Influence of Teaching and Social Presence on Cognitive Presence in Ethiopian Online Learning

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ABSTRACT

This study, guided by the Community of Inquiry (CoI) framework, investigated the levels of implementation and relationships between teaching, social, and cognitive presence in online MBA programs at five Ethiopian private higher education institutions. It also analyzes the impact of the teaching and social presence on the cognitive presence. Using a survey questionnaire, the author analyzed data from 245 students using descriptive statistics, correlations, and multiple linear regression. The findings indicate that teaching presence was perceived as strong, while social presence was lower, particularly in group cohesion. All three presences showed significant positive correlations. Teaching presence had the strongest correlation with both social (r=0.44) and cognitive (r=0.32) presence. Regression analysis confirmed teaching presence as a strong predictor of cognitive presence (β=0.302, p<0.001), while the influence and unique predictive contribution of social presence was minimal. The study underscores the crucial role of effective instructional design and teaching presence in online learning within this context and recommends enhancing collaborative learning to optimize outcomes.

Keywords: *Online learning, community of inquiry, teaching presence, social presence, cognitive presence, private institutions*

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INTRODUCTION

Higher education institutions (HEIs) are experiencing a major shift with the widespread adoption of online learning (OL), driven by technology and demand for flexible education (Mesmar et al., 2023). This is also true in developing nations like Ethiopia, where e-learning is increasingly integrated to expand access and improve education quality, especially after COVID-19 (Dejene & Tilahun, 2024; Matsieli & Mutula, 2024; Mulugeta, 2021).

Theoretical perspectives like transactional distance theory (Abuhassna & Alnawajha, 2023; Achuthan et al., 2024) and social constructivism (Secore, 2017; Woo & Reeves, 2007) highlight the crucial role of interaction in learning in general. However, the prominent framework for OL is the community of inquiry (CoI) model (Garrison, 2009). The CoI, rooted in collaborative constructivism (Garrison, 2016; Swan et al., 2009; Homer, 2022), guides the design and delivery of OL experiences (Garrison, 2016; Shea et al., 2022; Swan et al., 2009). It emphasizes creating communities where learners actively engage in exploring, making meaning, and confirming understanding (inquiry), moving beyond mere information dissemination (Anderson, 2017; Garrison 2016; Garrison & Akyol, 2013; Garrison & Arbaugh, 2007).

Within the CoI framework, effective and meaningful learning emerges from the dynamic interplay of three interconnected elements (Garrison, 2007; Garrison et al., 2010). First, teaching presence refers to the instructor's crucial role in designing, facilitating, and directing the cognitive and social processes essential for achieving meaningful learning outcomes, encompassing course structure, discussion guidance, and direct instruction. Second, social presence highlights learners' ability to project their unique personal characteristics, fostering a sense of belonging, trust, and open communication within the learning community. Finally, cognitive presence represents the degree to which learners are able to construct and confirm meaning through sustained reflection and discourse, and this is considered paramount for effective learning and critical thinking in online environments (Beckmann & Weber, 2016). Each presence significantly contributes to positive learning outcomes. Teaching presence ensures organized learning and support; social presence cultivates a collaborative environment; and cognitive presence enables knowledge construction and understanding (Kim & Gurvitch, 2020; Shea et al., 2022).

In Ethiopian private higher education institutions (PHEIs), OL offers solutions for access and flexibility challenges (Addis insight, 2020; FDRE MoE, 2023; Tessema, 2023; Tessema & Nicola_Gavrila, 2023). However, the Ethiopian context presents unique circumstances that may influence OL dynamics. Despite growing OL adoption in Ethiopian PHEIs, its effectiveness needs thorough investigation. A few research focused on challenges include infrastructure limitations (unreliable internet, limited technology access), digital literacy, and student engagement (Dejene & Tilahun, 2024; Yidana et al., 2023). These may particularly impact cognitive presence, hindering sustained reflection and collaborative discourse. Establishing strong teaching and social presences, though challenging given contextual limitations, could significantly influence cognitive presence (Cleveland-Innes & Campbell, 2012; Garrison et al., 1999; Kozan & Richardson, 2014). Therefore, examining the impacts of teaching and social presences on cognitive presence in Ethiopian PHEIs is crucial to inform strategies for enhancing OL quality and effectiveness in this unique context.

LITERATURE REVIEW

The CoI framework (Garrison, 2009) is a foundational theoretical lens emphasizing the importance of the learning environment. A CoI fosters collaborative learning through open communication, centered on the interplay of three key elements: teaching presence, social presence, and cognitive presence. Teaching presence involves the instructor's efforts in designing, facilitating, and directing the learning process, including setting objectives, structuring activities, fostering discourse, and providing direct instruction. Social presence focuses on learners' ability to establish community and connect with peers and the instructor, manifested through open communication and group cohesion. Cognitive presence, a core focus of many studies, represents learners' capacity to construct meaning through sustained reflection and collaborative inquiry (Garrison, 2009; Sadaf et al., 2021).

