

ENHANCING GROUP DYNAMICS: SOCIAL PRESENCE, COGNITIVE PRESENCE, AND EXPERIENCE IN VOICETHREAD DISCUSSIONS

SITI NAZLEEN ABDUL RABU¹, SHARON LEE JIA CHIAN², AHMAD SYAFIQ BIN MOHD NASIR³, NURULLIZAM JAMIAT⁴

^{1, 2, 3, 4}Centre for Instructional Technology and Multimedia, Universiti Sains Malaysia, Pulau Pinang, Malaysia

E-mail: ¹snazleen@usm.my*, ²sharonleejiachian@gmail.com, ³syafiqqnasir@gmail.com,

⁴nurullizamj@usm.my

ABSTRACT

The study explored undergraduate students' perceptions of social presence and cognitive presence during collaborative online discussions using VoiceThread. A mixed-methods approach was employed, incorporating an online questionnaire with close- and open-ended questions, analysis of students' VoiceThread comments, and interviews. Purposive sampling was used to select a cohort of 61 undergraduate education majors. Quantitative data from Likert items were subjected to descriptive and correlation analyses to examine the perceived social presence and cognitive presence, and their interrelationship. Content analysis of commenting modes revealed the frequency of text, audio, video, and doodling comments, supported by open-ended responses to explore students' preferences. Additionally, thematic analysis was conducted on interviews with a subset of 15 students to examine their experiences using VoiceThread for discussions. Findings indicated that students positively perceived both social and cognitive presences in VoiceThread discussions, with a moderately positive correlation between the two. Text-based comments were most frequently used, followed by audio, while video and doodling were used less often. In terms of its application for group discussion, VoiceThread was valued for its user-friendliness, commenting flexibility, and ability to foster collaborative engagement, though the non-threaded comment structure in the free version was viewed unfavorably. Technical and environmental challenges, such as poor internet connectivity and noisy settings, also hindered effective use. The study suggests the need for clear guidance, practice sessions, and supportive conditions to encourage the use of media-based comments, fostering meaningful interaction and knowledge construction in online group discussions.

Keywords: *Computer-mediated Communication (CMC), VoiceThread, Online Discussion, Community of Inquiry, Social Presence, Cognitive Presence, Commenting Modes, Experience*

1. INTRODUCTION

The rapid growth of online education has transformed the landscape of higher education, offering flexibility and accessibility for students to engage in learning activities beyond traditional classroom settings. Particularly, asynchronous online learning platforms have become essential tools, enabling collaborative learning and interaction across time and location constraints. In this context, computer-mediated communication (CMC) tools are increasingly integrated into learning environments, providing opportunities for extended interaction among peers and instructors [1]. Examples of such tools, including discussion boards and chats, allow students to respond without immediate pressure, giving them more time to

reflect on their responses before replying to others. This advantage is particularly useful for group discussions in online learning environments, as it fosters deeper reasoning [2] and enables students to collaborate on developing more comprehensive responses that demonstrate higher-order thinking skills [3]. However, for online group discussions to be effective, it is crucial that students feel socially connected and actively engaged in knowledge-sharing processes. In this regard, tools such as VoiceThread, which support multimodal interactions, have emerged as promising solutions for richer, more dynamic online peer discussions.

The Community of Inquiry (CoI) framework, developed by Garrison et al. [4], provides a foundational theory for understanding how effective learning occurs in online

environments. The CoI framework identifies three key elements that contribute to a successful educational experience: social presence, cognitive presence, and teaching presence. Social presence refers to the ability of learners to project themselves socially and emotionally, thereby representing themselves as genuine participants in mediated communication [4]. Learners who perceive a high degree of social presence are confident in expressing their thoughts and feel they can actively contribute to the learning community. They perceive themselves as collaborators, feel accepted by peers, and are willing to engage in constructive disagreement when necessary. Cognitive presence, in contrast, focuses on the inquiry process, wherein learners engage with a problem, iterating between discourse and reflection to construct meaning and confirm understanding [4]. Learners who perceive high cognitive presence are characterized by strong interest and motivation, as well as engagement in exploration, brainstorming, discussions, and reflection. Teaching presence includes facilitating and designing learning experiences by instructors, aiming at achieving meaningful and relevant learning outcomes [5]. Together, these three interdependent presences form the foundation for a collaborative learning community in online settings and are especially relevant to understanding student interactions on multimodal platforms.

While the CoI framework has been widely applied in research on online discussion activities, prior studies have typically focused on analyzing social, cognitive, and teaching presences across various platforms. For instance, both Junus et al. [6] and Duha et al. [7] applied the CoI framework to analyze online discussions—the former focusing on role-playing text-based interactions in forums and the latter on instructor and student comments in Facebook discussions—identifying instances of all three presences. Surveys have also been employed to investigate students' perceptions of their experiences with CMC tools. For example, Annamalai et al. [8] found that multimodal interactions on WhatsApp, including text, voice notes, and video uploads, fostered strong social interaction and meaningful cognitive engagement in a language course. Other studies, too, using surveys, have examined students' overall experiences in online courses, with discussion activities as just one component of the broader learning process [9], [10]. Collectively, these studies highlight students' generally neutral to positive perceptions of different discussion modes, emphasizing the potential of multimodal platforms to foster collaborative learning communities.

Building on these insights, VoiceThread, perceived as helpful in supporting students' sense of connection in online learning contexts [11], is of particular interest. This platform offers a distinctive approach to online group discussions by enabling a multimodal learning environment. As a cloud-based platform, VoiceThread provides "lived learning environments" [12, p. 222] where users can participate in asynchronous discussions, with inputs that are easily shared, stored, and tracked. With slide documents uploaded to VoiceThread, users can respond to individual slides or comments using text, audio, video, or doodles. Each of these interaction modes offers unique affordances that shape how students engage in collaborative learning. For one, text-based interaction—one of CMC's most widely used forms—supports knowledge sharing and storing, reflective thinking, and sustained discourse [13]. However, other dynamic modes, such as audio and video, are considered the key advantages of VoiceThread for enhancing social presence [12], offering students richer opportunities to project themselves socially and engage in deeper interactions. For instance, Murphy et al. [14] found that while the majority of students (63.90%) preferred text-based responses when given a choice, most students (60.49%) reported feeling more connected to their peers through video-based discussions. Similarly, previous studies highlight that students value the opportunity to listen to their peers [15], [16], with audio comments being identified as a statistically significant predictor of student engagement [15]. These findings illustrate the role of VoiceThread in fostering social presence by accommodating diverse student preferences and supporting more humanized peer-to-peer interactions. Expanding beyond these social affordances, cognitive presence is also supported through VoiceThread's multimodality. When students feel more at ease engaging in discussions, they tend to exchange ideas more frequently, facilitating critical thinking and knowledge construction in online collaborative learning. Evidence of this was reported in Chen et al.'s [17] study, which found that VoiceThread facilitated more sustainable participation rates and longer task engagement compared to the Blackboard discussion board.

