



ELSEVIER

Internet and Higher Education 7 (2004) 281–297

**THE INTERNET
AND HIGHER
EDUCATION**

Hybrid structures: Faculty use and perception of web-based courseware as a supplement to face-to-face instruction

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Abstract

The researchers examined responses from 862 faculty members at 38 institutions nationwide using the blackboard Learning Management System (LMS) to supplement their face-to-face instruction. The four research questions addressed the primary uses that faculty make of blackboard, perceptions that faculty have of how certain blackboard features enhance or elevate (or might enhance or elevate) their assessment of student work and instructional capabilities, and how faculty use of blackboard might positively affect the psychosocial climate within the face-to-face classroom setting. Additional analysis sought to identify the factors that predict use and positive perception of blackboard as a supplement to face-to-face teaching activities. The results indicate that faculty primarily used blackboard as a course management/administration tool to make course documents available to students and manage course grades. Few faculty used blackboard for instructional or assessment purposes, and even fewer utilized blackboard to foster a more positive sense of community within their face-to-face classes. Faculty attitudes, on the whole, were positive when it came to the classroom management functions of blackboard, but neutral or otherwise undecided in terms of its instructional or psychosocial benefits. The main factor in determining blackboard usage—whether for course administration or instructional purposes—was experience with the tool. In addition, women had more positive attitudes than men did in terms of blackboard's potential to enhance classroom management and foster a

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positive relational climate. Limitations of the study and suggestions for future research are discussed before concluding.

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Keywords: Blackboard; Augmentation; Hybrid; Online user education; Faculty; Assessment; Instruction; Classroom administration; Community; Learning management systems

1. Introduction

The relatively recent advent of Learning Management Systems (LMS), such as blackboard, eCollege, and Web CT, in the undergraduate setting has made it easy to provide “online user education,” that is, web-based augmentation to traditional (face-to-face) classroom instruction (Rutter & Matthews, 2002). This “hybrid” or mixed delivery approach lets instructors combine the advantages of online class learning with the benefits of face-to-face interaction with relatively limited technological sophistication on their part (Edling, 2000). Preliminary reports suggest that the hybrid approach holds significant benefits for students and instructors, regardless of their level of technological expertise (Black, 2001; Van de Ven, 2002) and regardless of whether the classroom is hard-wired for live Internet access (Bento & Bento, 2000).

Although teaching hybrid courses may increase time demands and, in some cases, result in a loss of control, many faculty enjoy this approach because it allows for significant flexibility and benefits in instruction. A hybrid approach may improve the efficiency of classroom management, especially for large classes (Papo, 2001), increase the degree of student-led learning (Saunders & Klemming, 2003), improve student morale and overall satisfaction of the learning experience (Byers, 2001), enhance information skills acquisition and student achievement (Kendall, 2001; Novitzki, 2000), and may even reduce student withdrawals and absenteeism (Sorg, Juge, & Bledsoe, 1998). In light of such positive effects, not to mention the cost efficiency of a hybrid approach—an attractive feature for institutions faced with shrinking budgets and classroom space—Brown (2001) posits that, in the future, institutions will design most courses by “the 90–10 Rule” (p. 22). In other words, a mix of face-to-face and online instruction (somewhere between 90% and 10% and 10% and 90%) will be superior to either 100% face-to-face or 100% online courses.

2. Faculty use of web-based courseware in traditional instruction

Faculty can use web-based courseware to augment traditional instruction in several ways. First, under the umbrella of classroom management and administration, faculty may use it as a form of knowledge presentation (Nelson & Palumbo, 1992), that is, to present knowledge in organized collections of information and ideas. In this way, instructors use blackboard as a “course home page” to make course documents, lectures, and other information available to students in an effort to more efficiently manage classroom procedures (Bento & Bento, 2000; Bunker & Vardi, 2001). Direct and organized links to course-related websites, journals, and current events are possible with

most courseware. Students report that such content connections help to bring the material alive and make it relevant to everyday life (Chuang, 2002). Additional classroom management features include class announcements, collecting and returning assignments, sending email, and the online gradebook.

Second, faculty may use web-based courseware for assessment purposes. “Just-in-time” teaching lets instructors review students’ online interaction and understanding “just” prior to a face-to-face session and then adapt classroom teaching accordingly (Wheeler, 2002). Test generators allow the faculty to create, administer, and automatically grade examinations that provide students with immediate feedback on the correctness of their responses (McGroarty et al., 2004). Byers (2001) describes “interactive assessment” in web-based learning environments as promoting dynamic feedback and course corrections “on the fly” (p. 362). Accordingly, more frequent and more convenient data collection allows for a more robust feedback loop, which, in turn, promotes more objective or precise achievement of predetermined learning outcomes.

Third, as part of both instructional and assessment activities, web-based courseware may be used by faculty to support class and small-group discussion. Instructors can promote knowledge construction by actively engaging students online to make sense of subject matter content. It is well supported that effective learning in web-based environs requires interaction and collaboration among learners (Kearsley, 2000; Palloff & Pratt, 1999, 2001). Instructors in the hybrid model can draw from online learning practices and use bulletin boards or live chat just prior to or just after discussions that occur during face-to-face sessions (Chuang, 2002). In small-group settings of five to eight students, discussion questions that require students to examine topics, apply the information and concepts to new situations, and draw inferences and elaborations from the information or synthesize information from several pages might be used. Furthermore, these class and group discussion scenarios can be used to promote active or student-centered learning. For instance, students can be directed to search for, interact with, discuss, and report back to the class on models, graphic representations, or a host of other web-based resources (Den Beste, 2003). Several practitioners have reported that the combination of face-to-face instruction with online discussion in such ways may actually influence the quality and quantity of interaction in face-to-face settings (King, 2001; Rutter & Matthews, 2002; Saunders & Klemming, 2003).