Relationships among the Presences

The relationships among teaching, social, and cognitive presences are positive and significant (Giannousi & Kioumourtzoglou, 2016), effectively interconnected within the CoI framework, and mutually influence effective OL (Garrison et al., 2000). Teaching presence is central to establishing and maintaining both social and cognitive presence for educational goals (Garrison et al., 2000, 2010), leading to the development of OL communities (Szeto, 2015). Research shows effective teaching presence directly influences both cognitive and social presence (Ke, 2010; Law et al., 2019; Skrypnyk et al., 2015), with a strong positive correlation between teaching and cognitive presence (Abidin et al., 2023).

Social presence refers to learners' ability to project their authentic selves, fostering community and enabling problem-solving and leadership skills through peer interaction (Garrison, 2000; Ngubane-Mokiwa & Khoza, 2022). Teaching presence is vital for building social presence by cultivating trust and open communication (Garrison et al., 2010). Effective online teaching requires building social relationships to promote dialogue and collaboration (Song, 2022). While some studies suggest social presence might have a less direct effect on learning outcomes compared to teaching presence (Diaz et al., 2010; Shea & Bidjerano, 2009), others emphasize its importance in collaborative OL and fostering productive communities (Arbaugh et al., 2008; Mutezo & Maré, 2023; Richardson & Swan, 2003).

Cognitive presence is the extent to which learners construct meaning through sustained communication, leading to engagement and productive discourse (Garrison et al., 2000; Sadaf et al., 2021; Shea & Bidjerano, 2009). It focuses on learning and knowledge construction through interaction (Ngubane-Mokiwa & Khoza, 2022). Cognitive presence is intertwined with the other presences.

The dynamic interplay among these three presences is crucial for quality online interaction and learning (Kinsel et al., 2005). Research consistently shows that teaching presence causally influences both social and cognitive presence (Garrison et al., 2010; Kreijns et al., 2014; Shea & Bidjerano, 2009). Social presence often mediates between teaching and cognitive presence, suggesting that teaching presence can enhance cognitive presence by strengthening social presence (Garrison et al., 2010; Kreijns et al., 2014; Shea & Bidjerano, 2009). Both social and cognitive presences are strong predictors for learning outcomes (Li, 2022). A strong teaching presence can still lead to learning and high cognitive presence even without sustained social presence (Shea & Bidjerano, 2009). Learners navigate the environment through teaching presence, engage through social presence, and develop higher-order thinking skills through cognitive presence (Gibson et al., 2012), highlighting the continuous interplay crucial for an effective OL experience.

Studies Examining the Influence of Teaching Presence on Cognitive Presence

Teaching presence strongly influences cognitive presence (Akyol & Garrison, 2008; Kozan & Richardson, 2014). Studies indicate that a lack of timely and meaningful teacher feedback significantly hinders students' cognitive presence (Maboe, 2024; Omodan & Ige, 2021; Reddy Moonasamy & Naidoo, 2022; Sadaf et al., 2021). Active and responsive teaching presence, potentially through interactive discussions or video interactions, is essential for supporting cognitive engagement in OL. Quantitative studies in Malaysia found a positive correlation between teaching presence and learning experience (Chuan et al., 2022; Munoz et al., 2021; Wut et al., 2024). Active instructor involvement in OL leads to a more positive learning experience, which is linked to cognitive engagement (Garrison, 2016; Garrison & Akyol, 2013). Research also shows that increased teaching presence positively impacts learner outcomes and cognitive achievement in OL (Hegeman, 2015; Afify, 2020).

Studies Examining the Influence of Social Presence on Cognitive Presence

Studies at the University of South Africa revealed that a lack of online support from lecturers and limited virtual interaction negatively impacted students' cognitive engagement (Maboe, 2024; Omodan & Ige, 2021; Reddy Moonasamy & Naidoo, 2022). The absence of strong teacher-student relationships hindered students' connection to learning material. Quantitative studies in Malaysia also found a positive correlation between social presence and learning experience (Abidin et al., 2023; Al-dheleai et al., 2020; Chuan et al., 2022; Jamil & Tasir, 2014). When students feel connected and can communicate in a trusting environment, their overall learning experience is positively influenced, indirectly supporting cognitive engagement and leading to better learning outcomes. Studies focusing on enhancing social presence through teaching strategies found a significant correlation between students' academic performance and social presence in online courses (Munoz et al., 2021; Varachotisate et al., 2023; Xia, 2024). Promoting social presence through social cues and peer communication improved social interaction and academic performance, indicating a positive influence on cognitive outcomes (Garrison, 2016).

Similar Studies Conducted in Ethiopia

Previous research in Ethiopia offers a general understanding of OL challenges and adaptations, especially in response to the COVID-19 pandemic. A UNESCO report (Tamrat, 2022) highlighted disruptions in Ethiopian higher education, focusing on limited resources and institutional readiness for online shifts. Other studies, such as Tamrat (2020) on private higher education experiences, Mengistie (2020) on the pandemic's overall impact on the Ethiopian education system, and Abera (2021) on pedagogical changes at Addis Ababa University, provide a broader understanding. Woldegiyorgis and Adamu (2022) offered a comprehensive, macro-level view of how the COVID-19 pandemic affected Ethiopian higher education, detailing the quick transition to OL, existing infrastructure challenges, readiness levels, and policy actions. Building upon this, studies by Tessema (2023), and Tessema and Nicola-Gavrilă (2023) broadly described OL

implementation and initial experiences in Ethiopian HEIs. However, these studies primarily explored the "what" and "how" of the pandemic's impact on education. The current research aims to investigate the "how well" and "why" of OL effectiveness by specifically examining the crucial interplay of teaching presence and social presence and their influence on cognitive presence within the unique context of Ethiopian PHEbased on the following research questions.

