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Technology to Facilitate Online Group Formation

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Abstract
This study examines technologies students use, and the reasons they choose to use them while forming groups during online problem-based learning (PBL). The data were collected from twenty-five students’ online written interactions through discussion board postings, chats, blogs, and wikis and from their responses to two surveys. The findings indicate that when forming groups online for PBL projects, students chose technologies to which they had easy access and ones that matched the tasks at hand. Implications of the findings are discussed in the paper.

Introduction
Problem-based learning (PBL) was conceived as a collaborative endeavor from its inception as an educational methodology. Barrows & Tamblyn (1980) discussed the tutorial group, a small group of students that faced a problem and worked towards its resolution as one of PBL’s inherent components. Later, Barrows (1998) restated the model by talking about essential characteristics of PBL. Collaboration was listed as essential because it demonstrated students’ professional performances in authentic learning experiences. Authentic ill-structured problems are usually solved by groups rather than by individuals (Cathcart & Sanovar, 1992). However, before successful collaboration takes place, students must take a series of steps to ensure a comfortable climate for collaboration (Hmelo & Evesen, 2000). These steps include learning about peers’ relevant background and establishing procedures for communication and collaboration in order to form groups. The effectiveness of group problem solving is largely determined by how well the group’s members communicate with each other (Jonassen & Kwon, 2001).

Koschmann et al. (1996) cautioned against using computer-augmented interaction as the only means of interaction among students participating in PBL. Jacques et al. (2007)’s study showed that the sense of community needed for team projects was developed more easily and naturally in the face-to-face settings than in the virtual environments. Notwithstanding, “online enrollments have continued to grow at rates far in excess of the total higher education student population, albeit at slower rates than previous years” (Allen & Seaman, 2007, p. 5). Barrows (2002) recognized the value of distributed PBL, yet questioned the potential of communication technology to support PBL in a way that would preserve the level of interaction that exists in face-to-face settings. Recent research has advocated an adapted PBL methodology as an option for students who are learning at a distance (McLinden et al., 2006).

One of the main purposes of PBL is to engender collaboration and meaningful learning experiences. With the rapid developments of new media and technology and online learning, there exists a need to engage students in meaningful and collaborative learning experiences through the use of various technologies. The study of group formation as mediated by technology has thus become an important line of inquiry.
With this study, we examine the technologies students use, and the reasons they choose to use them in the process of forming online PBL groups.

Group formation in online PBL

Tuckman (1965) identified four stages of group development – forming, norming, storming, and performing, which are all necessary and inevitable for a group to grow, face challenges, tackle problems, find solutions, plan work, and deliver results. Obviously, the forming of group stage sets the tone for the success of collaboration and problem solving (Daraboumis & Xhafa, 2005). This stage includes getting to know fellow students in an effort to identify potential group mates. Some important issues to consider include personal information, expertise level, work pace, available working time, scheduling, goals, attitudes towards collaborative learning, and previous experience with collaborative software or groupware. It also includes negotiation, i.e. finding a group that meets individuals’ needs (Daraboumis & Xhafa, 2005) and consolidation when students agree on ground rules and establish themselves as a committed group (Daraboumis & Xhafa, 2005; Taylor, 2005). Researchers have discussed dimensions that are important to consider when designing learning experiences that have small groups at their core, including group size, group composition and group assignment.

Group Size: Graham and Misanchuk (2004) discussed several options for group sizes. They indicated that larger groups would benefit from the potential exposure of more diverse ideas while smaller groups would provide better chances coordinating collaborative efforts. They indicated that it would take longer for online groups to communicate and suggested that online groups consider time zone and time availability factors, especially when synchronous communications are expected. Other authors proposed the numbers of members for small groups. Lohman and Frinkeland (2000) proposed that a group of 3 or fewer students would achieve learning outcomes most effectively. Taylor (2005) suggested that groups of 2 to 3 members would be the best choice when the collaboration required intensive work towards production. Others suggested that group sizes depend on the nature of the task. Oliver and Omari (1999) cautioned against the small number of 3 in a group because attrition could leave the group with two members who could become overwhelmed with the load of work. They concurred with Kagan (1989) who recommended groups of 4 students to reduce non-participation and group production losses such as the time needed for coordination.

