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Collaboration Through Community Interaction: The CAMS© Environment

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ABSTRACT

A concern in the education community is that as more technology is applied to course-related activities, the educational process will become less personal and interactive. However, this does not have to be the case. The Community/course Action/interaction Management System (CAMS©), described in this paper, is a course management system that fosters a sense of community and encourages collaboration through a number of features and functions.

INTRODUCTION

The education field, as with most business organizations, must adapt to fit the changing needs and expectations of the target market. One strategy is to deploy technology to support the
education process. To be effective, however, these technologies must do more than automate existing practices; they should improve the process of education (Marjanovic, 1999). New technology support should be developed in such a way that it fits into the existing culture. Ideally, it will develop from within the educational environment, rather than be imposed from the top. Technologies that don’t fit the culture or that enforce the existing norms are likely to fail (Franklin, 2001; Warschauer, 1998).

The concept of collaboration is defined in the Merriam-Webster dictionary as “to work jointly with others or together especially in an intellectual endeavor.” Collaboration is an important part of learning. Learning is more than knowledge acquisition; instead it is a process of interaction that occurs in social relationships within a community (Field, 2002). New technologies should allow students to engage in communication and collaboration activities that increase the learning potential (Warschauer, 1998).

Another factor that comes into play when designing computer-enhanced education environments is the context of communication. “The US, Canada, and northern European nations are defined as low-context cultures, meaning the verbal content of a message is more important than the medium – the setting in which the message is delivered” (Gundling, 1999, p. 29). However, in student populations which are made up of a large percentage of students from Asia and the Middle East, cultures where context plays a much more important role in communication, special consideration must be given to methods of adding context to the communication medium. In other words, technology has not replaced the need to look collaborators in the eye (Franklin, 2001).

Stoney and Wild (1998) view the interface as the most important factor in using IT for education. IT interfaces should be “realistic, easy to use, provide opportunities for exploration, engagement and learner control” (Field, 2002, p. 25).

This paper discusses a particular technology, a homegrown course management system, which addresses the issues examined above. In the next section the driving forces behind the development of the system and its features are described. The remainder of the paper evaluates the collaborative nature of the system.

BACKGROUND

The Community/course Action/interaction Management System (CAMS©) evolved over the course of approximately two years from a fairly simple grade reporting system to a full-blown course management system. It was initially created by one faculty member, with input from several others, and modified by that faculty member and several graduate students. Input was sought from all those who used CAMS©, both faculty and students.

The goal was to create a system that was participant-centric, community-oriented, functionally robust, and readily adaptable. A participant-centric system is not only user-friendly, but it also provides the user/participant with an ability to customize the environment to best fit the participant’s needs. Community-oriented systems enable the users of the system to interact
together, whether on a one-to-one basis or in larger groups, and provide means for getting to
know others in the group. Whereas at times it seems that being functionally robust and being
adaptable are conflicting goals, CAMS© has accomplished both by using a modular approach
and Active Server Page (ASP) technology. Refer to Table A in the Appendix for a comparison
of CAMS with two commercially available class management systems.

SYSTEM FEATURES

The current version of CAMS© includes the features described below. A student, faculty
member, or community member could belong to several CAMS© communities. Therefore, upon
accessing CAMS®, the user chooses which community/course to enter from the list of those
displayed.

In addition to basic navigation, the Homepage contains current announcements and a link to all
previous announcements, information on those enrolled in the community/course, details on who
in the group is on-line at the time and how to send an Instant Message to the group. (See
Appendix A for a sample homepage.) The details provided for each group member are:

- Student’s picture, which is linked to student defined information about themselves
- Phonetic spelling of name
- Nickname
- E-mail address
- Link to Send an instant message to this student (IM)
- Link to Student Web presence (personal and/or course-related)

Available from the navigation menu are several links to course/community details: Information,
Assignments, Notes corresponding to classes or communities, and Bookmarks. Bookmarks
allows faculty, student, or member to create bookmark areas and URLs. Each bookmark will
contain the URL, a short title, an explanation, and the picture of the link creator. The link creator
(faculty, student, or member) can edit or delete the link.

Students can use the Calendar as a personal planner. All assignments and schedules for any
class the student is in will automatically show up in the calendar. Students can add other events
to the calendar, which are only seen by the student. Additionally, faculty members can share any
events in their personal calendars with all of their students. The Schedule includes the date,
module information, to do list and deliverables list.