- What are the mean levels of teaching presence, social presence and cognitive presence of the participants?
- How do teaching presence, social presence, and cognitive presence relate to each other?
- How do teaching and social presences combine to influence cognitive presence in online learners within Ethiopian PHEIs?

RESEARCH MODEL

The research model for this article is based on the Community of Inquiry (CoI) framework, which posits that meaningful online learning (OL) emerges from the interaction of three essential elements: teaching presence, social presence, and cognitive presence. The study investigates how teaching presence (the instructor's role in design, facilitation, and direction) and social presence (learners' ability to project themselves and form a community) individually and collectively influence cognitive presence (the degree to which learners construct and confirm meaning) within the specific context of Ethiopian private higher education institutions. This model essentially tests the predictive power of teaching and social presences on cognitive presence, adhering to the CoI framework's theoretical relationships.

Participants

This study included 439 online MBA students from five PHEIs in Ethiopia, representing the total population of students enrolled between 2021 and 2024. A total of 245 students, making up the study's sample, responded to the survey. Participants' ages ranged from 23 to 62 (average 37.82 years), with 197 males (80.4%) and 48 females (19.6%). Of these, 245 (92.02%) responded to the survey. Participants were distributed across Harambee University (*n*=92, 37.6%), Select College (*n*=38, 15.5%), Yardstick International College (*n*=42, 17.10%), American College of Technology (*n*=41, 16.70%), and Ethiopian Technology College (*n*=32, 13.10%). A census sampling approach invited all eligible online MBA students to maximize response. Permission was secured through official channels with institutional associations, and researchers collaborated with online program directors to distribute the Google Form questionnaire. Participation was voluntary, with informed consent, ensuring responses were for academic purposes only, and anonymity and confidentiality were guaranteed. Initial descriptive statistics were automatically generated by Google Forms, with further statistical analyses performed using SPSS 26.

Data Collection Tool

To investigate the influence of teaching and social presence on cognitive presence among online MBA learners in Ethiopia PHEIs, data were collected from 245 students using the validated CoI Survey. This 34-item questionnaire, developed by Arbaugh et al. (2008) and validated by Swan et al. (2008), is currently in its 14th version (2020). It measures teaching presence (13 items), social presence (9 items), and cognitive presence (12 items) on a five-point Likert scale, with higher scores indicating stronger perceptions.

Data Analysis

Data were analyzed quantitatively using descriptive and inferential statistics. Descriptive statistics (means, standard deviations, frequencies) provided an overview of teaching, social, and cognitive presence levels. To analyze the responses from the 5-point Likert scale survey, a numerical value was assigned to each response option: *strongly disagree (1), disagree (2), neutral (3), agree (4), and strongly agree (5)*. The mean score for each item was then calculated. To interpret these mean scores, the range of the scale (from 1 to 5) was partitioned into five equal-interval categories, or "bands," to correspond with the five descriptive labels. The resulting partitioned ranges were used to categorize the mean scores and interpret the overall sentiment

for each survey item. These categories are defined as follows: *very low (1.00-1.80), low (1.81-2.60), medium (2.61-3.40), high (3.41-4.20), and very high (4.21-5.00)*. This method provides a consistent and systematic way to translate numerical mean scores back into meaningful qualitative descriptions, allowing for clear conclusions about the data. Cronbach's Alpha (α) ensured the reliability of the CoI Survey scales. Pearson product-moment correlation coefficients (r) established relationships between the three presences. The interpretation of correlation coefficients in this study was based on a common guideline that categorizes the strength of the linear relationship between variables. A Pearson correlation coefficient (r) between *0.10 and 0.29* is considered a *small or weak correlation*. A value between *0.30 and 0.49* indicates a *medium or moderate correlation*, suggesting a more noticeable relationship. Finally, a correlation coefficient from *0.50 to 1.0* represents a *large or strong correlation*, indicating a very close relationship where changes in one variable are highly associated with changes in the other. Multiple linear regression analysis determined the combined and individual impact of teaching and social presences on cognitive presence, assessing overall predictive power (R^2) and statistical significance (p-values).

Validity and Credibility

The CoI survey is highly reliable, showing strong internal consistency across numerous studies with Cronbach's alpha values typically from .91 to .95 (Arbaugh et al., 2008; Martin et al., 2022). In this study, the Cronbach's alpha values for the CoI scale were 0.90 for teaching presence, 0.92 for social presence, and 0.95 for cognitive presence, all confirming its strong reliability and internal consistency. The survey has also been extensively validated in diverse cultural and linguistic contexts (Carlon et al., 2012; Caskurlu, 2018; Moreira et al., 2013; Olpak & Cakmak, 2018; Yu & Richardson, 2015; Yu & Li, 2022; Stenbom, 2018), including Turkish (Öztürk, 2021) and South African ODeL settings (Mutezo & Maré, 2022). To ensure its relevance and appropriateness for the Ethiopian context, the survey was adapted and validated by a panel of experts. The panel included two professionals from the Addis Ababa University School of Psychology, two from the Department of Curriculum and Comparative Studies, and two OLdirectors from PHEIs. Their expertise ensured the instrument's content and wording were culturally and contextually appropriate for the study's participants.