A fourth albeit less common use of web-based augmentation—although a staple in online courses—revolves around the creation and maintenance of classroom community. One of the challenges in the hybrid approach relates to the loss of some face-to-face student contact, which means that instructors must pay careful attention to personalizing the online exchange. Effective online instructors have come to realize that building a sense of “community” is necessary for successful learning outcomes (Gunawardena, 1994; Gunawardena & Zittle, 1997; McLellan, 1999; Wegerif, 1998; Wiesenbergh & Hutton, 1996). Many online instructors build a sense of connectedness and social presence in online courses through verbal and nonverbal (textual) immediacy behaviors (Baringer & McCroskey, 2000; Vrasidas & McIsaac, 1999), which, in turn, may be experienced vicariously by students in the learning process (LaRose & Whitten, 2000). Other online instructors use personal nonsubject matter specific discussion folders, such as autobiographies or “Virtual Café” to foster a positive psychosocial dynamic (Woods & Ebersole, 2003). In this case, Walther’s Social Information Processing Theory? these folders allow for increased social interaction and may enhance students’ opportunities for content-related exchanges over time.

2.1. Statement of the problem

Although web-based instructional models (WBIs) are prevalent, few delivery models reflect a mixed approach that combines live instruction with web-based delivery systems. Resource-based learning environments (RBLE; Hill & Hannafin, 2001) and web-based instructional resource models (WBIR; Byers, 2001) are helpful as design methodologies but are pedagogically neutral and do not imply a particular form of learning or learning process (p. 360). Consequently, organized faculty development or training in the hybrid approach tends to be lacking at most institutions (Fahey, 2000). There tends to be little consistency in how instructors use web-based systems to support face-to-face instruction and few guidelines in relation to course size, year in school, perceptions of technology, learning style, and so forth. As Healey (1998) observes, most studies are related to a very specific teaching content or scenario and cannot be generalized.

Few studies to date have quantitatively described specific faculty use of web-based augmentation or have sought to identify patterns of uses or outcomes associated with such use (Parker, 2000). Reports from early adopters on suggested “best practices” are typically based on a small number of faculty within a given department of study who possess higher than average levels of technological savvy or who have some specialized training in web-based learning (e.g., Bunker & Vardi, 2001). There is considerable concern that rapid adoption of hybrid models might fail as a result of the inability of the faculty to adapt their teaching to suit the technological environment (Harasim, 1991; Saunders & Klemming, 2003).

As a first step toward more fully understanding how faculty of varying levels of technological and teaching experience from a variety of disciplines use web-based courseware to support traditional instruction, the researchers administered a web-based survey to faculty using the blackboard Learning Management System (LMS) at over 50 institutions nationwide. The following research questions were proposed in an attempt to identify faculty use patterns and perceptions of pedagogical effectiveness of web-based augmentation in face-to-face classes:

RQ1: What primary uses do the faculty make of blackboard to support or otherwise augment their face-to-face instruction? What course areas and features do faculty use most often? For example, are they more likely to use blackboard for classroom management/administration than instructional purposes?

RQ2: What perceptions do faculty have of how certain blackboard features enhance or elevate (or might enhance or elevate) their assessment of student work and instructional capabilities in the face-to-face classroom setting? For example, do they perceive blackboard as contributing to the development of students’ critical thinking skills and overall enjoyment of the course? Do they believe that blackboard use enhances their credibility as instructors or allows them to adapt to a greater variety of learning styles?

RQ3: Do the faculty use blackboard to foster positive psychosocial climates within their face-to-face classroom settings? Do the faculty use blackboard to build classroom community or foster immediacy? If they do, what strategies or practices do they rely upon?

RQ4: What factors predict use and positive perception of blackboard as a supplement to face-to-face teaching activities? For instance, are younger faculty more likely to use blackboard’s interactive features than older faculty? Are female faculty more likely than male faculty to use blackboard to support community building, collaboration, or interactivity? Will experience with the tool predict the frequency of use and positive attitudes toward blackboard’s pedagogical potential?

3. Methodology

3.1. Participants

A total of 862 faculty respondents from 38 colleges and universities using the blackboard Learning Management System (LMS) responded to the online survey. Fifty-nine percent (59%) were male, 39% were female, and 2% were unidentified. Sixty-one percent (61%) held doctoral degrees, 31% held master's degrees. The largest age range represented was 43–55 years (44%), 23% were over 55, 20% were 35–42, and 11% were 25–34.

The majority of respondents (57%) considered themselves somewhat or very computer literate. Almost half (48%) had taught with blackboard for more than four semesters, with another 24% having three to four semesters of blackboard experience in their classrooms. Approximately 12% had completed some formal education in the online environment, and 19% had taken continuing education or professional development courses online. Twenty percent (20%) used blackboard to teach online courses.

An overwhelming majority (83%) received blackboard training or assistance. Approximately one-third (35%) received less than 1 h of training, one-third (37%) received 1–2 h, and the remaining third received three or more hours. When asked what factors contributed to their use of blackboard in teaching, 65% indicated that they started using the blackboard out of personal or professional interest, 39% as a result of attending a training class, 29% noted strong encouragement by the administration, 27% because colleagues encouraged its use, and 11% because students encouraged them.

Finally, 90% of the faculty taught undergraduate courses using blackboard, while 23% used blackboard in graduate level instruction. Twenty percent (20%) of the faculty had been teaching at the college level for more than 19 years, 12% for 15–19 years, 18% for 10–14 years, 24% for 5–9 years, and 24% for less than 5 years.

3.2. Study procedure

At the beginning of spring semester 2003, a survey covering faculty use of blackboard augmentation was developed for administration via the Internet. The researchers' institutions were heavily invested in blackboard to deliver their online programs and to augment face-to-face courses.

The survey asked faculty to indicate how frequently they used various blackboard course areas and features to support traditional course management and instruction in traditional settings. Course management/administration was defined in the survey as making lecture notes, slides, and other supporting materials available to students using such areas including, but not limited to, course material, course documents, syllabus, information, and external links. Course management also included functions such as collecting and returning assignments with the Digital Drop Box, sending email, administering quizzes/exams, and entering grades in the online gradebook. Assessment and instructional uses included, but were not limited to, the use of various interactive features in blackboard, such as bulletin boards, threaded discussion, and chat rooms. Questions in the Assessment/instructional area focused on the use of blackboard to foster diversity, develop critical thinking skills, and adapt to a variety of learning styles both before and after particular face-to-face classroom sessions. Questions related to classroom community building and relationship formation were added as well.