Within CAMS®, participants can Chat in real-time. The display includes the picture and names
of all participants currently in chat. The messages are displayed by date and time in descending
order with the picture of the message creator and date created displayed next to the message.
Participants can use the chat search option to search the archive of messages for messages with specific words or phrases and/or by date created.

Faculty can create Projects and add or remove students from the projects. With a faculty-specified option, students can create projects and add themselves to a project. Once in a project participants can add topics to a project and add/edit/delete notes from a topic. They can also chat in real-time via the Project Chat feature. As with the basic chat feature, the display includes the picture and names of participants currently in the project chat and the archive of project chat messages can be searched by word, phrase and/or date.

Testing is also supported by CAMS®. Faculty can create test questions and question pools. Question types include: true/false, multiple choice, short answer, long answer (essay), Likert scales (5 or 7-point), and drop-down choice. Additionally Faculty can enable question add/edit/delete ability for students. Once a student creates a question, he or she and the faculty are the only ones that can alter or delete the question. To administer a test, the faculty member creates the test and sets the time it will be available, for a particular student and/or for the entire class. Once a test is completed all multiple choice, true/false and dropdown choice questions are graded immediately. When the faculty member is ready to grade the test, s/he can grade tests one-by-one or grade a specific question for all students at the same time. As they grade questions they can put a checkmark next to answers they feel best answer the question. Testing feedback makes this feature particularly valuable. The student can display their test which will include all of their answers and points received per question and feedback per question or he/she can select “view correct answers.” Once they select a question their answer, points received and feedback would be displayed along with the answers, points and feedback of those answers the faculty had marked as being the best answers.

Faculty and students can create Discussion threads or topics. Once a topic is created a faculty or student can add a message to the thread. A faculty or student can alter or delete any message they created. The faculty can restrict access to any topic. If the topic is restricted the student can see the titles of all messages but can only open his or her own. A student cannot modify the message if it is restricted but can copy it to a new message and submit it. Once the faculty removes the restriction all students can see all messages not just the titles (This gives the student the ability to share information with the faculty only or with all other students).

As the result of student feedback, a Book Exchange was added to CAMS®. Participants can add items to exchange such as books or other materials and these are displayed as available to students in all classes.

In the Grades feature, assignments of various types can be created by the faculty. Each assignment type can be weighted. When a faculty creates an assignment a grade-sheet is automatically created as well. Assignments can be graded one assignment at a time for all students or multiple grades for a particular student can be entered at one time. The grading for each assignment per student includes points and feedback. The student can go in at any time and see their scores and averages per assignment type and their overall percentage.
Instant Messaging (IM) is available. Clicking on the link displayed with the participant’s photograph sends messages. With Check IM the student or faculty is able to display the messages sent to them by others. Each message includes a picture of the message sender and the time sent. The user can reply to or remove messages as needed.

In addition to the features described above, in CAMS© each user can define three links. These user-defined links can be changed as frequently as needed. The links open a new window so that the user does not have to leave CAMS© to access those sites.

Ease of use is emphasized in CAMS©. The system uses the 3-click rule. “Usability studies found that typical web users want to get to a content location within a maximum of 3 clicks. This metric minimizes the number of times a visitor has to wait for page loading and the time taken to visually scan the page for the next link to send them on their way to their destination [and] that good web sites use a broad and flatter structure and not a narrow and deep structure” (AssetNow).

The ease of use and participant-centric focus of CAMS© is not unintentional. As discussed in the previous section, collaboration and a feeling of control over one’s environment are essential to learning. The following section discusses various types of collaboration in more detail, highlighting the CAMS© features that support collaboration, empowerment and sense of community.

**ENHANCING COLLABORATION WITH CAMS©**

From studies related to learning, we know that collaboration with others in the learning community is important (Warschauer, 1998; Field, 2002). This collaboration can take many forms, such as working together on a joint assignment or sharing ideas via open discussion in the classroom. In courses supported by CAMS©, technology provides more avenues for collaborative activities. In this section we will evaluate CAMS© based on types of collaboration and on the sense of control the participant has. Here, we will address collaboration along two dimensions: Indirect/direct, and asynchronous/synchronous. Each of these is defined in Table 1. Issues related to participant control are empowerment and ownership. In this context, we view empowerment (E) as having the ability to access (view) information 24/7, whereas ownership (O) refers to the ability to author (view, add, edit and delete) information at any time. Because the faculty for a course (or the “facilitator” of a community) has somewhat different capabilities than a student or member, the features are assessed from both the faculty and the student perspective. In addition, data collected from participant surveys during the two years that CAMS© has been interspersed to give a participant view of different system features.
Brian Mackie, Nancy L. Russo, Norbert Ziemer, Wayne Mackie