FINDINGS

Levels of teaching presence in online courses within Ethiopian PHEIs

Table 1 presents the descriptive statistics for students' perceptions of teaching presence across its three key dimensions: *direct instruction, design and organization, and facilitation*, in online MBA programs within Ethiopian PHEIs. The data, collected from 245 online learners, is based on a 5-point Likert scale where higher mean values indicate a stronger perception of teaching presence.

Based on the interpretive framework indicated in data analysis part, students in Ethiopian PHEIs generally perceive a moderate to high level of teaching presence in their online MBA courses. In *"design and organization,"* instructors are perceived as being very effective. They effectively communicate course topics (*Mean=4.21, SD=0.70*), which falls into the v*ery high* range, and they clearly communicated goals (*Mean=4.14, SD=0.71*), which is at the very top end of the *high* range. Instructors also provided clear instructions for learning activities (*Mean=4.02, SD=0.85*), a score that is also in the h*igh* range. Communication of due dates was also positive but with more variation (*Mean=3.77, SD=0.99*), which is at the midpoint of the *h*igh range. These findings suggest that the foundational elements of course design are very well-executed. Under *"direct instruction,"* students' perceptions were also high. Instructors were perceived as being timely with feedback (*Mean=3.83, SD=1.00*) and effective in focusing discussions (*Mean=3.70, SD=0.92*), with both scores falling into the *high* range. The perceived helpfulness of feedback for understanding strengths and weaknesses (*Mean=3.55, SD=1.20*) was at the lower end of the *high* range, indicating some room for improvement in feedback quality. Perceptions of "*facilitation"* were more varied. Instructors were generally effective in guiding students toward understanding course topics (*Mean=3.85,*

SD=0.81) and maintaining productive dialogue (*Mean=3.98, SD=0.80*), both of which are in the *high* range. However, lower scores were noted for helping identify areas of agreement/disagreement (*Mean=3.18, SD=0.79*) and reinforcing a sense of community (*Mean=3.11, SD=1.09*), both of which are in the *moderatel* range. Encouraging new concepts also had a lower mean (*Mean=3.44, SD=0.89*), which is at the very bottom of the *high* range. These results suggest that while general facilitation is proficient, fostering critical discourse and a sense of community is less consistently perceived as effective by the students.

Table 1: *Descriptive Statistics of Teaching Presence in Online Courses*

a. Direct Instruction	***N***	***Minimum***	***Maximum***	***Mean***	***SD***
The instructor provided feedback in a timely fashion	245	1.00	5.00	3.83	.997
The instructors provided feedback that helped me understand my strengths and weaknesses	245	1.00	5.00	3.55	1.20
The instructors helped to focus discussing on relevant issues in a way that helped me to learn	245	1.00	5.00	3.70	.92
b. Design & Organization					
The instructors clearly communicated important course topics.	245	1.00	5.00	4.21	.69
The instructors clearly communicated important course goals	245	2.00	5.00	4.14	.71
The instructors provided clear instructions on how to participate in course learning activities	245	2.00	5.00	4.02	.85
The instructors clearly communicated important due dates/time frames for learning activities.	245	1.00	5.00	3.77	.99
c. Facilitation					
The instructors were helpful in identifying areas of agreement and disagreement on course topics that help me to learn	245	1.00	5.00	3.18	.79
The instructors were helpful in guiding the class towards understanding course topics in a way that assist you learn	245	1.00	5.00	3.85	.81
The instructors helped to keep course participants engaged and participating in productive dialogue	245	1.00	5.00	3.98	.80
The instructors helped keep the course participants on task in a way that helped me to learn.	245	1.00	5.00	3.64	.93
The instructors encouraged course participants to explore new concepts in his/her course.	245	1.00	5.00	3.44	.89
Instructors' actions reinforced the development of a sense of community among course participants	245	1.00	5.00	3.11	1.09
Valid N (listwise)	245				

Note. N = sample size; M = mean; SD = standard deviation

Levels of social presence in online courses within Ethiopian PHEIs

Table 2 presents the descriptive statistics for students' perceptions of social presence across its three dimensions: group cohesion, open communication, and affective expression, as experienced by online MBA learners in Ethiopian PHEIs. The data, collected from the participant were presented in Table 2 below.

