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The Web

The World Wide Web is a worldwide connection of computers which enables users to easily view text, graphics, sound, and video from any computer with Internet access. The web allows users ("web surfers") to easily jump from one "web site" to another by clicking on hyperlinks, which might be text or graphics. The amount of information available on the Web has grown exponentially in the past several years. Organizations and individuals who develop and maintain web sites do so to share information, advertise products and services, enable online shopping, and engage in interactive processes with suppliers, dealers, and customers (Warkentin, 1995; Warkentin and Sayeed, 1995). The Web also makes it possible to collect information with forms, to conduct worldwide "web searches," and to enable exciting new ways of delivering educational services to college students.

The authors developed class resources web pages for their classes, in which the students may access lecture notes, study tips, practice test questions, office hours, announcements, and so forth. They may also use the links in the class pages to find additional web sites of interest. Furthermore, they have used a proprietary web-based computer conference system to link their students, enabling them to engage in remote collaboration.

MeetingWeb™

One of the useful tools that facilitates collaboration among Web users is the "MeetingWeb™" conference system. The MeetingWeb™ is a moderated web-based bulletin board which allows participants (who are issued passwords) to post topics and comments anytime day or night. The instructor can "seed" the conference with interesting or provocative topics; students may also begin their own topics. This creates a 24x7 virtual classroom discussion in which anyone can participate even if they are normally shy. Or a user may simply read the comments of others without contributing. Students can also post their project reports online to be graded and read by others. The MeetingWeb™ is an asynchronous computer conferencing system which provides asynchronous textual communication capabilities to its users. Figure 1 shows a representative screen of the MeetingWeb™ conference system. MeetingWeb™ permits group members to communicate by "posting" messages in a hierarchical manner. A message can be posted as a new *comment* (leftmost in the hierarchy), as a *reply* to a comment (indented under that comment), or as a *reply* to a reply. The indenting scheme appears as a familiar outline format; this intuitive structure makes the organization of the messages clear and unambiguous. Furthermore, the source of each message is clearly identified; the system provides eponymity.

"The interface is the system for most users. However well or poorly designed, it stands as the representation of the system" (Kendall and Kendall, 1995). MeetingWeb™ was designed to have a familiar look and feel to users of the World Wide Web, a new standard platform for computer communications. The system is easy to use; pilot tests confirmed that the students could learn and use the system with only a brief introduction. Characteristics of the system other than its ability to facilitate communication between team members did not appear to be a factor in the study. One feature of the system, namely its default feature of displaying only new or previously unread comments, unless configured to show all comments, may have slowed the adoption by a few participants until the feature was demonstrated to them. This unanticipated anecdotal factor, however, ceased to distinguish between groups once all participants were "retrained" to reconfigure their views.

The Project

MBA students at the host institution were teamed with students at another school to engage in a research project for which they were tasked with using the web search engines to find information pertaining to assigned topics related to Information Technology. The students at both universities were encouraged to organize their teams and to assign responsibilities via the conference or via email. They were asked NOT to use the telephone. The final reports were posted on the conference online rather than submitted on paper! And the reports contained actual hot hyperlinks to the web sites they uncovered in their research. Their work was also graded online with temporary easy detours to the websites they placed (linked) into their reports.

Research Questions

An instrument was designed to assess students' experience with the system. The instrument consisted of 26 items. The instrument included a thirteen item satisfaction measure specific to Computer-Mediated Communication Systems (CMCS). Participants responded to each measure on a five point Likert scale. These CMCS satisfaction measures have been compiled and validated by Hiltz and Johnson (1990). Further, the instrument measured students' propensity to use the telephone, the participants' self reported general computer skills and Web skills, the student teams' coordination activities, and the skills the students acquired from working in virtual teams using the MeetingWeb™. Following are the research questions of the present study.

