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The utilization of Computer Mediated Communication for case study collaboration

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Computer Mediated Communication (CMC) can be used as an effective tool for student communication and collaboration. First-year, first-semester dental hygiene students self-selected groups to develop dental hygiene process of care treatment plans, written reports, and oral case presentations based on assigned clinical cases. In consultation with the University of Michigan (UM) Digital Media Commons Collaborative Technologies Teams, CMC options were identified. Two chat rooms were established within the UM's Course Management System (CTools) to provide opportunities for synchronous (simultaneous, real-time) communication. One course blog site and 8 case blog sites were developed to provide students and instructors with electronic asynchronous (nonsimultaneous) communication formats. The purpose of this study was to evaluate the effectiveness of these technologies during group case study projects. CMC has the potential to provide an effective means of collaboration and communication when the technologies align with the purpose of the project and compliment the dynamics of student groups.

Keywords: Computer Mediated Communication (CMC), chat room, blog, case-based learning

Background

Small-group teaching methods emphasize teamwork and problem solving. In case-based learning, discovery is encouraged in a format in which students and facilitators share responsibility for identifying principle learning points.¹ Advanced preparation helps the learner to focus on key points of a clinical case. This encourages a structured approach to clinical decision making and allows learners to become the content expert for the case.¹

Collaborative problem solving skills are considered necessary for success in today's world. Collaborative problem solving is defined as activities that involve interactions among a group of individuals. Education is increasingly integrating collaborative group tasks in which students work together to solve problems or to accomplish projects.²

Increasing the potential for interaction and collaboration among participants, electronic technologies and the Internet provide opportunities to move away from the traditional classroom into educational environments that have no physical boundaries. Through previous course evaluations, students identified that meeting with group members posed a challenge due to time constraints when on campus, impeding the progress and thoroughness of the project. Computer Mediated Communication (CMC), such as chat rooms and blogs, presented a solution to this issue.

A chat room is a form of text-based conferencing. Chat room discussion offers an opportunity for synchronous (simultaneous, real-time) communication. The use of this technology for small group discussion offers an alternative to face-to-face meetings. Chat room experiences can serve to provide social interactions that are crucial for learning.³

Blog is the abbreviated name for "Weblog." The Weblog, beginning as an asynchronous (non-simultaneous) online journal, is now thought of as a Web-based electronic bulletin board. It serves as a user-generated Web site where entries are made in journal style and displayed in a reverse chronological order. A typical blog combines text, images, and links to other blogs, Web pages, and media related to its topic. The ability for readers to leave comments in an interactive format is an important part of many blogs. Time and date stamping of entries and archiving of past entries are distinctive features of Weblogs.⁴

A beneficial factor related to blogging is the automated syndication of content. An "aggregator" allows one to subscribe to blogs allowing the content for each blog conveniently available in one place. "Subscription" to an aggregator is accomplished by adding a URL or XML/RSS button from various sites. RSS (Real Simple Syndication) is a method of Web contents syndication. By using an aggregator, a reader can quickly survey their subscriptions and receive notices of new content.⁴

Twenty-eight first-year, first-semester dental hygiene students, enrolled in a residential (face-to-face) course were provided an opportunity to synthesize foundation knowledge into the development of dental hygiene process of care treatment plans through case-based learning. The purpose of this study was to evaluate the effectiveness of 2 Computer Mediated Communication (CMC) technologies-chat rooms and blogs-for group case study collaboration.

Review of the Literature

Factors have been identified related to student and instructor perceptions of CMC and the role it plays in shaping online discourse. Four important factors have emerged:

- the nature of the course, especially how class time is structured and how the purposes of the course are presented and understood by the students;
- students' sense of their roles as participants in course-related discourse, both in-class and online;
- students' perceptions in general of CMC as a communication medium;
- student perception of CMC assignment and management by the instructor.⁵

The successful use of technology in the classroom is linked to the concept of connectivity. Connectivity is the students' and instructors' ability to encourage the use of course materials in novel ways with technology linked to enhancing the learning process.⁶ The 5 points of connectivity include: communication, collaboration, motivation, integration, and creativity.

