

Exploring the Emotional Regulation during Foreign Language Learning in a Computer-Supported Collaborative Learning Environment

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Abstract. The online learning environment has become an inevitable means for language learners during the pandemic. According to Krashen's affective filter hypothesis, emotions act as a vital element in language acquisition (1981). Due to characteristics of online techniques, emotions can be experienced quite differently from the traditional face-to-face teaching mode. Although many studies have researched on the relations between emotions and online learning, between emotions and language learning, there are few touching on the emotions concerned with language learning in a computer-supported collaborative learning environment. This study, by surveying the products of related researchers, attempts to figure out strategies for language learners to regulate emotions in the computer-supported collaborative learning environment. Strategies are organised based on social presence, cognitive presence, and teaching presence. This study gives a comprehensive picture of language learners' emotional regulation.

Keywords: emotional regulation, computer-supported collaborative learning, language learning, social cognitive learning theory.

1. Introduction

The pandemic has made it a new trend for the majority to study in a computer-supported collaborative learning (CSCL) environment. Shifts of language learning environment give rise to emotional challenges for learners and teachers. Based on Krashen's affective filter hypothesis (1981) and Bandura's social cognitive learning theory (1986), it can be indicated that emotions and language learning interact with each other.

This study first analyses the relations among emotions, Foreign Language (FL) learning, and Computer-Supported Collaborative Learning (CSCL). In this section, major types of emotions are recognised, and causes of emotional struggles in online FL learning are discussed. In the second section, this study focuses on emotional regulation, combining the perspectives of social presence, cognitive presence, and teaching presence. Based on the function of these three types of presence and their interconnection, strategies for emotional regulation are provided. In the third section, a summary of this study is made, and limitations are illustrated.

2. Emotions Emerging from Computer-Supported Collaborative Learning

According to social cognitive learning theory, human agency works under an interdependent causal framework with three determinants reciprocally connect with one another (Fig. 1) (Bandura, 1986). These three determinants are: 1) internal personal factors illustrated as cognitive, affective, and biological cases; 2) behaviour; and 3) environmental events (Bandura, 1986).

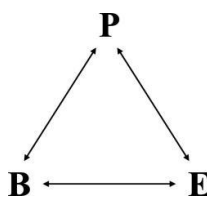


Figure 1. (Bandura, 1986)

P stands for personal factors; B stands for behaviour; and E stands for environment

Based on this structure, it can be inferred that 1) emotions, as an internal personal factor, can affect learner's learning behaviours, as well as social interaction within a CSCL environment; 2) features of CSCL environment can arouse changes in emotions and learning behaviours.

2.1. The Impact of Emotions

Many scholars have studied the correlation between emotions and language learning (Garrett & Young, 2009; Dai, 2021). Garrett and Young (2009) find that the learner attaches great value to the emotion during the process of language acquisition. Dai (2021) focuses on the emotion recognition between native English-speaking teachers and EFL (English as a Foreign Language) learners, which influences learners' comprehension.

Emotions can impact language acquisition (Krashen, 1981). Krashen (1981) asserts that, apart from aptitude, attitudinal factors are concerned with the outcomes of second language learning, especially acquisition. Through careful observation of several studies, Krashen identifies that the level of anxiety has a powerful impact on the affective filter, and points out that a lower filter not only brings the input into existence, but also equips the learners for language application (1981). In other words, if learners experience negative emotions such as anxiety in CSCL, they tend to hold a higher filter, thus having trouble conducting language input and output.

