Facilitation of computer-supported collaborative learning in mixed- versus same-culture dyads: Does a collaboration script help?

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ABSTRACT

To foster collaboration and improve the quality of students' discussions in mixed- and same- culture learner groups engaged in computer-supported collaborative learning (CSCL), a collaboration script was introduced. A 2×2-factorial design was used to examine the effects of using this collaboration script on students' online collaborative behavior and the quality of their discussions. A total of 130 university students worked in dyads on a topic concerned with intercultural communication. Culturally mixed dyads working with the script showed a higher frequency of seeking input and social interaction than the students in the other three types of dyads. Same-culture dyads working with the script showed a lower frequency of planning activity than same-culture dyads working without the script. Independent of script condition, the same-culture dyads displayed a higher frequency of contributing activity and showed a higher quality of online discussion than the mixed-culture dyads. Collaboration in culturally mixed groups is less than optimal and may require extra facilitation.

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1. Introduction

Today's information and communication technologies make it possible for schools to: (a) prepare learners for participation in a networked, virtualized society (Belz, 2003; O'Dowd, 2003); (b) form learning communities regardless of physical and temporal barriers (Rovai, 2002); and (c) stimulate both the cognitive and social development of their learners (Weinberger, Ertl, Fischer, & Mandl, 2005). The latter can be done with the aid of online group discussions (Weinberger et al., 2005), reflection on behavior with the help of an online peer feedback and reflection tool (Phielix, Prins, Kirschner, Erkens, & Jaspers, 2011), or the use of cooperation scripts to facilitate web inquiry and online learning (Kollar, Fischer, & Slotta, 2007). Over the past two decades, experimentation with internet usage in education and the adoption of learning management systems have provided insight into the use of online discussion forums to encourage collaborative learning among students (Nandi, Hamilton, Chang, & Balbo, 2012).

Positive effects for computer-supported collaborative learning (CSCL) have been widely documented in particular (see Lehtinen (2003) for a review). In CSCL, the collaboration of two or more learners to solve a problem is supported with not only computer technology but also the provision of an environment that promotes collaboration between students and thereby learning processes (Kreijns, Kirschner, & Jochems, 2003).

In multicultural settings, however, the introduction of CSCL has been found to bring not only benefits but also major challenges. Students can differ not only on how they view a collaborative task but also on how they view their compliance with task requirements, for example. Such matters depend upon students' procedural knowledge (i.e., experiences, feelings, information, strategies, and knowledge related to activities) (Fischer, Kollar, Stegmann, & Wecker, 2013; Kollar, Fischer, & Hesse, 2006; Rummel & Spada, 2005). Group dynamics can also be affected by the composition of the group, the size of the group, the collaborative media being used, and the specific learning task (Dillenbourg, 1999). The cultural composition of the group has also been shown to play a critical role in the functioning and success of a collaborative learning group (Cox, Lobel, & McLeod, 1991; Lim & Liu, 2006).

Same-culture groups share similar socio-behavioral norms, communication styles, and perceptions of the learning environment — which are all likely to encourage the building of effective in-group relationships, social bonds, and efficient communication processes while minimizing anxiety and group conflicts (Lim & Liu, 2006). In contrast, mixed-culture groups often suffer from misunderstandings and coordination difficulties when working on tasks together (Anderson & Hiltz, 2001; Popov et al., 2012; Weinberger, Clark, Hakkinen, Tamura, & Fischer, 2007). Other potentially detrimental factors such as insufficient turn-taking, inadequate time management, little or no distribution of subtasks, reduced social presence, lack of nonverbal cues, and limited

insight into other social cues can then become major stumbling blocks (Chen, Hsu, & Caropreso, 2006; Kim & Bonk, 2002; Uzuner, 2009). Particularly when the collaborating students do not know each other and must work together for the first time, major problems can arise (Janssen, Erkens, Kirschner, & Kanselaar, 2009). As a result, learners working in multicultural groups may not overcome the challenges of CSCL to achieve the potential rewards of such collaboration without additional facilitation.

The use of various kinds of scripts has been found to be very valuable in recent CSCL research (see Fischer et al., 2013 for an overview; Kollar et al., 2006; Weinberger et al., 2005). Scripts have been used to "promote productive interactions by designing the environment such that suggestions of different degrees of coercion are made to the collaborating students, engaging them in specific activities that otherwise might not occur" (Weinberger, 2011 p. 190). While recent research has shown collaboration scripts to effectively support online collaboration, we have little insight into the functioning of such scripts for same- versus mixed-culture groups. In the present study, we therefore explored the effects of a collaboration script when used by same- versus mixed-culture collaborative learning dyads.

2. Theoretical background

2.1. Culture and online collaborative learning

From a social constructivist perspective in which the importance of the personal and cultural backgrounds of learners are recognized as factors that can influence the manner in which they learn and acquire knowledge, we investigated the collaborative learning of same- versus mixed-culture dyads (Vygotsky, 1978; Wertsch, 1998; Zhu, 2009). We adopted Hofstede's definition of culture, namely: "the collective programming of the mind which distinguishes the members of one human group from another … the interactive aggregate of common characteristics that influence a human group's response to its environment" (1980, p.25). Within the specific context of online collaborative learning, we thus treated culture as one of the factors that can shape students' perceptions of the collaborative process, communication, and behavior in the group (Cox et al., 1991; Shi, Frederiksen, & Muis, 2013).