Despite its many affordances in promoting connection and collaboration, using VoiceThread for group discussions is not without drawbacks. While many students find VoiceThread easy to learn, some learners who are less familiar with technology may face a steep learning curve in using its features [18]. In addition to technical barriers,

social and emotional challenges can arise, particularly with video commenting. Murphy et al.'s [14] study identified three issues: (1) self-consciousness, where students felt nervous about being recorded and often forgot what they wanted to say; (2) fear of judgment, with students worrying about being critiqued for their opinions or their recording environment; and (3) perfectionism and self-presentation anxiety, as some students took multiple retakes to ensure their video comments were "perfect." These factors led some students to prefer text comments, potentially missing out on the cohesion that video comments can foster. Furthermore, challenges also arise in the collaborative use of media-based comments. While Guo et al.'s [19] study found that audio and video posts allow students to communicate directly and reach a consensus during discussions, using VoiceThread was associated with fewer discussion and negotiation behaviors than text-based discussion boards. This suggests that while VoiceThread enables multimodal communication, its affordances may not always support the deep, collaborative knowledge construction central to meaningful group discussions. This highlights the need to explore students' overall experiences in group discussions.

Students' perceptions of their learning environment play a crucial role in determining their outcomes [20]. Their views on the tools they use can significantly impact their motivation and engagement. While existing literature has explored social presence and cognitive presence in asynchronous discussions [6]–[8], most of these studies have examined these presences independently and on platforms other than VoiceThread. One VoiceThread-specific study by Merriam and Hobba-Glose [21] compared text-based discussions with VoiceThread's audio/video modes in a nursing course. However, their focus was limited to only selected dynamic modes and did not explore VoiceThread's full range of multimodal features. Another study by Asroff [22] examined students' perceptions of using VoiceThread as an asynchronous tool and reported a positive impact on social presence and cognitive presence. While valuable, the study focused on students' use of the platform for audio/video discussion boards and interactive presentations rather than focusing specifically on group discussion using all available modalities.

To address these gaps, the current study sought to investigate the statistical correlation between social and cognitive presences, offering a preliminary quantitative insight into how these

presences might relate within a multimodal asynchronous discussion environment on VoiceThread. It also examined students' use of all four commenting modes, including the relatively under-researched doodling mode [15], [18], [23], [24], which is deemed beneficial for improving comprehension of complex subjects [25]. In addition, students' overall discussion experiences were also of interest. This could provide insights into the association between certain modes, favorable perceptions, and specific challenges encountered on VoiceThread that could inform more effective platform use. Together, these aims motivated the current study of undergraduate students' perceptions of social presence and cognitive presence during group discussions for collaborative learning on VoiceThread.

This study formulated the following research questions:

- i. To what extent do students perceive social presence and cognitive presence in their group discussion experiences via VoiceThread?
- ii. What are the statistical correlations between social presence and cognitive presence in group discussions on VoiceThread?
- iii. How do students use different modes of interaction in group discussions on VoiceThread?
- iv. How do students view VoiceThread in supporting their group discussions?

In line with the CoI framework [4], which posits that social, cognitive, and teaching presences are interrelated in fostering meaningful learning within an online learning community, a hypothesis was formulated based on Research Question ii, focusing on the two presences of interest:

H₀: There is no correlation between students' perceived social presence and their perceived cognitive presence in group discussions on VoiceThread.

H₁: There is a positive correlation between students' perceived social presence and their perceived cognitive presence in group discussions on VoiceThread.

By addressing these questions and hypothesis, this study aims to contribute to the literature on multimodal collaborative learning environments and provide actionable insights for educators seeking to design more effective asynchronous group discussion activities. The findings are expected to offer suggestions for maximizing the affordances of VoiceThread in fostering meaningful interaction and knowledge construction.

2. RESEARCH METHODOLOGY

This study employed a concurrent mixed-methods design, involving both quantitative and qualitative data collection to explore undergraduate students' usage of group discussions on VoiceThread. A mixed-methods approach was chosen to provide a comprehensive picture of the students' learning experiences. The quantitative data addressed students' perceived social presence and cognitive presence and the correlation between them, while the qualitative data explored their commenting modes and experiences of using VoiceThread as a discussion tool. These complementary findings contributed to a more well-rounded understanding of students' participation in asynchronous group discussions.

2.1 Participants and Context

Purposive sampling was used to select the participants. This technique was appropriate as the researchers sought to understand the perceptions and experiences of individuals who used VoiceThread to complete their coursework and assignments, aligned with the study's focus on this multimedia platform [26]. A cohort of 61 second-year TESOL students who enrolled in the "Digital Audio and Video" course at a Malaysian public university was recruited. The course was conducted online via Schoology. It aimed to expose these pre-service teachers to audio- and video-related knowledge (e.g., production stages, camera equipment, shot and angle types, and editing techniques) for future teaching to cater to students' diverse learning styles. At the start of the course, students grouped themselves into teams of five to seven members, resulting in a total of 11 groups. They remained in their groups throughout the semester to complete several activities, including producing a video at the end of the semester, aimed at applying and extending their knowledge.

2.2 Procedure and Data Collection

For one of the activities, students were tasked with a group discussion centered on the types of camera shots and angles that can be used in horror films. VoiceThread (personal free account) was selected as the group discussion platform. Instead of instructors providing the discussion content, students were responsible for creating it. To do this, each group member answered the same three questions (Figure 1) in a shared Google Slides space.

Types of Shots and Camera Angles in Horror Films

Imagine that you are required to produce a short horror film. There are several types of shots and camera angles that can be used in a horror film to enhance the audience's experience.

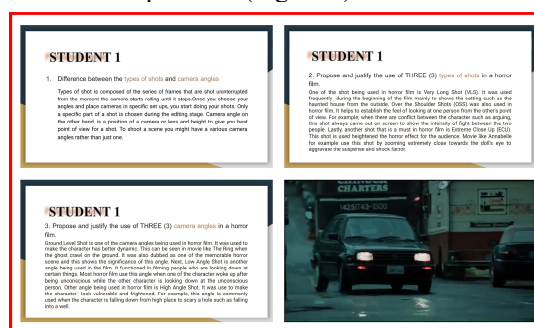
1. Discuss the differences between the **types of shots** and **camera angles**.
2. Propose and justify the use of **THREE (3) types of shots** in a horror film.
3. Propose and justify the use of **THREE (3) camera angles** in a horror film.

Each member must provide their answers to all three questions above in the Google Slides. Your answers will form the basis of the subsequent group discussion on VoiceThread.

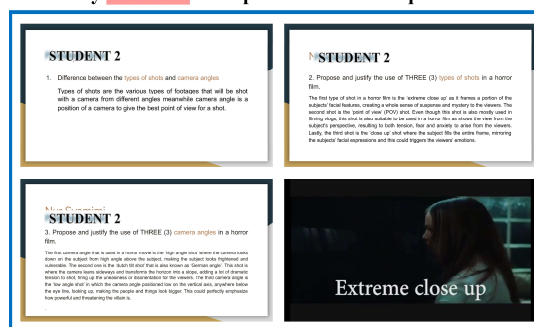
*In addition to words, you are encouraged to include snippets of horror films in your answers.