The analysis reveals varying levels of perceived social presence among online learners in Ethiopian PHEIs. Overall, the scores are lower than those for teaching presence, particularly in the areas of group cohesion and open communication. In the "*affective expression*" dimension, perceptions were generally high. Students strongly believe that online communication is an excellent medium for social interaction (*Mean=3.92, SD=0.90*), which falls into the *high* range. They also reported a *moderate-to-high* ability to form impressions of others (*Mean=3.42, SD=1.06*) and a sense of belonging from getting to know peers (*Mean=3.42, SD=0.87*), with both means resting on the threshold of the *high* range. These findings indicate that students view the online platform as a fundamentally viable space for social connection. In "*open communication,*" students' perceptions were in the *moderate* range. They felt moderately comfortable

interacting with other participants (*Mean=3.11, SD=0.84*) and engaging in discussions (*Mean=3.09, SD=1.13*). They were slightly more comfortable with the online medium itself (*Mean=3.37, SD=1.19*), which is at the very top of the *moderate* range. This suggests that while students are generally amenable to online interaction, their comfort level is not consistently high across all activities. The *"group cohesion"* dimension showed the lowest mean scores, all falling within the l*ow* or *moderate* ranges. Students perceived a *low* level of collaboration through online discussions (*Mean=2.42, SD=0.89*) and felt their views were *less acknowledged* by other participants (*Mean=2.44, SD=0.90*). While they were moderately comfortable disagreeing while maintaining trust (*Mean=2.91, SD=0.89*), this score is still within the *moderate* range. Overall, the results for group cohesion point to significant areas for improvement, suggesting that students feel a weak sense of community and mutual support within their online courses. In general, while online MBA students find online platforms suitable for basic social interaction and open communication, their perceptions of *group cohesion are notably low*. This highlights a critical need to enhance pedagogical strategies that foster collaborative learning, mutual recognition, and a stronger sense of community among students.

Table 2: *Descriptive Statistics of Social Presence in Online Courses*

a. Group Cohesion	***N***	***Minimum***	***Maximum***	***Mean***	***SD***
Online discussions helped me to develop a sense of collaboration	245	1.00	5.00	2.42	.89
I felt that my point of view was acknowledged by other course participants	245	1.00	5.00	2.44	.90
I felt comfortable disagreeing with other course participants while still maintaining a sense of trust	245	1.00	5.00	2.91	.89
b. Open Communication					
I felt comfortable interacting with other course participants.	245	1.00	5.00	3.11	.84
I felt comfortable participating in the course discussions	245	1.00	5.00	3.09	1.13
I felt comfortable conversing through the online medium	245	1.00	5.00	3.37	1.19
c. Affective Expression					
Online or web-based communication is an excellent medium for social interaction	245	1.00	5.00	3.92	.90
I was able to form distinct impressions of some course participants	245	1.00	5.00	3.42	1.06
Getting to know other course participants gave me a sense of belonging in the course	245	1.00	5.00	3.42	.87
Valid N (listwise)	245				

Note. N = sample size; M = mean; SD = standard deviation

Levels of cognitive presence in online courses within Ethiopian PHEIs

Table 3 presents the descriptive statistics for students' cognitifve presence across its four dimensions: resolution, integration, exploration and triggering events, as experienced by online MBA learners in Ethiopian PHEIs. The data, collected from the participant were presented in Table 3 below.

Online MBA students generally perceive a high to very high level of cognitive presence in their online courses, indicating a strong engagement with knowledge construction and application. The mean scores consistently fall within the *high* and *very high* ranges of the interpreted scale. The *"triggering events"* dimension shows the highest mean scores, with all falling into the *high* and v*ery high* ranges. This reveals that course activities are highly effective at stimulating curiosity and interest. Students felt *very highly motivated* to explore content-related questions (*mean=4.34, SD=0.72*), and found that problems posed increased their interest (*Mean=4.19,SD=0.71*) and intrigued their curiosity (*Mean=4.00, SD=0.90*), all of which are in the *high* range and successful initition of the learning process. In the *"exploration*" dimension, students' perceptions also reflect a strong level of engagement. They *very highly* utilized a variety of information sources to address problems (*Mean=4.21, SD=0.78*). They found online discussions valuable for appreciating

different perspectives *(Mean=3.75*, *SD=0.92)* and that brainstorming helped resolve questions (*Mean=3.60, SD=0.90*), with both falling into the *high* range. The *"integration"* dimension indicates a strong capacity for synthesizing new knowledge. Learning activities were perceived as *highly* helpful in constructing explanations and solutions (*Mean=4.05, SD=0.85*). Students also found reflection to be a *highly* valuable way to understand fundamental concepts *(Mean=3.64, SD=0.96*). However, combining new information to answer questions was perceived as *moderately* helpful (*Mean=3.40, SD=0.93*), suggesting some variability in this specific skill. Finally, the *"resolution"* dimension highlights a strong capacity for applying knowledge. Students felt *very highly* capable of describing ways to test and apply knowledge *(Mean=4.20, SD=0.68*), and *highly* confident in developing practical solutions (*Mean=3.90, SD=0.94*). The ability to apply course knowledge to their work was also perceived as *high (Mean=3.79, SD=0.88)*. In summary, online MBA students report a strong cognitive presence, particularly in their ability to be motivated by course content and to apply the knowledge they've learned. While there is a slight incline in the perceived effectiveness of combining new information, the overall findings indicate that the OL environment successfully fosters meaningful cognitive engagement and knowledge construction.