Faculty were also asked to rate along a five-point Likert scale (where “1”=Agree Strongly and “5”=Disagree Strongly) their perception of blackboard augmentation on their overall effectiveness as an instructor, including, but not limited to, the way blackboard affected their credibility as an instructor, their students’ enjoyment of the course, their relationships with other students, and the overall sense of classroom community. A pilot test was conducted during spring 2003 at a private liberal arts institution in Michigan, with nearly 80 full-time faculty. Changes were made to the survey instrument prior to national distribution.

Next, during spring semester 2004, a list of small-, medium-, and large-sized liberal arts colleges and universities using the blackboard LMSs to support face-to-face classroom learning activities was compiled. An announcement was sent to schools associated with the following organizations: Council of Independent Colleges (CIC), Michigan Collegiate Telecommunications Association (MiCTA), and the Midwest Higher Education Compact (MHEC), which represent all higher education institutions in the 10 state Midwest region. The researchers’ institutions were members of one or more of the aforementioned associations. Fifty-two schools using the blackboard LMS agreed to participate in the study and were included on the final LMS user list.

Each school’s Vice President or Director of technological services was contacted via email. The initial email described the purpose of the study, asked that the survey be disseminated to all full-time faculty, and included a direct URL link to the survey. As an incentive for participation, researchers agreed to calculate results for individual institutions. Faculty from 38 of the 52 institutions using blackboard eventually completed the survey. Twenty states across four separate regions were represented. About 14% of the institutions had less than 1000 students, 36.1% had 1000–2000 students, 31.4% had 2000–3500, and 17.5% of the institutions had 3500 students or more.

4. Results

4.1. *Research question no. 1: faculty blackboard usage*

The first research area considered faculty usage of the blackboard platform; in other words, what blackboard features do they incorporate in their face-to-face classroom? Do they primarily use the tool for knowledge presentation, assessment, knowledge construction, or for social interaction and the development and maintenance of classroom community?

4.1.1. *Course administration*

The dominant course administration usage of blackboard was for course document and resource delivery by instructors to students. Syllabus publication was the most common usage of the tool by the faculty, with 75% frequently publishing their syllabi and another 11% occasionally doing so. Eighty-one percent (81%) reported that they either frequently or occasionally sent email to the entire class through blackboard, 75% frequently or occasionally made supplemental readings available online, 61% sent email to selected students, and 59% used the online gradebook. This pattern did not carry over to assignments, as only 28% frequently or occasionally collected assignments online (via the Digital Drop Box) and only 20% frequently or occasionally returned materials online through blackboard.

From a course management perspective, the personal interactive features remained largely unused. Few faculty reported using virtual office hours (4%), live chat (3%), or student web pages (3%), either

frequently or occasionally. The faculty who responded “never” when asked about selected feature usage was striking. Ninety-five (95%) percent never used blackboard to invite virtual guest lecturers, 75% never used it to administer exams, 59% never used it to administer quizzes, 56% never used the Digital Drop Box to collect assignments, 68% never used it to return assignments, 58% never used the calendar function, and 55% never used blackboard for procedural question-and-answer discussion with students.

4.1.2. Instructional applications

When considering the instructional applications of blackboard, the usage of various features was decidedly lower than with the administrative tools, but higher than the more interactive course management features mentioned above. For example, 34% reported that they frequently or occasionally used blackboard to solicit a greater diversity of student opinions than otherwise possible in the face-to-face environment, although 50% indicated that they never used the blackboard for this purpose. Only 25% used blackboard to continue an in-class discussion online (56% “never”), 15% used blackboard to promote discussion before a face-to-face class session (71% “never”), 25% used it to address a variety of learning styles (63% “never”), 22% used blackboard to divide students into discussion groups (64% “never”), and 21% used blackboard to provide students with an area to plan and work on small-group projects (64% “never”). About 6% used the live chat or virtual classroom feature to discuss course content online (84% “never”).

4.2. Research question no. 2: perceptions of blackboard's utility

The second research question was: What perceptions do faculty have of how certain blackboard features enhance or elevate (or might enhance or elevate) their assessment of student work and instructional capabilities in the face-to-face classroom setting?

There were numerous attitudes, with which 60% or more of the faculty indicated positive agreement by responding that they “agreed” or “strongly agreed” with the statement. Specifically, 82% “agreed” or “strongly agreed” that blackboard helped them to more clearly communicate information about course procedures and requirements, 72% indicated that the blackboard is something that students have come to expect in our current technological age, 66% stated that the blackboard helps them to better meet the educational needs of students, 65% agreed that the blackboard helped them to better manage their time when it comes to administering the course and its requirements, and 62% agreed that the blackboard enhanced their students’ ability to learn course materials.

The remaining attitudes were largely neutral in both mean and mode of responses. On a five-point Likert scale, the remaining attitudes ranged in mean from 2.9 to 3.6, with upwards of 40% of respondents selecting “neutral” to reflect their attitudes. A more detailed breakdown of the faculty attitudes for RQ2 is shown in [Table 1](#).

4.3. Research question no. 3: social benefits of blackboard

The third research question was: Do the faculty use the blackboard to foster positive psychosocial climates within their face-to-face classroom settings? In other words, do the faculty use the blackboard to develop interpersonal or community relationships with or among students? If they do, what strategies or practices do the faculty have for building relationships with students and building connections among learners?

Table 1

Using blackboard in my face-to-face course. . .	Mean (S.D.)	Agreement (%)
Helps me more clearly communicate information about course procedures and requirements	4.21 (0.93)	82.3
Is something that students have come to expect in our current technological age	3.91 (0.93)	72.4
Helps me to better meet the educational needs of my students	3.73 (0.93)	65.8
Helps me to better manage my time when it comes to administering the course and its requirements	3.72 (1.12)	64.9
Enhances my students' ability to learn course material	3.62 (0.93)	61.5
Helps my students to be more satisfied with the overall learning experience	3.56 (0.87)	57.8
Enhances my credibility as an instructor	3.52 (1.01)	55.9
Helps students feel more connected to me as the instructor	3.47 (1.00)	52.8
Enhances my students' cognitive learning	3.46 (0.94)	50.5
Helps me to create the impression that I am more available to my students outside of regular face-to-face class meetings	3.36 (1.07)	48.2
Helps me to ensure that students are adequately preparing for face-to-face class sessions	3.31 (1.01)	44.0
Helps me feel a greater sense of community with my students	3.29 (1.03)	43.9
Makes me feel more connected to my face-to-face class	3.17 (1.08)	41.4
Allows me to draw out certain students who otherwise might not speak up in the face-to-face class meetings	3.23 (1.11)	38.4
Helps strengthen a student's sense of classroom community	3.13 (0.98)	35.8
Enhances my students' affective learning	3.21 (0.94)	35.5
Helps me to build stronger relationships with students	3.07 (0.99)	33.1
Helps me push students to deeper levels of critical thinking than possible in the face-to-face setting	2.96 (1.03)	26.5
Allows me to more effectively assess whether students are achieving planned learning than other assessment methods	2.96 (0.98)	25.8
Helps me to mentor students	2.88 (1.01)	24.6