Figure 1: Questions To Be Answered

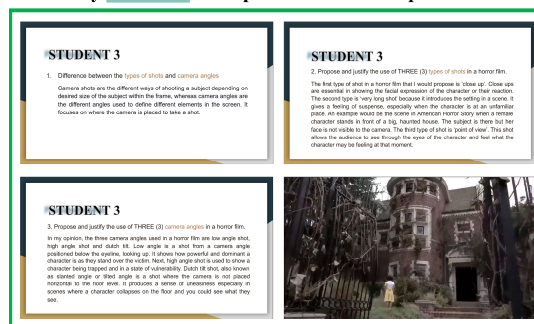
One member then converted the Google Slides, containing all members' contributions, into a PDF or PPT format and uploaded it to the VoiceThread platform (Figure 2).



Slide contents (including text and visuals) provided by Student 1 in response to the three questions.



Slide contents (including text and visuals) provided by Student 2 in response to the three questions.



Slide contents (including text and visuals) provided by Student 3 in response to the three questions.

Figure 2: Compilation Of Slides From Selected Members' Contributions Uploaded To VoiceThread

The VoiceThread link was shared among members. At this stage, the VoiceThread document was successfully created and served as the basis for subsequent group discussion. Next, all members were given two weeks to read through the slide content and interact with their group by posting and replying to comments using various formats, such as text, audio, video, or doodles on VoiceThread (Figure 3). Samples of students' interactions are displayed in Figure 4.

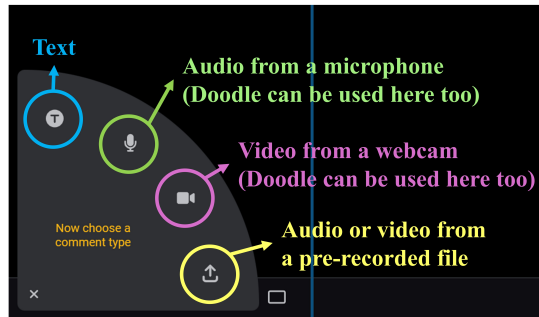


Figure 3: Commenting Options On VoiceThread

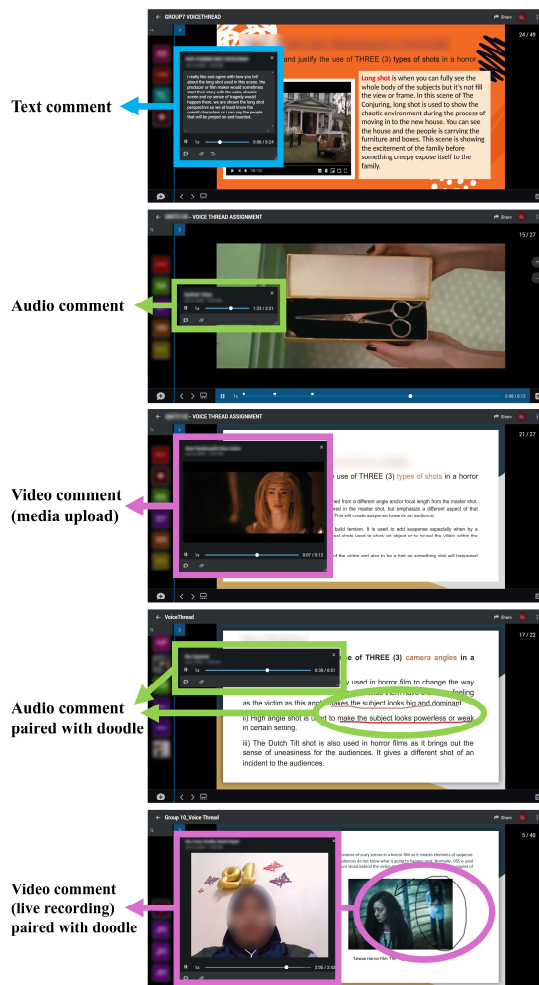


Figure 4: Students' Comments Posted In Various Modes

After completing the VoiceThread discussion activity, the instructors shared the experts-validated questionnaire created on Google Forms with all students. The questionnaire consists of three sections (Table 1 and Appendix 1). The first section collected student demographics. The second section included 25 Likert items adapted from Hilliard and Stewart's [27] 36-item CoI instrument, which itself was modified from Arbaugh et al.'s [28] version, along with additional items derived from Garrison's [13] indicators, measuring the constructs of social presence and cognitive presence. These items were rated on a five-point scale, ranging from 1 for "strongly disagree" to 5 for "strongly agree". It was noted that Cronbach's alpha values of 0.91 and 0.94 were computed for social presence and cognitive presence, respectively, during pilot testing, ensuring excellent reliability [29] for use with the entire cohort. The third section consisted of seven open-ended questions for students to share their narrative responses about their interaction and discussion experience on the VoiceThread platform. They were given one week to respond to the questionnaire.

Table 1: Structure Of The Questionnaire.

Sec.	Item No.	Type	Data collected
1	1-3	Multiple choice	Demographic information
2	4-6	Likert scale	Perceived social presence
	7-11		• Affective expression
	12-15		• Open communication
	16-20	Likert scale	Perceived cognitive presence
	21-23		• Triggering event
	24-25		• Exploration
	26-28		• Integration
3	29-35	Open-ended	Experience in VoiceThread discussion
-	36	Open-ended	Interview recruitment

Thereafter, students who provided their names and contact information at the end of the submitted survey were approached for interview arrangements, with their participation being entirely voluntary. Fifteen students from ten groups (excluding Group 4, as no students from this group volunteered) were interviewed to explore insights into their experience using VoiceThread for online group discussion and interaction. An interview

protocol was followed to guide the process (Appendix 2), and sessions were conducted on platforms preferred by the students, such as WhatsApp and Google Meet. To ensure ethical standards were met, students were provided with a consent form to sign if they agree to have their interview sessions audio recorded. They were also given their transcripts to review for accuracy and make any necessary modifications.

In short, the study followed a four-phase procedure comprising: (1) the development of a VoiceThread document as the basis for group discussion, (2) a two-week asynchronous group discussion using VoiceThread, (3) the administration of an online questionnaire, and (4) interviews with a subset of student volunteers. Figure 5 presents an overview of the research protocol.

