



# Novel CSCL design processes prompted by exploration of role-playing and emotions

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Computer supported collaborative learning has been a visionary approach to education for decades. The research field has been engaged in multidisciplinary efforts to integrate theory, methodology, pedagogy, and technology. This issue comprises four full articles to contribute to this progress by addressing timely research gaps, building on strong educational psychology concepts to explain these gaps, and bringing technologies in creative ways to design opportunities for collaborative learning. The four empirical papers in this issue contribute to two, partly interrelated themes: role-playing and emotions in CSCL. The authors frame their studies using traditional themes, such as perspective taking, dialogism, academic emotions and regulation, but have operationalized these concepts in their studies and CSCL designs in novel ways.

## Role-playing in CSCL – nudging students towards pedagogical goals

Designing and scaffolding better collaborative learning has been an important evolving theme in our journal (Schnaubert & Vogel, 2022). This “evolution” continues in this issue. This time role-play has been considered in a creative way as a framework and a way of scripting students’ collaboration towards pedagogical goals. Roles have several important functions and advantages for the collaborators and the success of the collaborative process. We know from earlier research that roles facilitate group regulation, distribution of tasks, and coordination of efforts by providing a set of responsibilities and functions that guide individuals’ behavior toward the group as well as towards other collaborators (De Wever & Strijbos, 2021). Roles can also enhance individual responsibility, positive interdependence, accountability, as well as group cohesion (Strijbos & De Laat, 2010).

Clyde Warden, Chi-Cheng Chang, James Stanworth, D’Arcy Caskey, and Judy Chen studied the impact of scripts on blended and online socially shared regulation of learning from a

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role-playing game theory perspective. In their study they acknowledge a need for supporting critical processes enabling planning, goal setting and monitoring in collaborative learning for purposeful regulation (Järvelä et al., 2021). Warden et al. considers learner engagement through the lens of role-playing. They derive theory of role-playing game practice to develop a foundation for designing, implementing, and measuring the effectiveness of low-cost scripts. The idea is to form a prompt that nudges learners toward a pedagogical goal while maintaining freedom of learner creativity and minimizing instructor intrusion. They develop a script and study how a repeated simple message impacts the group regulatory process. Their research questions are: Can a mere exposure prompt (MEP) script influence socially shared regulation of learning cognition and corresponding behavior in a role-playing context? and What behaviors do online and blended learners exhibit when exposed to the same MEP within the same curriculum? Data was collected over eight role-playing game iterations over a group-based semester-long business-oriented role-play simulation with 26 groups in the fully online mode ( $n = 128$ ) and 12 groups in the blended mode ( $n = 57$ ). Through behavioral trace data and social network analysis they measured behaviors in test and control groups comparing a fully online versus blended course. Their findings indicate that simple and specifically targeted scripts, in the form of MEPs, have promise for promoting desirable learning behaviors in a fully online multiplayer classroom. The authors conclude that instructors can easily employ MEP scripts as part of a multiplayer classroom by distilling a key pedagogical point down to its essence within a prompt.

Toshio Mochizuki and colleagues study investigated how the combination of mediating and perspective-taking manipulatives helps student teachers foster the perspective-taking of imaginary students in their microteaching role-plays and reflections. The study addresses the use of CSCL to improve microteaching, which is a well-known form of teaching simulation in professional development, such as with pre-service teachers. The authors argue that microteaching role-play is essential to the acquisition of dialogic teaching skills, and they build to the theoretical foundation of dialogic teaching (Bakhtin, 2010). The study design combines tangible puppets as mediating manipulatives and 3D manipulable animations as perspective-taking manipulatives for role-playing in CSCL. The researchers asked questions such as; Is the combination of the tangible puppetry and the 3D manipulable interface effective in fostering diverse student perspectives that are necessary for achieving dialogic microteaching? and; Do the effects remain in their subsequent microteaching even without the mediating and perspective-taking manipulatives? Epistemic network analysis (ENA) was employed to analyze discourse data collected both in the microteaching performances and in the reflections. The results showed that the combination of the two manipulatives was effective for achieving the immediate transfer of imaginary students' perspectives. Further qualitative analysis indicated that the perspective-taking manipulatives were effective in bolstering perspective-taking due to the nonverbal aspects of students' voices enacted in the role-play performances. The authors conclude that the nonverbal representations of characters represented in their manipulatives is a possible key factor in achieving good dialogic thinking and performance in role-plays in CSCL.