The major answer to this first question is “no.” Significant numbers of faculty do not use the blackboard for its potential psychosocial benefits. Less than 11% replied that they frequently used the blackboard to develop a stronger sense of classroom community, 15% indicated that they occasionally did so, 14% seldom used the blackboard to promote community, and the remaining 60% replied that they never used the blackboard for this purpose.

For those faculty who did use the blackboard to promote a sense of classroom community, they were offered the opportunity to respond to an open-ended question seeking details about their online community-building activities. Based on the responses, it appears that such efforts were almost exclusively focused on the use of the discussion board for extended class discussion. Typical responses included:

Blackboard is an extension of the classroom and the continuation of its conversations. We make frequent references to it in class. It is also open during the face-to-face class. It reduces the chalkboard use.

By having students comment on others' writing assignments, in the form of an ongoing dialogue. They are often afraid to speak up in class, but enjoy reading (and commenting) on classmates' assignments.

I've noticed that, using the discussion forum, every student can make a contribution and can be recognized as a full-fledged class member, which doesn't often happen in face-to-face settings.

People disclose certain 'personalities' on the discussion board, and these are often the folks that don't speak out in class. So there is more of a sense of everyone's contribution with blackboard added on to the in-class discussions. This does not guarantee enhanced community, but it is likely that it facilitates the students getting to know one another better, which could enhance community.

The discussions that take place on blackboard extend the sense of community discussions. Frequently there are references to one another's ideas, and also to a consensus that is arising in the group discussion. Interesting different dynamic than actually takes place in class.

4.4. *Research question no. 4: factors influencing usage and positive perception of blackboard*

The final research question was: What factors predict use and positive perception and use of the blackboard as a supplement to face-to-face teaching activities? Although these results are not exhaustive, they reflect an initial exploration into this question by considering the differences related to gender, age, and blackboard use experience.

4.4.1. *Course administration and management*

A one-way MANOVA was conducted to determine the effect of gender on the course administration and management usage variables. Significant differences were found between males and females on all dependent measures [Wilks' $\Lambda=0.91$, $F(46,1536)=1.57$, $p<.05$]. The effect size was small (partial $\eta^2=.05$). Post hoc ANOVAs on each dependent variable were also conducted. Females scored higher than males did on using blackboard to update the syllabus after class started [$F(2,790)=4.45$, $p<.05$, partial $\eta^2=.01$], emailing individual students [$F(2,790)=6.29$, $p<.01$, partial $\eta^2=.02$], and emailing groups of students [$F(2,790)=5.73$, $p<.01$, partial $\eta^2=.01$]. Female faculty were therefore more likely to use these three administrative features than their male counterparts.

There were also differences in such usage based on age, with a one-way MANOVA revealing Wilks' $\Lambda=.82$, $F(5,787)=1.39$, $p<.01$, partial $\eta^2=.04$. According to post hoc ANOVA results, there were age differences in syllabi posting [$F(5,787)=3.26$, $p<.01$, partial $\eta^2=.02$], updating the syllabi after class started [$F(5,787)=2.64$, $p<.05$, partial $\eta^2=.02$], making class lecture or notes available both before and after class sessions [$F(5,787)=5.01$, $p<.01$, partial $\eta^2=.03$ and $F(5,787)=4.43$, $p<.01$, partial $\eta^2=.03$, respectively], creating discussion folders for course procedure dialogue [$F(5,787)=2.66$, $p<.05$, partial $\eta^2=.02$], and letting students post photographs on the blackboard [$F(5,787)=2.44$, $p<.05$, partial $\eta^2=.02$]. Forty-three- to 55-year-old faculty were the most prolific users of blackboard in this area of analysis. This age group was most likely to post their syllabi on blackboard ($M=3.65$, $S.D.=0.80$), make changes to their syllabi after class started ($M=2.67$, $S.D.=1.05$), and make materials available on the blackboard before and after class ($M=2.47$, $S.D.=1.21$ and $M=2.74$, $S.D.=1.12$, respectively). Faculty under 25 ($M=2.75$, $S.D.=1.23$) were most likely to create discussion folders for course procedures, and those over 55 were most likely to use the blackboard for student photographs ($M=1.34$, $S.D.=0.82$).

Faculty experience teaching with blackboard had a much greater effect on the course administration and management usage variables. Significant differences were found using a one-way MANOVA [Wilks' Λ =.64, $F(92,3034)=1.57$, $p<.01$]. The effect size was moderate (partial $\eta^2=.11$). Post hoc ANOVAs revealed significant differences across every variable, except using the blackboard to bring in virtual guest lecturers, hold virtual office hours, and, interestingly enough, reminding students of course deadlines using the calendar features. Therefore, there were significant differences based on blackboard experience for publishing the course syllabus, updating the syllabus, making class lectures or notes available before and after class, making supplemental materials available, using the online gradebook, sending email to the entire class, individuals, and groups, collecting assignments through the Digital Drop Box, returning graded assignments, giving quizzes and exams, using live chat, creating discussion folders for course procedures and casual conversation, making faculty and student photographs available, providing personal information to the students, and developing student home pages.

4.4.2. *Instructional applications*

A one-way MANOVA was conducted to determine the effect of gender on the usage of the instructional tools found within the blackboard. No significant difference in such usage was found between males and females [Wilks' Λ =.97, $F(18,1596)=1.29$, $p=.18$].

