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The Future is Connection:

Collaboration, Creativity and Compassion in a Digital Society

Student perceptions on how social presence and social emotional wellbeing contribute to collaborative knowledge construction in online learning

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Collaborative knowledge construction (CKC) is a central objective of collaborative online learning environments (COLEs), yet existing research has largely focused on factors associated with successful collaboration and outcomes such as engagement, participation, and satisfaction. Comparatively less attention has been given to explaining how integrated experiences of social presence and social-emotional well-being support CKC. Addressing this gap, this study investigates the socio-relational mechanisms through which these experiences contribute to CKC. The study forms part of a broader Design Science Research (DSR) project and draws on qualitative data from semi-structured interviews with 20 undergraduate students experienced in collaborative online learning. Interview transcripts were analysed using reflexive thematic analysis employing a hybrid deductive–inductive approach. The analysis identified five complementary socio-relational enabling mechanisms: Participation Confidence, Emotional Safety and Interactional Comfort, Reciprocal Responsiveness and Peer Support, Relational Trust and Collaborative Openness, and Shared Accountability and Collaborative Commitment. Collectively, these mechanisms explain how social and emotional conditions support students' participation in CKC processes. The findings advance collaborative online learning theory by providing a mechanism-based explanation of how CKC emerges and offer a theoretical foundation for future design-oriented research and evidence-informed learning design.

Keywords: collaborative knowledge construction, collaborative online learning, social presence, social-emotional well-being, reflexive thematic analysis, qualitative

Introduction

Collaborative knowledge construction (CKC) is widely recognised as a defining characteristic of effective collaborative online learning environments (COLEs). Grounded in social constructivist perspectives, CKC is a socially mediated process in which learners develop understanding through dialogue, negotiation of meaning, and the co-construction of shared knowledge rather than through individual knowledge acquisition (Dillenbourg, 1999; Stahl, 2006). Consequently, fostering CKC has become a central objective of collaborative online learning (Jeong & Hmelo-Silver, 2016).

Achieving CKC in online learning, however, remains challenging. Meaningful collaboration depends not only on collaborative technologies and learning tasks but also on learners' willingness to participate and engage meaningfully with others. Online learning environments frequently present barriers such as psychological distance, reduced social interaction, limited participation, and feelings of isolation, all of which constrain collaborative dialogue and the development of shared understanding (Garrison et al., 1999; Kreijns et al., 2003; Swan et al., 2009). Consequently, researchers have increasingly recognised social presence and social-emotional well-being as critical conditions that foster connectedness, trust, confidence, belonging, and

meaningful collaborative engagement (Courtwright et al., 2020; Garrison et al., 1999; Keyes, 1998; Lowenthal & Snelson, 2017; Short et al., 1976)

Although a growing body of research has established that social presence and social-emotional wellbeing are important contributors to collaborative online learning, important theoretical questions remain. Existing research has primarily identified factors associated with successful collaboration and examined outcomes such as learner engagement, participation, satisfaction, and academic performance (Ahola et al., 2024; Zabolotna et al., 2025). While these studies have advanced understanding of what supports collaborative online learning, they provide comparatively limited explanation of how these social and emotional conditions support CKC. Furthermore, although growing evidence suggests that social presence and social-emotional well-being operate in an integrated and mutually reinforcing manner, little is known about the mechanisms through which their interplay supports CKC.

To address this gap, this study investigates the socio-relational mechanisms through which social presence and social-emotional well-being jointly contribute to CKC within collaborative online learning environments. Drawing on qualitative interviews with 20 university students, the study identifies five interconnected socio-relational enabling mechanisms that explain how these conditions support collaborative participation, knowledge sharing, and collaborative meaning-making. By providing a mechanism-based explanation of CKC, the study advances collaborative online learning theory and offers a conceptual foundation for future design-oriented research and evidence-informed learning design. Accordingly, this study addresses the following research question:

Through what mechanisms do integrated experiences of social presence and social-emotional well-being contribute to CKC within collaborative online learning environments?

Background and conceptual framing

This section reviews collaborative knowledge construction, the complementary roles of social presence and social-emotional well-being, and the need for a mechanism-based explanation of CKC.