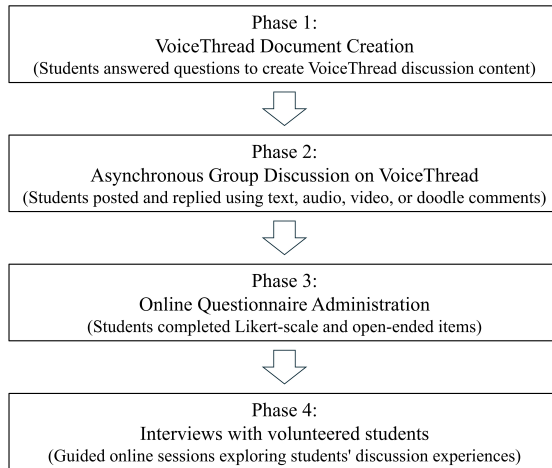


Figure 5: Research Protocol

2.3 Data Analysis

The quantitative data from the questionnaire were analyzed using the Statistical Package for the Social Sciences (SPSS) software. To address RQ1, descriptive analysis was conducted to report the descriptive statistics of students' perceived social presence and cognitive presence. Pearson correlation analysis was subsequently performed to test the hypothesis and examine the statistical relationship between social and cognitive presences in VoiceThread group discussions, addressing RQ2.

For RQ3, students' comments posted in the VoiceThread document were extracted and compiled in Microsoft Excel. A content analysis was conducted to determine the frequency of different comment types (text, audio, video, and doodling). Notably, although doodling can be accessed through the audio or video live recording

options, its count was treated separately from audio and video. This means that if a comment contained both video and doodling, it was counted as one unit of video and one unit of doodling rather than a single combined unit of video plus doodling. Narrative responses from the third section of the questionnaire supported the content analysis findings.

Lastly, to address RQ4, interview transcripts were analyzed using Braun and Clarke's [30] six-phase process of inductive thematic analysis. This process helped to identify and extract codes and themes, providing deeper insights into students' experiences using VoiceThread for group discussions. Table 2 summarizes the instruments, data collected, and analysis methods to address each research question.

Table 2: Data Collection And Analysis Summary.

RQ	Instrument	Data collection and analysis
1	Questionnaire (Sec. 2)	Likert responses: Descriptive analysis (mean and standard deviation)
2	Questionnaire (Sec. 2)	Mean of social presence and cognitive presence: Pearson correlation
3	VoiceThread documents	Comments posted: Content analysis (frequency of modes)
	Questionnaire (Sec. 3)	Open-ended responses: Corroborate findings
4	Interview protocol	Transcripts: Thematic analysis

3. RESULTS

The subsections below present the findings of each research question.

3.1 Participant Demographics

All 61 students in the cohort completed the questionnaire. Table 3 shows their demographics.

Table 3: Demographic Profile.

Characteristic	Category	Frequency (f)	Percentage (%)
Gender	Female	50	81.97
	Male	11	18.03
Race	Malay	44	18.03
	Chinese	6	9.84
	Indian	4	72.13
	Other	7	11.48
Age group	21-22	54	9.84
	23-24	7	11.48

3.2 Students' Perceived Social Presence and Cognitive Presence in VoiceThread (RQ1)

The second section of the questionnaire consisted of 14 items measuring social presence and 13 items measuring cognitive presence, focusing on students' collaborative learning experiences on VoiceThread. Table 4 summarizes the mean (M) and standard deviation (SD) of students' perceptions of each construct and associated categories.

Table 4: Descriptive Statistics Of Perceived Social Presence And Cognitive Presence.

Construct	Category	M	SD
Social presence (M = 4.34; SD = 0.61)	Affective expression	4.16	0.69
	Open communication	4.45	0.59
	Group cohesion	4.34	0.56
Cognitive presence (M = 4.39; SD = 0.52)	Triggering event	4.17	0.59
	Exploration	4.49	0.38
	Integration	4.61	0.55
	Resolution	4.49	0.50

Students reported very positive perceptions of both social and cognitive presences, with cognitive presence receiving a slightly higher mean score (M = 4.39) than social presence (M = 4.34). This suggested that students rated their ability to construct and confirm understanding more favorably than their emotional connection or self-presentation in the discussion in VoiceThread.

At the category level, the findings further revealed strong agreement among students regarding VoiceThread's suitability for collaborative learning. The mean scores for all categories of both constructs ranged from 4.16 to 4.61. The highest-rated category, integration (M = 4.61), under the cognitive presence construct, suggested that students found VoiceThread discussions particularly effective for constructing explanations and enhancing their understanding of the subject matter. In contrast, the lowest-rated category, affective expression (M = 4.16), under the social presence construct, still reflected a favorable perception. However, its relatively lower score than other categories implied that students felt marginally less engaged or connected emotionally through their interactions on VoiceThread.

3.3 Correlations of Social Presence and Cognitive Presence (RQ2)

Since both variables were normally distributed and the assumption of linearity was not

significantly violated, a Pearson correlation was computed to test the hypotheses regarding their relationship. As shown in Table 5, there was a moderately positive correlation between social presence and cognitive presence, with a Pearson correlation coefficient of 0.574, supporting the alternative hypothesis. This finding suggests that as students' social presence increases, their cognitive presence tends to increase, and vice versa. The correlation was statistically significant at the 0.01 level, indicating that the observed relationship is unlikely to have occurred by random chance. Figure 6 provides a scatterplot that visualizes the dataset of the two variables collected from all students.

Table 5: Correlation Matrix Of Pearson Coefficients.

Variable	Social presence	Cognitive presence
Social presence	1	.574**
Cognitive presence	.574**	1

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

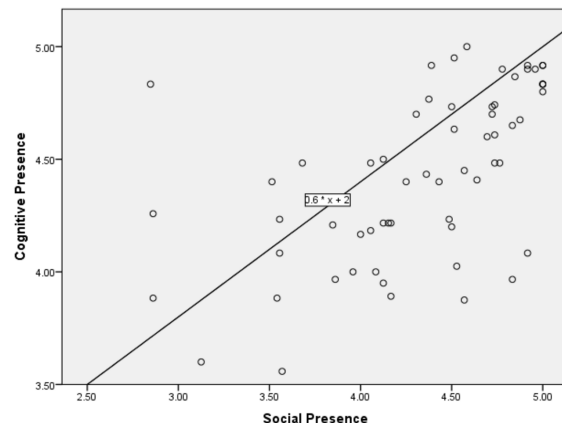


Figure 6: Scatterplot Of Correlations Between Social Presence And Cognitive Presence

3.4 Students' Use of Different Modes of Comments on VoiceThread (RQ3)

A total of 61 students across 11 groups posted 1358 comments on VoiceThread. Content analysis was conducted to count the frequency of each mode, yielding 1401 mode units. Note that the doodling feature is accessed with the audio or video option, so a single comment containing both audio and doodling was counted as one audio and one doodle.

At the overall level, text comments were the most frequently used (70.02%), followed by audio (22.20%), video (4.43%), and doodling (3.35%). This distribution, shown in Figure 7,

suggested a clear preference for less resource-intensive and more convenient interaction modes.

