

# UNDERSTANDING THE RELATIONSHIP BETWEEN COGNITIVE PRESENCE AND OTHER PRESENCES IN ONLINE GROUP WORK

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**Abstract.** Online group work has become an integral component of education, offering opportunities for collaboration beyond the boundaries of the physical classroom. Despite its purported advantages, online group work presents a range of challenges arising from various factors that often hinder positive learning outcomes. To better understand these issues, this study investigates the relationship between cognitive presence, social presence, and teaching presence in online group work. This quantitative study involved 123 undergraduate students from a local university, representing various semesters and disciplines. Data were collected through a 5-Likert scale survey to capture students' overall experiences with online group work. The survey comprised 24 items, divided into three sections to examine each presence more closely. Findings reveal moderate to strong positive relationships among the three elements, with cognitive presence and teaching presence emerging as the strongest dimensions. While online group work can create an environment conducive to learning, the provision of sufficient support and clear guidelines from instructors can further enhance its effectiveness. These findings are significant in helping educators and practitioners design online group learning environments that maximise collaboration and engagement, given their potential and relevancy in recent years.

**Keywords:** *online group work, cognitive presence, social interactions, teaching presence*

## Introduction

Tonheim et al. (2024) defined group work as independent student work without the instructors' presence. Group work nowadays has evolved into an online method in the workplace and education aligned with the advancement of technology. The online group work term is widely known as a central pedagogical methodology in education as teaching and learning are moving into blended and fully online platforms. Brindley et al. (2009) discussed some issues pertaining to challenges of online group work like coordination problems, unequal contribution, social isolation and problems in virtual discussions. Therefore, many studies have explored different kinds of presence in online group work to improve students' online learning experience when teaching presence scaffolding collaboration, social presence fostering trust, and cognitive presence driving higher-order learning. Teaching, social and cognitive presences are the core framework actively discussed for their relations in online group work (Aderibigbe, 2021). Teaching and social presences are the main indicator of cognitive presence while social presence mediate the impacts of teaching presence (Martin et al., 2019). Interventions of the presences function synergistically in bringing out the best online group work experiences.

Recent education evolution has seen collaborative group work being conducted online to ensure effective teaching and learning. This marks a crucial beginning when Movement Control Order (MCO) was enforced in 2020 causing the sudden move to the shift in platforms for teaching and learning. The post-pandemic teaching and learning is now utilising the combination of physical, online and hybrid activities especially the group work. In ensuring online group work is executed efficiently, the optimisation of artificial intelligence (AI) and social media in teaching and learning is important for educators' consideration (Lee et al., 2020). Hence, there are three vital dimensions pivoting the experience which are the cognitive presence, social presence and teaching presence to improve the online group work outcomes. A study by Martin et al. (2019) showed that a smaller correlation is portrayed in cognitive presence to the overall group work experience compared to social and teaching presence. However, teaching presence resulted in better participation among students during online classes (Singh et al., 2022). Additionally, Abd Aziz et al. (2024) proved that teaching presence portrayed positive impacts on cognitive presence and social presence among the pre-degree students in their study and proposed the future research to focus on comparing the significant impact of other types of presence on post-pandemic education. In consideration to previous studies, this study is conducted to evaluate and determine which presence is more dominant in the implementation of online group work specifically. Cognitive presence refers to learners' ability to construct meaning and understanding through purposeful discourse and reflection. Although much research has focused on different presences, the specific dynamics between cognitive presence and the others in the context of online group work remain underexplored. In turn, uncovering these relationships would bridge an important gap in both theory and practice, ensuring that online group learning supports deep inquiry, meaningful interaction, and successful learning outcomes.

This study is done to explore online group work. Specifically, this study is done to answer the following questions: (1) How does cognitive presence influence online group work? (2) How does social presence influence online group work? (3) How does teaching presence influence online group work? (4) What is the relationship between the three types of presence in online group work?