Collaborative knowledge construction in online learning

CKC is grounded in social constructivist perspectives, which view learning as a socially mediated process where understanding is developed through interaction, dialogue, negotiation of meaning, and shared problem-solving (Dillenbourg, 1999; Scager et al., 2016; Stahl, 2006). Within collaborative online learning environments, learners construct knowledge by exchanging perspectives and co-creating shared understanding rather than passively receiving information (Dillenbourg, 1999; Jeong & Hmelo-Silver, 2016).

In this study, CKC is conceptualised as a multidimensional collaborative process comprising four interrelated dimensions: dialogic interaction and engagement, cognitive elaboration and negotiation, mediated knowledge construction, and shared understanding and internalisation. These dimensions synthesise recurring collaborative processes identified across the social constructivist and computer-supported collaborative learning literature, capturing how learners engage in dialogue, negotiate ideas, use shared artefacts to support collaboration, and progressively develop shared understanding (Dillenbourg, 1999; Jeong & Hmelo-Silver, 2016; Stahl, 2013). Rather than representing sequential stages, these dimensions are mutually reinforcing processes through which CKC unfolds.

CKC depends not only on learning tasks and technology but also on learners' willingness to participate, communicate openly, and engage meaningfully with others. Accordingly, this study examines the integrated role of social presence and social-emotional well-being in supporting CKC.

Social presence and social-emotional well-being

This study builds on our earlier conceptual work, which proposed an integrated perspective of social presence and social-emotional well-being within collaborative online learning environments (Irugalbandara et al., 2026). The model conceptualises these constructs as complementary and mutually reinforcing dimensions of learners' collaborative experiences, comprising three dimensions of social presence (emotional expression, open communication, and group cohesion) and seven dimensions of social-emotional wellbeing (positive emotions, self-esteem, resilience, social integration, social acceptance, social contribution, and social coherence). Together, these dimensions represent the key social and emotional conditions that support collaborative learning and provided the conceptual framework that informed the deductive phase of the thematic analysis.

Within this integrated perspective, social presence reflects learners' ability to perceive others as socially and emotionally present through emotional expression, open communication, and group cohesion (Garrison et al., 1999; Lowenthal & Snelson, 2017). Social-emotional wellbeing encompasses learners' positive emotional and social functioning, including confidence, resilience, social integration, social acceptance, social contribution, and social coherence (Courtwright et al., 2020; Keyes, 1998).

Considering these constructs together is important because CKC requires more than opportunities for interaction alone. Learners must also feel psychologically confident, emotionally supported, and socially connected to engage meaningfully with others. While social presence creates opportunities for meaningful interaction by enabling learners to perceive others as real and accessible, social-emotional well-being influences their readiness and capacity to participate in those interactions. Together, these complementary experiences create the social and emotional conditions that support CKC.

Towards an explanatory understanding of collaborative knowledge construction

Although substantial evidence indicates that social presence and social-emotional well-being positively influence collaborative learning, existing research has primarily focused on relationships between these constructs and learning outcomes, providing limited understanding of the mechanisms through which they jointly support CKC. This represents an important theoretical gap because CKC is a dynamic socio-relational process through which learners engage in dialogue, negotiate meaning, and develop shared understanding.

Addressing this gap requires a mechanism-based perspective explaining how these social and emotional conditions shape learners' willingness and capacity to participate in collaborative dialogue, knowledge sharing, and collective meaning-making (Dillenbourg, 1999; Hmelo-Silver, 2003; Jeong & Hmelo-Silver, 2016; Stahl, 2006; Vygotsky & Cole, 1978). Accordingly, this study examines the socio-relational mechanisms through which integrated experiences of social presence and social-emotional well-being enable CKC.

Existing concepts provide important foundations for understanding learners' collaborative experiences. For example, self-efficacy concerns individuals' beliefs in their capacity to perform particular actions (Bandura, 1997), while psychological safety refers to a shared belief that a group is safe for interpersonal risk-taking (Edmondson, 1999). The Community of Inquiry (CoI) framework offers a broader account of meaningful online learning through the interaction of social, cognitive, and teaching presence (Garrison et al., 1999). However, these perspectives do not specifically explain the socio-relational processes connecting the combined social presence–wellbeing conditions to CKC. The present study therefore examines mechanisms as contextually situated socio-relational processes that connect these conditions with learners' participation in dialogue, negotiation, mediated knowledge construction, and the development of shared understanding.

