

Research on the Process Mechanism and Intervention Strategy of Emotional Interaction in Online Collaborative Learning

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Abstract: Online collaborative learning is a teaching and learning model supported by online education technology platform, in the form of group learning and teacher's guidance, and consisting of learners, teachers, and instructional resources. The theoretical basis of this teaching model is the theory of constructivism, which reflects that learners' emotional interaction can create new knowledge and meet the demand of learners' diversified learning goals. The process mechanisms of emotional interaction in online collaborative learning include environmental factors, cognitive understanding, value assessment, and control assessment mechanisms. This paper concludes with the hope that the intervention strategies to create the ambient environment of emotional interaction, encourage cognitive understanding of emotional interaction, stimulate awareness of emotional interaction, and enhance the intervention strategies of emotional feedback mechanism may help teachers optimize the design and teaching of online collaborative learning.

Keywords: Emotional interaction; Online collaborative learning; Knowledge construction; Online education

1. Introduction

Online collaborative learning (OCL) is a practical approach based on the teaching theory of constructivism, which encourages learners to work together with teachers to create knowledge base, and teachers to be the learner's partner. At present, online education technology has made this concept possible, because the development of online education technology has brought a revolutionary change to the traditional learning model, subverting the learning mode of learner's one-way acceptance of knowledge. Computers can redefine the collaborative relationship between teachers and students, and break the geographical limitations of the educational model by globally reorganizing resources, time, and space so that learners can interactively and proactively construct their own knowledge. OCL tends to be a mainstream trend in educational technology in the future, whereby teachers have to review their teaching objectives and think about how to engage online collaboration mechanisms and get students involved in arguing, communicating, supervising, and taking responsibility.

However, in China, online education technology remains in the early stages of development, and its application in teaching is not so widely used within the classroom. Although some teachers have been aware of the advantages of OCL, the mechanisms of how OCL can enhance learning outcomes are still obscure to most of them, which has resulted in unsatisfactory practice of OCL. Therefore, in this study, the process mechanisms and intervention strategies for emotional interactions in OCL is the main topic of the research.

2. Literature Review

2.1 Basic Theories of OCL

Collaborative learning theory originates from constructivist ideologies due to the social constructivist view that knowledge is built by social consensus, that knowledge should be built by social interaction in collaboration and sharing, and that learners are allowed to critique, question, and revise. According to Mao Gang et al. (2016), OCL is a multi-factor participatory process that requires online platforms to provide networks, systems, and learning tools, and also collaborative learning

systems that include students, learning content, learning groups, roles, resources, and tasks.

2.2 Issues in the Development of OCL

Currently, there is quite a lot of research literature on OCL, where a number of scholars argued that online collaborative interactions may not reflect the facial expressions, body language, and intonation expressions found in traditional classrooms (Zhan Yi, 2016) [1], which also resulted in a lack of trust among students (Zhang Kangying, 2015) [2]. Chen (2014) [3] suggested that persistent negative emotions in OCL can make participants drop out in the middle of the class, while Cleveland-Lnnes et al. (2014) [4] also agreed that emotions may play a positive role in the learning. Kreijns et al. (2003) [5] believed that emotional interactions in learning can enhance learning outcomes.

2.3 The Positive Effects of Emotional Interaction on Learning

Park and Lim (2019) [6] studied the relationship between students' emotional interactions and writing learning and found that class performance was significantly influenced by emotional interactions. Kreijns et al. (2003) argued that learners would need to be provided with adequate emotional interaction support to improve collaborative behavior in learning. Vuopala et al. (2016) [7] believed that learners' mutual help and commitment to each other can facilitate active collaborative learning. Kwon et al. (2014) concluded that an atmosphere of trust in collaborative learning is relatively important [8], which strengthens the sense of group belonging and improves the quality of collaborative learning. Rogat et al. (2015) argued that emotional interactions among learners can enable the maintenance of high level cognitive interactions in collaborative learning [9].

In terms of Chinese scholars, many of them have focused on the role of emotional interaction in OCL, such as Liu Junling et al. (2020) [10], who believed that emotional interaction in OCL helps to facilitate students' motivation to participate in class. Isohataia et al. (2019) suggested that high-level cognition relies on social-emotional processes, indicating that OCL requires emotional interaction to promote team cohesion and avoid students from feeling nervous or embarrassed [11].