Group Composition: Group composition has to do with the diversity of characteristics or lack thereof, such as demographic background, skill sets, previous experiences, and career background. Graham and Misanchuk (2004) talked about advantages and disadvantages of heterogeneous and homogeneous groups. On the one hand, heterogeneous groups benefit from a diversity of perspectives. Heterogeneity in a group helps to augment learning because of the rich discussions generated by diverse perspectives. Yet, a heterogeneous group can extend the time it takes to arrive at consensus. There is the need for training to deal with any conflict that may emerge (Graham & Misanchuk, 2004). Taylor (2005) proposed that instructional designers should strive for a moderate level of diversity which would encourage interaction without simultaneously triggering conflict. Taylor also cited Tinzmann (1990) in advocating heterogeneity without segregating students based on ability, achievement, interests or other characteristics. On the other hand, the homogeneous composition of groups has its advantages (Graham & Misanchuk, 2004). The homogeneous group has a potential to yield cohesiveness among group members. Bonk et al. (2004) suggested forming groups based on students’ interests. When this aspect is considered, some homogeneity should be expected in groups.

Group Assignment: Self vs. instructor assignment is another dimension that has been discussed regarding group formation. When students self-select into groups, instructors can expect a higher level of homogeneity than heterogeneity (Graham & Misanchuk, 2004). However, self-selection contributes to increased student ownership of the process since the students feel responsible for their placement in a group and are thus more accountable for the process. Student choice is also in line with the self-directed learning goals that are advocated in the constructive educational philosophy and the PBL methodological approach.

Online technologies to facilitate communication and collaboration

Course Management Systems (CMSs) have been dominant in online learning platforms in higher education for over a decade. CMSs provide a selection of technologies that can be used to support online PBL. Often, email and discussion boards are the core of CMS designs. However, these technologies have been seen as "only tentative, incomplete steps to true collaborative learning" (Klemm, 2005). Therefore, educators resort to a variety of other technologies that are available outside CMSs, which may better fulfill students’ needs for communication and collaboration.

New media and technologies, particularly web 2.0 technologies such as blog, wiki and podcast, can afford users the opportunity to communicate, collaborate, and learn at a much higher level of capacity, flexibility, and convenience. Blogs allow users to post reflections, images and links, to receive comments, and to connect to other like-minded people. Wikis allow users to write collaboratively on a topic, publish it immediately, and update it frequently. These technologies have greatly increased learners’ opportunities and capabilities of pursuing independent inquiry, collaborative inquiry, and formative inquiry towards expert knowledge (Lin, 2008). New communication technologies have reduced the cycle times required in communication. Various instant messaging tools such as Skype, MSN, Yahoo Messenger, allow users to communicate simultaneously at a distance. It has become more of a choice than an affordance when learners decide to communicate and collaborate asynchronously, synchronously, online, or face to face. In addition, online communication often supports more task-oriented communication although it can lead to less personal, social, or emotional interactions (Walther, 1992).

Clark and Brennan (1991) identified eight factors that characterize different media. These are: co-presence (same physical environment), visibility (visible to each other), audibility (speech), co-temporality (message received immediately), simultaneity (both speakers can send and receive), sequentiality (turns in sequence), reviewability (able to review messages) and revisability (able to revise message before sending). Characteristics of different media and technologies can play an important role in how students decide what technologies to use to communicate and collaborate with each other.

Situated in the above literature on group formation and new technologies, this study examines what technologies students choose to use to form online PBL groups and why. It reports results in an effort to contribute to the literature of PBL group formation through technology-supported interactions.