Method

Research context

This study forms part of a broader Design Science Research (DSR) project investigating how collaborative online learning environments can be designed to enhance CKC by integrating social presence and social-

emotional wellbeing. This paper reports the qualitative interview phase, which examined the socio-relational mechanisms through which these conditions supported CKC.

Participants and data collection

Twenty undergraduate students enrolled in Information Technology programmes at a large Australian university participated in the study. Participants were purposively recruited based on their experience of collaborative online learning environments. Semi-structured interviews were conducted via Zoom between February and June 2025. Interviews lasted 30–40 minutes, were audio-recorded with participants' consent, and transcribed verbatim for analysis. Ethics approval was obtained from the institutional Human Research Ethics Committee, and all participants provided written informed consent.

Interview protocol

The semi-structured interview protocol explored students' experiences of CKC and how social presence and social-emotional well-being shaped their collaborative participation. Participants reflected on collaborative discussion, knowledge sharing, peer interaction, and the conditions that supported or constrained CKC.

Data analysis

Interview transcripts were analysed using reflexive thematic analysis (RTA) (Braun & Clarke, 2019). A hybrid deductive-inductive approach was adopted. Deductive coding was guided by the previously developed conceptual framework to examine participants' experiences through the proposed conceptual dimensions, while inductive coding extended beyond the framework to develop explanatory socio-relational enabling mechanisms.

The research team consists of experienced educators and researchers in online and collaborative learning, and the lead researcher brought substantial prior experience in higher education teaching and research on technology-supported learning. She was also involved in the broader DSR project, including the development of the conceptual framework that informed this study. Consistent with RTA, these experiences and prior theoretical knowledge were treated as interpretive resources that shaped what was noticed and how participants' accounts were understood, while recognising their potential to direct attention towards expected patterns. The lead researcher therefore moved iteratively between the conceptual framework, coded extracts, and complete transcripts, remaining open to experiences and patterns that extended, complicated, or challenged the framework. Table 1 summarises the analytical process.

Table 1.
Analytical process for identifying socio-relational enabling mechanisms

Analytical stage	Analytical focus	Purpose	Outcome
Familiarisation	Read interview transcripts	Understand collaborative experiences	Initial observations
Deductive coding	Apply the social presence–well-being conceptual framework	Identify concept-driven patterns	Deductive codes
Inductive coding	Generate emergent codes	Identify socio-relational processes	Inductive codes
Theme development	Cluster and refine codes	Develop explanatory themes	Candidate mechanisms
Mechanism interpretation	Interpret themes	Develop socio-relational enabling mechanisms	Five mechanisms

Although the analysis combined deductive and inductive coding, this paper reports only the inductively developed socio-relational enabling mechanisms. The deductive findings informed refinement of the broader conceptual model reported elsewhere (Irugalbandara et al., 2026).

Findings: socio-relational enabling mechanisms supporting collaborative knowledge construction

This study aimed to understand how social presence and social-emotional well-being jointly supported CKC within collaborative online learning environments. Analysis of the interview data identified five complementary socio-relational enabling mechanisms that explain how learners' social and emotional experiences are translated into collaborative participation, knowledge sharing, and collaborative meaning-making.

Participants consistently described meaningful collaboration as arising not simply from opportunities for interaction but from feeling connected, confident, emotionally safe, supported by peers, trusted within the group, and collectively responsible for learning. These experiences were interpreted as five socio-relational enabling mechanisms: Participation Confidence, Emotional Safety and Interactional Comfort, Reciprocal Responsiveness and Peer Support, Relational Trust and Collaborative Openness, and Shared Accountability and Collaborative Commitment.

Although presented separately for analytical clarity, the mechanisms operated as complementary and mutually reinforcing socio-relational processes that collectively supported collaborative dialogue, knowledge sharing, perspective negotiation, and the development of shared understanding. The following sections describe each mechanism.