In addition to language acquisition, many case studies suggest that participation in online learning can be modified due to the emotional affect. For example, Deng et al. (2021) find that self-efficacy and academic emotions serve as a mediator between the regulatory focus and the participation in the online learning environment. Self-efficacy refers to one's belief in whether he or she is capable of organising and conducting actions in order to fulfil certain achievement (Bandura, 1997). The regulatory focus is oriented by promotion or prevention, with a promotion focus seeking for hopeful products, while a prevention focus giving prominence to both the accomplishment of tasks and the avoidance of unfavourable results (Hamstra et al., 2011; Higgins, 1998). In the case of online learning, learners are faced with challenges brought by technology and novel teaching procedures, and those with a promotion focus rise to the challenges on their own initiative, while others with a prevention focus suffer from worry about not being proficient (Deng et al., 2021). By observing students from senior high during their online courses, Deng et al. (2021) find that: (a) learners fall into a higher degree of promotion focus; (b) promotion focus advances the level of online participation; (c) self-efficacy and positive emotions make a contribution to the promotion focus and online participation. Based on their findings, this study will later discuss emotional regulation with self-efficacy being included.

2.2. Dominant Types of Emotions

Feelings, such as enjoyment, boredom, anxiety, and isolation, are recognised as dominant emotions during online language education (Zhang, Liu & Lee, 2021; Wang & Jiang, 2022; Yazdanmehr et al., 2021; Horwitz et al., 1986; Russell, 2020; Kwon et al., 2014).

Enjoyment. Zhang, Liu, and Lee (2021) record six EFL learners' development of foreign language enjoyment (FLE). They find that learners devote more than one third of communication time to developing a pleasant group environment. Foreign language enjoyment is also surveyed by Wang and Jiang (2022). They observe a high level of FLE among learners who study Chinese in an online environment.

Boredom. The CSCL environment makes an inevitable demand on learners' abilities to manipulate the systems and platforms that learners may find it time-consuming to get familiar with, which is proved by Azarmehr et al. (2021). They identify that the highest level of boredom is suffered by a German learner in the beginning due to unfamiliarity with the online environment.

Anxiety. Language study can arouse certain categories of anxiety, such as concerns over communication and disappointing evaluation (Horwitz et al., 1986). Anxiety in CSCL can also originate from technical problems. The unstable Internet connection makes learners feel stressed, unsure whether they miss the important introduction of new knowledge and course requirements, or

whether they miss the interaction with teachers and other learners, which may further affect their final evaluation. Meanwhile, Internet connections are not easily accessible to students of lower economic conditions (Russell, 2020). In this case, learners may intensify their anxiety over both academic progress and self-esteem.

Isolation. CSCL, where communication is frequently conducted through text and with delay of time, results in the lack of nonverbal expressions, including eye contact, facial expression, touch, and gesture, thus curbing social emotional interactions (Kwon et al., 2014). Isolated by screens, the learners can turn to no one immediately when they feel the urge. Even though they can communicate through the technical equipment, there will be delay of time.

2.3. Causes of Negative Emotions

Yazdanmehr et al. (2021) relate the sources of boredom with features of online learning, such as the sedentary position, the longtime staring at the screen, unclear directions, insufficient control over learning tasks, and inadequate social interaction with other language learners. The detect of the impact of control is in consistence with an earlier study (Heckel & Ringeisen, 2019).

In addition to features of online learning, the collaborative learning environment can arouse affective challenges. Learners are supposed to co-construct knowledge in CSCL (Rienties et al., 2012), which means they have to interact with each other. Collaborative learning is expected to bring about positive results, since it allows for active participation and peer communication within a small group (Micari & Pazos, 2021). Learners provide and receive information, observing others' strategies and attitudes, and thus co-constructing social support under ideal circumstance (Micari & Pazos, 2021). However, social relations can evoke negative emotions as well. For example, when language learners develop a self-image as less competent compared with peers, they tend to present passive attitudes towards learning engagement (Garrett & Young, 2009).

Apart from learners, teachers tend to experience emotional crisis as well in a computer-supported collaborative learning environment, especially during the pandemic, as they may fail to acquire satisfactory teaching space and have to be attentive to the issues of their private life, such as the care of children (MacIntyre et al., 2020). The concern of private life is put forward by Russell (2020) as well, assuming that during the pandemic, learners are likely to be bothered by the situation both at their home and in the globe. Moreover, Russell (2020) points out that teachers may come across challenges concerning their deficient knowledge of language pedagogy, pedagogy for educational technology, and online pedagogy.