Table 3: *Descriptive Statistics of Cognitive Presence in Online Courses*

a. Resolution	***N***	***Minimum***	***Maximum***	***Mean***	***SD***
I can apply the knowledge created in this course to my work or other non-class related activities	245	1.00	5.00	3.79	.88
I have developed solutions to course problems that can be applied in practice	245	1.00	5.00	3.90	.94
I can describe ways to test and apply the knowledgegained in this course	245	2.00	5.00	4.20	.68
b. Integration					
Reflection on course contents and discussions helped me understand fundamental concepts in this class	245	1.00	5.00	3.64	.96
Learning activities helped me construct explanations/solutions	245	1.00	5.00	4.05	.85
Combining new information helped me answer questions raised in course activities	245	1.00	5.00	3.40	.93
c. Exploration					
Online discussions were valuable in helping me appreciate different perspectives	245	1.00	5.00	3.75	.92
Brainstorming and finding relevant information helped me resolve content related questions.	245	1.00	5.00	3.60	.90
I utilized a variety of information sources to explore problems posed in this course	245	2.00	5.00	4.21	.78
d. Triggering Events					
I felt motivated to explore content related questions	245	2.00	5.00	4.34	.72
Course activities intrigue (arouse) my curiosity	245	1.00	5.00	4.00	.87
Problems posed increased my interest in course issues	245	2.00	5.00	4.19	.71
Valid N (listwise)	245				

Note. N = sample size; M = mean; SD = standard deviation

Relationship among teaching presence, social presence and cognitive presence.

Table 4 presents the Pearson correlation coefficients among teaching presence (Mean_TP), social presence (SP), and cognitive presence (CP) as perceived by online MBA students in Ethiopian PHEIs. The analysis examines the strength and direction of these linear relationships, with significance levels indicated at $p<0.01$ (**) and $p<0.05$ (*).

Table 4: *Pearson Correlations between Teaching, Social, and Cognitive Presence*

			Mean_ TP	SP	CP
Mean_TP	Mean_ TP	Pearson Correlation	1	.44**	.32**
		Sig. (2-tailed)		.00	.00
		N	245	245	245
SP	SP	Pearson Correlation	.44**	1	.16*
		Sig. (2-tailed)	.00		.01
		N	245	245	245
CP	CP	Pearson Correlation	.32**	.16*	1
		Sig. (2-tailed)	.00	.01	
		N	245	245	245

**. Correlation is significant at the 01 level (2-tailed). *. Correlation is significant at the 05level (2-tailed).

The correlation analysis reveals moderastely positive relationships among all three-core presences of the CoI framework:

i. *Teaching presence and social presence:* A moderately positive and statistically significant correlation was found between teaching presence and social presence ($r = 0.44$, $p < 0.01$). This indicates that, as students perceive higher levels of teaching presence, their perception of social presence in the online environment also tends to increase. This finding aligns with the theoretical understanding that effective teaching is crucial for fostering a sense of community and interaction among learners.

ii. *Teaching presence and cognitive presence:* A positive and statistically significant, albeit weaker, correlation exists between teaching presence and cognitive presence ($r = 0.32$, < 0.01). This suggests that while teaching presence is related to cognitive engagement, its direct association with students' perceived knowledge construction and meaning-making is less pronounced than its relationship with social presence.

iii. *Social presence and cognitive presence:* A weak but statistically significant positive correlation was observed between social presence and cognitive presence ($r = 0.16$, $p = 0.01$). This indicates that a greater sense of social connection and interaction among students is associated with a slight increase in their cognitive presence. While the correlation is modest, it underscores the supportive role that social interaction can play in intellectual engagement.

The correlation analysis confirms that all three presences within the CoI framework are positively and significantly related in the context of online MBA programs in Ethiopian PHEIs. Teaching presence demonstrates the strongest relationship with social presence**,** suggesting that instructors play a vital role in cultivating a sense of community among online learners. While teaching presence also positively correlates with cognitive presence, this relationship is weaker. Furthermore, a modest positive association between social presence and cognitive presence indicates that fostering social connections can contribute, albeit to a lesser extent, to students' cognitive development. These findings reinforce the interconnected nature of these presences and highlight the importance of designing and facilitating OL environments that intentionally nurture all three to optimize the learning experience.

Impact of teaching and social presences on cognitive presence

Table 5 presents the results of a multiple linear regression analysis conducted to examine the predictive influence of teaching presence (Mean_TP) and social presence (SP) on cognitive presence (CP) among online MBA students in Ethiopian PHEIs.

Table 5: *Regression Model Summary for Cognitive Presence*

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.317[a]	.100	.093	.243

a. Predictors: (Constant), social presence , mean teaching presence

Table 5 indicates that the combined predictors, teaching presence and social presence, account for a small but statistically significant proportion of the variance in cognitive presence. The combined analysis of teaching presence and social presence through multiple linear regression reveals a significant relationship with cognitive presence. The model summary, presented in Table 5, indicates that the combined predictors account for a small but statistically significant proportion of the variance in cognitive presence.

The *R-value of .317* indicates a *moderate positive correlation* between the predictors (teaching and social presence) and the dependent variable (cognitive presence). This confirms that as both teaching presence and social presence increase, there is a tendency for cognitive presence to also increase. The *R-squared value of .100* suggests that 10.0% of the variance in cognitive presence can be explained by the linear combination of teaching presence and social presence. While this percentage may seem small, it is a significant finding in social sciences research, especially when a wide range of factors can influence a variable like cognitive presence. The *adjusted R-squared value of .093* provides a slightly more conservative and accurate estimate of the population variance explained, accounting for the two predictors in the model. This value indicates that the model would be expected to explain approximately *9.3%* of the variance in cognitive presence in a larger population, reinforcing the significance of the relationship found. In summary, the regression analysis shows that while other factors undoubtedly play a role, teaching presence and social presence collectively have a statistically significant, albeit modest, positive impact on cognitive presence in this study's context.