Participation Confidence

Participation Confidence describes learners' socially fostered willingness to contribute ideas, ask questions, and express uncertainty during collaborative interaction. Rather than operating as an individual attribute, it developed through feeling connected, accepted, and supported by peers. Participant 13 described this change directly: "I've found it a lot easier to talk and ask questions and communicate…It gets rid of the nerves around asking questions or that kind of thing." Their account links reduced apprehension with a greater willingness to enter discussion. Conversely, Participant 8 explained: "Because when I'm not feeling connected to the community and I don't feel like I'm part of it, I'm usually more hesitant when I have questions I want to ask or something I want to share." Together, these accounts suggest that students' willingness to ask and contribute was shaped by how they experienced their place within the learning community.

Willingness to speak also depended on how peers responded. Participant 17 explained, "Then he pretty much just didn't pay attention to what I said or typed in…So I sort of felt inclined to just not worry about speaking up." Although the participant had made a contribution, its dismissal discouraged further participation. This contrasting account shows how Participation Confidence and Reciprocal Responsiveness interacted: opportunities to contribute mattered, but acknowledgement helped sustain dialogue. The mechanism thus helps explain students' entry into, and continued engagement in, dialogic interaction.

Emotional Safety and Interactional Comfort

Emotional Safety and Interactional Comfort describes how supportive and open interactions shaped learners' willingness to communicate during collaborative work. Participant 15 explained that "just being able to see each other and communicate was good, and it felt much less isolating." The participant linked visibility *and* communication with reduced isolation; the account does not suggest that seeing others alone was sufficient. Participant 10 described a different difficulty: "Even when the content is heavy, the openness and communication help reduce that stress." Here, open interaction did not remove the challenge of the material, but appeared to make engaging with it alongside peers less stressful.

Emotional state could also shape what learners brought to an interaction. As Participant 14 observed, "Being in a positive mood really sets the tone for how you interact with others." Taken together, these accounts suggest a reciprocal relationship: supportive interaction may ease discomfort, while learners' emotional states can shape their participation in turn. This mechanism helps explain conditions under which students felt more

comfortable entering discussion and seeking clarification. The extracts support that connection to dialogue more directly than a claim that cognitive elaboration necessarily followed.

Reciprocal Responsiveness and Peer Support

Reciprocal Responsiveness and Peer Support describes how learners responded to one another with assistance, ideas, and encouragement. Participant 11 explained, "Through them sharing and helping me in that group setting, I ended up learning the material much more quickly." This account identifies receiving help as valuable to the learner's understanding, rather than simply to their sense of participation. Support could also flow in the other direction. Participant 17 noted, "Normally if I see questions that I can confidently answer…I'll put forward ideas or suggestions." Read together, these accounts show how a learner might benefit from peers' contributions while also recognising opportunities to contribute to others' learning.

Participant 6 added that "people interpret instructions and material differently, and getting those different perspectives can deepen your knowledge of the topic." This suggests why reciprocal exchange matters for CKC: peers' differing interpretations give learners ideas to compare with their own, potentially prompting clarification or reconsideration. The accounts therefore connect peer responsiveness with knowledge exchange and cognitive elaboration. They do not, by themselves, show the use of shared artefacts, so a link to mediated knowledge construction would need evidence from elsewhere in the interviews.

Relational Trust and Collaborative Openness

Relational Trust and Collaborative Openness describes how developing relationships appeared to make students more willing to engage with peers' ideas. Participant 4 recalled, "We're talking on Discord, and it's actually…instead of just being students, we're kind of talking like friends." The shift from interacting as classmates to talking more familiarly suggests a relational basis for continued communication. It does not, on its own, establish that every interaction involved trust or substantive knowledge construction.

Participant 6's statement, "We have a shared goal," adds a sense of common purpose that could help orient those interactions towards collaborative work. The connection to learning becomes clearer in Participant 14's account: "Being able to discuss things with others and hear different perspectives not only helps with understanding the content but also gives you a broader view." Here, openness meant more than maintaining friendly contact: hearing alternative interpretations could expand a learner's understanding. Together, these accounts suggest how relational familiarity and shared purpose may create opportunities for perspective exchange, while engagement with differing ideas links this mechanism to cognitive elaboration. They also show why relational connection and shared commitment should be considered together, without treating them as the same mechanism.