A similar test was run to determine whether there were instructional usage differences by age. The resulting one-way MANOVA result was significant [Wilks' Λ =.92, $F(45,3559)=1.43$, $p<.05$]. The effect size was small (partial $\eta^2=.02$). Post hoc ANOVAs were also conducted and revealed that the only significant difference was the use of blackboard to carry on discussions related to course content that were started but not completed in face-to-face class sessions [$F(5,803)=2.42$, $p<.05$, partial $\eta^2=.02$]. Faculty aged 43–55 were the most likely to use the tool in this manner ($M=1.83$, $S.D.=1.02$), with 35- to 42-year-olds close behind ($M=1.80$, $S.D.=0.99$).

As with the administrative uses of blackboard, a one-way MANOVA revealed significant differences in instructional uses of blackboard based on faculty experience with the tool [Wilks' Λ =.88, $F(36,2984)=2.89$, $p<.01$]. The effect size was small (partial $\eta^2=.03$). Based on the results of post hoc ANOVAs, the usage of every instructional tool varied by faculty blackboard experience, including using the blackboard to divide students into discussion groups, carrying on discussions which were begun in class, discussing course material before and after class sessions, live chat, student group collaboration, accommodating a variety of learning styles, helping students communicate professionally with technology, soliciting a greater diversity of opinions from students, developing critical thinking skills, and building a stronger sense of classroom community.

4.4.3. *Perceptions and attitudes*

A one-way MANOVA was conducted to determine the effect of gender on the faculty attitudes toward blackboard. Significant differences were found between males and females on all dependent measures [Wilks' Λ =.91, $F(40,1492)=1.72$, $p<.01$, partial $\eta^2=.05$]. Post hoc ANOVAs on each dependent variable were also conducted with gender differences found in 10 of the 20 attitudinal statements. In each case, the female faculty reported more positive attitudes than male faculty did. Female faculty were more likely to report that the blackboard helped them feel a greater sense of community with their students, enhanced their credibility as an instructor, helped them more clearly communicate information about course procedures and requirements, helped students feel more connected to them as instructors, created the impression that they were more available to their students outside of scheduled class meetings,

helped them to mentor the students, built stronger relationships with the students, ensured that students were adequately prepared for face-to-face class sessions, and that blackboard was something that students had come to expect in our current technological age.

There were significant differences in faculty attitudes toward blackboard based on age, with a one-way MANOVA revealing Wilks' $\Lambda=.84$, $F(100,3629)=1.35$, $p<.05$, partial $\eta^2=.04$. Post hoc ANOVAs demonstrated that there were age differences in attitudes about the blackboard helping faculty to mentor students [$F(5,762)=2.38$, $p<.05$, partial $\eta^2=.02$] and helping faculty to build stronger relationships with students [$F(5,762)=2.55$, $p<.05$, partial $\eta^2=.02$]. Faculty under the age of 25 were most likely to indicate that blackboard helped them mentor their students ($M=3.25$, $S.D.=0.50$), with faculty over 55 coming in a surprising second ($M=3.05$, $S.D.=1.05$). Faculty over 55 stated that using the blackboard helped them build stronger relationships with students ($M=3.23$, $S.D.=0.98$), the most positive response for this question.

As with the previous analyses related to faculty experience with blackboard, a one-way MANOVA revealed significant differences in attitudes based on the length of time that faculty had taught with a blackboard [Wilks' $\Lambda=.82$, $F(80,2937)=1.85$, $p<.01$, partial $\eta^2=.05$]. Based on the results of post hoc ANOVAs, attitudes about the benefits of blackboard varied by instructional experience with the courseware platform on every item, except (1) allowing the faculty to more effectively assess whether students are achieving planned learning than other assessment methods, (2) helping faculty to mentor students, and (3) helping faculty to build a stronger relationship with students.

5. Discussion

The research questions sought to systematically identify faculty use and perceptions of the effectiveness of an LMS to augment face-to-face instruction. More specifically, the four research questions attempted to address primary uses that the faculty make of a blackboard, perceptions that faculty have of how certain blackboard features enhance or elevate (or might enhance or elevate) their assessment of student work and instructional capabilities, and how faculty use of blackboard might positively affect the psychosocial climate within the face-to-face classroom setting. Additional secondary analysis sought to identify the factors that predict use and positive perception of blackboard as a supplement to face-to-face teaching activities.

To begin, the dominant use of blackboard was for course administration and management purposes. Faculty primarily used blackboard to post course syllabi, send email, and post grades. An overwhelming majority of faculty "never" used a blackboard for more interactive course administrative functions, such as holding virtual office hours or collecting/returning assignments. Such findings suggest that, for the faculty participating in this study, a blackboard serves more as a high-tech website and mailing system rather than an interactive course resource. Perhaps, the familiarity with or satisfaction of traditional models of course administration and instruction mean that the faculty using blackboard to supplement traditional face-to-face instruction (as opposed to teaching courses primarily online) have few compelling reasons to harness the corresponding interactive features of a blackboard. Regardless, it is worth noting the limited range and primary application of the LMS, as indicated by the survey respondents.

Several assumptions may be driving the primary course management use of a blackboard identified above. Faculty may assume that face-to-face methods are more effective than distance education

methods are, or that students prefer face-to-face instructional methods over online delivery methods in hybrid courses. After all, if they wanted to experience online instructional methods, students would have taken an online course. Instructors may be concerned that students in the face-to-face setting expect minimal online involvement and then only in ways that make their access to information more efficient. Anything that would increase the workload, whether prior to or after a face-to-face session, would be perceived as negative and something that might detract from the students' overall satisfaction and positive evaluation of the course. The faculty too may see such pre- or postcourse engagement as unnecessarily adding to an already full workload. Future research should explore the full range of assumptions and reasons that the faculty have for deciding how and when to augment their traditional classes, as well as student preferences for optimal face-to-face and web-based interaction.

The primary use of blackboard as a high-tech information repository tool fits well with the knowledge presentation model (Nelson & Palumbo, 1992)—what Novitzki (2000) identifies as a “low” or “moderate” level use of an Asynchronous Learning tool—and appears to be a different approach than the highly interactive, discussion-based method favored by most asynchronous online courses. Put another way, a blackboard, when used to augment face-to-face instruction, is primarily used to transact information. It is noninteractive; that is, it is not reactive or fully interactive in communication sequences between faculty and students (Rafaeli, 1988).

