Challenges and Benefits of Collaborative Work in Online Courses

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Abstract
This investigation examined student experiences with online collaborative learning, focusing on the types and frequency of support received and their relationship to the Community of Inquiry framework. An online survey of 110 students revealed that the majority received support from both instructors and peers, with informational support being predominant. Primary benefits included enhanced collaboration skills and increased awareness of others' perspectives, while challenges primarily involved workload management and scheduling. Higher frequency and clarity of support were correlated with greater teaching and social presence. The findings underscore the significance of balanced, frequent, and clear guidance in online collaborative work, as well as the necessity to address deficiencies in emotional support. Implications for instructional design and faculty development are discussed.

Keywords: Online collaborative learning, social presence, instructional design, teaching presence

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Critical in nearly every field, collaboration consistently emerges as one of the most in-demand skills of any recent college graduate (Martin et al., 2021; Marutschke et al., 2019). Furthermore, the availability and development of educational technologies create opportunities to construct online learning environments that are increasingly responsive to student needs and preferences (Ingram et al., 2024), especially in the wake of the COVID-19 pandemic, as more than 61% of United States undergraduate students were enrolled in an online course in 2021 (National Center for Education Statistics, 2023). The capabilities of these technologies and the ever-expanding role of online learning in higher education (Oyarzun et al., 2023) position educational institutions to more effectively equip students with the requisite skills for success in a rapidly evolving 21st-century workforce, particularly through online collaborative learning.

Through a systematic review of online learner collaboration research, Oyarzun et al. (2023) identified diverse interpretations that, when synthesized, establish a comprehensive Online Collaborative Learning (OCL) Framework for research, facilitating the definition of online learner collaboration. Oyarzun et al. (2023) OCL Framework is structured around four core components: 1) Collaboration Technologies, 2) Collaboration Design, 3) Collaboration Facilitation, and 4) Collaboration Outcomes (p. 76). The OCL Framework posits that online learner collaboration occurs when there is a deliberate utilization of technology in online learning environments designed to facilitate collaborative interactions between instructors and learners for the purpose of achieving specific, measurable learning outcomes. The breadth of this definition leaves room for varied, diverse learning experiences that can be categorized as online learner collaboration, which will be further discussed in the literature review.

The purpose of this study was to explore the experience of students engaged in online learning collaboration, with a specific focus on the sources and frequency of support they receive during those activities. Several studies have investigated the relationship between CoI elements and learning outcomes or student satisfaction but have not directly addressed student support, specifically within the context of collaborative learning (Li et al., 2023; Sonji et al., 2023; Zhang et al., 2023). Addressing student support within collaborative learning is crucial. Collaborative learning environments, particularly web-based and computer-supported platforms, can enhance student engagement and satisfaction. Studies indicate that factors such as social influence and motivation positively impact collaborative learning, thereby improving student satisfaction (Oluwajana et al., 2021). Group member familiarity in collaborative settings increases teamwork satisfaction, which in turn boosts student engagement and perceived knowledge construction (Zhang et al., 2023). However, collaborative learning, especially in online contexts, presents challenges. The COVID-19 pandemic highlighted the difficulties students face with remote learning, isolation, and collaboration (McKay & Sridharan, 2023). This underscores the necessity for support mechanisms to assist students in navigating these challenges. Addressing student support in collaborative learning is essential as it impacts learning outcomes, skill development, and satisfaction. Proper support can enhance critical reflection, self-assessment (Altınay, 2016), and the development of teamwork skills (McKay & Sridharan, 2023). Supported collaborative learning can improve students' learning achievement, self-efficacy, and motivation (Zheng et al., 2020). By focusing on student support, educators can maximize the benefits of collaborative learning while mitigating obstacles, leading to more effective educational experiences.

By examining the relationship between peer and instructor support and the two components (social and teaching) of the Community of Inquiry framework, this study aims to better understand the benefits and challenges associated with online collaboration and how different forms of support may influence student perceptions of their perceived benefits and challenges.

Literature Review

Online Collaborative Learning

As an educational strategy, learner collaboration is fundamentally rooted in the social constructivist theory, which posits that social interaction plays a crucial role in the learning process for individuals (Vygotsky, 1978). Furthermore, strategically designed collaborative learning experiences have the potential to create an environment conducive to meaningful social interaction. The constructivist philosophy, which posits that learning occurs when individuals construct meaning and knowledge through negotiation and interaction with their environment (Piaget, 1977), serves as the theoretical foundation for developing collaborative learning tasks. The integration of this constructivist approach in higher education represents a paradigm shift wherein learners are no longer perceived as passive recipients of information disseminated by an instructor but rather as active participants engaged in the construction of their own meaning within and through intentionally designed learning experiences (Barr & Tagg, 1995; Brooks & Brooks, 1995; Rovai, 2004).

The practice of online collaborative learning is firmly grounded within the Community of Inquiry (CoI) framework (Garrison et al., 2000). CoI comprises three interconnected core components: cognitive presence, social presence, and teaching presence. When strategically integrated, these components can facilitate the creation of rich, engaging online learning experiences (Garrison et al., 2000). While CoI is not inherently limited to collaborative learning experiences, it provides instructors with a comprehensive framework for developing collaborative learning environments that positively correlate with students' perceived learning and satisfaction (Martin et al., 2022). Furthermore, CoI serves as a supportive framework for research into the quality of online collaborative learning experiences (Shea et al., 2022;.Stenbom, 2018).

Benefits of Online Collaborative Learning

The potential benefits of strategically designed online collaborative learning experiences are multifaceted and encompass enhancing student engagement and participation, fostering the development of critical thinking skills, improving flexibility and accessibility of learning experiences, and cultivating opportunities for peer support and feedback (Blumenfeld et al., 1996; Lyon et al., 2022; Pena-Shaff & Altman, 2009; Warsah et al., 2021; Wentzel & Watkins, 2011).

