

A Study of Correlation Between Teaching Presence, Social Presence, and Cognitive Presence of College Students Learning in Short Educational Videos

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Abstract: Short educational videos have become the main way of informal learning and mobile learning for college students. It is important to explore the presence of college students learning in short educational videos. This study conducted a survey to investigate the level of cognitive presence, social presence and teaching presence of learning college students learning in short educational videos and analyze the correlation between them based on COI framework. The participants are 514 college students from different universities in China. The findings of this study indicate the level of cognitive presence, social presence and teaching presence was relatively high. Each dimension of COI framework has a significant positive correlation. Furthermore, the influence of demographic variables such as gender and college academic phase on cognitive presence, social presence and teaching presence was also investigated. Based on these findings, suggestions for the college students learning in short educational videos were put forward.

1. Introduction

The development of emerging technologies has changed the way people live and socialize such as AI, big data, 5G, and so on. In this context, short videos relying on digital technologies provide more service content. The short educational video is a product of "short video + education"[1]. It has become an important issue in the field of education and new media. Especially in higher education, short educational videos have become the one of main way to learn for college students[2]. However, sufficient short educational video resources are not enough to promote learning effect of college students[3]. It is crucial to pay attention to the way of utilizing the resource in higher education effectively. It could enhance the presence of college students and promote learning effect. Community of Inquiry Framework (COI) provides a reference for the important topic.

In 2001, based on the practice of online learning and blended teaching at Athabasca University, Garrison et al proposed Community of Inquiry Framework (COI). The model is Showed in Figure 1. It has three core dimensions included Cognitive Presence, Social Presence and Teaching Presence. Cognitive presence refers to the extent which learners construct meaning through ongoing critical reflection and dialog in the process of exploring the learning community[4]. Social Presence refers to the learner's ability to project himself/herself into the community, thereby presenting himself/herself as a "real person" (reveal one's true self)[5]. Teaching presence refers to the design and instruction of learners' cognitive and social processes, which are to help learners realize their self-worth and self-awareness in the learning process[6]. In order to improve learning effectiveness in communities of inquiry, the correlation ship between teaching presence, cognitive presence, and social presence should be investigated. Researches has shown that the three dimensions in the COI

are not independent. Teaching presence provides structured design and guidance for building social presence and cognitive presence. In addition, social presence influences cognitive presence and teaching presence[7]. Therefore, this study aims to investigate the level of cognitive presence, social presence and teaching presence of college students in short educational videos and analyze the correlation between them based on COI framework. The specific research questions are as follows:

- (1) What are the level of cognitive presence, social presence and teaching presence of college students learning in short educational videos?
- (2) What is the correlation between teaching presence and cognitive presence of college students learning in short educational videos?
- (3) What is the correlation between pedagogical presence and social presence of college students learning in short educational videos?
- (4) What is the correlation between social presence and cognitive presence of college students learning in short educational videos?

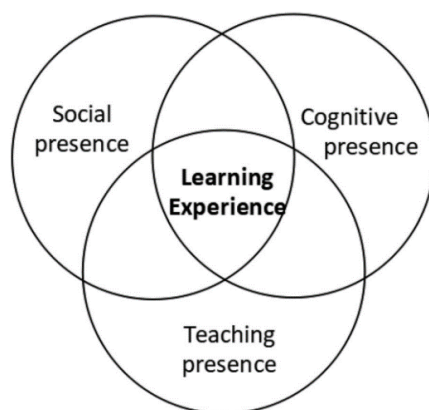


Figure 1 Community of Inquiry Framework.

2. Methodology

This study determined that cognitive presence, social presence and teaching presence are factors that influence the learning effect of college students learning in short educational videos through viewing the relevant literature. Firstly, based on the existing questionnaires[8], this study developed the questionnaire for measuring learners' perceptions of short educational videos. The college students who have experienced short educational videos were the research object. Secondly, the questionnaire was distributed and recovery through network. The invalid questionnaire was deleted. And the data was analyzed by SPSS software. Finally, based on the findings, recommendations were put forward in order to provide a reference for educational resources development and improving learning effect.

2.1. Participants

In total, 514 students were contacted. They come from different universities in China. After removing incomplete and meaningless questionnaires, there were 506 valid questionnaires were collected. The specific statistics are shown in Table I.

Table 1 Characteristics of survey objects.