In light of the primary course management use discussed above, it comes as little surprise that almost no instructional or interactive feature within the blackboard was reported to be frequently or occasionally used by more than one-fourth of the faculty respondents, and in almost every situation, there were more respondents who never used a given instructional feature than used it at all. This is particularly evident when considering the open-ended responses to a question which asked faculty to comment on the area of the blackboard that was most valuable in enhancing teaching effectiveness. Although every feature in a blackboard was mentioned by at least one instructor, the dominant theme that emerged was the use of blackboard to distribute course materials to students. Typical comments included:

Ability to provide extensive course material—information, assignments, explanatory material, readings, guidelines, standards, etc.—in a clearly organized way and have them always available for reference. It cuts down on student confusion and my time answering silly questions.

Blackboard is really just a holding area for me that packages together some course materials and course grades. I think it only minimally enhances my teaching effectiveness. How does it? By making materials easily accessible, allowing me to spend more time interacting, and less time simply lecturing. It allows students to easily check their grades, and notify me if something seems amiss.

Having a place where most everything about the course can be found at the students' fingertips. Course assessment, all assignments/homework, reading and film questions, quiz and exam study guides, lecture outlines, web links related to the course, email contact and discussion.

I find it a useful repository of course-related information. I put assignments on blackboard, lecture notes, lab protocols, and grades... If students miss handouts, they are always available on blackboard.

The results from the attitude scales further confirm the primary use of blackboard as a course administration/management tool. For instance, faculty were positive about the use of a blackboard to

improve the organization and communication of the course procedures and materials to students but were neutral or otherwise undecided when it came to attitudes about the pedagogical and psychosocial benefits of the tool in relation to supporting face-to-face classroom delivery. As institutions provide greater support and faculty development in the use of hybrid delivery models, attitudes regarding assessment and instructional uses are likely to change. Additional empirical research supporting the potential cognitive and affective outcomes of extensive (interactive) web-based augmentation (e.g., Novitzki, 2000) will likely increase positive attitudes in these areas as well.

With only about 26% of the faculty using the blackboard frequently or occasionally to foster a positive psychosocial climate, it is difficult to consider community building to be a significant use of an LMS in face-to-face classroom settings. Furthermore, only 44% ($M=3.07$) of the faculty agreed that a blackboard helped them to develop a stronger sense of community with their students, and less than 36% ($M=3.13$) indicated that it helped students develop community with each other.

It is worth noting here that few faculty mentioned using either the interactive or personal tools found within a blackboard. Recall that less than 5% of the faculty reported using virtual office hours, live chat, social discussion boards, or student web pages, either frequently or occasionally. Similarly, only 22% of faculty frequently or occasionally posted their personal pictures on blackboard, and 39% posted personal background information for students, while only about 6% had students post personal photos. Less than 25% of the faculty indicated that they frequently or occasionally used the discussion board features within blackboard for student discussion groups, pre- or postclass discussion about the course material, or as a resource for students to collaborate on group assignments. Whether the failure to use these interactive features within a blackboard soured the faculty on the potential community-development benefits, which have been seen in the online learning literature (e.g., Palloff & Pratt, 1999), or whether the perception that blackboard has little to offer toward community development leads the faculty to neglect particular instructional tools, is unclear. What is clear is that there is little evidence in this study to indicate that face-to-face instructors consider blackboard as a significant resource for community development.

Moreover, because many on-campus learners already have well-established social networks, the faculty may perceive students to be less interested in cohesiveness-building efforts online and might consider them counterproductive to the learning process. In addition, faculty who are socially active outside of formal class settings may set up different expectations for students in regard to interaction modalities in class (whether face-to-face or online). Other faculty may simply believe that community building or relationship formation occurs more effectively in face-to-face encounters—a presupposition that has been challenged by the comparison of students' sense of community in face-to-face and online courses of Rovai and Baker (2004)—and may tacitly or explicitly communicate these beliefs to their students. Comparisons between hybrid and traditional classes taught by the same instructors (where hybrid courses are designed in accordance with positive psychosocial practices) would be helpful in determining the extent to which blackboard contributes to a student's overall sense of community in the traditional.

For those faculty who sought to use blackboard to promote classroom community development, it is evident that the tool is seen as another opportunity for dialogue and discussion around the course material. A number of respondents noted that the quiet or introverted students were more likely to participate in an online class discussion than in a face-to-face one. Others similarly noted that some students not usually vocal in face-to-face settings tended to be more open online than in class. These observations are wholly consistent with research reporting that the more introverted a student is, the

better the student performs in a distance education setting (Biner et al., 1995). Future research should consider whether this (introversion/extroversion) and other personality dimensions, such as group versus self-orientation, correlate significantly with course achievement in the hybrid model.

Additionally, it would be valuable to conduct a follow-up study that related the pedagogical style of the instructor with their usage of blackboard. Perhaps, those faculty who tend to teach with a more constructivist style, such as incorporating collaborative learning, class discussions, and reflective inquiry, are more likely to embrace the interactive features of blackboard to extend their classroom than are faculty with other approaches. It is likely that such instructors may have greater success in terms of student achievement and course evaluation than do instructors who do not take advantage of these kinds of interactive uses.

The results further indicate that the main factor in determining blackboard usage—whether for course administration or instructional purposes—is experience with the tool. Faculty with four or more semesters of blackboard teaching experience were more likely to use course administration and instructional features than were faculty with less experience. Accordingly, patience may be to give faculty the opportunity to work with the tool longer than one or two semesters before passing judgment on the utility of the product. Because there are few well-developed hybrid delivery systems to direct faculty use of an LMS in the face-to-face setting, and few institutions provide systematic faculty development in such use, faculty must have time to formulate best practices within their chosen fields of study. Studies in technology and distance education have shown that teacher attitudes become more positive as a result of experience with technology (Na & Lee, 1993; Rollins, 1993).