## ***Literature review***

### ***Theoretical framework of the study***

This research is based on the Community of Inquiry (CoI) Model developed by Garrison et al. (1999), which provides a framework for enhancing online and blended learning. The CoI Model emphasizes that an effective educational experience results from the interplay of three components which are Social Presence, Cognitive Presence, and Teaching Presence. Social Presence allows learners to present themselves as real individuals, fostering trust, open communication, and a sense of community. It encourages collaboration and creates the emotional climate necessary for productive discussions. Next is Cognitive Presence which involves learners constructing meaning through reflection and dialogue, progressing through four phases which are recognising issues (triggering events), seeking information (exploration), linking ideas (integration), and applying knowledge (resolution). This component is essential for deep learning and critical thinking. Another aspect which is Teaching Presence encompasses the design and facilitation of the learning experience to achieve desired outcomes, including

planning activities, moderating discussions, and providing feedback. It integrates the other two presences, balancing intellectual engagement with community building. In essence, the CoI Model provides a theoretical basis for improving online learning by highlighting the interconnected roles of Social, Cognitive, and Teaching Presence. By fostering these elements, educators can create environments that enhance engagement and learning outcomes.

According to Aderibigbe (2021), online group work activities provide social, cognitive, and teaching presence to the participants. These three types of presence for online group work are essential in group work activities to create a meaningful learning experience especially in teaching presence. Group work is one of the important components in students learning because it enhances active learning experience through discussions and collaborative activities. According to Aderibigbe (2021), teaching presence is important to help facilitate collaborative discussions among students. Besides that, in order to support students' group learning, it is important to create an open and flexible learning environment. Next, in order to ensure cognitive presence, students should be given enough time to analyse the questions critically and relate to their personal experiences. This will increase their interest in learning and motivate them to think of new solutions to solve problems. Lastly, students who are actively engaged in the learning process will develop social presence. This is because Anyau et al. (2023) claim that by being active in group work, it will encourage active discussions, experience sharing and collaboration with other team members.

### ***Past studies***

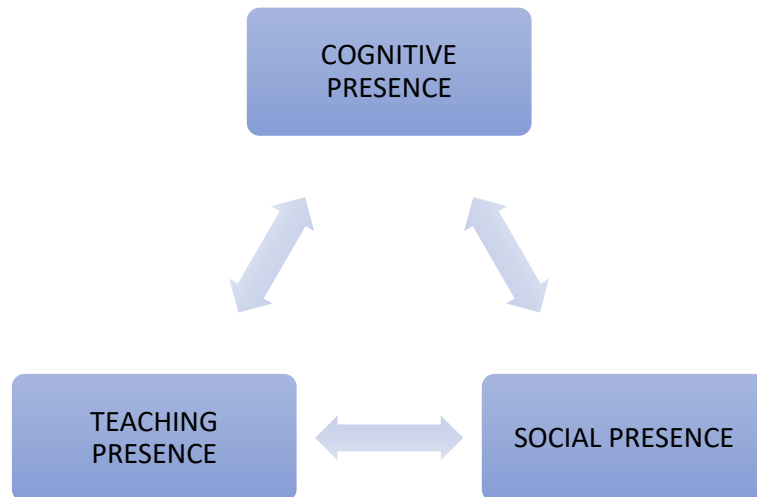
Previous studies have been done to provide insights on students and teachers' perceptions on cognitive presence, social presence and teaching presence in online group work (Donelan and Kear, 2024; Karaca and Akyüz, 2024; Vogel and Wood, 2023; Kelly et al., 2022; Aderibigbe, 2021). A study conducted by Aderibigbe (2021) revealed that most students' discussion posts reflected high-quality contributions grounded in deep learning approach, supported by engagement in online discussions and a reflective assignment, which are aligned to the concept of cognitive presence. In another study by Karaca and Akyüz (2024), they investigated the teachers' view and suggestions in facilitating small-group collaboration in online learning. The data were collected from semi-structured interviews with four female mathematics teachers who have experiences related to online learning. Through content analysis, the findings revealed that effective online group work required structured participation such as explaining group work expectations, assigning roles and creating individual accountability rather than simply placing students in breakout rooms. This study also emphasized the importance of teacher guidance, purposeful task design and real-time monitoring to ensure participation and meaningful learning in an online context (Karaca and Akyüz, 2024). Next, Donelan and Kear (2024) conducted a systematic review on online group work from a total of 57 relevant articles and they identified the key challenges of online group work such as low participation, unclear expectations and weak interpersonal relationships. Similarly, their study also suggested that online group work must be carefully planned and supported to ensure the students know how to collaborate online effectively.