Shared Accountability and Collaborative Commitment

Shared Accountability and Collaborative Commitment describes how learners' sense of responsibility to peers helped sustain their effort towards shared goals. Participant 4 explained that, "that connection and that social connection with them actually made me do the work accurately and properly, not just blow it off." For this participant, the relationship with group members gave the work a social significance: the quality of their contribution mattered because others were depending on it. Participant 19 similarly described how the group maintained its direction through "constant communication about our goals," adding that "it feels like really collaborating well together." This account suggests that commitment was sustained not simply by having a shared goal, but through ongoing interaction that kept that goal visible and collectively reinforced.

Participant 7's experience, however, complicates this enabling account. They explained, "If I'm not seeing that same level of interaction from my peers, it demotivates me. It makes me want to participate less." Rather than responsibility to the group automatically sustaining participation, commitment appeared to weaken when effort was perceived as uneven. This suggests that Shared Accountability was relational and conditional: learners' willingness to continue contributing could depend on seeing comparable engagement from others. In this way, Shared Accountability and Collaborative Commitment appeared to operate in interaction with

Reciprocal Responsiveness and Peer Support, with reciprocal participation helping to sustain, and its absence potentially weakening, continued contribution towards shared goals.

Synthesis of the findings

Taken together, the findings indicate that social presence and social-emotional well-being supported CKC through five interconnected socio-relational mechanisms. These mechanisms shaped whether learners felt able to enter collaborative dialogue, remain engaged, respond to others, consider different perspectives, and contribute towards shared goals. Their operation was relational and conditional rather than automatic: connection did not sustain participation when contributions were disregarded, and shared accountability weakened when peer engagement was not reciprocated.

The mechanisms also appeared to reinforce one another. Participation Confidence encouraged learners to contribute, while Reciprocal Responsiveness helped sustain that confidence by acknowledging and developing their contributions. Relational Trust supported openness to different perspectives, while Shared Accountability maintained engagement around collective goals. Emotional Safety and Interactional Comfort reduced the interpersonal and emotional risks involved in these processes. In this way, the mechanisms provide an explanatory bridge between learners' social and emotional experiences and the enactment of CKC. Table 2 summarises the CKC processes with which each mechanism was most clearly associated.

Table 2.
Socio-relational enabling mechanisms supporting collaborative knowledge construction

Socio-relational enabling mechanism	**CKC aspect most evident in these excerpts**	**Evidence in participants' accounts**
Participation Confidence	Dialogic interaction and engagement	Willingness to ask questions, share ideas, and continue speaking
Emotional Safety and Interactional Comfort	Dialogic interaction and engagement	Greater comfort communicating and seeking clarification
Reciprocal Responsiveness and Peer Support	Cognitive elaboration and negotiation	Peer help and differing interpretations that could deepen understanding
Relational Trust and Collaborative Openness	Cognitive elaboration and negotiation	Discussion of different perspectives and broader understanding of content
Shared Accountability and Collaborative Commitment	Sustained dialogic engagement towards shared goals	Continued effort and communication, which weakened when peers did not reciprocate

These mappings identify the CKC aspects most evident in the excerpts presented, rather than limiting each mechanism to a single process.

Discussion

Theoretical contribution

The findings provide an explanatory account of how social presence and social-emotional well-being jointly relate to CKC in online learning. Although previous research has emphasised interaction and dialogue as central to CKC (Jeong & Hmelo-Silver, 2016; Stahl, 2006), less attention has been given to the socio-relational conditions shaping learners' willingness to participate. Drawing on students' accounts, this study identifies five interconnected mechanisms that specify how social and emotional conditions were experienced as supporting dialogue, knowledge sharing, cognitive engagement, and collaborative meaning-making.

These mechanisms do not replace established theories but refine and contextualise them for CKC in collaborative online learning environments. Self-efficacy concerns beliefs about one's capability to perform an

action (Bandura, 1997) whereas Participation Confidence focuses on how supportive social conditions shape willingness to contribute, ask questions, and express uncertainty. Psychological safety concerns a shared belief that interpersonal risk-taking is safe (Edmondson, 1999) while Emotional Safety and Interactional Comfort focuses on learners' experienced comfort during collaborative interactions and its connection to CKC.