Measured features	Eigenvalue	Numbers	Percentage (%)
Gender	Male	246	48.62
	Female	260	51.38
Academic phase	Freshman	122	24.11
	Sophomore	158	31.23
	Junior	100	19.76
	Senior	126	24.9

2.2. Instrument

In this study, the Community of Inquiry Scale developed by Arbaugh's (2008) scale. Some wording was changed based on the respondents in the short educational video and a basic information survey was added. There are 36 items in the questionnaire included 2 items of basic information of participants, 13 items of Teaching Presence section, 9 items of Social Presence section and 12 items of Cognitive Presence section. The questions adopt 5-point Likert scale, it is easy to understand the complete list of scale descriptors ('1 equals strongly disagree, 2 equals disagree, 3 equals neither disagree nor agree, 4 equals agree, 5 equals strongly agree'). And the professors were invested to give suggestion face to face and by the email. Finally, reliability and validity of the questionnaire were tested. The results showed that questionnaire items could reflect variables to be studied. SPSS25.0 was used to data analysis.

2.3. Data analysis

The data analysis part of this study is divided into three steps.

First, the data collection. The questionnaire was distributed and recovery through network. The invalid questionnaire was deleted.

Second, data coding. The corresponding scores are recorded into an Excel according to the answer.

Third, data analysis. Import the data in the Excel file into SPSS25.0 for data analysis based on the research question.

3. Result

3.1. The level of all dimensions of COI framework

The total average score is 3.51. The average scores of cognitive presence, social presence, and teaching presence dimensions are shown in TABLE 2. All the average scores of the three dimensions are above 3, indicating that the college students have relatively high levels of presence while learning through short educational videos.

The average score of teaching presence is the highest, being 3.56. It suggests that students strongly perceive the presence and instructional guidance of the teacher in the short educational videos. The high level of teaching presence indicates that the video content is well-designed and that the quality of instruction is effective., included elements such as clear explanations, structured content, and the teacher's ability to facilitate learning through the video teaching.

The average score of social presence is 3.52. It indicates that students feel a sense of community and connection with others, including other participants and the instructor, even in a digital learning environment. This sense of connection can enhance motivation and engagement, making students feel more comfortable and supported.

The average score of cognitive presence is the lowest among the three, being 3.44. Despite being lower than the other dimensions, it is still above 3. It indicated that despite cognitive engagement, students can still improve in increasing the depth and complexity of the cognitive tasks in the videos, including the integration of more challenging content, opportunities for critical thinking, and activities that require higher-order cognitive skills.

Table 2 The average score of cognitive presence, social presence and teaching presence.

	Teaching Presence	Social Presence	Cognitive Presence
Average scores	3.56	3.52	3.44
Total average score	3.51		

3.2. The correlation between teaching presence, social, and cognitive presence

First, this study conducted a correlation analysis of three dimensions in the context of short educational videos. As shown in Table 3, each dimension of COI framework has a significant positive correlation. Specifically, the correlation coefficients of teaching presence with social

presence is 0.600. The correlation coefficients of teaching presence with cognitive presence is 0.629. And the correlation coefficients of social presence with cognitive presence is 0.553. This phenomenon can be explained by the fact that in the context of short educational videos, the level of designer has a direct impact on the learning experience of college students. The high level of teaching presence enhances students' engagement and interaction, which in turn strengthens their social presence. Additionally, well-structured instructional content facilitates cognitive processes, leading to higher cognitive presence.

Table 3 The average score of cognitive presence, social presence and teaching presence.

		Teaching Presence	Social Presence	Cognitive Presence
Teaching Presence	r	1	.660**	.629**
	Sig.		.000	.000
	number	506	506	506
Social Presence	r	.660**	1	.553**
	Sig.	.000		.000
	number	506	506	506
Cognitive Presence	r	.629**	.553**	1
	Sig.	.000	.000	
	number	506	506	506

** . Significantly correlated at the .001 level (both sides).

3.3. The influence of gender on the three dimensions

The independent t-tests was conducted to explore the influence of gender on teaching presence, social presence, and cognitive presence. As shown in Table 4, gender has no significant effect on the three dimensions.

Table 4 Independent samples T-Test results for the three presence dimensions based on gender.

	Teaching Presence	Social Presence	Cognitive Presence
Sig.	0.567	0.805	0.190
t	-0.637	0.191	-0.570
Sig. (2-tailed)	0.524	0.848	0.569

3.4. The influence of college academic phase on the three dimensions

The Multivariate Analysis of Variance (MANOVA) to was conducted to explore the influence of college academic phase (freshman, sophomore, junior, senior) on teaching presence, social presence, and cognitive presence. As shown in Table 5, college academic phase has no significant effect on the three dimensions. These findings imply that the effectiveness of short educational videos is consistent across different educational levels, supporting their broad applicability and inclusivity in higher education.