## Emotions in CSCL communication

In the past decade, research has made major progress in characterizing socio-cognitive and socioemotional dynamics in CSCL (e.g., Polo et al., 2016). There is a growing empirical understanding of the multifaceted interaction processes involved in collaborative learning,

integrating cognitive, and affective components as the core of collaboration (Törmänen et al., 2022). Still, the next two papers have found gaps in this area of research; in particular, limited research has examined emotions in evolving dual interactions and considered low-achieving students' emotional experiences in CSCL. We know from decades of research that emotions can facilitate or constrain students' learning. Positive emotions, such as curiosity and joy, can facilitate students' learning, while negative emotions, such as frustration and anxiety, can hinder students' learning. Moreover, different emotions, such as enjoyment, boredom, pride, and anxiety can affect achievement (Pekrun & Linnenbrink-Garcia, 2012) by influencing their engagement and attitude toward collaborative interactions (Baker et al., 2013).

Benzi Slakmon, Omer Keynan, and Orly Shapira explore emotion expression and recognition in written digital discussions on civic issues. In specific they study emotion regulation strategies involved in CSCL written discussions in higher education by examining emotional experience correlation and the characteristics of participants' intersubjective recognition of emotions. This is to say, they trace emotion expression as portrayed in digital written discussions, and as labeled by participants. While the role of emotions in CSCL interaction has been studied, the interactive nature of the dual role of the participant who serves as both reader and producer is a new perspective. The context of civic issues in digital discussions adds the earlier research especially considering CSCL as a tool for fostering deliberative democracy. The Slakmon et al. study aims to address these issues by asking the following questions: How do participants experience the emotional aspects of digital contentious civic discussions? What strategies do individuals use to recognize types of emotion and to determine their level of intensity? and, how accurate are the emotion recognition strategies that were used? In their study, 25 undergraduate students, placed in five study groups, took part in written digital discussion in controversial educational issues of which two groups were randomly chosen to participate in the study. Participants were interviewed and were asked to read the transcript of the digital conversation they took part in, while referring to all conversation turns. They were asked to explain their own, as well as others' reasoning regarding emotion expression and emotion intensity levels. In their mixed method analysis several emotion recognition strategies were found pointing to the idiosyncratically rich but lacking common ground of emotional social language. The results highlight the gaps between a composers' emotion labeling and others' emotion recognition. The authors highlight that the study offers new insight regarding emotional communication in CSCL settings. They conclude that in CSCL settings, emotions function as a dialogic instrument enabling people to relate to each other by fostering closeness and establishing relations.

Yuin Yang, Gaoxia Zhu, and Carol Chan studied the evolution of the academic emotions of academically low-achieving students in knowledge building. They argue that students' emotions influence their learning (Pekrun & Linnenbrink-Garcia, 2012) and point out that few studies have investigated what types of emotions low-achieving students experience and how their emotions evolve in the Knowledge Building process. The participants included 120 students from two Grade 9 classes and two Grade 11 classes across three different secondary schools. The participants built knowledge around Visual Arts, and their online Knowledge Forum discourse was examined. Accordingly, the authors asked: What emotions can be identified among low-achieving students in Knowledge Building? What are the transition and sequential patterns of low-achieving students' emotions manifested in the Knowledge Building process? And how do the emotions of low-achieving students evolve in the Knowledge Building process? Content analysis and sequential pattern analysis were analyzed as lenses into the emotions reflected in the digital Knowledge Forum

notes and the evolution patterns of emotions in inquiry threads. Their results show that the participants demonstrated a high percentage of joy and relatively low percentages of frustration and boredom. They also found that emotional states were likely to transition to themselves or similar emotional states in the inquiry threads. In conclusion the authors constructed a model of the evolution of emotions of academically low-achieving students in Knowledge Building. This model has implications for designing scaffolding or interventions to facilitate low-achieving students' emotions.

## Conclusions

These studies contribute to the research evidence that affect and emotion each play an important role in CSCL. Enabling students and teachers to express and recognize participants' emotions in digital discussions and display them in nonverbal ways in virtual spaces has the potential to elicit more fruitful reflection.

The articles of this issue communicate an important role for technologies to offer new representations that afford expression and interpretation of emotions during collaborative interactions. In these contexts, learners themselves may engage in a form of role play that stimulates productive collaborative learning interactions.

At the conclusion of this journal year, we offer this issue to inspire this community to seek out relatively unexplored areas and extend the frontiers of our theoretical knowledge and the impact of our expanding arsenal of collaboration support tools. We look forward to the coming year as we embark upon our final year as co-editors-in-chief and begin the formal search process for new co-editors-in-chief. As we look back on the past three years, it is heartening to see how we have made our way together through political unrest and wars as well as the onset, impact, and progressive movement out of a global pandemic. In the midst of all this, the journal continues to expand its collective authorship, interdisciplinarity and internationality, as well as impact. Please continue to join with us to build up this journal community as we enter 2023.

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