1. Does a student's general computer skills and experience with the Web influence the satisfaction with the CMCS?

2. Does the Web-based conferencing system enhance a student's skills in using Web search engines?

3. Does the Web-based conferencing system enhance a student's knowledge about the assigned research topic?

4. Does the Web-based conferencing system enhance a student's ability in working with remote partners,

5. Does the Web-based conferencing system enhance a student's skills in using email?

Results

To investigate the first research question, we asked the students to rate their general computer skills and World Wide Web skills. The responses were classified as either Novice or Experienced users in these two categories. Novice users were classified as those that responded with either a one or two (Newbie or Novice) and Experienced users were classified as those that responded with either three, four, or five (Intermediate, Strong, or Expert). The only significant difference on the mean responses on the user satisfaction was on the language of the system. Experienced users felt the language of the system was more courteous than novice users. Although other differences were not significant, experienced users tended to be more favorable about the mechanics of the system while novice users tended to be more favorable about the quality of the communication. Similarly, based on the students' Web skills, the only significant differences were that experienced users found the language of the system more courteous and the system easier to learn. Experienced users tended to respond more favorably about the mechanics of the system as well as the quality of communication. We further analyzed the differences between experienced and novice users by conducting a MANOVA using the two experience variables as independent variables and the items on the user satisfaction instrument as dependent variables. Though there was no difference between the two groups for the general computer skills variable ($F[13,24] = 1.31$ $p=.2743$), there was a significant difference between the two groups for the Web skills variable ($F[13,24]=3.04$ $p=0089$). Based on the examination of the mean responses mentioned above it appears the users who were more experienced with the Web were more favorable toward the conferencing system.

For research questions 2 through 5, the responses were generally favorable except for "Working with remote partners" and "email." The overall response for these items was below 3 which indicates a neutral response. The only differences between the two sites was that students at Northeastern reported learning significantly more about the Web and also about searching on the Web. However, they also report lower Web skills prior to the project. Most students reported learning from the project. One of the reasons for the meteoric rise of the Web and corporate "intranets" is that the interface is intuitive and easy to learn for most people. Using Web technologies it is possible to develop powerful, feature-rich communication systems with relatively little effort and at the same time use an interface that many people are already familiar with or can learn easily. It's relatively easy and inexpensive to add audio, video, graphics and animation to the system and the technology is changing rapidly. Researchers will be hard pressed to keep abreast of the developments in this area as people adopt and reinvent the technologies in unforeseen ways.

Conclusions

This was these students' first experience engaging in technology-supported collaboration with partners they have never met and likely never will! These virtual teams parallel a significant new trend in American business of forming virtual corporations with remote business associates using telecommunications, groupware, and other collaboration-support technologies. The students learned about 1) the Web, 2) Web search engines, 3) the topic they investigated, and 4) technology-supported collaboration with remote partners. The technology enabled the instructors to extend the classroom while creating a new learning paradigm and enhancing the learning experience. This system will be demonstrated and results and findings will be discussed.