The Study

The context: Researchers collected data from an online course that explored computer applications in education in Spring 2009. The course covered topics such as desktop publishing, computer use in classrooms, networking, and multimedia presentations. Course instructors developed a problem-based learning approach through which students would explore these topics and use computer applications to design learning experiences of their interests. The online collaborative problem-based learning experience spanned the entire semester. The group formation stage lasted three weeks. It was a stage during which students engaged in a series of
communications and dialogues geared towards preparing them to participate in the online collaborative PBL experience. First, students shared their collaborative experiences in the past—their successes and challenges. Then, students exchanged ideas about their project interests. This exchange included situating their computer application designs in subject matters and grade levels. Students wrapped up their group formation efforts by notifying the instructors about group members and the focus of their design efforts. Students were advised that they could use any technologies or methods including discussion forums, wikis, blogs, chats, phones, or face-to-face meetings to form teams and decide on their PBL projects related to computer applications.

Participants: This study focused on the adoption of technologies during the group formation process by twenty-five (25) students who agreed to participate: 3 male and 22 female students. They were undergraduate and graduate students who were enrolled in teacher education and school library media specialist studies at a mid-western university. When students approached computer applications in education, they showed interest in exploring these topics within the contexts of their future practices. Therefore, self-selected group formation based on common interests in contexts was encouraged (Bonk et al., 2004). This would yield more homogeneous groups but would also help increase student ownership (Graham & Misanchuk, 2004). Ideal group sizes (3-4 members) as described in literature were encouraged (Arts et al., 2002; Graham & Misanchuk, 2004; Taylor, 2005). However, students were allowed to form larger groups if they would prefer.

Data Collection and Analysis: The researchers investigated students’ technology adoption by analyzing a variety of data sources. They analyzed electronic documents which served as the footprints of this online PBL group formation experience including class and group discussion forums, blog postings, chat logs, individual and group wiki postings. They also examined students’ responses to two survey questionnaires: the Technology and Online PBL Experience Survey and the Self and Peer Assessment Survey. Two researchers independently analyzed the documents to identify patterns of technology adoption: looking for evidence of use of technologies, references to other technologies, kinds of activities for which the technologies were used, and reasons for adoption of the technologies. Researchers took a series of steps to help strengthen reliability of the study. They engaged in long-term exposure to the context during data collection and exposure to the data during analysis in order to achieve a better understanding of the context, process, and perspectives of key players (Cresswel, 1998, 2008; Merriam, 1998).

Researchers provided rich and thick descriptions so that the reader could gain a deeper understanding (Cresswel, 1998, 2008; Merriam, 1998; Patton, 2002). Additionally, the study implemented two levels of triangulation. One level, it examined the researchers’ observations and multiple perspectives of the students and instructors. On another level, it used multiple data collections and analyses including course records and surveys to reduce biases of one method to influence the findings.

Results Discussion board: The course instructors set up three separate forums to support students’ communication and collaboration efforts during the group formation stage. The first forum, Group formation experiences, served as a space for students to share group collaboration experiences, in which students posted 42 messages. The conversation lasted 19 days. Students made reference to group dynamics as the issue of concern in 25 of the 42 messages. The second forum, Project Ideas, allowed students to explore potential ideas for their projects. The forum turned out to be an important space for the exchange of project ideas. This conversation lasted 24 days and consisted of 89 messages. This was the most profuse conversation during group formation. Figure 1 depicts the distribution of messages that related to project ideas in this forum. See issue website http://www.rapidintellect.com/AEQweb/sp2009.htm The shared project ideas were highly diverse. Some students suggested solving specific educational problems; some provided descriptions of final products; and others were more general and suggested focus areas of subject matters or audiences. Many students expressed positive appraisal of their fellow students’ ideas although they did not necessarily commit to joining their peers or adopting their ideas. Only 9 students did so. This is understandable given that it was early in the PBL process. The discussion forum became a place where students initially went shopping for project ideas. Further dialogue was needed to allow students to feel comfortable settling down with ideas and team mates. Students also used this forum to exchange information about their personal styles when working in groups, their time availability and their preferred communication means.

