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Collaborative Learning in Engineering Education: A Grounded Theory Analysis of a CSCL Application

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ABSTRACT

This study examines how students collaborate on engineering problems and the effect of information technology on facilitating collaboration. Twenty-eight undergraduate engineering students were placed in small groups to discuss questions about mechanics of materials, either face-to-face or via a keyboard chat. Students were interviewed after completing the tasks, and the interviews were analyzed using the grounded theory approach. The resulting framework suggests that social goals as well as achievement goals are major motivations for students' behavior in the team situation, and that technology and group characteristics were acknowledged to influence their actions during and after the cooperation.

Keywords

Computer supported collaborative learning, grounded theory, virtual teams, visualization.

INTRODUCTION

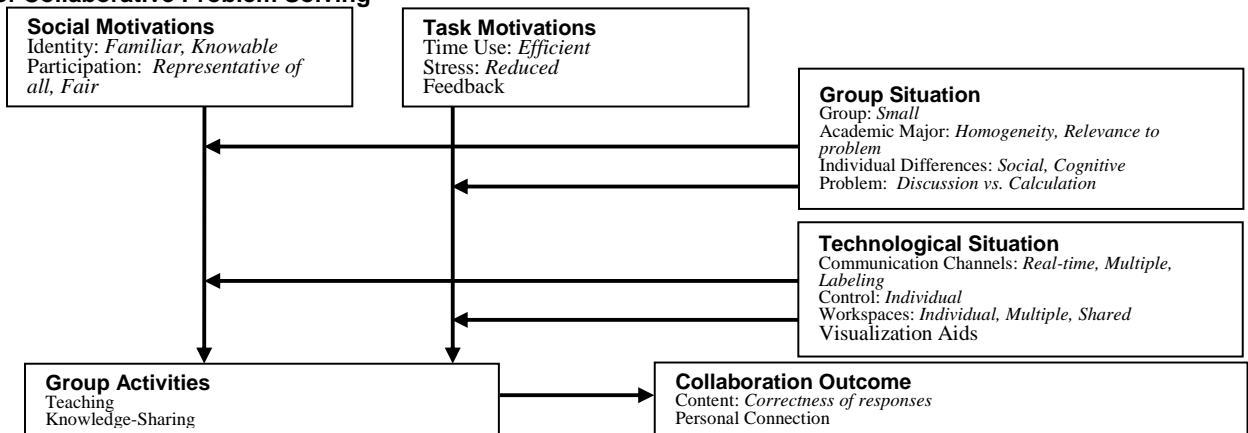
Engineers in industry increasingly work in teams to solve problems synergistically (Felder and Brent 2005); thus, collaborative learning technologies contribute importantly to engineering education (Wankat and Oreovicz, 1993). This study examines an information technology which facilitates collaboration by engineering students. The research questions are four-fold: 1) what motivations elicit collaborative learning; 2) how do students collaborate to solve engineering problems; 3) what are the outcomes of collaborative learning; and 4) what technology features facilitate collaboration and learning.

METHODOLOGY

28 students (average age: 22) were offered extra credit in a required engineering course. Students included 18 seniors, 8 juniors, and 2 sophomores, with 9 female. Five groups (2-3 students) used 3-D interactive applets of problems from the course, discussing them from different rooms via a built-in instant messaging service. Five face-to-face groups discussed printed diagrams. Interviews were made about the collaborations, then transcribed and analyzed. The poster shows the open and axial coding of a grounded theory approach, developing a theory based in qualitative data (Strauss and Corbin, 1998).

RESEARCH RESULTS:

Model of Collaborative Problem Solving



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