A study conducted by Vogel and Wood (2023) explored the university students' perceptions and experiences of their in-person and online collaborative group work before and during the COVID-19 pandemic. The respondents in this study were 115

senior undergraduates from various disciplines in a Canadian university. The findings showed that more courses required group work during the pandemic and online group work was perceived as lacking in efficiency, motivation and satisfaction but higher in workload demands compared to in-person group work (Vogel and Wood, 2023). They highlighted how students felt less motivated and satisfied due to lack of opportunities for social presence during online group work. They suggested that elements such as interactive and social opportunities are important to enhance students' satisfaction in online group work (Vogel and Wood, 2023). This is supported by Kelly et al. (2022) as their findings also emphasized that interaction with other students was one of the important aspects of a successful online group work. In their study, 68 undergraduates were assigned to either a treatment group with a utility-value intervention and a control group. The treatment group was exposed to the benefits of online group work and group work skills to enhance their perceptions of online group work. The findings showed that opportunities for social interaction during online group work positively influenced their perceptions and engagement in completing the tasks (Kelly et al., 2022). These previous studies highlight the importance of different types of presence including cognitive presence, social presence and teaching presence in online group work that support not only task completion but also enhance students' satisfaction in learning. Therefore, this present study focused on the relationship between cognitive presence, social presence and teaching presence in online group work to create a meaningful online learning experience.

### ***Conceptual framework of the study***

The theory of online learning (Anderson, 2004) states one interesting component is that online learning needs to focus on being knowledge centred. Knowledge-context lessons are actually important even in the traditional face-to-face lessons. Knowledge-centred learning takes into consideration learners' previous knowledge so learners can make sense of the newly introduced knowledge. In addition to that, learning is about making connections with ideas (Siemens, 2005). Learning is also making connections with other learners and that is why group work via online works as much as group work face-to-face. The concept of knowledge centred goes well with Aderibigbe (2021) cognitive presence where learners connect through sharing of information and ideas. Sharing of ideas gives learners confidence in learning and encourages curiosity among learners (Rahmat et al., 2021). *Figure 1* presents the conceptual framework of the study. This study explores Aderibigbe (2021) three types of presence in online group work and they are cognitive, social and teaching presence. Cognitive presence in group work refers to the exchange of ideas. The interaction in group work via online is a good display of connection of ideas that Siemens (2005) mentioned in connectivism. Next, social presence in online group work is felt when learners communicate to complete tasks online. Finally, teaching presence is needed even in online group work because the teacher plans materials and tasks to make the group work successful. This study also explores if there is a relationship between cognitive and social presence. It also investigates if there is a relationship between social and teaching presence as well as teaching and cognitive presence.



**Figure 1.** Conceptual framework of the study: The relationship between cognitive presence and all types of presence in group work online.

### Materials and Methods

This quantitative study is done to explore online group work. A convenient sample of 123 participants responded to the survey. The instrument used is a 5 Likert-scale survey. *Table 1* shows the categories used for the Likert scale; 1 is for Never, 2 is for Rarely, 3 is for Sometimes, 4 is for Very Often and 5 is for Always. *Table 2* shows the distribution of items in the survey. This study is replicated from Aderibigbe (2021) to reveal the variables in the table below. Section B has 7 items on cognitive presence. Section C has 7 items on social presence and section D has 8 items on teaching presence. *Table 2* also shows the reliability of the survey. The analysis shows a Cronbach alpha of .718 for Cognitive presence, .730 for Social presence and .908 for Teaching presence. The overall Cronbach alpha for all 22 items is .881; thus, revealing a good reliability of the instrument chosen (Jackson, 2015). Further analysis using SPSS is done to present findings to answer the research questions for this study.