The third discussion forum, Projects and Group Members, served as a place for students to disseminate information about the newly formed groups based on common interests, group members and their project focus. Course instructors posted a message to direct students to a wiki in which they could sign up in small groups. Students, however, carried out a 30-message conversation that lasted 16 days in the discussion forum. The bulk of the messages were inquiries about group formation: “I don’t think I have a group yet. If it’s ok, may I join yours?” A small set of the conversations reproduced the pattern of exchange of project ideas that was observed in the previous discussion forum with students suggesting or requesting project ideas, appraising ideas, and expanding ideas. Students also made references to using other available technologies under the discussion forum. They made eight references to the wiki as the place in which they disseminated their focus and group selection: “I’ll go ahead and try to get our names on wiki while we are all deciding on a project...ideas?” Students also advertised or inquired about the use of personal or CMS email as a communication means to work towards the resolution of the problem: “If you have more ideas, please e-mail me.” One student made reference to posting on another student’s blog for group-related communication and another student suggested the use of the phone. Eight statements from students denoted that they were making the transition from exchanging ideas and finding team mates to working together as a group in the refinement of the educational problem to be submitted as a project proposal: “How are we to do the proposal due tomorrow?”

Wiki: Wiki was introduced through the discussion board as one of the computer applications that educators could adopt for their teaching. The course instructors requested that students create individual and group wikis. The purpose of the individual wiki was that they could experiment with wiki on their own. The purpose of the group wiki was so that the group could hold their cumulative knowledge as they were working on their projects. The course instructors suggested a particular wiki service provider, requested that each group gave their wiki a title that would describe their group project, and provided tips for managing the wiki in terms of editing and viewing permissions. The instructors also gave students freedom to decide how to communicate with their peers and how to use the wiki to support their collaborative efforts. A number of students indicated that they had not worked with a wiki before. Some shared challenges in creating their first wiki, but mostly addressed the situation with positive attitudes: “yes, thank you, I have no idea what I am doing!” “well, I am always up for a good challenge [challenge]!”

Group wikis were set up towards the end of group formation stage. There were 13 revisions of the wiki and all were made by one group member. This group member made minor use of the wiki for brainstorming ideas for their project: “With the very lively and rich discussion about the Internet and personal privacy, I think a great topic would be: discovering the issues with personal privacy, safety, and security when using the Internet.”

Blog and Chat: There were no comments in the individual student blogs during the group formation stage that pertained to the use of technologies to support their online collaborative PBL efforts. In addition, there was no evidence of chat sessions other than a student of one group entering and leaving the chat embedded in CMS during this stage, although several students indicated that they used external chat programs to communicate with group members.

Student Survey Responses: Students provided information on the technologies that had been most effective in supporting their group formation. As shown in Figure 2 below, the class discussion board and email were voted as the most effective technologies during the group formation stage.

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Discussions
Instructors of this online collaborative PBL experience made available an array of technologies to support the group formation process. The analysis of documents and students self-reports through surveys evidenced students' adoptions of the discussion board and email to aid in their efforts. The adoption of the discussion forum as a major hub of communication is understandable as it was the major place for interaction that was introduced for the class as a whole. The use of email followed logically as students were comfortable with the technology and used it on a regular basis. In terms of the reasons for their adoptions, most students chose technologies based on easy access although some students considered the compatibility of technologies in terms of properties with the kinds of activities they engaged in. Students' embrace of the discussion board worked positively to support the process in this case. Students were comfortable with the technology and found it easily accessible. The discussion board has been considered as a "primary tool to facilitate interaction" in online courses (Reppan et al., 2005, p. 61). Discussion boards offer a "natural match" for group project interactions (Angeli et al. 2003 as cited in Repman et al., 2005). Discussion boards make conversations visible thus enabling students to learn the necessary things about their peers (Daradoumis & Xiufa, 2005).

Students' adoption of email during the group formation process, however, is a little troublesome. Part of the conversation was hidden in the inbox of those who were receivers and caused non-recipients to miss important information or links. Email would be a useful tool later when a smaller group of people have determined that they share common interests and want to wrap up their group formation efforts.