Perhaps one of the most frequently referenced benefits of online collaborative learning is the positive development of affective learning outcomes heavily linked to social presence (Garrison et al., 2000), such as an increased feeling of connectedness and the opportunity to build mutual trust through peer interaction (Grothaus, 2022; Oyarzun et al., 2023). These opportunities to foster community engagement in the online environment can contribute to

enhanced student learning outcomes (Chapman et al., 2005; Cherney et al., 2018; Gaad, 2022). Advancements in educational technologies, such as collaborative, cloud-based tools and videoconferencing software, increase the potential for more extensive collaboration as they facilitate interpersonal connections through visual, auditory, and efficient interactive communication among classmates (Grothaus, 2022). The benefits of online collaboration are also noted in asynchronous learning experiences as well, as Yoon et al. (2020) reported success in achieving high levels of dialogic transactivity through asynchronous discussion forums. These dialogic transactivity interactions are distinguished when an individual directly interacts with a peer's contribution by either elaborating on or otherwise agreeing with their sentiments (Vogel et al., 2016).

Expanding on the potential benefits of increased engagement and participation for online collaborative learning experiences, these experiences also create the opportunity to integrate critical thinking skills into the curriculum of online courses. Trespalacios (2017) integrated collaboration through the utilization of case study analysis activities, requiring small groups to create a presentation about their assigned case through VoiceThread. Trespalacios' (2017) example also illustrates the role of project-based collaboration in online learning, as strategically designed online collaborative learning experiences frequently incorporate some aspect of project-based collaboration, such as creating a presentation or a paper (Oyarzun et al., 2023). These types of small-group activities have the potential to yield positive academic outcomes (Blumenfeld et al., 1996; Gaad, 2022; Wentzel & Watkins, 2011) and enable instructors to design activities that further develop students' problem-solving and critical thinking skills (Kosar, 2021; Pena-Shaff & Altman, 2009; Rourke & Anderson, 2002).

Strategically designed collaborative learning in the online environment also enables instructors to utilize flexibility and accessibility, benefits of online learning. For example, Learning Management Systems (LMS) coupled with videoconferencing software enable instructors to host a mixture of synchronous and asynchronous discussions (Peterson et al., 2018). When strategically designed to leverage peer facilitation or through instructor-provided feedback throughout the discussion process, asynchronous discussion has been shown as an effective engagement strategy (Guo et al., 2014; Martin & Borup, 2022; Xie & Ke, 2011). This allows the flexibility of asynchronous discussion and the proven benefits of synchronous discussion for enhancing engagement and collaboration (Peterson et al., 2018) to create a learning environment that is robust, engaging, and responsive to the needs and preferences of learners (Ingram et al., 2024).

Online collaborative learning experiences facilitate instructors' ability to enhance the sense of community within an online environment through engaging, peer-oriented tasks. In face-to-face environments, a sense of community can be established through intentional, frequent opportunities for communication (Archambault et al. 2022; Dawson, 2006), and the establishment of an offline sense of community has been cited as an indicator of success in those communities (Baker & Moyer, 2018; Cameron et al., 2009). The significance of a sense of community in the face-to-face environment has naturally led to an increased focus on community engagement in online environments (Chatterjee & Correia, 2020), where online collaborative technologies, from cloud-based systems like Google Drive to discussion forums presented through learning management systems, are prevalent. These technologies enable instructors to

effectively integrate peer-oriented tasks, such as peer feedback opportunities or online discussion, in innovative ways to facilitate collaboration (Ishtaiwa & Aburezeq, 2015; Kerman, et al., 2024; Revere & Kovach, 2011).

Challenges of Online Collaborative Learning

Although there are evident advantages to online collaborative learning, the establishment and facilitation of effective collaboration in an online community presents significant challenges. Primarily, effective collaboration necessitates robust communication, and research indicates that the cognitive and social benefits of collaborative activities may be diminished if learners are unable to collaborate effectively (Jung et al. 2022; Soller, 2001). Communication challenges persist in both asynchronous and synchronous virtual environments (Clark & Brennan, 1991; Jung at al., 2022). In asynchronous spaces, these challenges manifest as potential delays in peer responses, which often predominantly reflect areas of agreement rather than critique (Yoon et al., 2020), thus necessitating explicit communication regarding the expectation for critical discourse, particularly in asynchronous communities (Garrison, 2007). Communication challenges also extend to synchronous spaces, where research suggests that students have reported experiencing feelings of judgment and fatigue during online synchronous sessions, as well as a perceived need to continuously monitor non-verbal cues such as facial expressions and visual appearances on camera (Grothaus, 2022). These concerns are corroborated by additional studies in which students reported reluctance to activate their cameras, citing privacy concerns or general discomfort with being visible on camera (Bedenlier et al., 2021; Brunet & Schmit, 2007; Kozar, 2016; Nilsen et al., 2013).

Additionally, communication concerns underscore student awareness regarding the potential for miscommunication in online interactions (Strauss & Rummel, 2020). Consistent with research indicating student apprehension about non-verbal miscommunication, particularly during video-based interactions (Bedenlier et al., 2021), students also express concerns about the impact of their interactions on their peers' emotional states, specifically citing instances of simultaneous speech attempts during videoconferencing (Grothaus, 2022). These communication challenges may be exacerbated by issues pertaining to equitable student access to adequate technologies, as technical difficulties arising from connectivity issues, operating system compatibility with student devices, or malfunctioning tools can impede engagement and, consequently, collaboration in online environments (Jeong & Hmelo-Silver, 2016; Strauss & Rummel, 2020).