Technology chosen should facilitate communication between students and instructors. Emerging technologies such as chat rooms and blogs are becoming more popular as they allow student participants to communicate freely, and to add to and update content while allowing for creativity of expression.⁶ Technology should encourage not only discussion and feedback, but also collaboration among all students and instructors. Instructors should be proactive in requiring students to learn technologies that may improve their understanding of course material. It should support communication for the active learning process, including brainstorming, to determine what is known and what is needed to be known.⁷

Providing instruction on the use of technology and incorporating this within the grading process provides motivation for student use.⁶ One of the most effective ways to encourage use of a technology is through an experiential project. In case-based learning projects, technology is best utilized in enhancing group interaction and discussion.⁷ CMC offers opportunities for on-demand delivery of text and video, in addition to allowing participants to create and store digital records of group sessions.⁷

Chat rooms are a synchronous CMC. They offer an authentic means of social interaction in the absence of a face-to-face meeting.³ Discussion is best facilitated in this format if interaction is guided by a common goal. With synchronous technology, students take the initiative and responsibility to arrange a meeting time so that all can be present in the chat room for discussion. When the goal of the discussion is defined and the appropriate members are present, chat rooms allow for the negotiation of understanding of course material in a way that supports meaningful learning.³

Blogs used in education are rapidly emerging as educators embrace the instructional potential of this online tool.⁸ Blogging as a classroom application allows for enhanced communication and comprehension among students, creating a collaborative learning community.⁹

When used as an electronic bulletin board a blog provides a fast, efficient means of communication. When used as an educational resource, instructors can post additional information, explanations, or examples to reduce confusion related to assignments and projects. As a collaborative tool, a blog may be dedicated solely to a topic or project, with groups of students using a site as a common medium for completing an assignment.⁸ Blogging can provide a means of ongoing communication with group members of a project team that would not otherwise be available unless the team members met face-to-face.⁹

Four benefits have been identified with the use of blogs by students:

- Blogging has been cited as a motivating tool because of its newness.
- The use of blogs gives students legitimate chances to participate. The goal of teaching and learning is to integrate students into a community of practice, opening up a world beyond the traditional teacher-student relationship.
- The use of blogs helps students become subject matter experts. The blogger is involved in filtering information to utilize the most relevant, with postings reflecting the best content for discussion.
- The use of blogs provides opportunities for diverse perspectives. Often time and curriculum constraints do not provide an opportunity for every student to share thoughts in a traditional classroom.¹⁰

Blogs can be commented on, providing opportunities for feedback and scaffolding of new ideas. Hyperlinks can be included in blogs, which can assist students in identifying supporting and new information, assisting in knowledge construction.¹⁰

Methods

Two faculty members responsible for first-year, first-semester dental hygiene courses worked in partnership to align their individual course contents for students' participation in the case study project. Twenty-eight students self-selected partners, establishing 2-person groups. Students were provided with case assessment documentation that included a medical-dental history, oral examination form, periodontal chart, radiographs, and intraoral photographs. Each group was responsible for 1) participation in an online "patient" interview; 2) completion of a dental hygiene process of care treatment plan; 3) written report expanding information included in their treatment plan; and 4) an oral case presentation to the class. The objective of this case study project was to provide first-year, first-semester students with collaborative treatment planning experiences prior to their entry to direct patient care.

In consultation with the University of Michigan Digital Media Commons Technologies Teams, Computer Mediated Communication (CMC) options were considered to address student collaboration concerns related to real-time scheduling for project activities. Chat rooms and blogs were identified as 2 CMCs that would address the students' needs. Two chat rooms were added to the class course management system site (CTools). Using mBlog, a blogging service available to students, faculty, and staff at the University of Michigan, one course blog site and 8 case blog sites were developed. Each blog site was provided a link to the class Course Management System (CTools) site. Within the password-protected CTools site was posted assessment documentation for each case.

In order for instructors to easily track postings on all 9 blog sites, a blog aggregator was used. "Bloglines," a free Web-based service, allows the user to track blogs, news, podcasts, etc, in one site. When new content was added, a subscriber's list of feeds becomes bold, eliminating the need for instructors to log onto individual blog sites.

Case-related blogs were available for multiple purposes. One purpose was to serve as an extension of the "patient" interview, with an opportunity for students to pose questions related to the medical-dental histories and the oral examination. One course instructor served as each "patient," responding to questions and comments posted in mBlog case sites. Students assigned to the case could read entries and post entries and comments. Case blog sites, along with CTools chat rooms, were intended as a means for project team member communication and collaboration. The case study project, from initial orientation workshop to oral case presentation, spanned 7 weeks.