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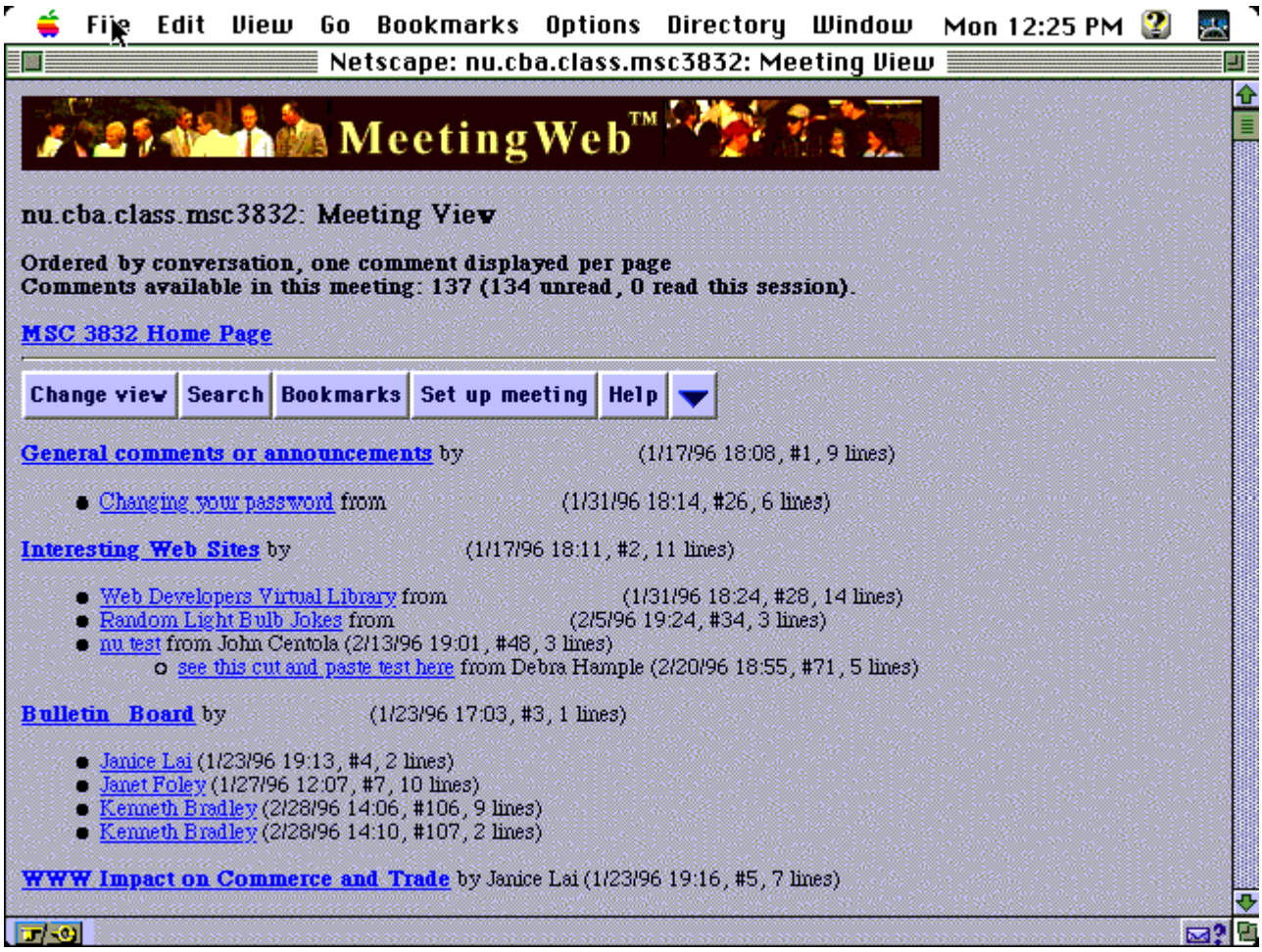
Figure 1
MeetingWeb™


File Edit View Go Bookmarks Options Directory Window Mon 12:25 PM
Netscape: nu.cba.class.msc3832: Meeting View
MeetingWeb™
nu.cba.class.msc3832: Meeting View
Ordered by conversation, one comment displayed per page
Comments available in this meeting: 137 (134 unread, 0 read this session).
MSC 3832 Home Page
Change view
Search
Bookmarks
Set up meeting
Help
General comments or announcements by (1/17/96 18:08, #1, 9 lines)
Changing your password from (1/31/96 18:14, #26, 6 lines)
Interesting Web Sites by (1/17/96 18:11, #2, 11 lines)
Web Developers Virtual Library from (1/31/96 18:24, #28, 14 lines)
Random Light Bulb Jokes from (2/5/96 19:24, #34, 3 lines)
nu test from John Centola (2/13/96 19:01, #48, 3 lines)
see this cut and paste test here from Debra Hample (2/20/96 18:55, #71, 5 lines)
Bulletin Board by (1/23/96 17:03, #3, 1 lines)
Janice Lai (1/23/96 19:13, #4, 2 lines)
Janet Foley (1/27/96 12:07, #7, 10 lines)
Kenneth Bradley (2/28/96 14:06, #106, 9 lines)
Kenneth Bradley (2/28/96 14:10, #107, 2 lines)
WWW Impact on Commerce and Trade by Janice Lai (1/23/96 19:16, #5, 7 lines)