



Group regulation and social-emotional interactions observed in computer supported collaborative learning: Comparison between good vs. poor collaborators



Kyungbin Kwon ^{a,*}, Ying-Hsiu Liu ^{b,1}, LaShaune P. Johnson ^{c,2}

^a Indiana University, Instructional Systems Technology, 201 North Rose Avenue, Bloomington, IN 47405, USA

^b University of Missouri, 507 Clark Hall, Columbia, MO 65211, USA

^c Creighton University, 2500 California Plaza, Hixson-Lied Science Building, Rm 202, Omaha, NE 68178, USA

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ABSTRACT

This study explored what social interactions students exhibited during collaborative learning, and analyzed how the social interactions evolved in a computer-supported collaborative learning (CSCL) environment. Six groups ($n = 28$) from an undergraduate online course were observed during a semester. Students' interactions were analyzed in two perspectives: group regulation and socioemotional. Cluster analysis was conducted to identify collaboration patterns of the groups. The analysis identified three collaborator clusters: one good and two poor. The good collaborators (named Early Active Collaborator) demonstrated: (1) intensive interactions among group members in the early collaboration phase, (2) positive socio-emotional interactions continuously, and (3) adaptive selections of group regulatory behaviors. The others showed dormant interactions throughout the projects and least socio-emotional interactions (named Passive Task-oriented Collaborator) and did not coordinate group process in a timely manner (named Late Collaborator). Comparisons of the interaction pattern and instructor intervention were discussed.

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1. Introduction

With the aging of the American population and the growth of life-sustaining technologies, health science professionals will need to be able to quickly handle unexpected medical and ethical challenges; and with the growing emphasis on patient-centered care and care coordination, they are increasingly called upon to work on interdisciplinary teams. Within these teams, they will be asked to provide health care and to negotiate difficult ethical questions. In the *Institute of Medicine's, 2001* report, "Crossing the Quality Chasm", the authors emphasized the importance of interdisciplinary healthcare teams in facing the challenges of a quickly evolving American health care system. Within this call for interdisciplinarity in care, comes also a call for increasingly interdisciplinary educational opportunities for pre-professional health sciences students (*Institute of Medicine, 2001*). Courses required across the undergraduate health sciences curriculum, such as the clinical ethics courses featured in this study, offer an opportunity for the "interprofessional collaborative process", which allows for the reinforcement of theories and practices integral to interdisciplinary health care administration.

In recent years, efforts to strengthen this interprofessional collaboration in students have been studied and several models have been developed. Many models feature problem-based learning or case studies to encourage interdisciplinary collaboration (*Solomon & Salfi, 2011*). In this study, a group of interdisciplinary health sciences students were tasked with creating an ethical case study and creating an interdisciplinary, patient-centered solution to the ethical dilemma. Clinical ethics courses are standard in most health sciences programs, and offer, according to *Schonfeld and Spetman (2007)*, pre-professional students critical thinking skills that will allow them to solve unexpected situations.

* Corresponding author. Tel.: +1 812 856 8450; fax: +1 812 856 8239.

E-mail addresses: kwonkyu@indiana.edu (K. Kwon), liuyingh@health.missouri.edu (Y.H. Liu), LPJohnson@creighton.edu (L.P. Johnson).

¹ Tel.: +1 573 882 2095.

² Tel.: +1 402 280 2042.

As the numbers of online asynchronous health sciences courses grow, it is important to discover how best to offer online opportunities to develop the building blocks needed for later interprofessional collaboration and to acquire the critical thinking skills required to handle difficult ethical situations. While many instructors have tried to improve students' collaboration skills by providing collaboration opportunities through a group project, students' actual collaboration is below expectation in many cases. Considering the deficit of non-verbal expression, a time lag between conversations, inept collaboration skills in online environments, and different time zone, one cannot guarantee effective collaborative learning without proper interventions or guides (Salomon & Globerson, 1989).

For this reason, many types of instructor's interventions and collaboration tools were invented, such as visualization of group process to establish group awareness (Bodemer, 2011; Dehler, Bodemer, Buder, & Hesse, 2011; Phielix, Prins, Kirschner, Erkens, & Jaspers, 2011; Sangin, Molinari, Nüssli, & Dillenbourg, 2011), self and peer assessments on group process (Dochy, Segers, & Sluijsmans, 1999; McLeod, Liker, & Lobel, 1992; Phielix, Prins, & Kirschner, 2010; Phielix et al., 2011), and metacognitive guidance (Kwon, Hong, & Laffey, 2013). The positive outcomes of the intervention were well demonstrated by the products of or satisfaction with collaboration. However, these results are limited in their ability to explain how the intervention works, and what behaviors can be expected in a collaborative learning situation. In this sense, direct observation of collaborative behavior is required.