A base line survey was conducted at the initial orientation of first-year dental hygiene students prior to classes beginning. Questions were structured to determine students' technology ownership, understanding, and type of Internet service provider. Also included were questions related to use and frequency of technology communication tools.

Prior to the initiation of the case study project, a University of Michigan Instructional Technology Librarian conducted a 90-minute orientation workshop for the dental hygiene students. Included in the workshop was the process of utilizing the 2 chat rooms established within the class CTools course management site. This session also covered accessing the class and case mBlog sites, posting new entries, and comments. The public aspect of mBlog was identified within this session and students were informed that cases used for this project were fictitious. The session also provided a discussion on responsible computing practices and etiquette related to the use of these technologies.

Students surveyed after the workshop provided feedback on their knowledge level before and after this session, along with their confidence in submitting a blog entry and accessing CTools Chat. At the completion of the project, students were again surveyed. The questions on this survey were expanded to cover not only technology-related issues, but also the learning effectiveness of the case study project.

To provide an opportunity for expanded student feedback on this project, a focus group was conducted 3 weeks after the end of the project and final survey. A 1-hour focus group with 10 volunteer students was facilitated by the University of Michigan School of Dentistry Director of Dental Informatics. This provided students an opportunity to provide an enhanced explanation to the answers provided in the end-of-project survey.

Results

In an initial dental hygiene computing survey, 80% of the first-year dental hygiene students indicated they had high speed Internet available at home, with 5% reporting dial-up Internet access. Of the 2 Computer Mediated Communications identified for the case study project, 86% of the students had never used a blog, and 96% had not participated in a chat room (Figure 1). Students surveyed pre-and post-mBlog/CTools Chat Orientation Workshop indicated an 80% knowledge/confidence level for mBlog use, and a 100% knowledge/confidence level for CTools Chat at the completion of the orientation workshop (Figure 2a & 2b).

Figure 1. Initial Dental Hygiene Computing Survey

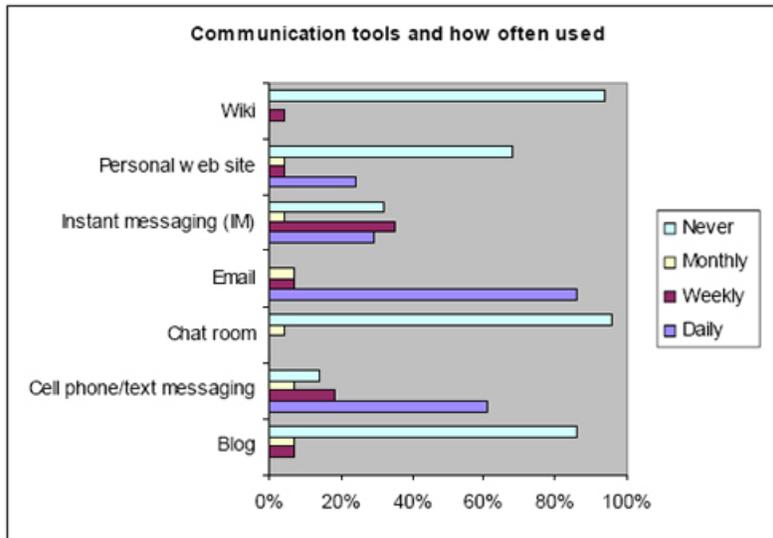
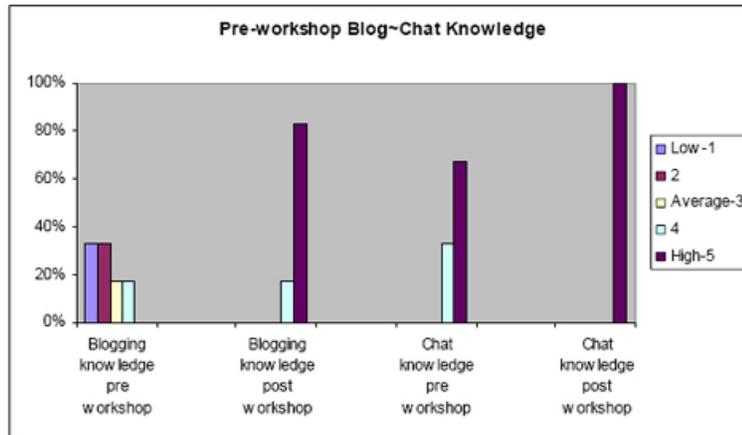
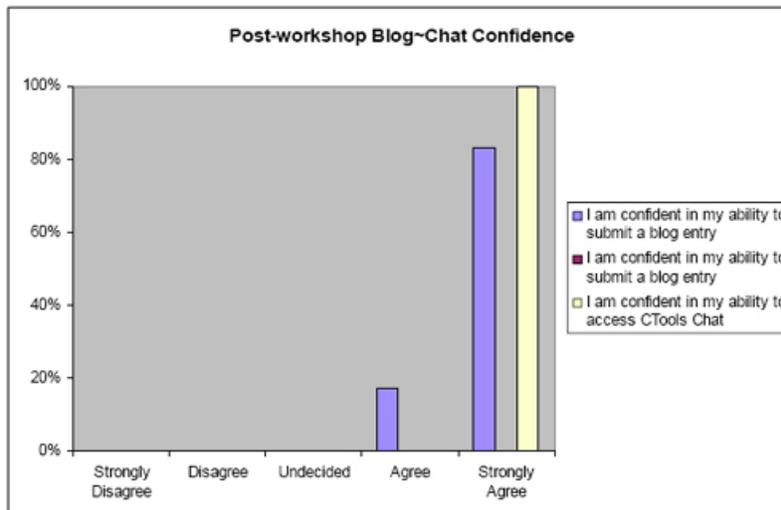