Through their systematic review of online learner collaboration research, Oyarzun et al. (2023) revealed a diverse array of grouping methods utilized in online environments, including random assignment, criteria-based approaches such as heterogeneous or homogeneous grouping, student-created groups, instructor-assigned groups, and additional methods. The complexity of grouping methods is further compounded by conflicting findings in research on the effectiveness of group size (Cherney et al., 2018; Saqr et al, 2019). In essence, the process of grouping students in online environments is intricate, and the decisions made (or absence thereof) during the formation of student groups significantly influence group dynamics and accountability within those groups (Oyarzun et al., 2023). Unequal participation among group members represents a prevalent challenge in online learner collaboration, wherein social loafing, a phenomenon describing the tendency for individuals to exert less effort in collaborative tasks compared to

independent ones, is frequently observed (Karau & Williams, 1993). To mitigate the potential for social loafing within groups, Johnson and Johnson (2009) and Poort et al. (2020) recommend forming smaller groups, specifically those comprising fewer than five students when feasible, with clearly defined roles for participation assigned to each member (Cherney et al., 2018).

Group dynamics, while influenced by grouping decisions, also contribute to peer accountability, a significant challenge in online learner collaboration where managing group conflicts can be problematic. Various strategies, including collaboration scripts, virtual pinboards for accountability in short-term synchronous breakouts, and group presentations, can provide a measure of peer accountability when implemented strategically (Grothaus, 2022; Lingard & Berry, 2002; Strauss & Rummel, 2020). Nevertheless, a perceived deficiency in collaboration and communication skills among peers remains a limiting factor to the success of groups (Barak et al., 2016). This perceived lack of communication and collaboration skills among group members that can impede effective teamwork may also highlight challenges related to motivation and feelings of isolation in online environments (Cherney et al., 2018; Lingard & Berry, 2002). Although research indicates relationships between peers are not themselves a direct predictor of online learning satisfaction, peer relationships have been demonstrated to impact direct predictors of satisfaction, such as the quality of communication between peers and instructors and communication among peers (Wengrowicz et al., 2018).

Community of Inquiry Framework

The three overlapping core components of the CoI framework—cognitive presence, social presence, and teaching presence—can be utilized as a framework to develop comprehensive and engaging online learning experiences (Garrison et al., 2000). Social presence provides a fundamental basis for leveraging the interrelated components of CoI in online collaborative learning; as Garrison (2007) asserts, "understanding the role of social presence is essential in creating a community of inquiry in designing, facilitating, and directing higher-order learning" (p. 69). Social presence can be enhanced through the implementation of structured, collaborative tasks that incorporate clearly defined roles for participation (Cherney et al., 2018) and strategically formed groups comprising students capable of effectively initiating group interactions (Saqr & López-Pernas, 2023). These collaborative, substantive tasks demonstrate the close relationship between social and cognitive presence, and cognitive presence can be enhanced through online collaboration in various ways, including discussion forums for sustained reflection or groups with well-defined objectives capable of producing sustained collaboration, occasionally without necessitating synchronous engagement in a virtual environment (Baker, 2004; Garrison, 2007; McPherson & Nunes, 2004; Oyarzun et al., 2023; Wengrowicz et al., 2018).

The Community of Inquiry (CoI) framework emphasizes the importance of timely support and guidance for students in OCL environments. Timely support and guidance are primarily associated with the teaching presence component of the CoI framework. Teaching presence involves designing, facilitating, and directing cognitive and social processes to achieve meaningful learning outcomes (Tolu, 2013). In OCL, instructors play a vital role in providing timely feedback, addressing student concerns, and guiding discussions to maintain focus on learning objectives. Martin et al. (2021) found instructors' timely responses were rated highly for enhancing instructor presence, engagement, and learning in online courses. Effective facilitation

by instructors is essential for successful online group work. While group work can be a valuable learning tool, students often resist it. However, with good design and effective facilitation, it can lead to positive outcomes (Gibson, 2019). Instructors need to discuss group management issues, use methods to evaluate individual performance within groups, and provide adequate support to facilitate students' group experiences (Chapman & Van Auken, 2001).

Examining the significance of social and cognitive presence highlights the substantial role that teaching presence plays in developing and managing online collaborative learning environments. Consideration of the importance of social and cognitive presence also reveals the outsized impact of teaching presence in the creation and facilitation of online collaborative learning experiences (Baker, 2004; Garrison, 2007). Instructors play an essential role in modeling productive critical discourse, in addition to their importance in facilitating collaboration through establishing clear measures for peer accountability (Garrison, 2007; Strauss & Rummel, 2020). Heilporn and Desrochers (2020) specifically mention instructor presence is evident to students through an instructors accessibility, availability, and follow-up, revealing to students that the instructor cares for students, which has "major impacts on students' perceptions in an online course" (p. 10). Therefore, the design of online collaborative learning experiences and the instructor's presence in that online environment through the effective use of accessible technologies, strategic grouping, and ensuring tasks require meaningful collaboration (Cherney et al., 2018; Heilporn & Desrochers, 2020), provides a critical foundation upon which effective collaboration between online learners can occur (Oyarzun et al., 2023).

Learner Support During Online Collaborative Learning

Learner support during online collaboration can happen in a variety of ways and come from multiple sources. Dolean and Kear (2024) conducted a systematic review of challenges and methods to address them and found that both instructor and peer support can mitigate online collaborative challenges. However, specific support strategies are not mentioned. Robinson et al. (2017) explored instructors' perceptions of online collaborative learning and found that learner support was at the core of collaborative learning success. They recommended instructors consider nurturing and scaffolding the learners during collaborative work. They also recommend considering learner comfort levels in collaboration, in addition to the instructional design of the task. Hernandez-Selles et al. (2019) emphasized that intragroup emotional support was a key factor in computer-supported collaborative learning. Paterson and Prideaux (2020) added that structured design coupled with supportive facilitation was important for collaborative learning activities' success. While the research points to a need for supportive facilitation of online collaborative learning, there is an opportunity to dig deeper into effective methods of providing support including source and frequency.

Methods

Research Questions

(a) How frequently do students receive support or guidance in collaborative activities and what forms does this support take in online courses?