**Table 1.** Likert scale use in this study.

Category	Description
1	Never
2	Rarely
3	Sometimes
4	Very Often
5	Always

**Table 2.** Distribution of items in the survey.

Section	Elements (Aderibigbe, 2021)	No of items	Cronbach Alpha
B	Cognitive presence	7	.718
C	Social presence	7	.730
D	Teaching presence	8	.908
Total items		22	.881

## Results and Discussion

### *Demographic analysis*

Table 3 shows the percentage for demographic profile of the respondents. A total of 123 respondents from a local higher education institution were involved in this study with male (34%) and female (66%). The respondents varied across different semesters with students from semesters 1-3 (68%) and those from semesters 7 and above (11%). In addition to respondents' gender and semester, the questionnaire also includes items detailing out the respondents' general experience during online learning sessions. Item no.3 shows that 64% respondents reported to have experienced online learning for a year and above and 36% experienced less than a year of online learning. For item no.4, 55% respondents reported to have 2-4 hours of online session per week while 33% respondents reported to have more than 8 hours session per week. Item no.5 shows 63% respondents had an online learning session that consisted of mostly lectures and only 14% reported to experience online learning that involved more activities than lectures.

**Table 3.** Demographic profile in percentage (%).

Question	Demographic profile	Categories	Percentage (%)
1	Gender	Male	34%
		Female	66%
2	Semester	1-3	68%
		4-6	21%
		7 and above	11%
3	Online learning experience	Less than one year	36%
		1 year and above	64%
4	Duration of online learning per week	2-4 hours per week	55%
		5-8 hours per week	32%
		More than 8 hours per week	13%
5	Class type	Mostly lectures	63%
		more activities than lectures	14%
		More lectures than activities	23%

### *Descriptive statistics*

#### *Findings for cognitive presence*

This section presents data to answer research question: (1) How does cognitive presence influence online group work? Figure 2 shows the mean for cognitive presence. Four items share the same mean of 4. Firstly, item 4 (mean=4, SD=0.8) states that group work allowed the students to exchange information. Next, item 5 (mean=4, SD=0.7) reports that the team members presented new information in group discussions. Item 6 (mean=4, SD=0.8) states that at the end of the online group discussion, the team used new ideas discussed. Item 3 (mean=3.8, SD=0.8) states that when the learners are in online groups., they were amazed at how many ideas were discussed. Finally, item 2 (mean=2.8, SD=0.9) states that when they worked in groups online, they were confused over the different types of ideas discussed.

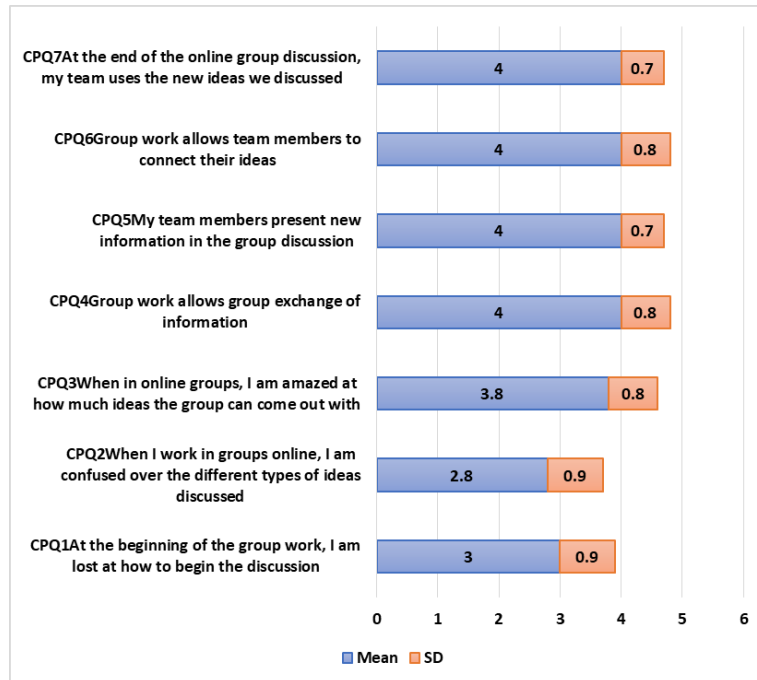


Figure 2. Mean for cognitive presence.