<table>
<thead>
<tr>
<th>Type</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Indirect Asynchronous Collaboration (IAC)</td>
<td>A participant has the capability to post or modify information and others can access that information.</td>
</tr>
<tr>
<td>Direct Asynchronous Collaboration (DAC)</td>
<td>A participant has the capability to post or modify information and others can modify that information.</td>
</tr>
<tr>
<td>Indirect Synchronous Collaboration (ISC)</td>
<td>A participant has the capability to post or modify information and other community participants can access that information in “approximate real time.”</td>
</tr>
<tr>
<td>Direct Synchronous Collaboration (DSC)</td>
<td>A participant has the capability to post or modify information and other community participants can reply back or modify the posted information in “approximate real time.”</td>
</tr>
</tbody>
</table>

Table 1: Four Types of Collaboration

CAMS© was analyzed using the definitions above. The features were evaluated from both the student perspective and the faculty perspective. The type of collaboration, based on the table above, and the empowerment or ownership embodied in the feature is identified in parentheses in the discussion. For example, (DAC, O) would mean that the feature provides direct asynchronous collaboration and ownership. As an example, consider what happens when a user logs in to CAMS©. The user selects which course or community he or she would like to access. This feature is owned (O) by the faculty member and both faculty and students are empowered (E) to view the data. It classified as IAC (Indirect Asynchronous Communication) for the faculty member because faculty can change the availability of a class, and the results are available to students the next time they log in. In fact, every feature of the system can be classified as IAC for the faculty member. This and the remainder of the analysis are summarized in Table 2 at the end of the section.
CAMS® was designed with ease of use in mind. From the homepage (see Appendix A), with three clicks or less, a student can access a list of all class announcements in descending order and can read any particular announcement (E).

It is very easy to use and everything is under a separate tab. For example if you just need to print lectures you don’t have to go through 5 options but right to lectures. – Intro to MIS student

The students or faculty can easily add or modify their own personal picture, phonetic spelling, nickname, web presence link, email address and other information about themselves (O, IAC). He or she is able to access the above information on any other community participant (E). By including photographs and some personal information for all the participants in the class or community, more context is provided for the technological interface. This makes communication between participants easier and increases the sense of community.

You can get to know your classmates because the pictures are posted and you can learn names instead of calling them hey you. It makes me feel more comfortable to go up and talk to someone I don’t know just because I know their name –

Statistics student

I really enjoyed the pictures of everyone. It helped put a face to the name of the people you are in class with. Also, it really helped me learn who everyone was, even if I didn’t work with them during the class.

– Accountancy student

It allowed you to communicate with your classmates. It had pictures of everyone to make the class closer.

– Intro to MIS student

Any participant can click on the IM icon next to a participant’s picture to send them an instant message (O, ISC). The instant they send the instant message it is available to the receiving participant (E).

I liked being able to contact my classmates. It made it much easier to get things done – Database student

I liked the IM capabilities of CAMS because it increased the availability of communicating better with classmates along with the professor – Database student

IM - Best communication tools for CAMS users in the same class. Better, faster, and more convenient than sending e-mail. And you don’t even need to copy and paste other’s email address, just click the picture or IM button. – Graduate student

The Homepage also provides faculty-created links (IAC, O) to announcements, class information, assignments, schedule, and notes (E).
**Check Instant Messages**

Here participants can click on CK IM and see any instant messages that have been sent to them (E). They see the message, the picture of the sending participant and the time it was sent. They can reply to message (O, ISC) and either save the message to access later or discard the message (O).

**Chat**

Chat can be used to communicate with other participants (both students and faculty) in approximate real-time (O, ISC). The photos of all those currently in chat are displayed, and the photo of the sender is displayed with each message, thus adding a personal touch to the interaction. In addition, chat messages are archived for later search by topic or date (E).

*It fostered camaraderie - helping us to get to know one another.* – Finance major

**Calendar**

Participants can put any event into the calendar (O). Once the faculty member has entered assignments and scheduled events (IAC, O), they are automatically displayed by title on the appropriate day in the calendar. If the date is clicked, complete details about personal events, assignments and schedule events for that day are displayed (E).

*All the links made it easy to see what needed to be done* – Database student

*It helps us focus on the assignments given.* – Finance student

**Threaded discussion**

Faculty and/or students can create both topic areas and messages within a given topic (O, ISC). These messages and topics can be viewed by the other participants (E). The faculty can restrict a topic (DAC, O). Once the topic is restricted, a student can add a message to the topic or go into edit and copy the modified message to a new message. Under a restricted topic, students can see their own complete messages but can only see the titles for all other messages. This makes it possible to use the discussion board as a drop box for assignments.