Table 5 Multivariate analysis of variance results for the three presence dimensions based on educational level.

Effect	Text Statistic	Value	F	Error df	Sig.
Academic Level (Freshman, Sophomore, Junior, Senior)	Pillai's Trace	0.008	0.437	1506	0.915
	Wilks' Lambda	0.992	0.436	1217.019	0.916
	Hotelling's Trace	0.008	0.434	1496	0.917
	Roy's Largest Root	0.004	0.677	502	0.567

3.5. Binary regression analysis of social presence and teaching presence on cognitive presence

As shown in Table 6, there is a strong predictive relationship between teaching presence and social presence on cognitive presence. The standardized regression coefficients for the two independent variables are both positive, indicating that both social presence and teaching presence have significant positive effects on cognitive presence. In addition, the β coefficient for social presence is higher in absolute value compared to teaching presence. This suggests that while both dimensions positively influence cognitive presence, social presence has a greater positive impact on

cognitive presence than teaching presence. The higher β coefficient for social presence means its critical role in fostering cognitive engagement and facilitating deeper learning among students. This finding implies that creating a socially interactive learning environment, where students feel connected and supported by their peers and instructors, can significantly enhance their cognitive engagement. Moreover, this highlights the importance of incorporating strategies that promote social interaction within educational videos, such as collaborative tasks, discussion forums, and interactive elements.

Table 6 Binary regression analysis of teaching presence and social presence on cognitive presence.

Model	B	Standard error	Beta(β)	T	P
Constant	3.182	.369		8.634	.000
Teaching Presence	.249	.047	.233	5.346	.000
Social Presence	.262	.042	.269	6.177	.000

4. Discussion

Short educational videos are an effective way to present problem situations and engage learners in meaningful learning experiences[9]. This study demonstrates that both teaching presence and social presence can directly influence and predict cognitive presence. And cognitive presence can not only affect social presence directly, but also influence social presence through its interaction with teaching presence. Furthermore, cognitive presence and teaching presence have significant positive effects on social presence. Gender and college academic phase have no significant effect on the three dimensions. And cognitive presence and teaching presence can also have a reciprocal effect on social presence. These findings suggest that in short educational video learning, college students can leverage the stimulating effect of social presence to enhance their conversational abilities, so as to supporting both cognitive presence and teaching presence. Therefore, the quality of short educational video should be optimized from these three aspects in order to improve the presence and learning effect of college students learning in short educational video. Three strategies can be implemented:

4.1. Personalizing and Targeted products

Utilize data mining and other technologies to create personalized and targeted learning experiences. By analyzing users' browsing habits and learning preferences, educational platforms can intelligently recommend content that aligns with students' interests and needs. The personalized approach can increase college student engagement and cognitive presence by providing relevant and stimulating learning materials.

4.2. Increasing investment in short educational video research

Increase investment in the research and development of high-quality short educational videos. It includes creating well-structured courses and inviting industry experts to contribute their knowledge and insights. Expert involvement can enhance the credibility and depth of the content, thereby improving teaching presence. Additionally, developing engaging and interactive video content can further support cognitive and social presence by keeping students actively involved in the learning process. Examples adopting in the short educational videos can help students understand and enhance the practical application. Promote student learning experience by integrating hands-on experiences and facilitating collaborative support.

4.3. Increasing investment in short educational video research

Garrison suggests that it is important to enhance social presence by creating an environment and providing support in a learning community[10]. Promote communication and interaction among learners by incorporating features such as messaging or bullet screens in short educational videos. These interactive elements can foster a sense of community and social presence by allowing students to share their thoughts, ask questions, and collaborate with other participants in real-time.

Enhanced social interaction can support cognitive presence by encouraging deeper discussion and reflection on the learning material. By fostering a supportive and interactive learning environment, short educational videos can promote a more meaningful and enriching educational experience, ultimately enhancing overall learning outcomes for college students.

5. Conclusion

This study has been conducted to investigate the correlation of cognitive presence, social presence and teaching presence of learning college students in short educational videos based on COI framework in three aspects. First, this study explored the level of cognitive presence, social presence and teaching presence of learning college students in short educational videos based on COI framework. And correlation of the three dimensions was explored. The results showed that there is a significant positive correlation between the three dimensions. Second, Regression analysis was conduct. The results indicated that teaching presence and social presence predicted cognitive presence. Third, gender and college academic phase have no significant effect on the three dimensions. Finally, based on these findings, suggestions for the development of short educational videos were put forward to improve the effectiveness of learning.

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