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ORIGINAL ARTICLE

Emerging approaches for supporting easy, engaged and effective collaborative learning

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Abstract Collaborative learning is one of the key instructional strategies and is adopted world widely. In the past three to five decades, cooperative learning in a traditional classroom has been popular in the west countries and has been adopted gradually in east countries; collaborative knowledge building through online community attracted much attention in the last 10 years. With the development of social networking and the expansion of Web 2.0/x.0, the query of collaborative learning effectiveness appeared in both classrooms and online environments, which are a concern to educators, researchers and policy makers. Based on the analysis of new generation of students, in the present article, we first analyzed the issues in both F2F and online collaborative learning, and the differences of collaborative learning between the west and the east from the perspective of culture. After that, we proposed three new approaches for future CSCL studies: orchestrating diverse activities with resources, embedding assessment into learner experience, and infusing smart environment with group activities.

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1. Introduction

Collaborative learning has gained an increasing role in educational research and practices in recent years. Computer-supported collaborative learning (CSCL) is a pedagogical approach wherein learning takes place via social interaction using a computer or through the Internet. Therefore, in the field of computer-supported collaborative learning, the group interactions are often mediated by various kinds of technologies. Nowadays, many new technologies emerged, such as ubiquitous learning technologies, gesture-based computing, augmented reality technology, learning analytics etc. Students who have been growing up in the technology environment are keen to using new devices, apps and various kinds of new technologies. However, in the field of computer-supported collaborative learning there are still some issues and challenges need to be addressed, when considering how to utilize emerging technologies to support collaborative learning.

Collaborative learning aims to promote students' individual cognition, group cognition and community cognition. The learners' characteristics are key pedagogical aspects for designing collaborative learning activities, while it is claimed that new generation of students has significant different learning characteristics from the previous generation. So we first analyzed the characteristics of the new generation students. Then

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we identified issues from the dimensions of knowledge building, interaction analysis methodology and assessment. Finally, we proposed the three approaches to support easy, engaged and effective collaborative learning.

2. Diverse needs of the new generation students

When we consider new generation of students, there are three similar concepts of Millennial, digital natives, and net generations. Howe and Strauss first coined the term 'Millennial Generation' (defined as being born between 1982 and 2000), as successor to, but not wanting to be associated with the 'Generation X' (born between 1961 and 1981) (Howe and Strauss, 1992). They claimed that special, sheltered, confident, team-oriented, achieving, pressured, and conventional were the basic characteristics of Millennials. 'Digital Natives' was introduced to describe this generation by Prensky (2012), because he found them to be 'native speakers' of the digital language of computers and the Internet. Digital natives was accustomed to the twitch-speed, multitasking, random-access, graphics-first, active, connected, fun, fantasy, quick-payoff world of their video games, MTV, and Internet. 'Net Generation' was proposed by Tapscott (2005), and he argued that the generation of children who grew up with the new medium was defined by their relationship with digital technology. Then, Brown (2005) identified the 10 learning characteristics of Net Generation: group activity, goal and achievement orientation, multitasking, trial and error, heavy reliance on network access, pragmatic and inductive, ethnically diverse, visual, and interactive. Based on the previous research, Berk (2009) identified the 20 characteristics of 'N-Geners': technology savvy, relies on search engines for information, interested in multi-media, creates internet content, operates at a fast speed, learns by inductive discovery, learns by trial and error, multi-tasks on everything, shorten attention span, communicates visually, craves social face-to-face interaction, emotionally open, embraces diversity and multiculturalism, prefer teamwork and collaboration, strives for lifestyle fit, feel pressure to succeed, constantly seek feedback, thrives on instant gratification, response quickly and expect quick responses in return, and prefer typing to handwriting.

From the analysis of different terms associated with new generation of students, we can see that new generation of students is experiential learners, interactive and social learners, multi-taskers, structured and relevant learners, and technology immersed learners. However, researchers argue that while digital technologies are associated with significant changes in the lives of young people, there is no evidence of a serious break between young people and the rest of society (Bennett et al., 2008; Selwyn, 2009). Jones and Hosein (2010) argued that there was not a single Net Generation with common characteristics, and age only seemed to be one of several interrelated factors, rather than the sole factor. Jones (2013) pointed out that the claim that there was a new generation of learners characterized by a new mentality had to be carefully assessed in the light of recent empirical evidence. Whether the students who had grown up with technology could stand for a new generation, was the debate between the two parties/groups of researchers on the new generation students. So students may have very diverse needs in the process of collaborative learning, even though they have something in common. Collaborative learning design should consider new generation students' learning preference and at the same time consider the diversity of learners.

3. The query on effectiveness of computer-supported collaborative learning

The CSCL is characterized by the sharing and construction of knowledge among participants using technology as their primary means of communication or as a common resource (Stahl et al., 2006). The CSCL can be implemented in online and classroom learning environments, which can take place synchronously or asynchronously. The appropriate processes assessment and interaction analysis methods can provide insight into effectiveness of collaborative learning in face-to-face and online context.

3.1. The lack of processes assessment in classroom collaborative learning

In classroom environment, the effectiveness of collaborative learning is almost measured by assessing the outcomes, which are produced by both individual and group. Assessment can be seen as the engine that drives learners to participate in collaborative learning activities and contribute more. Assessment data serve as a vehicle for helping teachers to monitor collaborative learning progresses and adjust instruction. Assessment in F2F context consists of observing, capturing video, and summarizing complex individual and group behaviors, engagement questionnaire, pre-test and post-test, from which researchers make reasonable inferences about learning processes and products.

Because the processes assessment is often neglected, the assessment always fails to measure the knowledge level, skills, attitudes, and emotions of collaborative learning in time. In addition, there are still other issues when assessing collaborative learning processes. For example, how can a teacher know learners' contributions during completing ongoing task? How can a teacher effectively monitor the collaborative learning process and assess group performance in time? How to use just-in-time assessments to support ongoing learning activities? How can a teacher identify if an idea is a promising one or not, and if it is improved by other group members?

To solve these problems, we can adopt different assessment methods from a different perspective. There are three types of assessment in collaborative learning: self-assessment, peer assessment, and whole-group assessment. Self-assessment can be valuable both for providing an insight into the group progress and for individual learning (Lee et al., 2006). Peer-assessment is also an important method to improve students' understanding of subject matter and metacognitive skills. The whole-group assessment can measure the quantity and quality of students' learning as a team and facilitate learners' reflections on the collaborative learning processes. Meanwhile, various emerging technologies can also be used for recording the processes of collaborative learning and help teachers to understand how the intersubjective meaning making is achieved.

3.2. The query of interaction analysis methods in online context

Currently, online collaborative learning tends to focus on the cognitive process by emphasizing task-oriented communica-

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