Figure 2 (a & b). mBlog/CTools Chat Orientation Workshop Survey Results
 2a.



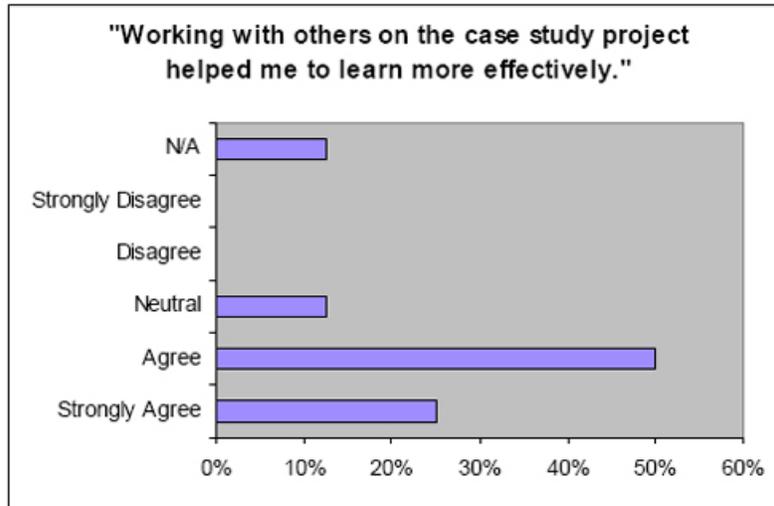
2b.



Eighty-three percent of the students strongly agreed they were confident in their ability to submit a blog entry, and 100% strongly agreed in their ability to access CTools Chat when again surveyed at the end of the project. When asked if the case study process helped students to learn course material, 75% agreed. Seventy-five percent agreed that working with other students on this project enhanced learning effectiveness (Figure 3a & 3b). Students surveyed continued to identify the mBlog/CTools Chat Orientation Workshop as a valuable session, requiring little to no additional technical assistance to utilize these technologies (Table I).

Figure 3 (a & b). Case Study Project Effectiveness and Learning Results

3a.



3b.