In this section, the interrelations among emotions, language learning, and online learning environment are discussed. Although the emotions detected include positive ones, such as enjoyment, more efforts are put into the study of negative emotions that are obvious in the online learning environment. It is of great value to further put forward strategies to deal with the negative affective variables.

3. Emotional Regulation

3.1. Three Kinds of Presence in Regulation

In the community of inquiry framework, Garrison et al. (2000) illustrate the relations among social presence, cognitive presence, and teaching presence, defining the overlapping part of these three kinds of presence as educational experience.

Cognitive presence refers to both the active cognitive process, in which solutions to learning problems are come up with, and the application of such cognitive product (Kozan & Richardson, 2014). Social presence refers to emotional relatedness within social interaction (Garrison et al., 2000). Teaching presence is the design, organisation, and instruction of cognitive and social presence with the aim of producing valuable products for individuals and educational efforts (Garrison et al., 2000).

Rienties et al. (2009, 2012) focus on the role of motivation in CSCL. Combined with other studies, they conclude that in CSCL: 1) more autonomy and freedom is allowed for learners; 2) teachers'

direct guidance and in-time feedback are relatively obstructed; 3) intrinsically motivated learners benefit from autonomy, while learners of extrinsic motivation are discouraged due to lack of guidance and regulation. Their conclusion can confirm the significance of enhancing both self-regulation and teaching presence, with the former helping learners make better use of autonomy and the latter helping learners receive clearer instruction and in-time regulation. Meanwhile, co-construction of knowledge in CSCL is expected (Rienties et al., 2012), thus making a demand for social regulation.

Therefore, when it comes to emotional regulation, it is meaningful to include: 1) cognitive presence in the form of self-efficacy and self-regulation; 2) teaching presence in the form of teachers' voice; 3) social presence in the form of social regulation.

3.2. Self-efficacy and Self-regulation

Self-efficacy and self-regulation are two crucial components of social cognitive learning theory.

3.2.1. Self-efficacy

Four sources contribute to the construction of self-efficacy: 1) enactive mastery experiences, 2) vicarious experiences, 3) verbal persuasion, and 4) physiological and affective states (Bandura, 1997).

Enactive mastery experiences, which genuinely prove whether one has the abilities required for success, are identified as the most persuasive source (Bandura, 1997; van Dinther, Dochy, & Segers, 2011). Experiences of success consolidate the belief in self-efficacy, while failures diminish it (Bandura, 1997). Meanwhile, many studies suggest that high-level self-efficacy can boost initiative online engagement and positive emotions. For example, based on the control-value theory, Heckel and Ringeisen (2019) associate high-level self-efficacy with better control, which further arouses interest during online courses. They certify the direct impacts of self-efficacy on affective factors, indicating that learners of higher level of self-efficacy are able to acquire a better sense of control, and are more willing to rise to academic challenges, thus producing positive emotions such as pride. Their assertion is similar to the conclusion (Deng et al., 2021) mentioned earlier in this study, which affirms the positive impact of self-efficacy and positive emotions on promotion regulatory focus and online participation. When learners show more belief in their ability to handle the situation, they are more willing to have an adventure and seek for outcomes of higher level, instead of simply being content with ordinary fulfilment of tasks in a cautious way (Deng et al., 2021). Therefore, combining Bandura's theory (1997) and the finding of these related studies, it can be inferred that high-level self-efficacy contributes to positive actions, the success of which, as enactive mastery experiences, can produce positive emotions and further enhance self-efficacy.

However, easy success alone may result in expectation for short-time outcome, thus bringing about a lack of acceptance of failures (Bandura, 1997). A kind of robust self-efficacy demands for success through removing barriers with persistent endeavour (Bandura, 1997). This urges language learners to cope with challenges in a patient way, holding the belief that their continuous efforts and problem-solving process can better consolidate self-efficacy, rather than immediately being discouraged and generating negative emotions once faced with obstacles.