Three primary areas of research on the relationship between the cultural backgrounds of students and their learning in an online collaborative learning environment can be distinguished: (1) studies of cultural differences in the perceptions of the online group processes (e.g., Anakwe & Christensen, 1999; Thompson & Ku, 2005); (2) studies of how the linguistic and cultural backgrounds of the collaborative partners affect their actions, behaviors, and engagement in the online collaborative environment (e.g., Kim & Bonk, 2002; Lim & Liu, 2006; Oetzel, 2001); and (3) studies of the differences in the motivation of the students to work within an online collaborative learning environment (Wang, 2007).

Cultural differences can both benefit and disrupt "intra-group dynamics" (Halverson & Tirmizi, 2008, p. 12). Key benefits can be derived from the sharing of culturally diverse knowledge and the preparation of students for working in culturally heterogeneous groups. Likely challenges are the need to coordinate markedly different, culture-specific perceptions of group processes and approaches to communication.

Students from different cultures can also display remarkably different patterns of behavior within their online collaborative interactions. When Kim and Bonk (2002) investigated American, Finnish, and Korean students conducting asynchronous web-based conferences, they found the American and Finnish students to show more task-oriented behavior than the Korean students while the Korean students showed more relationship-oriented behavior than the American and Finnish students. Similarly, Setlock, Fussell, and Neuwirth (2004) found the communication strategies employed by Asians (i.e., individuals from India and East Asia) versus Westerners (i.e., individuals from North America) to differ in terms of argumentation. The Westerners

tended to focus on mostly points of disagreement while the Asians tended to discuss each point regardless of whether there was disagreement on the point or not.

In other research, Wresch, Arbaugh, and Rebstock (2005) analyzed the patterns of participation in discussions by American and German university students collaborating together in an interactive online learning environment. The German students showed lower levels of participation relative to the American students. More importantly, the differences in participation could be traced to differences in the perceptions and expectations of the students with regard to the international online course. In the U.S.A., teachers are involved in the learning process, continually steer the efforts of student, and therefore have considerable interaction with students. In Germany, regular interaction with teachers or, for that matter, other students is the exception than the rule. This means that — although only incidental or virtually nonexistent — the participation of the German students in the online class was consistent with their usual learning behavior.

In still other research, Tapanes, Smith, and White (2009) showed differences in student perceptions of an online course at two American universities to reflect the individualist versus collectivist cultural backgrounds of the students: students with a collectivist cultural background were less motivated to participate in an asynchronous learning network (i.e., networks for anytime and anywhere learning via computer communications technologies, Hiltz & Goldman, 2005) than students with an individualist cultural background. The individualist–collectivist cultural orientation as put forth by Hofstede (1991) has been widely used to describe what appear to be culturally-based differences in collaborative group processes, including online learning environments (e.g., Cox et al., 1991; Goncale & Staw, 2006; Oetzel, 2001).

In a number of studies, the following aspects of communication have been reported to pose problems for culturally diverse students collaborating online: (1) inability to understand specific cultural references in online discussions; (2) lack of non-linguistic cues; (3) difficulties expressing disagreement; (4) communicative constraints resulting in less substantive postings; and (5) mismatched communication patterns (i.e., use of short, content-driven contributions as opposed to long, relationship-driven contributions or vice versa) (see Uzuner, 2009 for a review).

Early studies of the quality of collaborative learning primarily examined individual learning outcomes and final group results. They therefore failed to recognize that most collaborative learning outcomes are mediated by the quality of the group discussion and dynamics (Lim & Liu, 2006). We now know that assessment of the quality of online discussions is crucial for the successful use of technological learning environments (Hawkes & Dennis, 2003). This assessment can be done with regard to the content of the discussion and thus in terms of adequate clarification, justification, elaboration, and application of theories and other information related to the subject matter and discipline. Assessment can be done with regard to participation in the discussion and thus in terms of the consistency and frequency of the students' involvement (Henri, 1992; Nandi, Chang, & Balbo, 2009). In assessing the quality of the online interactions, cultural factors that are known to play a role in what students share, expand upon, and gain from a collaborative learning process should also be considered (e.g., Kim & Bonk, 2002; Zhao & McDougall, 2008; Zhu, 2009). However, many social and cultural factors have yet to be taken into account in the study of online collaborative learning (Cox et al., 1991; Vatrapu & Suthers, 2010; Weinberger et al., 2007). Very little research has empirically examined the quality of online discussions involving students with different cultural backgrounds (exceptions are Shi et al., 2013; Vatrapu, 2008; Zhu, Valcke, Schellens, & Li, 2009).

In sum, CSCL offers students opportunities to connect across time and space, but its successful application is hard to achieve due to not only the limitations imposed by working in an online environment but also the challenges of online collaboration and learning. Critical