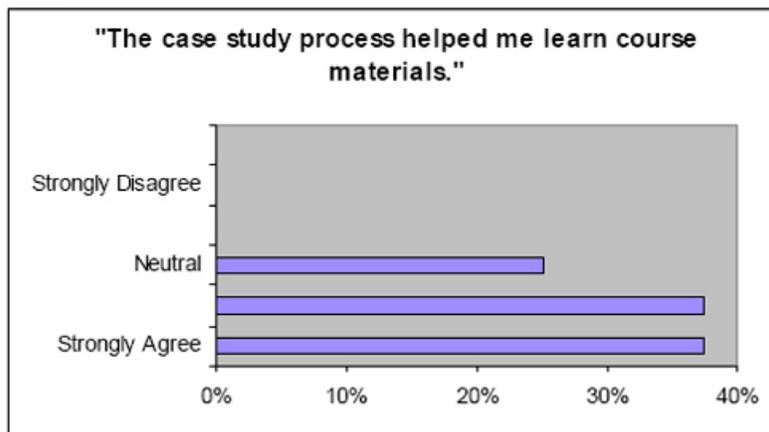
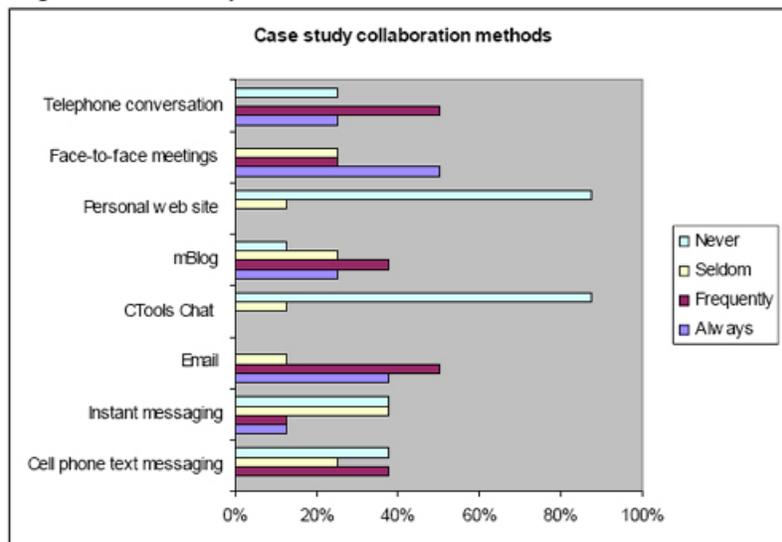


Table I. mBlog/CTools Chat Utilization During Case Study Project

	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree	N/A
mBlog~Chat Orientation Workshop provided a valuable introduction to electronic communicating and collaboration options	25%	37.5%	37.5%			
I required technical assistance to work with collaboration technologies during the case study project.	12.5%		12.5%	25%	50%	
I participated actively in case study discussion through the use of mBlog.	50%	25%	25%			
I participated actively in case study discussion through the use of CTools Chat.			25%	25%	25%	25%
mBlog discussions were a valuable part of the case study project.	50%	37.5%	12.5%			
CTools Chat discussions were a valuable part of the case study project.			50%			50%

Seventy-five percent of the students strongly agreed that mBlog discussions were a valuable part of the project and actively used this technology. CTools Chat, however, was not utilized and was not identified as a valuable technology for collaboration in this project. Students surveyed at the end of the case study project indicated face-face-meetings and telephone conversations were the formats used most often for collaboration (Figure 4), followed by email, blogs, and instant messaging.

Figure 4. Case Study Collaboration Methods



The use of mBlog was utilized exclusively for communication with case study "patients" and inquiries related to case study project format. Student mBlog postings totaled 81. Twenty-two out of 28 students (79%) participated in mBlog case sites communication. The average number of postings per student was 3.6, with one student posting 14 entries. Group members could self-select if one or both members would be responsible for posting in mBlog for the online patient interview. Only 1 group of students did not provide any postings. Instructor postings/comments throughout the project totaled 89. Of these, 4 were related to the project assignment and 85 were "patient" interview responses.

Discussion

The use of technology for collaboration was confirmed as being an integral part of the case study project for first-year, first-semester dental hygiene students. Blogging was the primary means of communication with case study "patients," and was utilized to enhance student knowledge of individual case assessment information. It provided an opportunity for students to formulate questions, simulating medical-dental history "patient" interviews. An additional benefit identified was the flexibility feature of mBlog. Patient interviews during clinical treatment are limited in time related to appointment scheduling. Blogging allowed students the opportunity to dialogue with the "patient" throughout the weeks of their project. This proved to be a time intensive activity for instructors, with a faculty member serving as all 8 "patients," responding to 94% of the postings. Faculty members indicated that this time was well spent and was a valuable, authentic component of the project that contributed to student success.