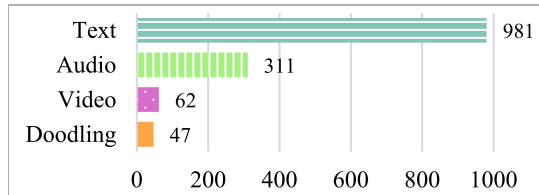


Figure 7: Overall Commenting Modes On VoiceThread

At the group level (Table 6 and Figure 8), text comments dominated in eight out of the 11 groups, underscoring their widespread adoption. However, three groups (Groups 1, 8, and 10) preferred audio comments over text, reflecting some preference variation. Notably, only four groups (Groups 1, 2, 6, and 10) used all available commenting modes. Doodling, the least used mode, was employed by only five groups (Groups 1, 2, 6, 9, and 10).

Table 6: Frequencies Of Each Group's Commenting Modes.

Modes of comments	Group 1 (n = 5)	Group 2 (n = 5)	Group 3 (n = 6)	Group 4 (n = 6)	Group 5 (n = 5)	Group 6 (n = 6)	Group 7 (n = 5)	Group 8 (n = 5)	Group 9 (n = 7)	Group 10 (n = 5)	Group 11 (n = 6)
Text	56	93	136	79	48	54	144	23	207	18	123
Audio	57	20	16	24	33	17	-	51	12	71	10
Video	9	3	16	-	13	7	-	1	-	12	1
Doodling	19	2	-	-	-	5	-	-	1	20	-
Total	141	118	168	103	94	83	144	75	220	121	134

Note: Bold text indicates each group's most frequently used commenting mode.

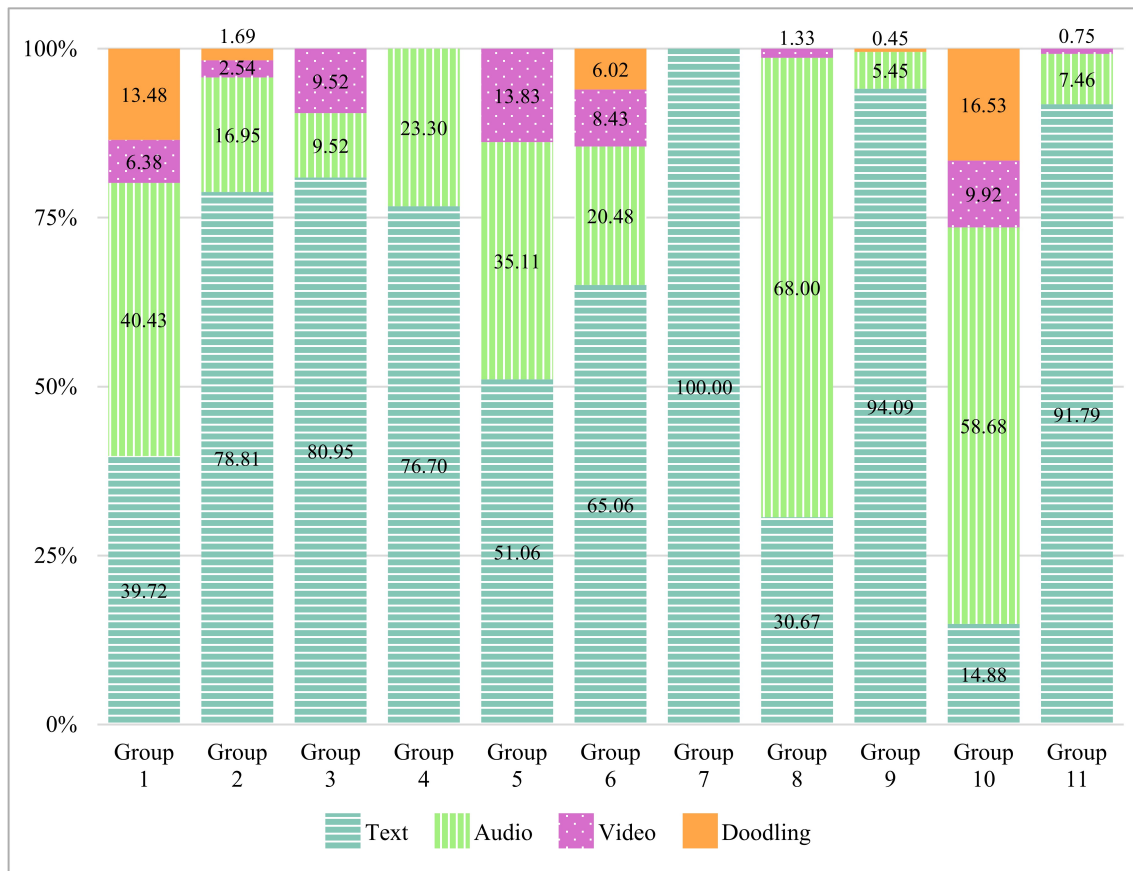


Figure 8: Percentage Distribution Of Groups' Commenting Modes

The findings from the content analysis were further corroborated by students' self-reported weightage allocation in Q4 of the open-ended section. Students reported the highest usage of text comments (56.15%), followed by audio (27.36%), video (11.72%), and doodling (4.77%), mirroring the observed patterns in the content analysis. Figure 9 compares students' actual usage, derived from content analysis, with their self-reported weightage allocation from the questionnaire.

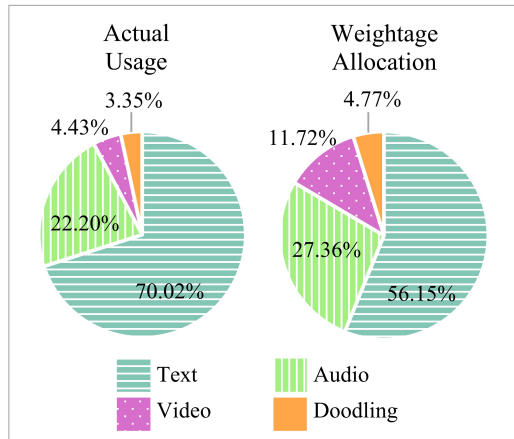


Figure 9: Comparison Of Actual Usage And Weightage Allocation Of Commenting Modes

The descriptive analysis of the remaining open-ended questions offers additional insights into the reasons behind students' preferences for specific commenting modes. Many students highlighted the convenience of text comments, describing them as "the easiest" and allowing them to "write any type of idea" they wished to express. This corresponded with the frequency data showing text comments as the most commonly used mode.

Students favored audio comments for their ability to provide a sense of "real interaction." One student stated, "I feel like I was finally really interacting with a person rather than just reading what they typed before." Others valued the ease of voice-based expression, as illustrated by one remark: "I love that we can comment using our voice so that we can say our thoughts right with the right way of expressing it." Efficiency was another key factor, with one student sharing, "Personally, I like voicing out, which is audio in this case, because I can straight away record my opinion, and I don't have to waste time writing it."

Regarding video comments, their use appeared to be driven by their ability to convey clearer explanations. For example, one student remarked, "The example is much clearer, and others will understand better." Another noted, "More informational since we could share pictures

and videos while commenting on it." Analysis of the extracted video comments supports this, revealing that students not only recorded themselves sharing opinions but also uploaded short clips to illustrate examples of camera shots and angles, enhancing their explanations. Video comments also serve as a source of motivation for some students, with one stating, "I feel so motivated to continue doing it. The video comment part is the interesting part for me as I don't really like to type my answer." However, convenience concerns limited their use. One student explained, "I prefer to use text and audio because they are more convenient for me. For example, if I want to use video, I have to wear my hijab first, which can sometimes be inconvenient."