(b) What are the perceived benefits and challenges associated with participating in collaborative work in online courses?

(c) Do social presence and teaching presence vary depending on the source and frequency of support students receive during collaborative work? Do they also vary according to the level of guidance?

Procedures

The study was conducted at an urban institution in a southeastern U.S. city, with research approval granted by the Institutional Review Board (IRB) of the institution. An online survey was created using Qualtrics, and convenience sampling was used through various distribution methods. Initially, the survey was sent to a student listserv within the researchers' institution. Additionally, the survey link was shared with several pertinent professional organization special interest groups. The survey invitation was also posted in group pages on social media platforms, such as LinkedIn and Facebook.

Measures

The 39-item survey questions were developed following a comprehensive review of relevant literature and included some existing items from the CoI. Participants were initially asked six questions about basic details about the online course in which they participated in collaborative work, including the title of the collaborative work. They were then invited to report on any challenges or benefits related to online collaborative activities and to provide feedback on the clarity and source of guidance received for facilitating collaboration through eight researcher-generated items.

The survey utilized the Community of Inquiry (COI) framework (Garrison et al., 2000) to evaluate students' teaching presence and social presence, with each sub-scale comprising 10 and 9 items, respectively. Cronbach's alpha was calculated to determine internal consistency reliability, yielding values of .919 and .891 for the two subscales, which demonstrated satisfactory reliability.

The survey concluded with six demographic questions about participant age, gender, student status, student classification, employment status, and number of online classes taken. Prior to final distribution, the survey was reviewed by three content experts with expertise in online teaching and learning. They were informed about the study's goals and asked to identify any errors or issues. The survey was revised based on their feedback.

Participants

A total of 210 students took part in the survey. However, almost one-fourth were excluded because they reported not having engaged in any collaborative work in online courses over the past year. As a result, 148 students were included in the dataset. Of these, 38 cases were further excluded due to incomplete responses (with more than 30% of the data missing) leaving a total of 110 complete submissions. The demographic details of the remaining participants are presented in Table 1.

Table 1

Participants Demographics

Category	N	%
Status		
Part-time student	27	24.5
Full-time student	81	73.6
Missing	2	1.8
Age		
18-24 years old	55	50.0
25-34 years old	21	19.1
35-44 years old	12	10.9
45-54 years old	14	12.7
55-64 years old	4	3.6
Prefer not to respond	2	1.8
Missing	2	1.8
Classification		
Undergraduate, Freshman	10	9.1
Undergraduate, Sophomore	11	10.0
Undergraduate, Junior	16	14.5
Undergraduate, Senior	18	16.4
Graduate, Master	40	36.4
Graduate, Doctorate	12	10.9
Other, Post Bacc	1	0.9
Missing	2	1.8
Number of Online Courses Taken		
Under 5	42	38.2
5-10	42	38.2
11-20	15	13.6
21-30	4	3.6
31+	5	4.5
Missing	2	1.8

Most of the participants were full time masters' students in the 18–24-year-old range who have taken 10 or less online courses. The courses that students reflected on in their survey responses were evenly distributed across three levels: introductory (N=39; 35.5%), intermediate (N=34; 30.9%), and advanced (N=37; 33.6%). Additionally, most students indicated that the course was offered online asynchronously (N=59; 53.6%). This was followed by synchronous online courses (N=23; 20.9%), hybrid courses combining online and face-to-face components (N=15; 13.6%), and bichronous courses that blend asynchronous and synchronous online formats (N=13; 11.8%).

Data Analysis

The exploratory study investigated the nature of support and guidance provided during collaborative work in online courses, and as a result, most findings were presented using descriptive statistics. The first two research questions were examined with frequency tables,

detailing both the actual counts and percentages for each category. The final research question was analyzed using an ANOVA procedure, which is appropriate for comparing means across multiple groups.

Results

Support and Guidance in Collaborative Work

Table 2 presents the nature of the support students received during their collaborative work. Nearly half of the students (N=52, 47.3%) reported receiving support equally from both their instructor and peers. About a quarter of participants received support exclusively from their instructor (N=26, 23.6%) or from their peers (N=27, 24.5%). Regarding the frequency of support, only one participant reported receiving no support, while the majority indicated that support was provided either sometimes (N=52, 47.3%) or often (N=43, 39.1%).

Students were also asked if they received clear guidance on how to collaborate with group members, including delineation of roles, responsibilities, and tools. Most participants reported receiving some level of guidance, though 6 students (5.5%) indicated that no guidance was provided.

In terms of support type, most students reported receiving informational support, such as suggestions or advice (N=95, 86.4%). As this survey question allowed multiple responses, students could identify more than one type of support. Network support, including communication or collaboration assistance, was also common (N=62, 56.4%). Esteem support, involving compliments or validation, was reported by (N=53, 48.2%). Emotional support was the least frequent, with only (N=20, 18.2%) of students reporting its provision.

Table 2

Collaborative Work Support

Category	**N**	**%**
Major Source of Support		
Instructor	26	23.6
Peer(s)	27	24.5
Both instructor and peers evenly	52	47.3
No support	4	3.6
Missing	1	0.9
Frequency		
Never	1	0.9
Rarely	13	11.8
Often	43	39.1
Missing	1	0.9
Level of Guidance		
No guidance	6	5.5
Somewhat clear guidance	27	24.5
Moderately clear guidance	36	32.7
Definitely clear guidance	40	36.4

Missing	1	0.9
Support Type		
Informational (suggestion or advice)	95	86.4
Esteem (compliment or validation)	53	48.2
Network (communication /collaboration assistance)	62	56.4
Emotional (sympathy or empathy)	20	18.2

Perceived Benefits and Challenges

Table 3 displays the frequency of potential benefits and challenges perceived by participants in online collaborative work. Students could select multiple options, as the question allowed for multiple responses.