Gender played an important role in predicting use and attitude toward the LMS as well. Females were more likely to use course administration/management features than men did and held more positive attitudes about a blackboard's relational potential than men did. In past research, females have been found to have more positive attitudes about using Internet-based instructional systems to teach certain subject matters than males did (Miller, 1997; Linder, Murphy, & Dooley, 2001). The current findings raise the possibility that female faculty will not only be more positive about the effectiveness of hybrid delivery in general, but will be more likely to use blackboard for classroom community building than male faculty were. Recall that female faculty were proportionally more likely to use blackboard to email the whole class, as well as email individual students and groups, than male faculty did. Perhaps, this increased use of this interactive feature of the blackboard results in women having a greater level of optimism toward the relational effects of the tool. It is difficult to say, however, whether their attitudes are driving their usage of blackboard or their attitudes are formed as a result of their experiences engaging the students with the interactive tools. Furthermore, the small effect sizes and the lack of similar differences with more overt measures of community and usage of interactive blackboard features limit the interpretation of these gender differences.

Based on the results of post hoc ANOVAs, attitudes or perceptions about the benefits of blackboard varied by instructional experience (i.e., number of semesters teaching with blackboard) on every item, except (1) allowing the faculty to more effectively assess whether students are achieving planned learning than other assessment methods, (2) helping faculty to mentor students, and (3) helping the faculty to build a stronger relationship with students. The latter two items are interesting because both demonstrated gender and age differences in the previous analyses. However, as with the other post hoc tests involving faculty experience, faculty with four or more semesters of blackboard teaching experience reported the highest positive attitudes concerning the benefits of using a blackboard in face-to-face courses.

Even more surprising was the finding that faculty over 55 stated that using blackboard helped them build stronger relationships with students ($M=3.23$, $S.D.=0.98$), the most positive response for this question. This seems to belie the belief that educational technology is embraced primarily by younger faculty.

Course subject matter could have affected how the faculty in this study used blackboard. Some subject matter requires extensive explanation to facilitate understanding, whereas other courses are more hands-on in their delivery and assessment. In the current study, significant differences in usage (administrative and instructional) and attitudes by course subject were identified. The effect sizes were all small, however. At the same time, no clear patterns emerged from the results. For example, leadership/management faculty were the most likely to use the gradebook function, political science and pre-law faculty were most likely to post course syllabi online, business and economic faculty were most likely to post lectures and course materials before class, health sciences faculty were most likely to email individuals, and education faculty were most likely to use blackboard to promote a sense of classroom community. Similar diversity appears in the attitudinal responses, although an overview of the attitude responses seems to show that education, leadership and management, and political science and pre-law tend toward higher attitudes about the benefits of blackboard. Based on these results, additional research should systematically explore differences or best practices among faculty in different areas of study, accounting for such additional variables as pedagogical style, age, gender, and faculty experience.

Future research should also account for student expectations, as it relates to LMS use in the face-to-face setting. Students have a significant history with the traditional classroom, and one would expect that their idea of learning in new environments is influenced accordingly. Younger students (as compared with adult learners) may have a less constricted view of the classroom and may approach traditional learning with a different set of expectations. Perhaps, students enroll in traditional, hybrid, and online courses with different expectations, and therefore, their satisfaction levels would not coincide with a uniform instructional design and delivery. Such research efforts might reveal biases inherent in current hybrid course design strategies that include and exclude students based on learning style, cognitive style, motivation, subject, gender, or other factors. Because there is no common history with online and hybrid learning commensurate with the traditional classroom, it becomes increasingly important to understand what the students (and instructors) are expecting before the class begins.

There were several limitations in this study. First, although the sample was highly representative of faculty using blackboard to augment face-to-face instruction, it was not drawn randomly and the results are therefore limited in generalizability. Second, the study focused on users of only one LMS, blackboard, which further limits generalizability. Future studies should include multiple LMS platforms. Third, the study did not examine macro or institutional issues, such as educational philosophy and extent of online course programs or offerings at participating institutions, which may have influenced faculty use and perception. Institutions with progressive educational philosophies and robust online initiatives may be more supportive of faculty experimentation in hybrid delivery systems, which, in turn, may positively influence faculty use and perception. Fourth, the faculty in this study taught mainly undergraduate courses. Expectations for web-based augmentation may be different at the graduate level, where the emphasis is on research, writing, and discussion. Finally, most of the studies in the current investigation were from small, private liberal arts institutions. Because competition among similarly situated institutions may drive educational initiatives, future investigations should expand to include larger, public institutions across a broad spectrum of educational choices.

6. Conclusion

In summary, despite frequent use of an LMS for course administration purposes, the faculty do not appear to be harnessing the full pedagogical potential of web-based augmentation via LMSs such as blackboard. The possible potential of LMS tools to increase course administration efficiency and enhance learning in traditional settings is an important educational issue that must be fully explored from both faculty and student perspectives.