To evaluate students' collaboration and to identify effective collaborative interactions, there is a need to know what types of behavior students exhibit when interacting with group members, and what types of behavior are helpful in coordinating group work and in encouraging others. Classifying students' behaviors will illustrate social interactions employed for collaboration. In addition, observation on how the social interactions evolve along with the collaborative process will give a holistic picture of in-group dynamics. Further, comparisons of behavior patterns between good and poor groups will explain which behaviors could enhance group collaboration. This knowledge will allow instructors to design more effective interventions and to diagnose the collaboration process. As mentioned in Dufner, Park, Kwon, and Peng (2002), it takes several weeks to complete a group task and to develop the skills needed for successful collaboration. To fully explore and understand student collaboration behaviors, we purposefully observed groups over a thirteen week period, using multiple sources of data.

In sum, the purposes of this study were to explore the ways in which pre-professional health sciences students collaboratively accomplished tasks offered in a computer-supported collaborative learning (CSCL) environment and to identify behaviors that led to group regulation and/or socio-emotional interactions. The study also aimed to classify desirable collaboration patterns which were demonstrated by students. These goals would be achieved by observing online discussion exchanged throughout a group project and eliciting students' responses on their collaboration experience.

2. Theoretical framework

2.1. Group regulation

To achieve common goals, a group needs to coordinate group efforts and resources in effective ways. By analogy with self-regulation, the group coordination behavior can be identified as group regulation. While number of agents and scope of actions are different, self- and group regulation share characteristics in that both require the following behaviors: identifying goals and tasks, monitoring process, and evaluating strategies and outcomes (De Jong, Kollöffel, Van der Meijden, Staarman, & Janssen, 2005; Saab, 2012). As the ability to regulate one's learning process plays an important role in individual learning (Zimmerman & Schunk, 2001), the quality of collaborative learning heavily relies on the competency to continuously coordinate group process (Erkens, Jaspers, Prangmsma, & Kanselaar, 2005), time management (Xu, Du, & Fan, 2013), individual responsibility and social interdependence (D. Johnson, Johnson, & Smith, 2007), and high interactivity among members (Brewer & Klein, 2006; Cohen, 1994). If these group regulatory behaviors were not coordinated properly, one might not expect positive outcomes from collaboration and, in the worst case, students would experience social loafing: deliberate less effort for collaboration of less capable or apathetic students (Karau & Williams, 1993; Kerr & Bruun, 1983; Latané, Williams, & Harkins, 1979; Salomon & Globerson, 1989); the sucker effect: reduction in effort not to take over other peers' responsibilities (Kerr, 1983; Salomon & Globerson, 1989); or a failure at group coordination (Barron, 2003; Kruger, 1993).

Compared to learning individually, students who work in collaboration with group members need another unique group regulatory behavior: sharing common ground. In a CSCL context, for example, students ask other students for opinions and update group process with others in order to keep everyone on the same page (Janssen, Erkens, Kirschner, & Kanselaar, 2012). Communicating one's strengths, weaknesses, and preferences allows students to choose effective collaboration strategies. Announcing when a member will be off-line will reduce misunderstanding among students about one's absence or nonresponse. If students have different ideas or suggestions, they need to negotiate them (Kirschner, Beers, Boshuizen, & Gijsselaers, 2008). The timing for maintaining common ground can vary, depending on tasks and group members. However, early group regulation usually enhances the establishment of shared common ground, and this reduces the need for maintaining group effort later (Lajoie & Lu, 2012).

These behaviors are indispensable ingredients for regulating group work. Students, however, in many cases do not seem to exhibit the skills as expected (e.g., Gunawardena, Lowe, & Anderson, 1997; Puntambekar, 2006). As Salomon and Globerson (1989) expressed, "Teams just do not always function as well as they could or as well as one would have expected them to" (p. 90). In addition, students using computer-mediated communication (CMC) for collaboration usually spend more time and effort than ones in a face-to-face setting to regulate group work (van der Meijden & Veenman, 2005). All of these group regulatory behaviors should be initiated, guided and encouraged through group members' autonomy and/or through instructor's intervention. For these reasons, observing students' collaborative behaviors in an online learning environment is beneficial to describe which group regulatory behaviors (do not) occur, and to identify which ones affect the success of and satisfaction on collaboration.

2.2. Socio-emotional interaction

A socio-emotional interaction refers to actions relevant to the expression of one's emotion in a social context such as "getting to know each other, committing to social relationship, developing trust and belonging, and building a sense of on-line community" (Kreijns,

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