Vicarious experiences put the individual evaluation in the social background, in order to deal with activities which, lack in clear measures (Bandura, 1997). For instance, learners can evaluate their progress by comparing with peers. At the same time, peer leaders can intensify self-efficacy, as their success is seen as a kind of vicarious experience (Bandura, 1997). Verbal persuasion refers to other people's conveying of faith in one's abilities (Bandura, 1997). Verbal persuasion can come from teachers, parents, and peers. Self-efficacy can be perceived through physiological and affective states, as they can reflect to which degree learners believes they can handle the situation (van Dinther, Dochy, & Segers, 2011).

Grounded on analysis of these four sources of self-efficacy construction, it can suggest that in order to help language learners generate positive emotions 1) learners are supposed to upgrade the level of self-efficacy by initiatively exploring adventures to acquire experiences of satisfactory success; 2) teachers, parents, and peers are ought to provide verbal encouragement and affirmation; 3) social interaction, which can provide vicarious experiences, should be highlighted.

3.2.2. Self-regulation

According to Rienties et al. (2009, 2012), more autonomy is granted to learners in CSCL. Such large amount of freedom asks for effective self-regulation. Self-regulated learning (SRL) includes both metacognitive capabilities and the ability to regulate emotional, behavioural and social-environmental variables (Zimmerman, 1989, 1995). In other words, learners are supposed to monitor progress during online language learning, showing concern for not only their self-development, but also strategies involved in social interaction.