Regarding benefits, about two-thirds of students felt that participating in online collaborative work helped them gain or improve collaboration skills (N=74, 67.3%). The second most common benefit reported was an increased awareness of others' perspectives (N=70, 63.6%). However, only about a quarter of students felt that collaborative work enhanced their overall satisfaction (N=29, 26.4%) or confidence (N=31, 28.2%).

In terms of challenges, more than half of the students identified workload balance (N=65, 59.1%) and scheduling conflicts (N=58, 50.9%) as significant issues in online collaborative work. Conversely, only 16.4% of students (N=18) cited technical issues as a challenge, indicating that most students did not experience major difficulties with technology during online collaborative activities.

Table 3

Benefits and Challenges

	N	%
Benefits		
Increased collaboration skills	74	67.3
Increased awareness of others' perspectives	70	63.6
Increased communication skills	66	60.0
Increased problem-solving skills	53	48.2
Relationship building	50	45.5
Increased confidence	31	28.2
Increased satisfaction	29	26.4
Challenges		
Workload balance	65	59.1
Scheduling conflicts	58	50.9
Communication issues	49	44.5
Anxiety/Stress	34	30.9
Technical issues	18	16.4

One question asked students to provide an example of a benefit or challenge they experienced. The qualitative analysis of those comments is summarized in the next two sections.

Benefits

Despite the challenges, students also identified several benefits associated with group work. The most frequently mentioned benefit, with ten references, was the opportunity for collaboration and learning. Students valued the diverse perspectives that their peers contributed, which enhanced their understanding of the course material. One participant noted, “I benefited from learning other people’s perspectives of the topics,” while another student indicated multiple benefits to group work including, “The benefit of having group work is so many... it helps us to think critically.”

Another benefit identified four times was the acquisition of new tools and skills. Several students reported that working in groups allowed them to familiarize themselves with new collaboration tools, which they found useful for managing group tasks. As one student noted, “I learned new collaboration tools,” indicating that these experiences extended beyond the immediate project to provide broader skill development.

Lastly, three students identified peer relationships as a benefit. Participants highlighted how group work fostered connections that they may not otherwise have developed with their classmates. One student explained, “I was able to build strong relationships with peers in my completely online/asynchronous class through group projects.” This sentiment emphasizes the social value of group work in a digital learning environment.

Challenges

The most frequently cited challenge involved scheduling conflicts, which accounted for 25 instances. Students encountered difficulties in aligning their schedules due to a combination of full-time and part-time commitments, varying work hours, and other personal responsibilities. As one participant stated, “Everyone had different work hours, hence communication was delayed, and it caused a few hurdles in time management.” Another participant emphasized, “We struggled scheduling when we would do things,” demonstrating the widespread difficulty in coordinating group activities.

Team participation emerged as another significant challenge, with ten references. Many students expressed dissatisfaction regarding unequal contributions from group members, resulting in imbalances in workload. One participant described the issue concisely: “One person just stopped replying to the group chat. No explanation.” Another reported, “It was hard to get people to do the work.” Such instances of disengaged team members placed additional burdens on those who remained active.

Communication issues, mentioned in twelve instances, further complicated group collaboration. Inadequate communication often resulted in confusion and delayed responses. As one student elucidated, “People not wanting to work or failing to communicate until the last minute” created stress and impeded project progress. Another participant observed, “Sometimes other students would take a while to post their discussions,"” which hindered the timely completion of group assignments.

Workload imbalance, cited nine times, was a persistent source of dissatisfaction. Some students found themselves assuming additional responsibilities to ensure the project’s success.

One participant stated, “It felt more like the bystander effect than teamwork,” reflecting the uneven distribution of responsibilities. This challenge led to frustration and affected the overall group dynamic.

Relationships Between Teaching Presence, Social Presence, and Support/Guidance

No significant difference was observed in teaching presence based on the source of support, $F(3,105) = 2.223$, $p = 0.090$. However, there was a significant difference in social presence between students who received support solely from the instructor ($M = 33.08$) and those who received support equally from both the instructor and peers ($M = 37.87$), $F(3,104) = 3.184$, $p = 0.027$.

The ANOVA test revealed significant differences in teaching presence, $F(2,105) = 5.02$, $p = 0.008$, and social presence, $F(2,104) = 6.529$, $p = 0.002$, based on the frequency of support. For teaching presence, the Tukey HSD post-hoc test indicated that the mean score for “Often” ($M = 44.44$) was significantly higher than for "Rarely" ($M = 37.77$), $p = 0.008$. Similarly, for social presence, the mean score for “Often”" ($M = 38.53$) was significantly higher than for ”Rarely” ($M = 31.62$), $p = 0.003$. For both tests, the “Never” category was excluded from the analysis due to its limited sample size. Since a post-hoc test is not possible when any group has fewer than two cases, we only compared the three remaining categories: Rarely, Sometimes and Often.

When clear guidance, such as defined roles and responsibilities, was provided, students reported significantly higher teaching and social presence. Specifically, ANOVA results showed that those who received “Definitely clear guidance” had a higher mean teaching presence ($M = 46.10$) compared to those who received “No guidance” ($M = 34.33$), “Moderately clear guidance” ($M = 40.39$), or “Somewhat clear guidance” ($M = 40.78$), $F(3,105) = 9.074$, $p < 0.001$. A similar trend was observed for social presence, with “Definitely clear guidance” ($M = 38.90$) significantly higher than “Somewhat clear guidance” ($M = 34.65$) and “Moderately clear guidance” ($M = 34.81$), $F(3,104) = 3.792$, $p= 0.013$.

Discussion

The findings of this study provide valuable insights into the nature of support and guidance in online collaborative activities, perceived benefits and challenges of participating in such work, and how the source and frequency of support influences teaching and social presence. The results suggest that while students generally receive support during collaborative activities, the sources and frequencies of support vary, impacting their experiences in different ways.