Doodling comments were not explicitly mentioned in the open-ended responses, suggesting limited perceived utility for this mode, consistent with its low frequency in the content analysis. However, examining the extracted comments revealed that doodling was often paired with audio or video comments, with students underlining or circling textual points or visuals discussed on the slides.

Despite personal preferences, many students expressed positive views about the variety of commenting modes available on VoiceThread. One student noted, "It is fun to have choices. We can use whichever option we have to interact with group members. It's quite boring if it's always in the form of text-based," while another shared, "I enjoyed using VoiceThread as there are various forms to leave our comments." Some students were even eager to explore new modes, as one commented, "I get to try the new method to have discussions with my peers." This enthusiasm for different modes may have contributed to increased collaboration on VoiceThread compared to other discussion platforms like Google Docs and Moodle Forum: "I can see more collaboration between my peers than using text-based discussion forms." This may explain why some groups used all available commenting modes.

3.5 Students' Views on Using VoiceThread for Group Discussions (RQ4)

Thematic analysis was conducted on qualitative data from 15 students (13 females and two males) who volunteered for an interview session to explore their views on VoiceThread's role in supporting group discussion. Two main themes were identified: affordances and barriers. Table 7 presents the themes along with their respective categories and codes.

Table 7: Summary Of Thematic Analysis.

Theme	Category	Code
Affordances	User-friendly	Accessible for beginners
		Easy to use
		Convenient video comment viewing
	Versatile comment sharing	Allows for different sharing formats
		Flexible choice of commenting modes
		Enhanced explanation with different modes
		Clearer expression with reduced misinterpretation
	Collaborative engagement	Encourages interaction
		Feedback and perspective sharing
Barriers	Limited back-and-forth engagement	Lack of threaded interaction
	Technical and environmental requirements	Requires stable internet connection
		Requires a quiet environment for comment recording

3.5.1 Affordances

The “affordances” theme refers to VoiceThread’s features that enhance students’ discussion experience and support their learning goals. Students highlighted that VoiceThread is user-friendly, facilitating a smooth entry into the discussion activity. Many described it as simple and intuitive, even for those without prior experience, thereby reducing learning barriers and encouraging participation. The ability to view video comments directly within the platform, rather than clicking a link to be redirected to a webpage, was also appreciated.

- These features are easy to use. They do not require the students to have any special skills or knowledge to use. (G6S7)
- When using Google Docs, we insert links of videos we wish to share. VoiceThread, on the other hand, allows videos to be uploaded as comments, making it easy to watch. (G1S2)

In addition, VoiceThread supports multimodal communication (i.e., text, audio, video, doodling), offering students the flexibility to choose their preferred commenting mode. This flexibility empowered students to participate in discussions in ways that align with their personal preferences for

more active and confident interaction. The availability of different commenting modes enriched the way students articulate ideas, supporting clearer and more direct explanations. Specifically, audio and video comments helped reduce tone misinterpretation and confusion, which often occurred with text comments alone.

- The discussion turns out quite well since it has various tools that help us to explain better. (G2S4)
- ... we can express more on the learning. If we use only text-based, we only read them, and a person might read them in a different tone than the commenter intended. So by using VoiceThread, not only we can hear the opinions, but we can also understand better what the commenter wants to share. (G5S6)
- By using various modes of communication, it makes the interaction realistic as students are able to see facial expressions and hear the tones of the person commenting. (G11S14)

Furthermore, the commenting feature enabled students to share their thoughts with one another, fostering viewpoint exchanges, self-evaluation, and knowledge expansion.

- Audio, video, doodling, and text comments help to communicate ideas and thoughts about particular topics. (G6S7)
- Others can also evaluate and see the feedback given by their peers, which gives them the opportunity to expand their knowledge and thinking. (G11S14)

3.5.2 Barriers

The “barriers” theme pertains to the limitations that hinder students’ experience and reduce their ability to engage in effective group discussions. The barriers were experienced in two ways. The first was the platform’s lack of threaded comments. One student noted that comments feel more like individual expressions rather than interactive conversations, reducing the sense of peer-to-peer engagement and weakening the collaborative group discussion experience. While some students attempted to create a sense of interaction by mentioning their peers’ names at the beginning of comments, this approach still lacked the natural flow of back-and-forth dialogue as in traditional threaded discussions.

- ... the discussion or interaction does not appear as real interaction. What I’m trying to say here is, the interaction is not in a thread form. It looks more like individual forms of comment. Even though students comment and

mention their peers' names, the interaction still looks like individual forms. (G6S7)

The second barrier manifested through technical and environmental constraints. Students reported challenges linked to their personal access to a conducive environment and the basic technological requirements for effective discussion. For instance, students in noisy environments or those with weak internet connections often faced difficulties recording or uploading their media comments. These challenges discouraged the use of preferred audio or video commenting modes, prompting students to resort to text comments instead. This reliance on text may limit the depth of group discussions.

- If your internet connection is really poor, then you can't interact more often. For example, when I was uploading my audio comment, it took a long time to upload. (G8S9)
- ... if we have a poor internet connection and want to send audio, it takes some time to be uploaded during the discussion. (G9S112)
- If I am using the audio modes, I have to find a quiet place because I don't want disturbances or noises to appear in my audio comment. (G8S9)

4. DISCUSSION

The study investigated students' perceived social presence and cognitive presence during group discussions on VoiceThread. The descriptive analysis of Likert-scale items revealed high mean scores for both presences, indicating that students generally felt socially connected and cognitively engaged. These self-reported perceptions align with Mardi's [31] analysis of students' reflections on VoiceThread discussions, which identified indicators of both presences—students described emotional expression, self-disclosure, group commitment, and a sense of belonging (social presence), as well as information exchange and knowledge application (cognitive presence). Additionally, content analyses of VoiceThread discussions in prior studies found behavioral evidence of all three social presence categories—affektive expression, open communication, and group cohesion—in students' actual discourse moves [19], [32], [33]. Taken together, the current study provides a complementary perspective to these prior works, helping to build a more comprehensive understanding: VoiceThread not only facilitates social presence in practice but is also perceived by students as a space that supports

meaningful connection and engagement in online collaborative learning.

The finding supports the alternative hypothesis that perceived social presence and cognitive presence are positively correlated in VoiceThread discussions. A Pearson correlation coefficient of 0.574 was reported, indicating a moderately positive correlation between the two presences. This suggests that as social presence increases, cognitive presence tends to increase as well while using VoiceThread. While this finding aligns with Pham et al.'s [34] study, which observed significant interrelationships between specific dimensions of social presence—affektive collectiveness, open communication, and sense of community—and cognitive presence in a broader online learning context, the current study extends this relationship to a more specific setting: group discussions using the multimodal VoiceThread platform. This indicates that the interplay between social and cognitive engagement may remain positively associated while using specific technological platforms such as VoiceThread for supporting online learning. The reciprocal nature of this relationship denotes that when students are able to present their authentic selves, they are more likely to engage with peers through questioning and information exchanges, thereby increasing opportunities for knowledge construction in VoiceThread.