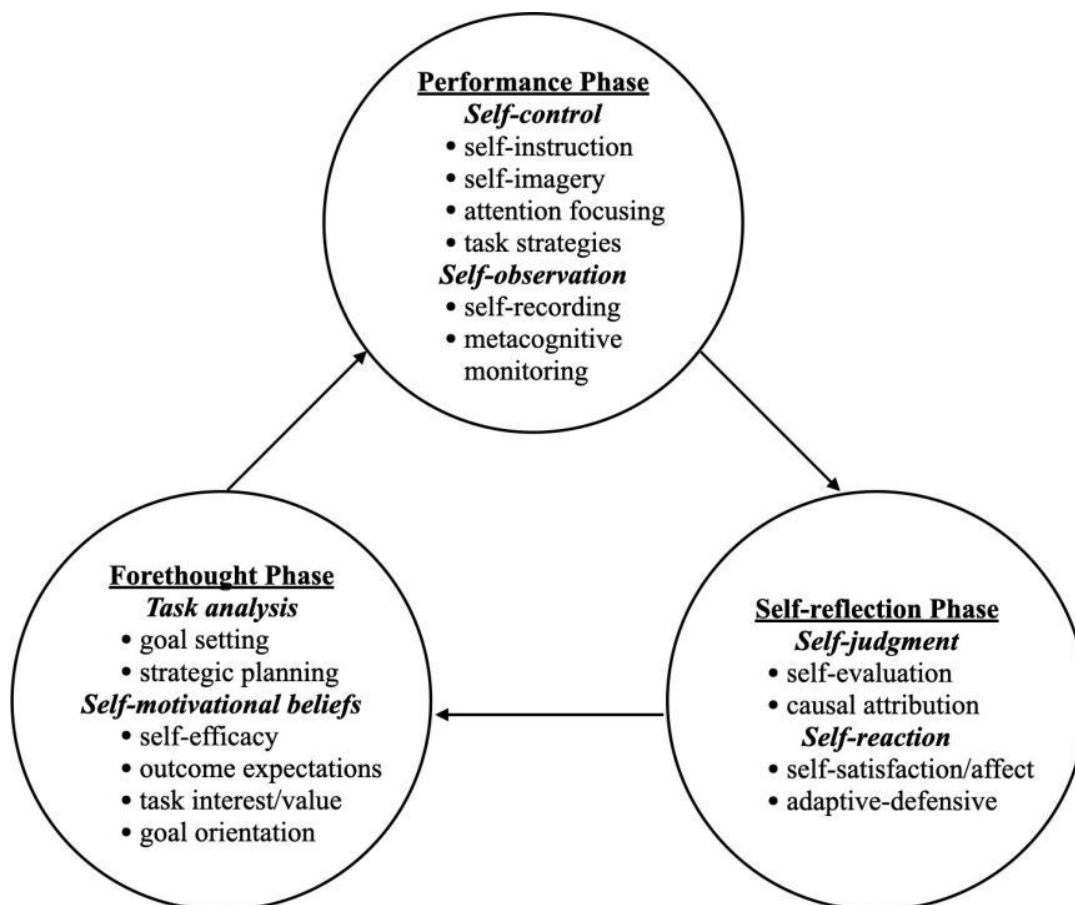


Figure 2. Zimmerman's Three-Phase Model (2000, 2013)

A three-phase model (Fig.2) includes forethought, performance and self-reflection phases (Zimmerman, 2000; DiBenedetto, & Zimmerman, 2013). Another model (Fig.3) constructed by Schmitz & Wiese (2006) is divided into pre-action, action, and post-action phases.

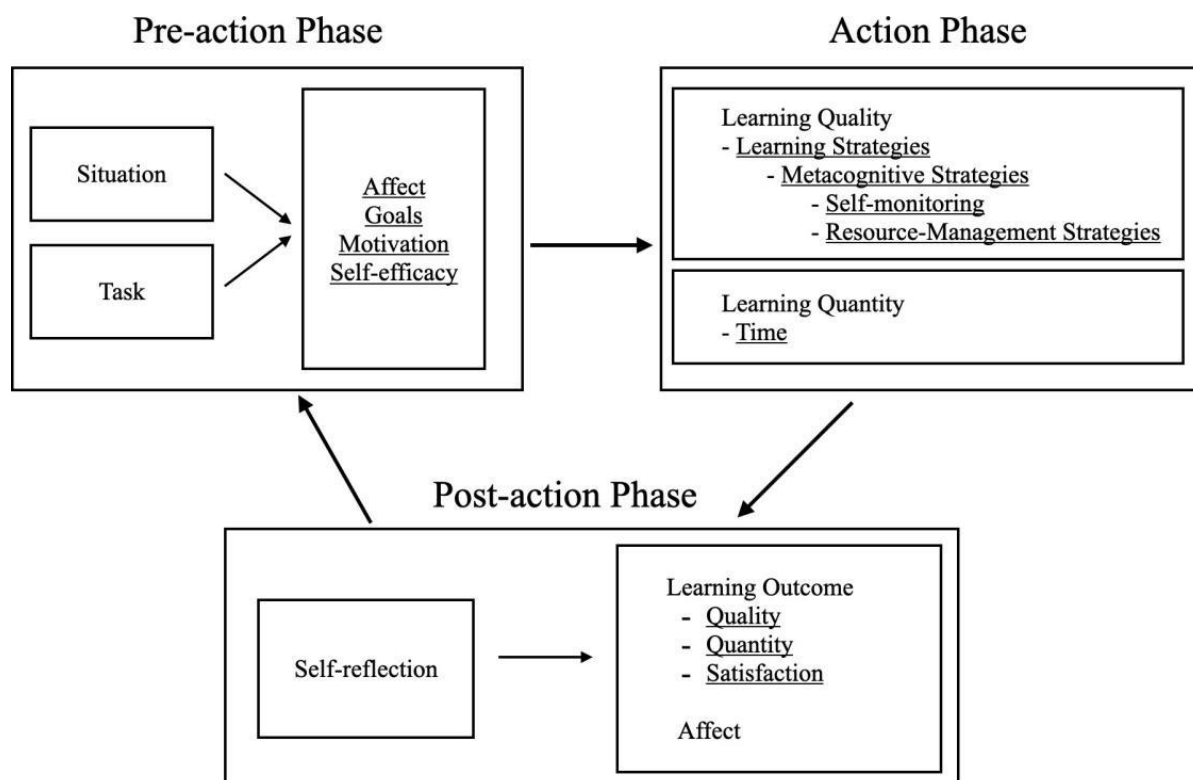


Figure 3. Model Constructed by Schmitz & Wiese (2006)