Table 6: *Model Summary for Multiple Linear Regression Predicting Cognitive Presence*

	Model	Sum of Squares	*Df*	Mean Square	*F*	*Sig.*
1	Regression	1.59	2	.80	13.48	.000[b]
	Residual	14.31	242	.06		
	Total	15.90	244			

a. Dependent Variable: Cognitive presence, b. Predictors: (Constant), social presence, mean teaching presence

The ANOVA table demonstrates that the regression model is statistically significant (F (2, 242) = 13.48, p = .000). This indicates that the combination of teaching presence and social presence significantly predicts cognitive presence, meaning that these variables, taken together, contribute significantly to explaining the variation in students' cognitive presence perceptions.

Table 7: *Coefficients[a]*

	Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	*Beta*		
1	(Constant)	2.969	.184		16.14	.000
	Mean_TP	.243	.055	.302	4.45	.000
	SP	.015	.034	.030	.44	.664

a. Dependent Variable: CP, The coefficients table provides insights into the individual contribution of each predictor.

Teaching presence (TP): The unstandardized coefficient (B) for teaching presence is .243, with a standardized coefficient (Beta) of .302. This indicates that for every one-unit increase in perceived teaching presence, cognitive presence is predicted to increase by .243 units, holding social presence constant. This

relationship is statistically significant (t = 4.45, p = .000). This suggests that teaching presence is a significant positive predictor of cognitive presence**.**

Social presence (SP): The unstandardized coefficient (B) for social presence is .015, with a standardized coefficient (Beta) of .030. The t-statistic is .435, and the p-value is .66. Since the p-value (.664) is greater than the conventional significance level of .05, social presence is not a statistically significant predictor of cognitive presence in this model**,** when teaching presence is also included. This suggests that the unique contribution of social presence to predicting cognitive presence, after accounting for teaching presence, is negligible.

In summary, the multiple regression analysis reveals that teaching presence is a significant positive predictor of cognitive presence among online MBA students in Ethiopian PHEIs. Specifically, an increase in perceived teaching presence is associated with a notable increase in cognitive presence. However**,** social presence does not emerge as a statistically significant predictor of cognitive presence in this model, implying that its unique contribution to explaining variations in cognitive presence is minimal when teaching presence is also considered. While teaching presence and social presence collectively explain 10% of the variance in cognitive presence, the primary driving factor within this model is teaching presence, underscoring its pivotal role in fostering students' meaning making and knowledge construction in these OL environments.

DISCUSSION AND CONCLUSION

This study explored how teaching and social presences influence cognitive presence in OL within Ethiopian PHEIs, using the CoI framework. Findings offer insights into online MBA students' perceptions in a developing country context.

Online MBA students generally perceive a strong teaching presence, especially in course design and organization, indicating effective structuring of content and clear instructions (Garrison et al., 2000). Instructors also provided timely feedback and focused discussions. However, areas for improvement were identified in facilitation, with students perceiving less instructor engagement in identifying agreement/disagreement, fostering community, and encouraging new concept exploration. These observations align with research from other developing contexts noting hindrances from delayed feedback and limited instructor participation (Maboe, 2024; Omodan & Ige, 2021; Reddy Moonasamy & Naidoo, 2022; Sadaf et al., 2021). This suggests a need to enhance active and interactive pedagogical strategies to fully activate learning and community building, beyond just structural aspects.

The study revealed a more complex picture for social presence. While students believe online communication is suitable for social interaction and expressed moderate comfort with open communication, group cohesion showed significantly lower perceptions. This suggests students may not feel a strong sense of collaborative learning or consistent peer acknowledgment in online discussions. This is consistent with challenges in cultivating social presence in virtual environments, especially with limited spontaneous interaction, mirroring findings from South African studies (Maboe, 2024; Omodan & Ige, 2021; Reddy Moonasamy & Naidoo, 2022). While research in contexts like Malaysia links social presence positively to learning experience (Al-dheleai & Tasir, 2020; Al-dheleai et al., 2020; Abidin et al., 2023; Chuan et al., 2022; Jamil & Tasir, 2014), the result of this study suggests that the perceived absence of collaborative opportunities might weaken this positive influence on cognitive outcomes.

Despite some limitations in perceived social presence, online MBA students reported a *high* level of cognitive presence, a finding consistent with the analysis of their mean scores.This indicates active engagement in meaning-making, knowledge construction, and application. Students were highly motivated to explore content, found problems intriguing, utilized diverse information sources, and effectively

constructed explanations and solutions. They also demonstrated a strong ability to apply new knowledge practically. This healthy cognitive engagement aligns with the CoI framework's emphasis on cognitive presence for critical thinking (Beckmann & Weber, 2016; Garrison et al., 2000). This finding is particularly notable given infrastructure and digital literacy challenges often associated with OL in developing countries (Dejene & Tilahun, 2024; Yidana et al., 2023), suggesting the OL environment effectively supports intellectual development.