The organization and archivability of mBlog sites were positive features. Linking back from the case blog site to the CTools course site, where patient documentation was posted, was identified as an efficient tool. In addition to posting their own questions of the "patient," students found it insightful to review the questions of others involved with the same case. Because all postings and comments were saved, it was valuable to return to case blog sites throughout the project. Of the 10 students present in the focus group, there was a range of students from those who posted frequently (> 6) to those who had not posted at all (0). All focus group members indicated they had accessed case blog sites to read postings and comments related to patient assessment information and utilized this information to develop their group case study projects.

CTools Chat were not utilized to communicate with the "patient," as students indicated this would have involved having to schedule to be in the chat room with the "patient" at a specific time. Students felt this was an ineffective use of their time and preferred to post questions at their own convenience.

For collaboration during the organization and development of the written and oral portion of this project (treatment plan, written synopsis, and oral case presentation), neither mBlog nor CTools chat was used. First-year dental hygiene students have a credit hour intensive course load and are together an average of 35 hours per week. Students identified they most often used time between classes to meet face-to-face for project development. Familiarity and comfort level with each other also made use of the telephone another frequently used means of immediate communication and collaboration.

Students identified that even though mBlog and CTools Chat were not used among team members for project development, alternative communication technologies were used for collaboration. Email was utilized for less time-sensitive communication such as sending drafts of written material among group members. Instant messaging was identified as the most often used means of electronic discussion, as this technology utilizes the features of a chat room while allowing for ease of multitasking while working with other software applications.

Students confirmed that the group process was effective for developing the case study project. Groups found sharing the workload and professional interaction among group members to be very helpful. Having the opportunity to communicate with the case study "patient" electronically was an important factor in obtaining additional, important assessment data.

A limitation of this study is the small number of participants. Data continues to need to be collected so that the population can be expanded to a more statistically appropriate number.

Conclusion

The use of Computer Mediated Communication (CMC) is useful and effective for case study communication and collaboration in this study. However, online discourse can be affected by circumstances of student groups. Within this study, the use of mBlog for student and "patient" communication during the case study project was an effective asynchronous CMC. The use of CTools Chat was not found to be effective because of its synchronous format. Alternative CMCs (email and instant messaging) were utilized by students for collaboration during case study project development, and were used in addition to face-to-face and telephone communication. CMC has the potential to provide an effective means of communication and collaboration when the technologies align with the purpose of the project and compliment the dynamics of student groups. Further study is needed to continue to explore this effectiveness.

Acknowledgements

Notes

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References

1. Srinivasan M, Wilkes M, Stevenson F, Nguyen T, Slavin S. Comparing problem-based learning with case-based learning: effects of major curricular shift at two institutions. *Acad Med.* 2007;82(1): 74-82.
2. Chuang S, O'Neil HF. Role of Task-Specific Adapted Feedback on a Computer-Based Collaborative Problem-Solving Task. National Center for Research on Evaluation, Standards, and Student Testing (CRESST). Los Angeles, CA. June 2006.
3. Curtis R. Analyzing students' conversations in chat room discussion groups. *Coll Teach.* 2004;52(4): 143-148.
4. Martindale T, Wiley DA. Using Weblogs in scholarship and teaching. *Tech Trends.* 2005;49(2): 56-61.
5. Yagelski RP, Grabill JT. Computer-mediated communication in the undergraduate writing classroom: a study of the relationship of online discourse and online discourse and classroom discourse in two writing classes. *Comput Comp.* 1998;15(1): 11-40.
6. Smith SE, Potoczniak A. Five points of connectivity. *EDUCAUSE.* 2005;40(5): 30-40.
7. de Lang BA, Dolmanns DH, Muijtejens AM, van der Vleuthen CP. Student perceptions of a virtual learning environment for a problem-based learning undergraduate medical curriculum. *Med Educ.* 2006;40(6): 568-575.
8. Ray J. Welcome to the blogosphere: the educational use of blogs (aka edublogs). *Kappa Delta Pi Record.* 2006;42(4): 175-177.
9. Polling C. Blog on: building communication and collaboration among staff and students. *Learning and Leading With Technology.* 2005;32(6): 12-5.
10. Ferdig RE, Trammell KD. Content Delivery in the Blogosphere. *T.H.E. Journal.* 2004;31(7): 15-20.