According to these models, by analysing the tasks, goals, motivation, and abilities before performance or action, learners can see a clearer future picture, thus being more able to prepare for challenges and handle the situation. Such procedure can reduce the chances of being caught by emotional crisis arousing from uncertainty and obstacles. During performance, learners modify their states. After completion of tasks, learners summarise their performance and do reflections, which can lead to better preparation for the next task. The models can increase the chances of success, thus boosting self-efficacy and positive emotions, which is in consistence with explanation of enactive mastery experiences mentioned previously.

Students have the tendency to employ SRL strategies more frequently in an online learning environment (Broadbent, 2017).

3.3. Teachers' Voice

Garrett and Young (2009) trail a Portuguese learner's affective responses, and divide the comments into four categories: language awareness, teacher voice, social relations and cultural learning. Out of 255 positive comments, teacher voice takes a dominant position at a ratio of 38%, followed by social relations which occupies 25%. Moreover, as Rienties et al. (2009, 2012) point out, direct instruction and in-time feedback from teachers are limited in CSCL. Therefore, in CSCL the role of teacher should be attached great value to.

3.3.1. Strategies Used for Teachers' Own Emotional Crisis

In order to help learners, treat CSCL with positive emotions, teachers themselves should present a hopeful vision. However, teachers can experience emotional frustration as well (MacIntyre et al., 2020; Russell, 2020). Thus, it is of vital value to figure out solutions for teachers. In a study (MacIntyre et al., 2020), two classifications of teachers' coping strategies are measured: approach and avoidant. Acceptance, regarded as an approach strategy, comes as a priority. Avoidant strategies, including disengagement, drug abuse, and denial, are of less detection. MacIntyre et al. conclude that approach coping leads to positive emotional outcomes, while avoidant coping is only related with negative affective products (2020). This result infers that teacher should face the challenges on their initiative, rather than try to escape from the problems.

3.3.2. In-time Intervention

Direct guidance is proved to be more effective than approaches containing minimal guidance including Problem-Based Learning (Kirschner et al., 2006). Meanwhile, predictive learning analytics can be employed to help teachers trace learners' progress, especially by predicting those who may not complete learning tasks and reminding teachers to observe them (Herodotou et al., 2019). Furthermore, research shows that positive outcomes can be derived from the early intervention of teacher presence (Molenaar et al., 2012; Kwon et al., 2014).

To conclude, when it comes to a CSCL environment, much trouble will be saved if teachers provide clear instructions and help learners develop a sense of self-efficacy, cooperation and communication before the conduct of the tasks, such as verbal persuasion. Teachers can also capitalise on analytical tools to monitor learners' progress and provide timely guidance, especially the direct one.

3.3.3. Visualising Formative Feedback

Ez-zaouia et al. (2020) employ Emodash, an interactive dashboard where visualising feedback of learners' emotions is generated, to analyse the reports that tutors write. They find that by using Emodash tutors show a preference for formative reports, being more aware of learners' emotions and involving affective comments more frequently in the feedback. However, concerning the changes that tutors make among different Emodash usage, a general view of emotions is qualified enough for tutors to pay close attention to learners' affective response.