### Findings for social presence

This section presents data to answer research question: (2) How does social presence influence online group work? Figure 3 shows the mean and standard deviation for the social presence factor in online group work. Item 4 (mean=3.9, SD=0.8) and item 7 (mean=3.9, SD=0.8) showcased the highest mean explaining that students are not shy to share new ideas with team members and this allows them to communicate clearly among the group members. The average mean are portrayed in item 1,3,5 and 6 (mean=3.5-3.8, SD=0.8-0.9) showing students are sensitive in noticing and expressing emotions while performing online group work activities. The lowest mean portrayed by item 2 (mean=2.7, SD=0.9) signifying the least significant impact that students are unhappy in online group work.

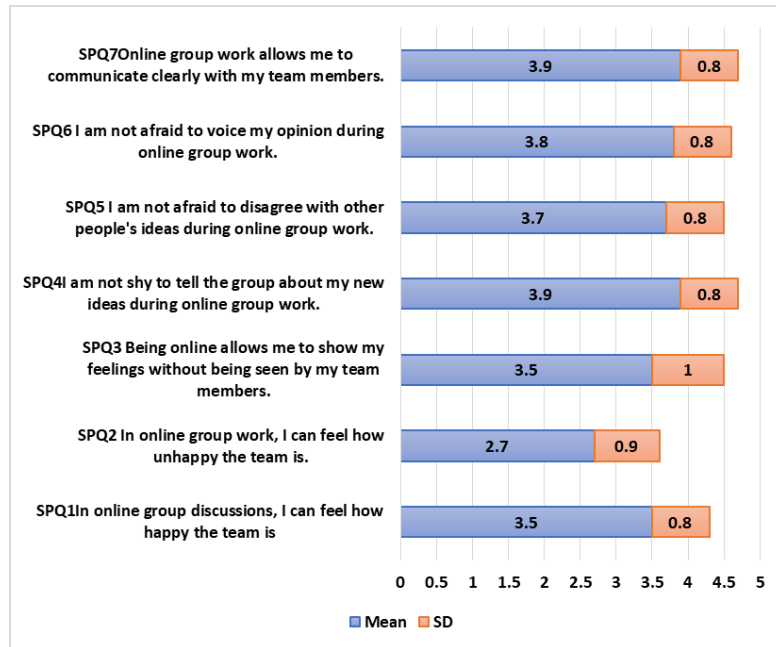


Figure 3. Mean for social presence.

### Findings for teaching presence

This section presents data to answer research question: (3) How does teaching presence influence online group work? Figure 4 shows the mean and standard deviation of the teaching presence influence on online group work. Items 3 and 5 have the highest value (mean=4.2, SD=0.8), indicating students successfully use templates and examples provided by the teacher. They can also understand the topic better by using the examples given. Items 1, 2, 6, and 7 have an average value (mean=4.1, SD=0.7-0.8), suggesting that the teacher uses suitable teaching materials to explain the topic and shows how to complete tasks online. They also agreed that they can see how they should write their examples using examples given by their teacher. In contrast, items 4 and 8 show the lowest value (mean=4, SD=0.9-0.8), indicating less influence on students imitating the teacher's methods, despite finding the explanations about the task, assignment or test clear.

