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Instruction of computer supported collaborative learning environment and students' contribution quality*

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Abstract

Along with the integration of network and communication innovations into education, those technology enriched learning environments gained importance both qualitatively and operationally. Using network and communication innovations in the education field, provides diffusion of information and global accessibility, and also allows physically separated multiple users to communicate and work together (Chiu and Hsiao, 2010). Herewith study groups have the opportunity of communicate, collaborate and discuss each other via the collaborative learning environments in which more than one method is used. One of the environments which set this process to work is "Computer Supported Collaborative Learning Environment (CMCLE)". The study group is composed of 99 undergraduate students, 46 of females and 53 of males. A computer supported collaborative learning environment is developed by researchers. The study comprised of four weeks of "The Interpersonal Communication Conflict" subject in the "Effective communication" course. Within the aim of this study, students' messages are analyzed with regard of contribution quality and the process of computer supported collaborative learning environment is discussed.

Keywords: Computer supported collaborative learning, case-based learning, Participation, Contrubition quality

1. Introduction

The integration of advances in educational technology with the constructivist approach has led to the use of online learning communities in educational settings (Öztürk and Deryakulu, 2011). One of the online learning environments that are frequently used in this context is Computer-Supported Collaborative Learning (CSCL). Cognitive structuralists defend that CSCL environments provide a richer learning experience because inputs explain personal learning elements (memory recall) and consecutively order knowledge elements during social interaction (De Wever, Schellens, Valcke and Van Keer, 2006). As technological innovation in networking and communication has been integrated into education, these rich learning environments are becoming more important qualitatively and functionally. Students play an active and constructive role during the discussion process and during all interactions in fully interactive CSCL environments. (Dewiyanti, Brand-Gruwel, Jochems and Broers, 2007). CSCL, as a certain variety of online learning, brings together the theoretical contributions of collaborative learning models and the capabilities of online learning environments. Because of this quality, CSCL environments enhance social interaction

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and facilitate in-depth learning (Francescato et al., 2006). Online discussions, where social interaction is at the top level, increases interaction between participants and makes it easier for them to structure information (Öztürk and Deryakulu, 2011; Topçu, 2006). However, such interaction is neither self-generated nor spontaneous (Lipponen, Rahikainen, Hakkarainen and Palonen, 2002). In order to have interaction in a learning environment, the instructional designer has to build interaction into the environment during the design phase.

Student contribution to collaborative learning is defined as interaction and collaboration between group members in solving a problem or completing a task. There are many factors influencing the discussion process in CSCL environments (S.-L. Wang and Hwang, 2012). These are defined as the absence of non-verbal signs, the information load, the lack of simultaneity, access, multi-faceted discussions leading the class, cognitive maturity, technology, time constraints, course features, character traits of individuals, the process of collaborative learning, and the satisfaction drawn from collaborative learning (Dewiyanti et al., 2007; Öztürk, 2009). At the same time, an environment structured by considering these elements can significantly influence student contribution and the effectiveness of the environment. The use of these elements have led researchers and teacher education faculties to ask how learning environments have to be structured, how discussion can be facilitated and encouraged, and how the learning outcomes can be assessed. (Mitchem et al., 2009).

2. Measurement and assessment in CSCL

According to Guzdial and Turns (2000), the discussion should be structured in a sustainable way in order to create an effective discussion environment among participants. However, if a discussion is to result in learning, what need to be emphasized is not just who participated and how much they contributed, but also what they discussed. In other words, determining the quality of participant contribution is as important as the contribution and it serves to estimate the interaction that is taking place in the environment. Consequently, determining the quality of the contributions to a discussion makes it possible both for participants and teachers to receive more feedback.

Different methods of analysis have been used to determine and assess contribution quality. Discussions can be accessed through qualitative, quantitative, or qualitative and quantitative methods of analysis. (Palmer, Holt and Bray, 2008). However, the most popular among these are the rubric-type measurement criteria (Kalelioğlu and Gülbahar, 2010).

The literature provides many measurement criteria for assessing simultaneous and non-simultaneous web-supported discussions. While there are common elements used in these criteria, other elements are at variance with one another. Kalelioğlu and Gülbahar (2010) have summarized popular criteria used in the literature (Table 1).

Table 1. Summary Table for Criteria Used in Assessing Online Discussions (Kalelioğlu and Gülbahar, 2010)

Criteria	Researchers
Participation requirement, participation count, active participation in discussion, length of messages, level of formality, presence of references	Fleming (2008)
Participation frequency, first assignment post, follow-up messages, contribution to content, presence of evidence and references, clarity and compliance with rules	De Vry, Frey ve Watson (2006)
Ability to display grasp of material, timely and appropriate feedback, meeting or exceeding message count requirements, clarity, intelligibility and logicality of writing	Anderson ve Puckett (2003)
Frequency of timely feedback, contribution to discussion, ability to display grasp of subject, preparation for discussion (doing the reading beforehand), compliance with online rules	Dabbagh (2000)
Participation frequency, message content, quality of questions asked, collaboration, message tone (compliance with rules of courtesy and respect), compliance with rules of good grammar and syntax	Rovai (2007)

3. Methodology

The case-based computer-supported collaborative learning environment was deployed during the course titled "Effective Communication," offered in 4 th semester to students majoring in Turkish Language Education at Uşak University's Faculty of Education. The research took 4 weeks. The research was conducted using the newly developed case-based computer-supported collaborative learning environment (Figure 1). During the 4 weeks, students have followed the online instructions and answered questions directed at them prior to coming to class.

In this environment, 4 phases that proceed incrementally are completed each week. These phases are;
1. Understanding the problem: This phase requires the participants to explain the conflict in communication that is illustrated in the example, why s/he sees it as conflict and the possible reasons for the conflict.
2. Analyzing the problem: This phase requires the participants to build on the comments posted during the "Understanding the problem" phase and to explain what criteria they used to classify types of conflict and to offer a theoretical justification for these criteria.
3. Providing solutions: This phase requires the participants to provide solutions to the problem as defined in the "Understanding the problem" and "Analyzing the problem" phases.
4. Making decisions: This phase requires the participants to research the relevant literature and to conclude with their views on the problem and the solutions.

In order to assess student messages in terms of contribution quality, the messages have been transferred to a computer. Afterwards, referees have used the Assessment Criteria for the Evaluation of Online Discussion to rate them. (Kalelioğlu and Gülbahar, 2010).

4. Results

The contribution quality of student messages posted on the case-based computer-supported collaborative learning environment have been assessed by reference to sub-criteria and the average points for each sub-criterion are provided in Table 2:

Table 2. Average Points for the Contribution Quality of Student Messages Posted on the Case-Based Computer-Supported Collaborative Learning Environment

Sub-Criteria	$\overline{\chi}$	ss
Participation frequency	10	0,00
Cognitive effort	7	2,16
Ability to display grasp of subject	7	2,66
Presence of evidence, examples and references	7	2,95
Level of formality / courtesy	8	2,08
Compliance with rules of good grammar and syntax	7	1,71
Clarity, intelligibility and logicality of writing	8	2,21
Collaboration	7	2,53
Compliance with online rules	7	1,88
Ability to lead	7	2,23

The assessments of the participant messages posted on the developed environment show that the quality of contribution is high according to four criteria for evaluating online discussion: communication skills, cognitive

skills, teaching skills and social skills (Kalelioğlu & Gülbahar, 2010). At the same time this finding suggests that the environment has reached the targeted level of effectiveness.

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