*I liked dropping off my assignments/papers in the discussion board. Since my classmates were doing the same, it gave me the opportunity to review their work and compare them to mine.* – Finance student

*On the Discussion Board I was able to post questions that I did not ask in class* – Accountancy student

**Project Management**

Faculty create and add students to projects or can allow students to create projects and join projects (O, DAC). Once a project is created the project members can add topics to the project
and notes to the topics. Once a topic or note has been created, any student can modify/or delete it (O). Modifications to project notes can be done by multiple participants at virtually the same time (DAC, DSC). Project members can also interact via project chat in approximate real time (O, ISC). Pictures and names of participants who are online are displayed, which provides more context to the communication.

_The project management tools are very good collaboration tools for a group to work on a project and keep track of the project documents._

– Graduate student

_Project management tools are easy to use; everyone can see, add, and update notes. A good place for a team to work together at different locations._ – Graduate student

**Bookmarks**

Participants are able to add bookmarks and bookmark groupings (O, IAC). A bookmark includes the URL, a short title and an explanation or purpose of the bookmark. Once created the bookmarks are viewable by selecting the bookmarks tab and selecting a specific grouping such as databases or good collaboration websites. All bookmarks in that grouping will be displayed including the link, title, explanation and the picture of the creator of the link (O, E). Faculty can make changes to any bookmarks (DAC).

_Bookmarks are good for students to share useful links._ – Graduate student

_The bookmarks made the page a little more personal._ – IS major

**Testing**

Testing includes creating questions, question pools, tests, test administration and student viewing of their corrected tests and correct answers. A test is made of questions retrieved from question pools. The faculty can create questions of different types and store them in multiple question pools. They can then create a test by adding questions from one or more question pools (O). Once a test is created the faculty can make the test available for a specific timeframe and can optionally make it available at other timeframes for specific students. Students are able to create/modify/delete questions from one pool called Student Questions (O, IAC, ISC), which the faculty member may elect to use in identifying test questions (E).

The faculty can grade one test for one student or grade one question from a test for all students. They are able to give a score and feedback for each question and optionally select student answers that they want to display (O). Students can optionally view their graded tests including scores and feedback per question or view test question correct answers (E). When they view correct answers they first select a specific question from a test. Then the question is displayed along with their answer, score for that question and the feedback they received for that question. Additionally answers the faculty selected as exemplary are displayed along with points given.
and feedback. This gives the student an additional resource when trying to understand test questions and exactly what was expected.

**Grading**

Assignments are broken into groups called assignment types. The faculty can create as many assignment types as needed. The default types are assignments, quizzes, projects and tests. An assignment is created as a specific type and a grade-sheet is automatically created. The assignment can be graded using criteria based grading where the assignment is given a set of grading criteria and then when grading that assignment the faculty is able to grade each criteria separately giving a score and feedback or using standard grading each assignment has just one score and feedback (O, ISC). When grading one assignment for all students the faculty will see a list of student pictures and be able to enter a score and feedback for each student for the given assignment. Optionally the faculty can grade all assignments for a specific student (O, ISC).

Students are able to see their score, feedback and percent for each assignment, score and percent for each assignment type and their overall score and overall percentage as soon as the grading is posted (E).

_I liked the grades link in which we were able to check grades throughout the semester because they were updated on a timely basis_ – Database student

**Three User-Specified Links**

Students and faculty can add up to three URL’s to web pages or tools they feel are useful to themselves or to others in the class/community (O). This allows participants to personalize their information to some degree, which helps others get to know them better, and also provides an additional means for learning from each other (E).

**Book Exchange**

Students can add books or other materials to trade with other students. Any student in any class or guests can access the book exchange system to search for items and contact the student offering the item (ISC, O, E). Faculty can make modifications to listings as necessary (DAC).

**Additional Features**

Participants are always aware of who else is currently using the class system. Pictures of all participants in a class who are logged into the system are displayed at the bottom of each webpage. From this it is very easy to contact co-participants by simply clicking on the photograph to send an instant message (O, ISC). In this sense students feel that they are studying together in the same virtual place. In addition there is a link to GOOGLE and a link to a multi-language dictionary (O, E), which can aid communication between participants and highlights the need to be aware of the diversity of the community.
<table>
<thead>
<tr>
<th>Feature</th>
<th>DAC</th>
<th>IAC</th>
<th>DSC</th>
<th>ISC</th>
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Table 2: Features related to collaboration, empowerment and ownership.