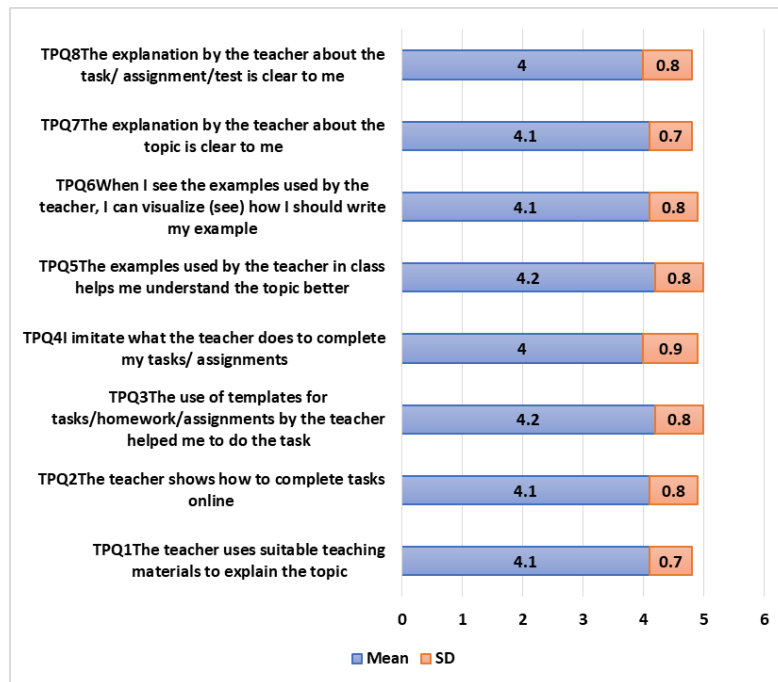


Figure 4. Mean for teaching presence.

### Exploratory statistics

This section presents data to answer research question: (4) What is the relationship between the three types of presence in online group work? To determine if there is a significant association in the mean scores between the three types of presence in online group work, data is analysed using SPSS for correlations. Results are presented separately in Table 4, Table 5 and Table 6. Table 4 shows there is an association between cognitive and social presence. Correlation analysis shows that there is a moderate significant association between cognitive and social presence ( $r=.422^{**}$ ) and ( $p=.000$ ). According to Jackson (2015), coefficient is significant at the .05 level and positive correlation is measured on a 0.1 to 1.0 scale. Weak positive correlation would be in the range of 0.1 to 0.3, moderate positive correlation from 0.3 to 0.5, and strong positive correlation from 0.5 to 1.0. This means that there is also a moderate positive relationship between cognitive and social presence. Table 5 shows there is an association between social and teaching presence. Correlation analysis shows that there is a moderate significant association between social and teaching presence ( $r=.398^{**}$ ) and ( $p=.000$ ). This means that there is also a moderate positive relationship between social and teaching presence. Table 6 shows there is an association between teaching and cognitive presence. Correlation analysis shows that there is a high significant association between teaching and cognitive presence ( $r=.507^{**}$ ) and ( $p=.000$ ). This means that there is also a strong positive relationship between teaching and cognitive presence.

Table 4. Correlation between cognitive and social presence.

Element		Cognitive	Social
Cognitive	Pearson Correlation	1	.422**
	Sig. (2-tailed)	-	.000
	N	123	123
Social	Pearson Correlation	.422**	1

	Sig. (2-tailed)	.000	-
	N	123	123

Note: **\*\*Correlation is significant at the level 0.01(2-tailed).**

**Table 5. Correlation between social and teaching presence.**

Element		Social	Teaching
Social	Pearson Correlation	1	.398**
	Sig. (2-tailed)	-	.000
	N	123	123
Teaching	Pearson Correlation	.398**	1
	Sig. (2-tailed)	.000	-
	N	123	123

Note: **\*\*Correlation is significant at the level 0.01(2-tailed).**

**Table 6. Correlation between teaching and cognitive presence.**

Element		Teaching	Cognitive
Teaching	Pearson Correlation	1	.507**
	Sig. (2-tailed)	-	.000
	N	123	123
Cognitive	Pearson Correlation	.507**	1
	Sig. (2-tailed)	.000	-
	N	123	123

Note: **\*\*Correlation is significant at the level 0.01(2-tailed).**

**RQ1: How does cognitive presence influence online group work?**

The findings of this study show that learners view online group work positively as a place for information sharing and connecting to other learners in a way that would allow learning to take place. An online learning session with group work sets up a space for learners to introduce various ideas, to discuss and analyze the ideas at hand, to share and exchange their opinions regarding the ideas, and to eventually make decisions on those ideas. The cognitive presence of learners during online group work allows learners to forge a connection with each other and to ensure the desired goal of learning through online group work is achieved. The knowledge-centered context identified in this study positively aligned with Aderibigbe (2021) and Siemens (2005) findings that an environment where learners learn through making connections with ideas and other learners is a great tool to facilitate learning.