In terms of the first research question—how frequently students receive support and what forms it takes—the majority of participants indicated that they receive support either from their instructors, their peers, or both. Informational support was the most frequently cited, followed by network and esteem support. Interactions between instructors and students should focus on the definition and discussion of group management, which will promote significant interactions leading to learning (Abdu et al., 2012; Bangert, 2009; Cherney et al. 2018; Saqr & López-Pernas, 2023). Notably, emotional support was the least common. This suggests that while students receive substantial guidance in terms of practical collaboration (e.g., suggestions, advice, and

assistance with communication), there may be a deficit in the emotional or empathetic support necessary to foster stronger group dynamics. Given the increasing emphasis on holistic student well-being in online learning, this finding could imply the need for more deliberate efforts to incorporate emotional support mechanisms in online courses to ensure students create a climate of trust and a sense of group belonging and responsibility throughout their collaborative work (Grieve et al., 2016; Hernandz-Selles et al, 2019; Molinillo et al., 2018; Reyes et al., 2012).

Regarding the second research question—what are the perceived benefits and challenges—students reported significant gains in collaboration skills, awareness of others' perspectives, and communication skills. However, fewer students observed improvements in overall satisfaction and confidence, indicating that while collaborative work is evidently beneficial in terms of skill development, it may not consistently enhance students' overall experience or self-efficacy. The challenges reported by participants that may negatively impact student experience, particularly workload balance and scheduling conflicts, align with common issues like communications challenges, increased potential for miscommunication, or connectivity issues in online collaborative environments (Bedenlier et al., 2021; Donelan & Kear, 2024; Strauss & Rummel, 2020). These findings highlight that while collaborative work has clear benefits, careful attention must be paid to managing group dynamics, scheduling, and equitable technology access and workload distribution to prevent these challenges from undermining the potential benefits (Jeong & Hmelo-Silver, 2016; Strauss & Rummel, 2020).

The third research question examined the variation in social and teaching presence based on the source and frequency of support. The findings indicate that while the source of support (whether from peers, instructors, or both) did not significantly impact teaching presence, it did have a measurable effect on social presence. Students who received support equally from both their instructor and peers reported a higher sense of social presence compared to those who received support solely from their instructor. This echoes the findings of prior research that suggests a more balanced approach, where the contributions of both instructors and peers to the support system may enhance the sense of community and belonging in online collaborative environments (Kerman et al., 2024; Molenaar et al., 2012; Tseng & Yeh, 2013).

Furthermore, the frequency of support significantly influenced both teaching and social presence. Students who received support more frequently, whether sometimes or often, reported higher levels of both presences. This finding is particularly significant, as it underscores the critical role that ongoing, consistent support plays in maintaining a strong teaching and social presence, which are essential elements of the CoI framework (Cherney et al., 2018; Rovai, 2004). Pedagogical and social aspects require careful planning and curricular and pedagogical implementation (Hernandez et al., 2014; Ornellas & Munoz Carril, 2014; Saqr & López-Pernas, 2023; Sims, 2003; Stahl et al., 2004). Without frequent interaction and engagement, students may experience a sense of disconnection, which could diminish the effectiveness of the collaborative learning experience (Kwon et al., 2014; Reyes et al., 2012; Wengrowicz et al., 2018).

Additionally, the clarity of guidance emerged as a critical factor influencing both teaching and social presence. Students who reported receiving "definitely clear" guidance on collaboration roles and responsibilities demonstrated significantly higher levels of both teaching

and social presence compared to those who received less clear guidance. This finding highlights the importance of clear communication and structure in online group work (Martin et al., 2021; Palacious-Nunez & Deroncele-Acosta, 2021). Without clearly defined roles and expectations, students may struggle to engage fully in the collaborative process, leading to lower levels of perceived presence and, potentially, a less effective learning experience (Kukulska-Hulme, 2005).

These findings suggest that effective support in online collaborative work is multifaceted, involving frequent and balanced interaction between instructors and peers and clear guidance on roles and responsibilities. While collaborative work is undoubtedly beneficial in developing key skills, challenges such as workload imbalance and scheduling conflicts remain significant barriers. Therefore, instructional designers and educators must carefully plan and structure online collaborative activities to optimize both teaching and social presence, ensuring that students feel supported, engaged, and capable of contributing meaningfully to group work (Donelan & Kear, 2024; Fiock, 2020).

Implications

The findings of this study underscore the critical importance of comprehensive support systems in online collaborative learning environments. While informational support is commonly provided, the study highlights a significant gap in emotional support mechanisms, crucial for fostering a positive and productive learning atmosphere (Strauss & Rummel, 2020). To address this, educators and instructional designers should implement strategies beyond mere information provision and actively promote emotional and empathetic support among students. This could include integrating peer mentorship programs, regular check-ins, and structured opportunities for emotional exchanges, such as reflective discussions or dedicated spaces for sharing personal challenges related to group work. These measures can help build trust, enhance group cohesion, and address feelings of isolation or frustration that are often prevalent in online settings (Donelan & Kear, 2024).

Moreover, the study's findings emphasize the need for a holistic approach to student support that recognizes the interconnectedness of emotional well-being and academic success. By incorporating explicit mechanisms for emotional support, educational institutions can create more inclusive and supportive online learning environments that cater to the diverse needs of students. This approach aligns with the growing recognition of student well-being as a key factor in academic achievement (Hernandez-Selles et al., 2019). Practical implementations could involve training both peers and instructors in providing emotional support, developing guidelines for supportive online interactions, and regularly assessing the emotional climate of online collaborative groups. By addressing the emotional aspects of online learning alongside the informational components, educators can foster more engaging, supportive, and ultimately more effective online collaborative learning experiences.

This study's findings underscore the critical role of a balanced approach to support in online learning environments. By emphasizing the importance of both instructor and peer support, the research reveals that students experience a more robust sense of social presence when they receive guidance from multiple sources. This dual-source approach not only enhances

students' feelings of belonging but also increases their overall engagement with the course material and their fellow learners (Donelan & Kear, 2024).