The analysis of relationships among the three presences revealed significant positive correlations. The analysis of relationships among the three presences revealed significant positive correlations, confirming the interdependent nature of the Community of Inquiry (CoI) elements.The strongest correlation was found between teaching presence and social presence ($r = 0.44$, $p < 0.001$). This finding highlights the instructor's crucial role in actively fostering a sense of community and encouraging meaningful interaction among students. Within the CoI framework, this aligns with the design and organization component of teaching presence, where the instructor creates opportunities for interaction, as well as the facilitating discourse component, where they guide and moderate discussions to build a cohesive learning environment. This result is consistent with studies that emphasize the instructor's central role in establishing the conditions necessary for students to feel comfortable and connected in online settings, which is a prerequisite for robust social presence (Garrison, 2017; Omodan & Ige, 2021).

A positive correlation also existed between teaching presence and cognitive presence ($r = 0.32$, $p < 0.001$). This finding indicates that effective instructional design and facilitation are essential for promoting knowledge construction. The correlation, while moderate, underscores that teaching presence is not just about content delivery but also about structuring activities that challenge learners to engage in critical thinking, problem-solving, and reflection. This result mirrors findings from other studies (Arbaugh, 2008; Giannousi & Kioumourtzoglou, 2016), which demonstrate that well-defined learning objectives, timely feedback, and targeted questioning are all teaching strategies that significantly contribute to a student's ability to engage in productive intellectual work.

Furthermore, a positive, albeit weaker, correlation was found between social presence and cognitive presence ($r = 0.16$, $p = 01$). This suggests that even a moderate sense of social connection can support intellectual engagement. While direct collaboration may not be the primary driver of cognitive outcomes in this context, the supportive environment cultivated by social presence allows for intellectual risk-taking, the open sharing of ideas, and peer-to-peer feedback. This is a vital but often understated component of knowledge construction. Previous research supports this, showing that a feeling of belonging and peer validation, even when less overt, can reduce feelings of isolation and sustain the cognitive effort required for deep learning (e.g., Al-dheleai & Tasir, 2020; Garrison, 2017)

Regression analysis further clarified the predictive power of teaching and social presences on cognitive presence. Teaching presence emerged as a significant positive predictor of cognitive presence, confirming the instructor's active role directly fosters meaning construction and critical thinking. This aligns with prior research on teaching presence's strong influence on cognitive outcomes (Akyol & Garrison, 2008; Kozan & Richardson, 2014) and positive learning experiences in developing countries (Chuan et al., 2022; Munoz et al., 2021; Wut et al., 2024). However, social presence was not a statistically significant predictor of cognitive presence in this model when teaching presence was also considered. This suggests that while social presence might correlate, its unique contribution to predicting cognitive outcomes, beyond teaching presence, is negligible here. This finding aligns with some studies indicating a less direct impact of social presence on cognitive presence, or that strong teaching presence can drive learning without highly developed social interaction (Shea & Bidjerano, 2009; Diaz et al., 2010; Akyol & Garrison, 2008). This could imply that in these

Ethiopian PHEIs, cognitive engagement is primarily driven by instructor-led activities and individual efforts, rather than extensive peer collaboration, possibly due to observed lower group cohesion. This distinction provides valuable insight into the specific dynamics of OL in this regional context.

This study provides empirical evidence from Ethiopian PHEIs regarding the critical role of teaching presence and, to a lesser extent, social presence in shaping online learners' cognitive engagement.

Teaching presence is strong and crucial: Online MBA students generally perceive a strong teaching presence, particularly in terms of course design and organization. This is a foundational strength of OL in these institutions, indicating that instructors are effectively structuring and guiding the learning process. The findings underscore that teaching presence is a significant and positive predictor of cognitive presence, directly contributing to students' meaning-making and knowledge construction. This emphasizes the instructor's central role in facilitating effective OL outcomes in this context.

Social presence needs enhancement: While online communication is seen as a viable medium for social interaction, the dimensions of group cohesion and perceived collaboration are notably weaker. Although social presence correlates positively with cognitive presence, its unique predictive power on cognitive presence is minimal when teaching presence is accounted for. This suggests that while students may acknowledge the potential for social interaction, the actual depth of collaborative learning and peer acknowledgment is not yet consistently translating into a direct contribution to their cognitive development.

High cognitive engagement amidst varying presences: Despite the challenges in fostering social cohesion, students report a high level of cognitive presence, indicating active engagement in triggering events, exploration, integration, and resolution of knowledge. This suggests that students are resilient and capable of constructing meaning, largely driven by strong teaching presence and their individual initiative.

Suggestions

To further enhance OL in Ethiopian PHEIs, instructors should continue to prioritize clear instructional design and direct guidance. However, there is a clear need to develop and implement targeted strategies to foster more effective social presence, particularly in areas of group cohesion and authentic collaborative dialogue. This could involve promoting structured group activities, encouraging peer feedback, and increasing instructor presence in discussion forums to model and facilitate richer interactions. Future research could explore mediating factors that might explain the relatively weaker direct impact of social presence on cognitive presence, as well as qualitative studies to understand students and instructors' experiences in fostering and experiencing these presences in detail.

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