References

- Baringer, D. K., & McCroskey, J. C. (2000). Immediacy in the classroom: Student immediacy. *Communication Education*, 49, 178–186.
- Bento, R. F., & Bento, A. M. (2000). Using the web to extend and support classroom learning. *College Student Journal*, 34(4), 603–609.
- Biner, P. M., Bink, M. L., Huffman, M. L., & Dean, R. S. (1995). Personality characteristics differentiating and predicting the achievement of televised-course students and traditional-course students. *The American Journal of Distance Education*, 9(2), 46–60.
- Black, G. (2001). *A comparison of traditional, online and hybrid methods of course delivery*. Paper presented at the Teaching Online in Higher Education Online Conference, November, 2001. Available at <http://www.ipfw.edu/as/2001tohe/master.htm>
- Brown, D. J. (2001). Hybrid courses are best. *Syllabus*, (1), 22.
- Bunker, A., & Vardi, I. (2001). Why use the online environment with face-to-face students? Insights from early adopters. ERIC Document No. 467926.
- Byers, C. (2001). Interactive assessment: An approach to enhance teaching and learning. *Journal of Interactive Learning Research*, 12(4), 359–374.
- Chuang, Wen-hao (2002). An innovative teacher training approach: Combine live instruction with a web-based reflection system. *British Journal of Educational Technology*, 39(2), 229–232.
- DenBeste, M. (2003). PowerPoint, technology and the web: More than just an overhead projector for the new century? *The History Teacher*, 36(4), 492–504.
- Edling, R. J. (2000). Information technology in the classroom: Experiences and recommendations. *Campus Wide Information Systems*, 17(1), 10.
- Fahey, D. M. (2000). blackboard courseinfo: Supplementing in-class teaching with the Internet. *History Computer Review*, 16(1), 29–37.
- Gunawardena, C. N. (1994). *Social presence theory and implications for building online communities*. Paper presented at the Third International Symposium on Telecommunications in Education, Albuquerque, NM.
- Gunawardena, C. N., & Zittle, F. J. (1997). Social presence as a predictor of satisfaction within a computer-mediated conferencing environment. *The American Journal of Distance Education*, 11(3), 8–26.
- Harasim, L. (1991). Teaching by computer conferencing. In A. Miller (Ed.). *Applications of computer conferencing to teacher education and human resource development* (pp. 25–33). Paper presented at the International Symposium on Computer Conferencing, Columbus, OH.
- Healey, J. M. (1998). *Failure to connect: how computers affect our children's minds- and what we can do about it*. New York: Simon & Schuster.
- Hill, J. R., & Hannafin, M. J. (2001). Teaching and learning in digital environments: The resurgence of resource-based learning. *Educational Technology Research and Development*, 49(3), 37–52.
- Kearsley, G. (2000). *Online education: Learning and teaching in cyberspace*. Belmont, CA: Wadsworth/Thomson Learning.
- Kendall, M. (2001). Teaching online to campus-based students. *Education for Information*, 19(1), 325–346.
- King, K. (2001). Teaching online to campus-based students: The experience of using WebCT for the community information module at Manchester Metropolitan University. *Education for Information*, 19(4), 325–346.

- LaRose, R., & Whitten, P. (2000). Re-thinking instructional immediacy for web courses: A social cognitive exploration. *Communication Education*, 49(4), 320–338.
- Lindner, J. R., Murphy, T. H., & Dooley K. E. (2001). *Factors affecting faculty adoption of distance education: Competency, value, and educational technology support*. Paper presented at the 20th Annual Western Region Agricultural Education Research Meeting, Carmel, CA.
- McGroarty, E., Parker, J., Heidemann, M., Lim, H., Olson, M., Long, T., et al. (2004). Supplementing introductory biology with on-line curriculum. *Biochemistry and Molecular Biology Education*, 32(1), 20–26.
- McLellan, H. (1999). Online education as interactive experience: Some guiding models. *Educational Technology*, 39(5), 36–42.
- Miller, G. (1997). Agricultural education at a distance: Attitudes and perceptions of secondary teachers. *Journal of Agricultural Education*, 38(1), 54–60.
- Na, S., & Lee, M. (1993). *Predictors of teachers' computer use in Korean vocational agriculture high schools: A proposed framework*. Paper presented at the 20th Annual National Agriculture Education Research Meeting, Nashville, TN.
- Nelson, W. A., & Palumbo, D. B. (1992). Learning, instruction, and hypermedia. *Journal of Educational Multimedia and Hypermedia*, 1, 287–299.
- Novitzki, J. E. (2000). *Asynchronous learning tools in the traditional classroom—A preliminary study on their effect*. Paper presented at the International Academy for Information Management, Annual Conference, Brisbane, Australia.
- Palloff, R. M., & Pratt, K. (1999). *Building learning communities in cyberspace: Effective strategies for the online classroom*. San Francisco, CA: Jossey-Bass.
- Palloff, R. M., & Pratt, K. (2001). *Lessons from the cyberspace classroom: The realities of online teaching*. San Francisco, CA: Jossey-Bass.
- Papo, W. (2001). Integration of educational media in higher education large classes. *Educational Media International*, 38(2–3), 95–99.
- Parker, M. J. (2000). *Web-based extended learning through discussion forums*. Paper presented at the National Educational Computing Conference, Atlanta, GA.
- Rafaeli, S. (1988). Interactivity: From new media to communication. In R. P. Hawkins, J. M. Wiemann, & S. Pingree (Eds.), *Sage Annual Review of Communication Research: Advancing Communication Science*, vol. 16 (pp. 110–134). Beverly Hills, CA: Sage.
- Rollins, T. J. (1993). *The efficacy of the adoption diffusion theory for agricultural education*. Paper presented at the 20th Annual National Agriculture Education Research Meeting, Nashville, TN.
- Rovai, A. P., & Baker, J. D. (2004). Sense of community: Differences between students attending Christian and secular universities. *Christian Scholar's Review*, 33, 471–489.
- Rutter, L., & Matthews, M. (2002). InfoSkills: A holistic approach to on-line user education. *Electronic Library*, 20(1), 29–34.
- Saunders, G., & Klemming, F. (2003). Integrating technology into a traditional learning environment: Reasons for and risks of success. *Active Learning in Higher Education*, 1, 74–86.
- Sorg, S., Juge, F., & Bledsoe, R. (1998). *Institutional change through a web-enhanced course model*. Paper presented at the Florida Educational Technology Conference, Orlando, FL, March, 2000. Available at <http://distrib.ucf.edu/dlucf/present.htm>
- van de Ven, M. (2002). Implementing ICT in education faculty-wide. *European Journal of Engineering Education*, 27(1), 63–76 (14 pp.).
- Vrasidas, C., & McIsaac, M. S. (1999). Factors influencing interaction in an online course. *The American Journal of Distance Education*, 13(3), 22–36.
- Walther, J. B. (1992). Interpersonal effects in computer-mediated interaction: A relational perspective. *Communication Research*, 19, 52–90.
- Wegerif, R. (1998). The social dimension of asynchronous learning networks [Online]. *Journal of Asynchronous Learning Networks*, 2(1) (Available: http://www.aln.org/alnweb/journal/vol2_issue1/wegerif.htm).
- Wheeler, S. (2002). Around the globe. *Quarterly Review of Distance Education*, 3(2), 227–230.
- Wiesenberg, F., & Hutton, S. (1996). Teaching a graduate program using computer-mediated conferencing software. *Journal of Distance Education*, 11(1), 83–100.
- Woods, R. H., & Ebersole, S. (2003). Using non-subject matter specific discussion boards to build connectedness in online learning. *American Journal of Distance Education*, 17(2), 99–118.