Frequency and clarity of support are also vital for fostering strong teaching and social presence. This underscores the need for instructors to provide ongoing, consistent feedback and clearly define roles and responsibilities within group activities (Abdu et al., 2012; Bangert, 2008; Hernandez-Selles et al., 2019). In online learning environments, where ambiguity can lead to disengagement, explicit instructions and well-structured group tasks are essential to keep students on track and motivated. These findings suggest that detailed guidelines, rubrics, and regular instructor involvement are beneficial and necessary to enhance collaborative activities' effectiveness (Van Thien, 2021).

Additionally, this study reinforces the notion that while online collaborative work provides numerous benefits, challenges such as workload imbalance and scheduling conflicts continue to impede its full potential (Hillard et al., 2020). To address these issues, educators must implement strategies that ensure equitable workload distribution and offer flexible scheduling options. Mechanisms that facilitate transparent tracking of group contributions and adaptive timelines may mitigate these common barriers, thereby enhancing group collaboration and reducing participant frustration (Oyarzun et al., 2023).

One strategy to address workload imbalances and scheduling conflicts is the implementation of a group charter. The collaborative group establishes the parameters of their communication at the commencement of the semester, encompassing meeting times, communication methods, conflict resolution protocols, and timelines for collaborative activities (Tu & Corry, 2002). Consequently, both the instructor and students are cognizant of the group expectations, and the instructor can, therefore, provide the necessary guidance to the students prior to their engagement in the collaborative activity (Gibson, 2019; Martin et al., 2021). Esarco (2009) determined that groups operated more efficiently and effectively due to the standardization of work and responsibilities among learners.

From a broader perspective, this study has implications for the ongoing development of the Community of Inquiry (CoI) framework, specifically regarding how teaching and social presence can be effectively cultivated through intentional instructional design. All three aspects of social presence (emotional expression, open communication, and group cohesion) require support (Donelan & Kear, 2024). Furthermore, the "facilitating discourse" element of teaching presence is particularly significant for achieving social presence (Donelan & Kear, 2024). By providing frequent, balanced, and clear support, instructors can not only enhance the collaborative learning experience but also strengthen the sense of community and engagement, which are critical for student success in online learning environments (Martin et al., 2021; Oyarzun et al., 2023).

These findings highlight the imperative for faculty development programs that prioritize facilitating online group work. Instructors should be trained to identify the various types of support that students require and to implement strategies that promote both cognitive and emotional well-being. By addressing these factors, online courses can be designed to provide not

only collaborative skill development but also a more comprehensive and supportive learning experience.

Limitations

The research encountered several limitations. The insufficient sample size impeded the generalization of findings. Additionally, the broad term "collaborative learning" encompasses diverse methodologies. Some potential participants may have declined involvement due to misinterpretation of the concept of collaborative work or learning, as evidenced by an incomplete submission citing confusion about the survey's purpose. In addition, while the research team employed several recruitment strategies to reach a broader population of online learners in higher education in the U.S., it is highly likely that our participants are overrepresented from the study population of the participating institutions. Furthermore, the study's wide-ranging topic and heterogeneous sample, spanning multiple disciplines and course levels, potentially complicated the process of drawing meaningful conclusions. Another limitation of the study design is that, due to the limited sample size, we could only perform a simple one-way ANOVA. This design does not allow for control over potential confounding variables. It is also important to note that, while the equal variance assumption was supported by the Levene's test for the ANOVA, the normality assumption was not upheld based on the Kolmogorov-Smirnov test ($p < .001$ for teaching presence and $p = .017$). Although the ANOVA test is known to be fairly robust to violations of the normality assumption (Leech et al., 2015), caution is warranted when interpreting the results. Lastly, the investigation focused exclusively on the social dimensions of collaborative learning, assessing teaching and social presence within the Community of Inquiry (CoI) framework while omitting cognitive presence.

Conclusion

This study contributes to the understanding of effective support systems in online collaborative learning by highlighting the significance of both informational and emotional support mechanisms. While informational support, such as guidance on project management and task completion, is widely present in online group work, the absence of emotional support emerges as a critical area for improvement. This finding aligns with existing research, emphasizing the importance of integrating emotional and empathetic support to foster a positive learning environment (Strauss & Rummel, 2020). Implementing structured mechanisms such as peer mentorship programs, reflective discussions, and regular check-ins is essential for building trust, mitigating feelings of isolation, and promoting group cohesion (Donelan & Kear, 2024). Such support can significantly enhance students' sense of belonging and their overall engagement with collaborative activities.

Moreover, the study underscores the importance of a balanced and frequent approach to support, involving contributions from both peers and instructors. This dual-source model of support not only strengthens social presence but also cultivates a more robust sense of community in online learning environments. Students who receive guidance and feedback from multiple sources experience higher levels of engagement and satisfaction, suggesting that educators should actively facilitate peer interactions alongside their own contributions to student support (Hernandez-Selles et al., 2019). The findings also address prevalent challenges in online group work, including workload imbalances and scheduling conflicts. Such impediments can

undermine the potential benefits of collaborative activities if not managed effectively (Hillard et al., 2020). Strategies to mitigate these issues, such as implementing tools for transparent tracking of group contributions, flexible scheduling options, and structured group charters, are essential to ensure that the collaborative learning experience is equitable and effective for all participants (Oyarzun et al., 2023; Tu & Corry, 2002).

Furthermore, the study has broader implications for refining the CoI framework. Intentional instructional design that prioritizes frequent, balanced, and explicit support not only enhances teaching and social presence but also promotes a more engaging and supportive online learning experience (Martin et al., 2021; Oyarzun et al., 2023). The results of this study highlight the necessity for faculty development initiatives that equip instructors with the skills to recognize and address both cognitive and affective needs in collaborative learning contexts. By adopting a comprehensive approach to support, educators can create more inclusive and impactful learning environments, ultimately contributing to improved student outcomes and satisfaction in online courses (Donelan & Kear, 2024; Esarco, 2009).

