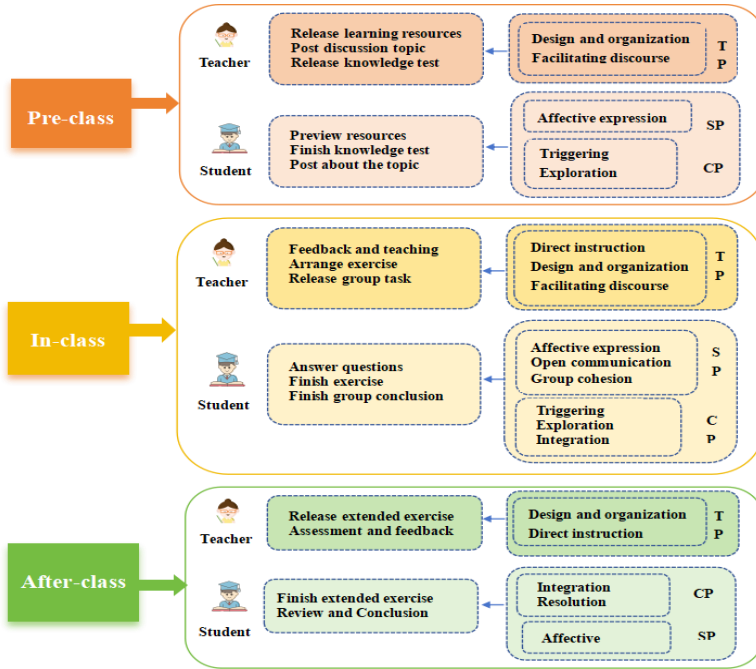


Fig. 5. COI-based Blended Teaching Framework

## 5 Conclusion

In the research field of blended teaching, COI theory provides us with a strong theoretical support. However, in future research, we should further explore and improve this theoretical model, and continuously innovate its application in teaching practice. Here are some suggestions for future research:

- Development of multi-dimensional effectiveness evaluation model: Currently, the evaluation of blended learning effectiveness mainly focuses on student academic performance and satisfaction. Future research can consider integrating more dimensional evaluation indicators, such as students' self-learning ability, critical thinking, innovation ability, etc., to construct a more comprehensive evaluation model.
- The application of learning analytical technology: using learning analytical technology to collect and analyze student learning data, such as learning paths, learning time allocation, and interactive modes, and adjusting teaching strategies and learning resource allocation to achieve more personalized and accurate teaching support.
- Innovation in technical support platforms: Currently, blended learning still requires strong technical support. Future research can focus on exploring how to construct and optimize a learning management system that supports the exploration of COI

theory, in order to promote online communication, collaboration, and in-depth learning among students.

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