The mechanisms also complement the CoI framework (Garrison et al., 1999). While CoI provides a broader account of meaningful online learning through social, cognitive, and teaching presence, the mechanisms offer greater specificity about how social presence and well-being may shape participation in CKC. They therefore function as context-sensitive explanatory links between broader social-relational conditions and students' engagement in CKC processes. Figure 1 synthesises these relationships.

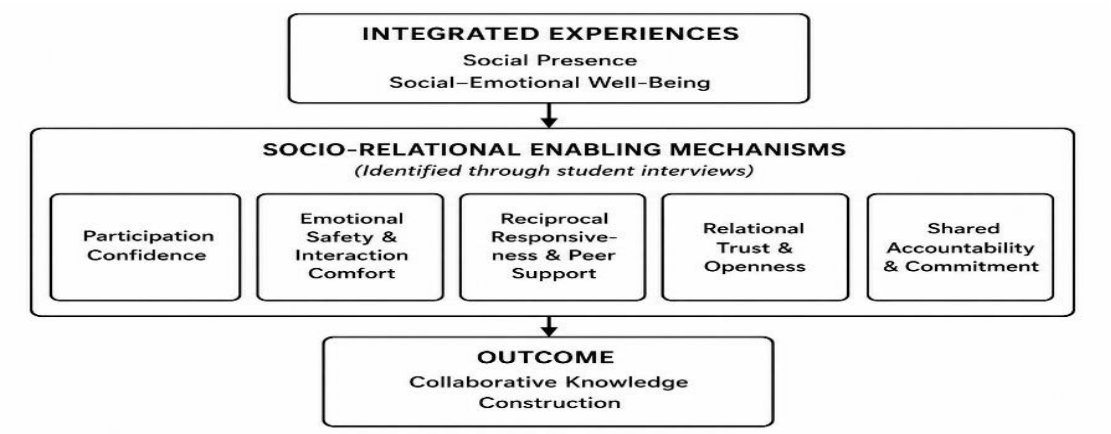


Figure 1. Mechanism-based explanation of Collaborative Knowledge Construction

As illustrated in Figure 1, the five mechanisms offer an explanation of how students experienced social and emotional conditions as supporting CKC. They also identify conditions that future learning designs could seek to foster and evaluate through contextually appropriate strategies, without prescribing particular technologies or teaching practices.

Implications for learning design

The mechanisms suggest conditions that learning designers might foster to support CKC, rather than prescribing particular teaching strategies or technologies. Collaborative activities could support:

- Participation Confidence by scaffolding early, low-risk opportunities for learners to contribute ideas, ask questions, and develop confidence to participate in collaborative dialogue.

- Emotional Safety and Interactional Comfort by creating psychologically safe and inclusive environments where learners feel comfortable expressing uncertainty, questioning ideas, and engaging in open discussion.

- Reciprocal Responsiveness and Peer Support by designing structured opportunities for learners to exchange feedback, respond to one another's ideas, and collaboratively refine understanding.

- Relational Trust and Collaborative Openness by encouraging sustained interaction, perspective sharing, and respectful dialogue that supports the negotiation of meaning and collective sense-making.

- Shared Accountability and Collaborative Commitment by designing collaborative tasks around shared goals, mutual responsibility, and ongoing communication that sustain engagement throughout the collaborative learning process.

These implications extend learning design beyond providing opportunities for interaction to considering the conditions under which learners feel able and willing to collaborate. They informed evidence-informed design propositions in the broader DSR project; their effectiveness in practice remains to be evaluated.

Conclusion

Drawing on interviews with 20 students, this study identified five socio-relational mechanisms through which learners experienced social presence and social-emotional wellbeing as supporting CKC: Participation Confidence, Emotional Safety and Interactional Comfort, Reciprocal Responsiveness and Peer Support, Relational Trust and Collaborative Openness, and Shared Accountability and Collaborative Commitment. Together, they help explain how social and emotional conditions shape learners' willingness to participate, exchange ideas, and develop shared understanding.

The findings also show that these mechanisms are conditional: participation may weaken when contributions are ignored, or peer engagement is not reciprocated. This mechanism-based account offers a foundation for learning design, but the proposed relationships have not been tested through an intervention. Future research should examine how the mechanisms operate in other educational contexts and whether designs intended to foster them support CKC in practice.

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