The analysis of documents and students' reports showed lack of adoption of the wiki, blog or chat. While these technologies could be adopted for these purposes, they were also the most troublesome in facilitating group formation. The hierarchical structure of blogs predisposes a conversation in which the blog owner posts a message and other people reply to the message. It is difficult to carry a many-to-many conversation in a blogosphere. Furthermore, for each person to have equal access to posts original messages, each person would have to set up his or her own blog. In order to carry out an equivalent group formation conversation, this would entail visiting the blogs of each of the classmates. Messages would not be stored in a central location easily accessible to all as is the case for the discussion board.

Klemm (2005) advocated the use of a shared document computer conferencing system with capabilities similar to those of wikis. While the idea of having all interactions contained in a single technology is appealing, anecdotal evidence and experience at later stages of this online collaborative PBL process suggested that students find it troublesome when the collaborative project documents incorporate annotations from peers and instructors. There comes a time in the process when students want to clean up the document and consequently lose the visibility of those contributions. Furthermore, easily recognizing peer entries in the wiki demands the use of conventions that not all students use all the time. Finally, the purpose of the group formation process is not necessarily to engage in social writing, but to get to know peers. Therefore, having discrete messages that are automatically identified with name and time stamp better supports this process. Chat was another tool that students did not fully embrace at this stage. Chat presented a number of challenges for the inexperienced users and these challenges were magnified by the size of the group (Braaten & Essex, 2001 and Ingram et al. 2000 as cited in Repman et al., 2005).

Just like email, chat can prove beneficial later when peers who share common interests have been identified and students become interested in further exploring the possibility of formalizing a group.

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Student Trauma in the Classroom

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Abstract
Trauma-related disruptive student behavior has risen sharply. With the increase in the number of students experiencing traumatic events, and the number of U.S. veterans entering college, disruptive behavior may worsen. The purpose of the present study was to explore faculty experiences with student traumatic behavior, as well as their training to deal with such behavior.

Introduction
The impetus for this study began with a conversation among faculty from various departments about recent incidents of disruptive student behavior in the classroom. All faculty had received rude emails, several faculty had students say things to them such as, "I am not going to stand for the grade you gave me on this paper." Several faculty had been approached in their capacity as "advisor," but found that what the student in question really needed was a qualified counselor to help them deal with serious mental health concerns. One faculty member was even in fear for her safety walking to and from class. Furthermore, none of the faculty felt prepared to handle these issues and all felt like they were "floundering" a bit trying to figure out the best way to handle these student issues. As a result, it became clear that a research study on faculty experiences with disruptive student behavior and their preparation for dealing with such issues was needed. The research discussed here presents the initial findings of that study (Klein, Pritchard, Ellson-Bowers, Book, Birdsay, & McMullen, 2008).

Disruptive student behavior (ranging from talking in class to inattention and inattention) has risen sharply in college classrooms in recent years (Amada, 1986; 1992), with some estimating that incidents have doubled or tripled in both frequency and severity in past decade (Schneider, 1998). Facing a severe student disruption in class can be a faculty member’s worst nightmare. Although most college faculty members are well-versed in their own disciplines, they typically do not receive classroom management training skills in graduate school (Anderson, 1999; Seidman, 2005). Thus, confrontations with disruptive students inside or outside of the classroom can be very upsetting for faculty because they have not been trained to cope with such instances, and may not even be aware of the ethical, legal, or even university policies and procedures for dealing with disruptive or confrontational students (Hernandez & Fister, 2001; Lamb, 1992). In addition, such disruptions can easily hinder the relationships between faculty and other students in the class. In fact, when college students were asked to list things that inhibited their learning while in college, the number one answer was disruptive behavior of fellow students in class (Seidman, 2005). Disruptive student behavior in the classroom has even been linked to problems with student retention (Seidman, 2005). Thus, disruptive student behavior seems to impact students as much as, if not more than, college instructors (Amada, 1986; Seidman, 2005).