**RQ2: How does social presence influence online group work?**

It has been found that learners generally feel more comfortable expressing their thoughts in an online group work environment. Some of the highest-rated responses, such as not shying away from expressing ideas and having more courage to voice out his/her opinions, are the most prominent examples. Online group work that encourages active participation allows learners to interact with each other, making them more willing to exchange ideas and opinions openly. The results of this study are consistent with previous research by Vogel and Wood (2023) as well as Kelly et al. (2022). Both studies emphasized the importance of providing a space where learners have every opportunity to interact with other learners in the same group to ensure successful online groupwork.

### ***RQ3: How does teaching presence influence online group work?***

As much as teachers have an important presence in physical classes, they also have an equally important presence in online group works. The findings clearly highlighted a teacher's role in enhancing the quality of an online session. Most respondents agreed that sufficient resources such as templates and examples provided by teachers helped them understand the task/lesson better. In a classroom setting where physical interaction was lacking, it was evident that learners also highly valued the teacher's role in executing the tasks. Overall, the result shows that a teacher's help to establish a more comfortable environment, structured instructions, and providing a clear direction to online group work is vital. These outcomes parallel the findings of a study by Karaca and Akyüz (2024), which emphasized the importance of teachers' guidance and support in online group work to ensure learners' participation and successful collaboration. The study by Karaca and Akyüz (2024) revealed that clear directions, group work's expectations, learners' roles and responsibilities, and carefully planned tasks and their executions are vital for group work to be effective, rather than just leaving the learners on their own in breakout rooms figuring things out by themselves.

### ***RQ4: What is the relationship between the three types of presence in online group work?***

This study explored the relationship between online group work and three types of presence: cognitive, social, and teaching presence. The findings suggest that there are positive relationships between cognitive presence and social presence as well as between teaching presence and social presence in online group work. Establishing an online group work environment where learners feel encouraged to actively participate would promote social interaction and opportunities for the learners to bond and create meaningful exchanges. Such a setting consequently established a knowledge-centered context, which would eventually lead to learning new information and ideas. Moreover, the findings have also established a strong positive relationship between cognitive presence and teaching presence. This has strengthened the notion that teachers' facilitation indeed plays an important role in making sure that everything falls into the right place. Overall, the findings of this study have therefore indicated that with the right conditions, online group work can serve as an effective learning tool.

## **Conclusion**

The findings of this study support Anderson (2008) Online Learning Theory, which emphasises the importance of knowledge-centred approach in online learning environments. The findings revealed the positive relationships between cognitive, social, and teaching presence which suggest that when all the three types of presences are implemented simultaneously, it will enhance cognitive development in online group work. This aligns with Siemens (2005) connectivism, which stresses the role of interaction, collaboration, and networking in creating meaningful learning experiences. In addition, the moderate correlation between cognitive and social presence supports Aderibigbe (2021) who claim that active learner engagement in exchanging ideas leads to stronger social connection. By the same token, the moderate significant association between social and teaching presence validates the conceptual framework in which teacher guidance and facilitation are essential in maintaining effective communication

and collaboration among learners. Most notably, the strong correlation between teaching and cognitive presence highlights the conceptual framework in which well-structured instructional design and clear guidance not only support social interactions but also directly strengthen critical thinking and problem-solving processes. According to Aderibigbe (2021), teaching presence acts as a crucial role, linking and enhancing both cognitive and social engagement in online group work. To conclude, the results support the study's theoretical framework as well as adding conceptual insight into how the three types of presence work interdependently.

The findings of this study revealed strong positive relationships among cognitive presence, teaching presence and social presence that will maximize the collaboration and engagement in online group work. Collectively, this study highlights that effective online group work is influenced by embedding the three presences, where online group work should not only aim for successful task completion, but it should be supported with clear guidelines, integration of knowledge and conducive online learning environment to facilitate meaningful online group work. Future researchers could further explore how cognitive presence, social presence and teaching presence influence learning outcomes particularly in specific disciplines of study. Furthermore, conducting a comparative study on how students from different cultural backgrounds perceive and experience the three presences in online group work. Other than that, future researchers could explore how AI technology influences cognitive presence, social presence and teaching presence in online group work. The suggested future research would contribute to meaningful understanding in enhancing the benefits of online group work particularly in higher education context.

### **Acknowledgement**

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### **Conflict of interest**

The authors confirm that there is no conflict of interest involve with any parties in this research study.

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