2.4 Literature Review

According to the existing literature, many scholars have conducted different studies on OCL. In particular, the problem of insufficient emotional interaction in OCL has been noted, whereas emotional interaction can enhance learners' willingness to participate, sense of belonging, team cohesion, etc. In the later section, the process mechanism of emotional interaction will be discussed from a theoretical perspective, and corresponding intervention strategies will be given as well.

3. Components and Processes of OCL

3.1 Components of OCL

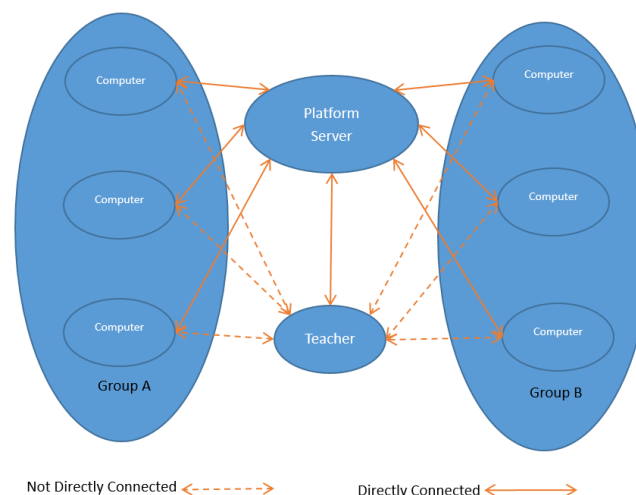


Figure 1: Components of OCL

As previously mentioned, OCL is a way of learning that emphasizes mutual cooperation and consultation among learners. Instead of imparting knowledge to learners by the instructor, students are able to construct and revise knowledge by receiving, imitating, internalizing, and sharing through communication, interaction, and learning.

3.2 Components of OCL

In this paper, the definition of OCL by Liu Junling (2020) is referred to, and the basic components of OCL are divided into the following three groups.

First, as shown in Figure 1, learning community, which refers to the learning groups in a common learning environment, including students, teachers, other group members, etc. It provides an atmosphere for interactive learning, as well as help and guidance to prevent students from feeling lonely and helpless.

Second, the network environment, which represents the environment in which collaborative learning takes place, including hardware and software environment. The hardware includes computers, interactive technology, tool functions, etc., while the software environment represents learning resources, learning courses, virtual libraries, etc.

Third, interaction, which refers to the way students communicate with each other. It can be carried out around cognition, emotion, and teaching, etc.

3.3 The Issue of Emotional Interaction in OCL

Emotional interaction is a social sharing process of emotions. It is due to one's impulse to share the emotional experiences with others after experiencing an event that affects the emotional balance. In the process of OCL, participants are supposed to talk about related events and their feelings and to improve their cognitive level through communication, interaction, and collision of ideas. However, as participants differ in the learning community and online environment in the process, their experience varies as well. Currently, the following are the major issues of emotional interaction.

3.3.1 Lack of Awareness and Skills for Emotional Interaction

In traditional educational activities, both primary and secondary education as well as higher education advocate rational interaction instead of focusing on a teaching program that facilitates emotional interaction. Although the online collaborative interaction are conducted via different terminal devices, asynchronous interaction, and in a non face-to-face mode, it is still difficult to feel the expression changes, physiological characteristics, and body language of other participants. Moreover, the participants lack the skills to use their voices, emotions, intonation, expressions, and body movements to convey messages, so emotional interaction is inadequate, and there is no timely guidance and motivation for emotional evaluation.

3.3.2 Lack of Management and Control over Emotional Interactions

The learning content and direction of online collaborative interaction is different from traditional teaching. It is fully assigned to students who are supposed to coordinate and manage the interaction content independently. However, the current online collaborative interaction model may lack management and regulation mechanisms. Teachers are not experienced in supervising students' collaborative interaction, nor do they guide and regulate the content of communication among participants in a timely manner.

3.3.3 Lack of In-depth Interaction

There is no well-designed OCL environmental atmosphere in China. Emotional interactions are more likely to be institutionalized, and learning groups tend to rush to reach simple consensus. For example, easy acceptance, appreciation, or emotional expressions are simply generated behaviors according to instructional guidelines, in which there is a lack of in-depth thinking and analysis, without further cognitive interactions.