3.4. Social Regulation

3.4.1. Social Emotional Support

Researches indicate that social emotional support can be derived from both teachers and other learners, especially peers. Peers serve as an important factor in the perception of social interaction, and the failure of maintaining social interaction can result in low motivation (Yang et al., 2006; Rienties et al., 2009). Yoshida (2020) focuses on emotional scaffolding between Japanese learners and native Japanese speakers through communication based on online text. Emotional scaffolding is defined by Meyer and Turner (2007) as interactions that help learners develop positive emotions and complete classrooms tasks. Yoshida (2020) arrives at the conclusion that emotional scaffolding, including emoticons usage and encouragement, stimulates positive emotions, while tiredness and embarrassment may arise due to the absence of emotional scaffolding.

When it comes to social interactions, cognitive processing focusing on co-construction of knowledge is considered as high-level, while interactions aiming at information sharing and understanding founding are recognized as low-level (Volet, Summers, & Thurman, 2009). According to Janssen et al. (2012), learners spend a lot of time building understanding in CSCL. They find that interactions, involving joking, consoling, seeking agreement and constructing understanding, are detected persistently. However, they also maintain that the focus on basic processing suggests the relatively low-effective progress.

To conclude, collaborative environment ought to offer emotional scaffolding. Meanwhile, apart from devoting a large amount of time to developing understanding, the co-construction of knowledge should be emphasised.

3.4.2. Distribution of Control

The receiving of control contributes to positive emotions (Yazdanmehr et al., 2021; Heckel & Ringeisen, 2019). Rogat and Adams-Wiggins (2014) study on several kinds of social regulation, aiming at distinguishing their focus, such as co-equal contributions, idea incorporation, task conduct, and group domination. They assert that learners tend to participate less frequently in the co-construction of knowledge when they are not given the adequate control, including being continuously neglected and denied. Thus, when social regulation is conducted, each group member needs sufficient control over completion of tasks and social interactions.

3.4.3. Non-verbal Interaction

Non-verbal interaction can be made great use of to advance the impact of online interaction. Dai (2021) identifies four components that play a crucial role in EFL learners' interaction with their teacher, with eye contact and gesture being more influential, followed by smile and tone. Zhang, Liu, and Lee (2021) notice that apart from words, emojis can advance learners' abilities to regulate the emotions.

4. Conclusion

This study focuses on Foreign Language learners' emotional regulation in a CSCL environment. Emotions not only impact language acquisition, but also are closely related with engagement in collaborative learning (Krashen, 1981; Deng et al., 2021). Features of online learning and collaborative learning can arouse emotional challenges (Yazdanmehr et al., 2021; Micari & Pazos, 2021; Garrett & Young, 2009; MacIntyre et al., 2020; Russell, 2020). To remove negative influence of emotions, strategies for emotional regulation are discussed. Rooted in three types of presence in community of inquiry framework (Garrison et al., 2000), emotional regulation is analysed from perspectives of self-efficacy, self-regulation, teachers' voice, and social regulation. High-level self-efficacy advances engagement and inspires positive emotions originating from success and fulfilment (Bandura, 1997; Heckel, & Ringeisen, 2019; Deng et al., 2021). Effective self-regulation allows for meaningful usage of autonomy in CSCL. In terms of teachers' voice, strategies for teachers' own affective crises, in-time guidance, and visualised formative feedback are discussed. As for social regulation, much emphasis is put on social emotional support, distribution of control, and non-verbal intervention.

However, this study fails to elaborate on the strategies from the perspective of three kinds of presence, only giving out a general outline. Moreover, this study focuses on the computer-supported collaborative learning environment without clear identification of the situation, as CSCL learning can take place in the live classes, the recording courses, after-class learning platforms, and so on. This study only analyses the whole picture of CSCL learning.

In the future research, scholars can explore the areas as follows:

The way of processing online learning materials, such as size, colour, and space, in order to relieve the negative emotions, including boredom and isolation.

Shifts in a multi-cultural online language classes, such as cross-cultural communication and modification of teaching designs due to various cultural backgrounds and native languages.

The influence of personality, such as whether timid learners are more eased in CSCL learning.

Application of artificial intelligence, which can effectively and accurately identify and analyse learners' emotions, and further give feedbacks and suggestions.

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