In terms of students' use of commenting modes, the study found that most comments posted on VoiceThread were text-based, followed by audio, while video and doodling comments were much less frequent. This pattern is consistent with Herring and Demarest's [23] study, which also reported a dominant use of text, followed by audio and minimal use of video. Similarly, Kidd and Beaudry [24] found a preference for text over media-based comments, attributing this to emotional discomfort—such as feeling awkward or anxious when using audio or video. In contrast, the current study highlights more pragmatic concerns: students cited efficiency, unstable internet connections, and environmental noise as reasons for choosing text over richer media formats.

Meanwhile, the findings differ from some studies. Mejia's [15] ranked preference survey and Ching and Hsu's [18] frequency count both showed a preference for audio comments over text, with video being the least. In particular, the latter study found that students felt more connected when using media-based modes (i.e., audio and video) [18]. A similar observation was reported by Asroff [22], where students expressed feeling much closer to

their peers when they could see and hear them. Likewise, in the current study, students cited a sense of “real interaction” and “better understanding” when using these modes. This may be due to the richness of vocal and visual cues that enhance authenticity and reduce ambiguity for a more inclusive and interactive experience [14], [31]. Such media modes have also been shown to support self-expression and peer connection, contributing to a more humanized online learning experience [35].

Doodling comments, being the least frequently used mode, represent a novel finding in this study, as previous studies have typically focused on other commenting modes [15], [18], [23], [24]. The low frequency of doodling was somewhat unexpected, given the visual nature of the discussion topic that centered on camera shots and angles. Students were expected to use doodles more often to annotate or visually represent their ideas, especially since some slides in the VoiceThread included short clips or images that could have served as ideal canvases. While a few students did doodle on visuals while speaking, the more common use involved marking text on slides—primarily to direct their peers’ attention to what they were discussing [36], [37].

The study also explored students’ views on using VoiceThread to support their group discussions through interviews. Students’ responses revealed two primary themes: “affordances” and “barriers.” The positive categories of “user-friendly” and “collaborative engagement” under “affordances” correspond to students’ most liked attributes identified in Mejia’s [15] study, where students valued the platform’s ease of use and its ability to facilitate engaged and interactive discussions. Notably, the platform’s simplicity and intuitiveness likely facilitated faster onboarding and reduced technical anxiety, allowing students to focus on the discussion rather than platform navigation. Additionally, the availability of multimodal commenting options was highly valued, as audio and visual modes are not equipped in common text-based discussions. These flexibility options enabled students to contribute thoughts and feedback in personal and comfortable ways. The dynamic nature of these commenting options also enhanced expression, as students highlighted how VoiceThread displayed peers’ facial expressions and tones—aligning with past findings [14] that video responses enabled better interpretation of tone and body language. This supported the development of a shared understanding, which is essential for building bonds and establishing a

collaborative learning environment. These findings are consistent with previous studies, suggesting that VoiceThread’s multimodal features promote increased peer connection [16], [38].

Students’ narratives also highlighted negative experiences. One barrier was the platform’s lack of threaded replies, which restricted conversational-style discussions. This flat interaction model limited opportunities for immediate follow-up and reciprocal exchanges, both of which are essential for fostering deeper dialogue and collaborative learning. This echoes Aragon et al.’s [39] findings, which observed that transitioning from a linear to a threaded discussion format significantly enhanced social reciprocity in online communities. Although this limitation could be addressed by upgrading to a premium VoiceThread license, financial support may be necessary to enable access to this feature. Another barrier stemmed from students’ learning environments, particularly for those in shared living spaces, as they needed a quiet environment to record audio or video comments. This was also a challenge noted in Merriam and Hobba-Glose’s [21] study. In addition, students cited reduced interaction due to unreliable internet connections when using media-based comments. While students with stable internet access could engage using their preferred commenting modes, those with limited bandwidth often had to resort to alternative modes or reduce their participation altogether, impacting engagement and equity in discussions. Furthermore, weak connections sometimes prompted students to read written comments instead of media-based ones, as the latter took longer to load, resulting in missed opportunities to fully engage with their peers’ contributions. Nevertheless, the asynchronous nature of VoiceThread’s group discussion activity helped mitigate some challenges by accommodating individual circumstances. It allowed students to engage at their own pace while still contributing meaningfully to the discussion. Whether waiting for media comments to upload or opting for other modes, students experienced fewer time constraints and less social pressure, as the asynchronous format did not require immediate participation.

Similar overarching insights were evident across the different data sources in this study. First, there was convergence in students’ positive perceptions of using VoiceThread for group discussions. This is reflected in the high mean scores for social presence and cognitive presence on the Likert items, as well as the “collaborative engagement” category under the “affordances”

theme in the interview responses. Second, although text remained the dominant commenting mode, students expressed appreciation for the availability of media-based options in their open-ended questionnaire responses. This aligns with the “versatile comment sharing” category from the interviews, which emphasizes how different modes provide flexibility and help students articulate ideas more clearly while reducing misunderstandings. Together, these findings suggest that the social and expressive benefits of VoiceThread’s multimodality can contribute meaningfully to students’ online discussion experiences.

5. IMPLICATIONS

The findings of the study provide insights for enhancing collaborative learning in online environments. First, the positive relationship between social presence and cognitive presence emphasizes the importance of prioritizing features in CMC platforms like VoiceThread that promote authentic social interactions, thereby fostering richer discussions and deeper learning. Second, students’ preference for text-based communication, despite the availability of multimodal options, suggests the need for educators to encourage the use of media-based comments to strengthen connections and enhance clarity of expression. Instructors can support this by providing low-stakes practice opportunities, modeling the use of different modes, and helping students build confidence in expressing themselves beyond text. The low usage and lack of feedback on doodling comments suggest that students may find the feature either irrelevant or challenging due to unfamiliarity. Instructors could address this by demonstrating how doodling can enhance group discussions, such as by annotating visuals to clarify explanations.

Beyond instructional practice, institutions should consider allocating resources to upgrade VoiceThread or similar tools through site license subscriptions, enabling advanced features like threaded discussions to support more interactive and sustained peer connection. Lastly, student-reported issues related to unreliable internet connections and unsuitable learning environments, even in relatively low-bandwidth asynchronous group discussions, point to broader access challenges in online learning. While these concerns extend beyond any single course implementation, Atan et al.’s [40] recommendations to provide subsidized data packages for disadvantaged students and to offer access to on-campus facilities for those in non-conducive learning spaces may be

useful. These measures can help ensure equitable participation in online learning and reduce the digital divide among students.

