Examining the Role of Emotion Awareness and Sharing Emotions During Collaborative Learning

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Abstract: Learners' emotions have become an important area of research in computer-supported collaborative learning (CSCL). However, learners often fail to pay attention to their own or their peers' emotions during learning (Eastabrook, Flynn & Hollenstein, 2014). As the experience of some emotions (e.g., anxiety, shame, and fear) may be maladaptive to learning, it is important to raise learners' awareness of their emotions and their peers' emotions and support them in reacting timely and wisely in response to such emotions. To this end, we conducted an authentic study to identify learners' practices and preferences regarding their awareness of the types of academic emotions they experience and the extent to which they share such emotions.

Theoretical background and research questions

Regulation of learning has three modalities: self-regulation, co-regulation and socially-shared regulation (Hadwin, Järvelä, & Miller, 2011). Self-regulation refers to regulating one's own learning, co-regulation refers to helping others regulate their learning, and socially-shared regulation refers to regulating learning together in a group setting. The current study shows the importance of considering emotions to improve shared/co-regulation of the learning tasks and identifies emotional awareness as a key step towards effective regulation of emotions and consequently, effective regulation of collaborative learning. Most emotion awareness systems have been developed to support tutors in monitoring learners' emotions (Ez-Zaouia & Lavoué, 2017). To date, only a few tools have been designed to support emotion awareness for such purposes within CSCL settings. Leveraging tools to better support students in identifying emotions felt by their peers is an important step to enriching CSCL environments. A better understanding of learners' awareness of their own and their peers' emotions could help the design of such environments. This study focuses on the reasons why students share or keep their emotions to themselves. Specifically, we investigate: (a) types of academic-related emotions learners are aware of and how they use cues to understand peers' emotions; and (b) emotions learners share or keep for themselves.

Context and methods

11 participants (8 female, 3 male; 3 Caucasian, 8 Asian; and, average age was 24 years) undergraduate and graduate science, technology, engineering and mathematics (STEM) students from a North-American university volunteered to participate in the study. Participants were recruited through advertisements on departmental listserves. A list of nine different academic-related emotions (D'Mello et al., 2014) were created on a table during a week. Once participants completed their table they attended a face-to face interview about the table they filled out. Then they were offered a gift from the university gift store. Data used in this study comprised of the emotions students reported on the emotion table, along with the associated context in which the emotions were experienced (solo or in collaboration), as well as extracts from answers to interview questions. This study used a qualitative exploratory approach. Verbal transcripts of interview data as well as written self-report data from the emotion grids were coded using a detailed coding scheme derived by one of the authors to answer the research questions. Three author-researchers coded the data manually and obtained an agreeable interrater reliability of 89.27% using the Pearson correlation coefficient. All initial disagreements were discussed to reach final agreements.

Results and discussions

Academic emotions

Participants were mainly aware of their anxiety, boredom and curiosity. We observe notable differences amongst participants, as illustrated by a rather high standard deviation for all emotions. Regarding *their own emotions*, participants noticed during interviews that they were mainly aware of frustration and anxiety. Regarding *others'*

emotions, several participants declared that they were not able to identify others' emotions, especially if they were not friends or if that had minimal previous interactions with specific individuals.

Indicators/cues participants use to know their and others' current emotional experiences

Participants identified general cues for remembering their own emotions. They also highlighted cues for specific negative emotions; e.g.: (a) boredom: low efficiency, engagement and concentration, (b) anxiety: physiological changes in the body such as faster heart-beats, cold body, hands shaking, perspiration and the desire to eat; (c) confusion: raised eyebrows, reading repeatedly, and change in speech; and, (d) frustration: faster heart-beats, getting easily irritated and agitated, rumination, depressions of after-exam. It is noteworthy that participants identified specific cues only for negative emotions, like anxiety, confusion and boredom. For example, cues for anxiety were reported as agitation, stronger emotional expressions, bad hairstyle, speech, impatience, blushing, and moving a pen rapidly back and forth in hands. And, regarding boredom, cues included just scrolling up and down the pages, eyes getting closed or having low engagement and curiosity in the academic material.

Which emotions do learners share and which emotions do they not share?

Participants chose to share mainly positive emotions, like engagement, surprise, curiosity and delight. While they are willing to share boredom, even if it is a negative emotion, they are less likely to share their anxiety and frustration. Some reasons behind students choices of keeping an emotion or sharing it with peers is dependent on several factors, the most important being emotional contagion and worries of its negative effects on teamwork. Social proximity and similar emotions were other main reasons to such decisions.

Discussions

Results showed that bodily (e.g., physiological, facial, vocal) changes as well as behavioral and cognitive cues led to an understanding of self and others' emotions. Findings also revealed that participants have less tendencies to share negative emotions such as anxiety and frustration, and reasons behind students decisions were revealed. This research also provided evidence that there are emotions learners are not aware of about their peers, there are some emotions that they want to share and there are others that they prefer to keep for themselves.

Limitations and implications for the support of emotion awareness and sharing

The study participants were from the same curriculum (STEM) and similar university. Further research needs to examine the research questions beyond a specific curriculum and, university and across borders to extend the generalizability with larger sample sizes and different academic contexts. Our research findings contribute to a better understanding of how emotion is experienced in academic contexts and how it might influence learners' practices and needs in learning and interaction with peers. These findings have implications for the design of advanced emotional CSCL tools that support emotion awareness and sharing amongst students during collaborative learning activities. We believe that such tools should be tailored to learners' needs and context, and should not consider all types of emotions at the same way. Negative emotions could have a detrimental effect on the teamwork, especially if learners are not close to each other. Learners may be able to decide which emotions they would like to share and to make explicit what kind of reaction they expect from others in the group, either cognitive or behavioral. Such CSCL tool could support emotional socially-shared regulation.

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