4. The Process Mechanism of Emotional Interaction Affecting Learning Effectiveness in OCL

4.1 Mechanism of Environmental Factors

Conflict and friction among participants are inevitable in OCL, so a collaborative rapport among members is the key proposition of emotional interaction. Arguments and disagreements among participants are unavoidable as well as essential. Differences in perspectives and ideas may contribute to an atmosphere of conflict, prompting situations in which participants may be less willing to share their personal ideas and less engaged with other group members. An overly contentious atmosphere can also result in unproductive online collaboration, leading to limited facilitation of learning exchanges and discouraging cognitive, teaching, and social interactions.

In contrast, a group atmosphere that encourages communication, mutual respect, mutual motivation, and mutual trust is conducive to online collaborative interaction. The complementarity of personal factors such as backgrounds, abilities, and personalities of group members may also lead to a more congenial atmosphere in which the group encourages learning and discussions, and every communication behavior is positively reciprocated. Thus, the atmosphere is more easily to enable interaction desires. For example, when the atmosphere for discussion and learning is good enough, members are less likely to concern themselves with whether their comments or opinions are proper. This is especially beneficial when the group members are mentally close to each other. Since the atmosphere is not easily damaged due to different viewpoints, it is more conducive to create more diversified arguments with a convergence of ideas.

4.2 Mechanisms of Cognitive Understanding

Cognitive understanding is the most basic human mental process, which refers to the process of reacquiring knowledge, applying knowledge, processing information, etc. Through the behavioral process of cognitive understanding, it is possible to obtain feedback from other people. Meanwhile, if the emotions of other learners or collaborators also affect the interactive behavior of the learner, for example, when one of the parties involved in the discussion starts to express negative emotions, this may prevent the learner from expressing ideas.

Emotional interactions have a positive effect on cognitive understanding. Emotional expressions and emotional evaluations allow individuals to reflect and think about their views, which also allows members to begin in-depth conversations about issues and to influence cognition in response to the conclusions of those discussions. It is conducive to sustain the cognitive interaction process, advance cognitive depth on issues, generate deeper understanding of knowledge, and collectively improve deficiencies and progress together.

4.3 Mechanism of Value Assessment

First, students' evaluation of the perceived importance, perceived usability, and knowledge applicability of knowledge usually affects their emotional interaction. In other words, the interaction enables students to perceive the worth of the knowledge content. However, if they do not perceive the importance of the content, they are not willing to participate in the online collaborative interaction.

Second, OCL allows students to engage in the social, collaborative, and communicative experiences, which are beyond the acquisition of academic knowledge. At the same time, online collaboration can also meet the learners' mental needs such as taking responsibility, sense of identity, and sense of achievement, making it possible for students to learn and develop skills or literacy that are not available in the textbook.

Lastly, OCL enables students to choose emotional interactions in response to their own interests and hobbies. Participants can work on questions with knowledge that interests them, or complete class assignments or group tests in the course content, releasing the maximum initiative of students in collaborative interactions.

4.4 Assessment Mechanism

The online interactive process enables learners to have a strong sense of self-efficacy. Unlike the traditional learning is a unidirectional and passive-learning process, the online technology can provide a variety of tools for learning and short-term feedback for students. Therefore, the students can keep

pace with the teachers, and enhance their sense of self-efficacy during completing the tasks.

Besides, OCL can be used to coordinate both the time and progress of different participants. Through collaborative learning, it is easy to find out the shortcomings of different students in learning the knowledge system and quickly provide solutions via a flexible mechanism of organizing and coordinating. It is also easy for students themselves to identify their own problems in learning, and make efficient assessment accordingly.

5. Intervention Strategies for Emotional Interaction in OCL

5.1 Creating a Collaborative Emotional Atmosphere

The emotional atmosphere of OCL should be inclusive, not only argumentative but also congenial, allowing for argumentation of ideas around the subject and valuing the participants' acquisition of critical thinking skills. Teachers are expected to encourage the argumentative atmosphere, i.e., to ask if there are different answers. Teachers should also avoid too much argument, but rather analyze the characteristics of each answer that contribute to knowledge extrapolation, precise statements, knowledge processing, etc., to create a long-lasting argumentative atmosphere. According to the theory of emotional infection, different kinds of emotions provide different signaling and infectious effects, i.e., positive emotions can motivate other participants to interact with each other, which also requires the assistance from teachers.