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
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<tr>
<td>DAC</td>
<td>Direct Asynchronous Collaboration</td>
</tr>
<tr>
<td>IAC</td>
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<td>DSC</td>
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<td>E</td>
<td>Empowerment</td>
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<td>Faculty</td>
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<td>S</td>
<td>Student</td>
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</tbody>
</table>

TABLE 3: LEGEND OF ABBREVIATIONS USED IN TABLE 2

DISCUSSION AND CONCLUSION

The features and functionality within CAMS© are designed specifically to be participant focused. This means the interface is user friendly and enables the user to navigate intuitively (see Figure A, Appendix). It also translates into an unusually high level of empowerment, allowing the user (student or community participant) to customize user-specified information.

Many of the features within CAMS are multi-user areas for collaboration, which allow the user to post ideas, share resources and reference materials, as well as engage in a discourse. These can benefit teams as well as an entire community or class. The reason for this goes back to the initial objectives of the system. At the onset, the vision for CAMS© was for a participant centric interface. The idea was that this system would optimize the “best of both worlds” (face to face and online). This is a radical departure from the design of the commercially available course management systems. It was believed that CAMS© could provide an improved method of serving our students.

The development process facilitated the current results and system advantages by incorporating a high degree of user feedback at multiple points. This was not an “all at once” development; rather the approach taken was an incremental approach, injecting new features and functionality throughout the evolution of CAMS. This approach in itself emphasized the importance of focusing on the student as the “customer” or user of the system, and was instrumental in the end results.
CAMS© will continue to evolve, as will the study of its implementation and use. Currently, two years of research data have been collected from introductory, exit, and on-going surveys. Testing is a very new feature, which has been used by only one faculty member. Therefore, there is little feedback available yet on this feature. As it becomes a commonly used function, it is possible that adjustments will be made based on participant (both faculty and student) comments. This feedback has been critical to the on-going improvement to CAMS©, and to the feeling of ownership and satisfaction experienced by the users.

**APPENDIX**

<table>
<thead>
<tr>
<th></th>
<th>WEBCT</th>
<th>CAMS</th>
<th>BLACKBOARD</th>
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<td>Yes</td>
</tr>
<tr>
<td>Messaging</td>
<td>No</td>
<td>Yes</td>
<td>No</td>
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<tr>
<td>Calendar</td>
<td>Limited</td>
<td>Fully Integrated</td>
<td>Limited</td>
</tr>
<tr>
<td>Chat Archive Available for Reference</td>
<td>No</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Online Testing</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
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<tr>
<td>Test Answer Key</td>
<td>Limited</td>
<td>Rich w/ Feedback</td>
<td>Limited</td>
</tr>
<tr>
<td>Rubric Grading</td>
<td>No</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Send Message or e-Mail *</td>
<td>Name</td>
<td>Name (incl. Phonetic Spelling) &amp; Photo</td>
<td>Name</td>
</tr>
<tr>
<td>Digital Drop Text</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Student Created Projects</td>
<td>No</td>
<td>Yes, Instructor Grants Permissions</td>
<td>No</td>
</tr>
<tr>
<td>Student Self-Select for Project Teams</td>
<td>No</td>
<td>Yes, Instructor Grants Permissions</td>
<td>No</td>
</tr>
<tr>
<td>“3 Click Rule” (maximum no. of clicks required for navigation)</td>
<td>No</td>
<td>Yes</td>
<td>No</td>
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</table>
Brian Mackie, Nancy L. Russo, Norbert Ziemer, Wayne Mackie

<table>
<thead>
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<th>User Defined Links **</th>
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<th>Yes, multiple locations</th>
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<td>Peer-to-peer Interactivity</td>
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<td>Highly Interactive</td>
<td>Limited</td>
</tr>
<tr>
<td>Peer-to-faculty Interactivity</td>
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<td>Highly Interactive</td>
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** Includes bookmarks (e.g. within a discussion forum, to benefit the entire community) and favorites in the toolbars (to assist the individual user).

* A system user can identify the intended recipient by name or picture. This feature was integral to the initial system design and is therefore incorporated throughout CAMS (incl. “Chat,” “Teams,” “Messaging,” “Home Page,” “Bookmarks,” “Calendar,” “Grading” and “Members Online” displays.)

Table A: Comparison of Major Course Management Systems
FIGURE A: CLASS HOME PAGE
REFERENCES