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Conflict of interest statement
The authors declare that there are no conflicts of interest regarding the publication of this manuscript. No financial, professional, or personal relationships have influenced the research, analysis, or findings presented in this study.

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Appendix

Directions: Think of a single course in which collaborative learning was an intentional part of an online course you taught and think about the primary collaborative work within that course.

1. Please indicate a course level.
    a. Undergraduate
    b. Graduate, Masters Level
    c. Graduate, Doctorate Level
2. Please indicate course difficulty.
    a. Foundation/Beginner/Introductory
    b. Intermediate
    c. Advanced
3. Was the course a(n)
    a. Elective course
    b. Required course
4. Please indicate the discipline of the course.
    a. Humanities (i.e., arts, history, etc.)
    b. Social Science (i.e., Anthropology, Sociology, Psychology, Education, etc.)
    c. Natural Science (i.e., Biology, Chemistry, Physics, etc.)
    d. Formal Science (i.e., Computer Science, Statistics, Mathematics, etc.)
    e. Applied Science (i.e., Business, Engineering, Medicine, etc.)
    f. Other _____
5. How was the course delivered?
    a. 100% asynchronous online
    b. 100% synchronous online
    c. Bichronous (blend of asynchronous and synchronous online)
    d. Hybrid (blend of online and f2f)
6. Please provide the title or short description of the primary collaborative work.

Thinking about a specific course and specific collaborative work within that course, please answer or rate the following questions regarding the design of the collaborative work.

7. What was the group size for the collaborative work?
    a. Small (2-4)
    b. Medium (5-8)
    c. Large (9+)
    d. Whole class
8. How were the groups formed?
    a. Randomly assigned
    b. The instructor assigned based on certain criteria
    c. Self-selected
    d. Other
9. What type(s) of collaboration were required with the work (Check all that apply)
    a. Discussion
    b. Project
    c. Peer review
    d. Activity (non-graded)
    e. Assignment (graded)

f. Informal/Social
g. Other

10. What was the duration of the collaborative work
    a. A small part of the semester (i.e., a single module/weeks/unit)
    b. An intermediate part of the semester (i.e., some modules/weeks/units)
    c. A large part of the semester (i.e., many modules/weeks/units)
    d. The entire semesters (i.e., entire course)

Please answer or rate the following questions regarding eh facilitation of the collaborative work

11. What role(s) did you play? (Check all that apply)
    a. Designer/Planner of the activity or product
    b. Developer
    c. Facilitator/Coordinator/Supporter
    d. Information provider
    e. Other _____
12. What support was given during the collaborative work? (Check all that apply)
    a. Informational support (suggestion or advice)
    b. Esteem support (compliment or validation)
    c. Network support (communication/collaboration assistance)
    d. Emotional Support (Sympathy or empathy)
    e. Other _____
13. How often was support given during the collaborative work?
    a. Often
    b. Sometimes
    c. Rarely
    d. Never
14. Who primarily gave support during the collaborative work?
    a. Instructor
    b. Peer(s)
    c. Both instructor and peers evenly
    d. Neither

Rate your level of agreement with each of the following statements using the Likert Scale from 1 Strongly disagree to 5 Strongly agree.

15. The collaborative work provided the following benefits:
    a. Increased my students' communication skills
    b. Increased my students' collaboration skills
    c. Helped the students build relationship
    d. Increased students' awareness of others' perspectives
    e. Increased students' problem-solving skills
    f. Increased students' confidence
    g. Other _____
16. The collaborative work presented the following challenges
    a. Scheduling conflicts
    b. Workload balance
    c. Technical issues
    d. Communication issues
    e. Anxiety/Stress

    f. Other _____

17. Please rate the effectiveness of the collaborative work in promoting students learning.
    a. Not effective
    b. Somewhat effective
    c. Very effective
    d. Extremely effective
18. Please provide a brief reason for your effectiveness rating.
19. Please rate your level of agreement with each of the following statements using the Likert Scale from 1 Strongly disagree to 5 Strongly agree.
    a. I clearly communicated important course topics
    b. I clearly communicated important course goals
    c. I provided clear instructions on how to participate in course learning activities
    d. I was helpful in identifying areas of agreement and disagreement on course topics that helped course participants to learn
    e. I was helpful in guiding the class toward understanding course topics in a way that helped course participants clarify their thinking
    f. I helped to keep course participants engaged and participating in productive dialogue
    g. I helped keep the course participants on task in a way that helped them to learn
    h. I encouraged course participants to explore new concepts in this course
    i. My actions reinforced the development of a sense of community among course participants
20. (optional) Please share the details or example of the collaborative work that you implemented with your students.
21. What is your gender?
    a. Male
    b. Female Transgender
    c. Non-binary/nonconforming
    d. Prefer not to respond
    e. Other
22. What is your age ranges?
    a. 18-24 years old
    b. 25-34 years old
    c. 35-44 years old
    d. 45-54 years old
    e. 55-64 years old
    f. 65-74 years old
    g. 75 years or older
    h. prefer not to respond
23. What is your faculty rank?
    a. Tenure-track Assistant Professor
    b. Tenure-track Associate Professor
    c. Tenure-track Professor
    d. Non-tenure track faculty (Clinical, Teaching, Research)
    e. Lecturer
    f. Adjunct

24. How many online courses have you taught (including the same course repeatedly taught over time)?
    a. Under 5
    b. 5-10
    c. 11-20
    d. 21-30
    e. 31+
25. What is your level of comfort in online teaching?
    a. Not at all
    b. A little comfortable
    c. Fairly comfortable
    d. Very comfortable
26. Does your institution offer professional development opportunities (e.g., workshop) to enhance your online teaching skills?
    a. Yes
    b. No
    c. I don't know