Generally, argumentative modes are divided into persuasive and dialectical arguments. In argumentation it is important to have participants adopt the claims, arguments and data in the argument as rules, and to restrict the qualifications and rationale of the argumentative approach. This is used as an element to motivate participants to develop critical thinking and increase motivation for collaboration, aiming ultimately to negotiate to agreement.

5.2 Encouraging Emotional Interactions for Cognitive Understanding

Emotional interactions can deepen the cognitive understanding. Thus, teachers have to initiate learning behaviors gradually to make emotional interactions continue and deepened, which requires strategies to extend the duration of emotional interactions. This requires teachers to use strategies to extend the duration of emotional interactions. The first step is to use "skip-threshold" approach to build trust and rapport within each group, starting with simple problems and gradually increasing the complexity of the collaborative tasks, with cognitive levels cascading upwards. Specifically, the tasks of each collaborative group should be moderated, supported, and released. In the early stages, the instructional framework can be limited to the learning content, and gradually released as students become more proficient in collaborative learning, allowing the collaborative group to take on the teacher's cognitive load and deepen understanding through emotional interaction within the group, while the teacher begins to serve as the coordinator of the group's operation.

5.3 Stimulating Awareness of Emotional Interactions

The lack of awareness of emotional interactions may be one of the reasons why learners are not willing to participate. Teachers should also emphasize the importance of emotional interactions in collaborative learning and increase students' focus on them. For example, teachers can introduce videos, PowerPoint, photos, and text to illustrate the significance of emotional interaction to academic learning and to show that this approach is more effective in enabling participants to acquire further knowledge or skills. At the same time, teachers can also explain the content, methods, and rules of emotional interaction, and they can design some mini-games to enhance the sense of gaining emotional interaction and make students well involved in the discussion. Especially in terms of featured courses in secondary schools, some grading sessions can be set up in group reports and group discussions, where each group can dispatch representatives to ask questions or grade accordingly, so that students can fulfill their cognitive needs and social needs during emotional interactions. In addition, teachers should also design a set of diversified evaluation rules in collaborative learning, so as to ensure the diversity of evaluation subjects, evaluation dimensions, evaluation contents, evaluation methods and evaluation feedback.

5.4 Enhancing Emotional Feedback Mechanisms

Teachers in OCL should be concerned with giving feedback to students because emotional interactions need to be accepted and assured to produce willingness to continue. Otherwise, cognitive confusion and frustration may arise among participants. Therefore, it is essential to give timely responses and evaluations to interacting objects, and is necessary to examine the smoothness of the deliberation process and lead the way in which each learning group give emotional responses during the negotiation process. For example, when students need to be accepted, the teacher can give emotional responses, and when they are nervous, anxious, or frustrated because of rebuttals, the teacher can support them with reassurance and empathy, and when students feel low in motivation to interact, the teacher can encourage them to express their ideas in a timely manner. On the whole, teachers in OCL are supposed to provide emotional regulation to facilitate the progress of each learning group and to enhance the positive effects of emotional interaction on cognitive understanding.

6. Summary

OCL is a teaching and learning model supported by online education technology platform, in the form of group learning and teacher's guidance, and consisting of learners, teachers, and instructional resources. The theoretical basis of this teaching model is the theory of constructivism, which reflects that learners' emotional interaction can create new knowledge and meet the demand of learners' diversified learning goals. In this paper, it analyzed the components and processes of OCL, and proposed a definition as well as the existing problems and shortcomings of emotional interaction in OCL. At the same time, the process mechanism of OCL to enhance learning effectiveness through emotional interaction has been analyzed from a theoretical perspective, and relative intervention strategies has been suggested in creating the ambient environment of emotional interaction, encouraging emotional interaction of cognitive understanding, stimulating the awareness of emotional interaction, and enhancing the emotional feedback mechanism, which is in hope to help teachers optimize the design and teaching of OCL.

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