6. LIMITATIONS AND DIRECTIONS FOR FUTURE RESEARCH

This study acknowledges several limitations that should be considered in interpreting the findings and guiding future research. First, participants were drawn from a single creative media course at one university, which limits the generalizability of the results. The specific course context may introduce bias, meaning the insights gained here might not apply in other disciplinary or institutional settings. Future research could expand the sample to include students from a wider range of academic disciplines and institutions to generate more broadly applicable findings.

Second, while this study analyzed comments by their mode of delivery, future research could further categorize them based on the component indicators of social and cognitive presence. This would provide deeper insight into how specific modes support different types of communication and learning, and could help inform instructional strategies that promote specific modes for targeted learning outcomes. Such an analysis could also complement self-reported questionnaire data and help validate students’ perceptions, thereby reducing potential response bias. Taking this a step further, with the threaded option available in an upgraded VoiceThread account, research could also investigate which commenting modes elicit replies. This may reveal engagement patterns and help identify strategies to foster more interactive and collaborative discussions.

Finally, the study focused only on two components of the CoI framework (i.e., social presence and cognitive presence). Teaching presence was excluded due to the lack of instructor facilitation during the VoiceThread task. While instructors participated in the “design and organization” component through task design, platform selection, and providing introductory guides, they did not participate in providing “direct instruction” or “facilitating discourse,” which are key indicators of teaching presence. Future research could examine students’ perceptions of all three CoI elements by involving instructors in both task preparation and ongoing engagement (e.g., providing feedback) with students during VoiceThread discussions. This would provide a fuller picture of group dynamics and pedagogical support in multimodal online discussions.

7. CONCLUSION

This study explored undergraduate students' perceptions of social presence and cognitive presence, their use of multimodal commenting features, and their group discussion experiences on VoiceThread. The descriptive analysis of Likert items revealed that students perceived both social presence and cognitive presence positively. Correlation analysis further indicated a moderately positive relationship between these two presences, showing that when students can project themselves and feel socially connected with their peers, they are more likely to engage in deeper cognitive processing, critical thinking, and meaning-making activities. Content analysis of students' comments showed that text-based comments were the dominant mode of peer interaction, followed by audio comments, with video and doodling comments used much less frequently. Additionally, interviewed students valued VoiceThread's simplicity, range of commenting options, and ability to facilitate collaborative engagement, all of which helped them convey their messages and ideas more effectively. However, some students faced challenges, such as weak internet connections and suboptimal learning environments, which hindered their ability to use VoiceThread's features fully. The lack of threaded comments was also noted as a limitation, as it made it difficult for students to respond directly to specific comments and maintain a clear flow of discussion. Overall, these findings suggest that VoiceThread can be a useful tool to foster richer, more dynamic group discussions, exposing students to diverse perspectives. When thoughtfully integrated into online learning activities, it has the potential to enhance peer interaction, strengthen both social and cognitive presences, and build a stronger sense of community for meaningful collaborative learning. As such, this study serves as an initial step toward understanding students' perceptions, and further research is encouraged to investigate the academic and emotional impacts of using VoiceThread for group learning.

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APPENDICES**Appendix 1: CoI Online Questionnaire****Section 1: Demographic information**

1. Gender
 - ☐ Female
 - ☐ Male
2. Age group
 - ☐ 19-20
 - ☐ 21-22
 - ☐ 23-24
 - ☐ 25 or above
3. Race
 - ☐ Malay
 - ☐ Chinese
 - ☐ Indian
 - ☐ Other: _____

Section 2: Perceptions of social presence and cognitive presence in VoiceThread discussions

Please read the following descriptions carefully. Rate your experience based on the online discussion using VoiceThread.

Statement	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
4. I found online communication via VoiceThread to be an excellent medium for social interaction.					
5. Peers expressed emotions in their comments.					
6. There was a sense of humor in the comments.					
7. I felt comfortable conversing during the VoiceThread activity and discussion.					
8. Peers responded to others' comments.					
9. Peers asked questions to other members.					
10. Peers complimented others' comments.					
11. Peers expressed agreement with others' comments.					
12. I felt comfortable disagreeing with my peers while still maintaining a sense of trust.					
13. I felt that my point of view was acknowledged by my peers in the group.					
14. Online discussions via VoiceThread helped me develop a sense of collaboration.					
15. Peers addressed or referred to others by name.					
My motivation in the VoiceThread discussion was increased by the					
16. assignment questions.					
17. text commenting.					

18. audio commenting.					
19. video commenting.					
20. doodling commenting.					
21. I brainstormed and found relevant information that helped me resolve the activity and discussion questions.					
22. I utilized a variety of information sources that further improved my understanding of the fundamental concepts of types of shots and camera angles in this course.					
23. I learned a lot from my interactions with my peers as they provided divergent views during the VoiceThread activity and discussion.					
24. This learning activity helped me integrate an understanding of types of shots and camera angles into my final video project assignment.					
25. This learning activity helped me improve my understanding of the fundamental concepts of types of shots and camera angles in this course.					
26. I can describe ways to use and apply the knowledge gained in my final video project assignment.					
27. I have developed solutions that can be applied in practice in my final video project assignment.					
28. I can apply the knowledge gained in this activity to my video production practice.					

Section 3: Experience with VoiceThread interaction and discussion

29. What are your thoughts on including VoiceThread as an interactive and communication tool for online discussions about the types of shots and camera angles assignment?
30. Describe your experience using the VoiceThread platform.
31. VoiceThread allows for different modes of interaction, including text, audio, video, and doodling. In which modes of interaction (text, audio, video, or doodling) are you most inclined to participate? Why?
32. Please allocate a total of 100% to reflect your usage across these FOUR modes of interaction: text, audio, video, and doodling.
33. What do you like best about VoiceThread as a communication and collaboration tool?
34. What do you like least or dislike about VoiceThread as a communication and collaboration tool?
35. Do you feel more connected to your peers in VoiceThread than you would if you used a text-based discussion platform like Google Docs or a Moodle forum for a discussion activity? Please explain.

Extra:

36. If you are willing to be interviewed about your VoiceThread discussion experience, please provide your name and email address below so I can contact you.

Appendix 2: Interview Questions

1. How easy was it to use VoiceThread for the group learning activity? How would you describe VoiceThread's usability?
(Note: Usability refers to how well you use VoiceThread to achieve a defined goal effectively, efficiently, and satisfactorily.)
2. How did you and your peers use the different commenting modes (text/audio/video/doodling) provided by VoiceThread to interact with one another during the discussion?
3. What did you find most difficult about using VoiceThread for the discussion?
4. What are VoiceThread's major limitations in fostering collaborative learning and communication?
5. What are the benefits of VoiceThread discussions compared to text-based discussions in Google Docs or Moodle forums?
6. Which features of VoiceThread, if any, did you find especially beneficial for promoting group learning?
7. Can you see other opportunities or contexts for using VoiceThread? Do you think you would use VoiceThread in the future—for other classes or as a platform when you are a teacher?
8. How can VoiceThread be effectively used in online activities? Based on your experience, how could the use of VoiceThread for this group discussion be improved?
9. Is there anything else you would like to add?