Deficiencies of Course Management Systems: The WebCT Vista Attitudinal Survey

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Abstract: Course management systems (CMSs) support thousands of courses at colleges and universities worldwide, delivering fully online courses as well as supplementing traditional face-to-face instruction. It is possible that CMSs have introduced so much new functionality so fast that users have not had a chance to seriously reflect on what they need or want. Perhaps users are understandably giddy about the instructional tools they now have at their fingertips, and have not yet critically examined these tools. We developed a WebCT Vista Attitudinal Survey to measure user satisfaction with the tool and perceived usefulness of specific new features currently unavailable in WebCT Vista. We piloted the survey with 234 college students who used WebCT Vista as a supplementary of a face to face course. Results provide evidence that CMSs are still evolving tools, and need accommodations and improvements.

Course management systems (CMSs; e.g., WebCT, Blackboard, Angel, Educator, FirstClass) are software systems designed to manage course content and course activities. These tools integrate technological and pedagogical features into a well-developed Web-based system that allows instructors who are unfamiliar with web-based technologies to design, deliver, and manage an online course. Common features in most CMSs include content areas, discussion boards, chat rooms, assignment drop boxes, quizzes and surveys, and white boards. CMSs support student-student and student-teacher communication and collaboration; students are able to share resources, collaborate, participate in forums, take online tests, access their grades, and upload assignments.

Today CMSs support thousands of courses at colleges and universities and that number is growing at a staggering rate. While CMSs were initially developed to support distance education and fully online course delivery, they are now used predominantly in on-campus classroom settings to compliment traditional courses (Harrington, Gordon, & Schibik, 2004; Morgan, 2003). CMSs are now used both to support and supplement face-to-face instruction, or a so-called "blended" approach, and to deliver fully online web-based courses. The ease with which users can organize asynchronous (and synchronous) communication activities in CMSs is one of its most powerful features, because it enables (in fact, arguably encourages) instructors to create and support dynamic learning communities, consistent with a social constructivist perspective. This certainly explains some of the growth in on-campus blended courses (Dabbagh, 2004; Morgan, 2003).

"Perhaps no other innovation in higher education has resulted in such rapid and widespread use as the CMS" (Harrington, Gordon, & Schibik, 2004, "History of CMS" section). By 2002 over three-quarters of all colleges and universities in US had adopted a CMS, and nearly one-fifth of college courses used a CMS (Campus Computing Project, 2002). By 2004, just a few short years from their introduction into higher education, such systems could be considered "ubiquitous" on college campuses (Molenda & Bichelmeyer, 2005). The recent merger of Blackboard and WebCT made Blackboard, Inc. the world's leading provider of integrated e-learning systems, by itself serving more than 3,650 academic clients in more than 60 countries worldwide (Blackboard.com, 2005). It is possible that CMSs have introduced so much new functionality so fast, that end users have not had a chance to seriously reflect on what they need or want. Perhaps users are so enamored with the powerful functionalities they now have at their fingertips, that they have not yet critically examined these tools to ask "what else or different do I need?" How can these tools get even better to satisfy educational expectations and needs? (Ioannou & Hannafin, in press).

Deficiencies of CMSs

While CMSs have become accessible and increasingly useful for many instructors and learners in higher education, some have recently expressed frustration over things like response time and ease of use. Siemens (2004) examined the drawbacks of CMSs and suggested functionalities that CMSs need to acquire to meet user needs. The author asserted that the CMS interface is confusing to many users, and needs to be simplified. Current CMS interfaces rely on "what do the designers/administrators want/need to do, [rather than on] what the end user want/need to do" (Siemens, 2004, "Drawbacks to Learning Management Systems" section).

In a recent study, Jafari, Mcgee, and Carmean (2006) investigated the advantages and limitations of CMSs, interviewing 59 faculty, 52 students, and 51 academic, library, and IT administrators and IT service providers from seven campuses. These institutions were using one or more CMS including Blackboard, WebCT, eCollege, and ANGEL Learning. All users expressed dissatisfaction with the speed, efficiency, and intuitiveness of current CMSs. Administrators suggested that "Smart error messages would relieve frustration and time for both faculty and support staff. Smart meta-tagging and searching could make accessing files and finding threads more efficient" (p. 4). Faculty members wanted more user-friendly functions that required fewer clicks in order to make tasks such as entering grades or returning files less time consuming. They would also like to have more feedback, warning, and notification mechanisms within the system. However, the most frustrated end users were the learners who generally characterized the current CMSs as "dull." The authors observed:

> For all the slow, backward, and clunkiness of the current systems, students noted that the environment isn't even easy to figure out: the navigation is confusing and takes too many clicks, assignments get lost, the discussion can't be sorted with newest on top, the system doesn't learn anything about the learner and never sends reminders or status messages (p. 8).

Considering how technology's limitations highly affect the quality of the instruction, Ioannou and Hannafin (in press) discussed how CMSs can become more efficient, user-friendly, and intuitive by adopting a client-site software. The authors asserted that often users do not look for the many features that vendors seek to implement in CMSs, but rather for *ease* and *speed*, both characteristics of a client application. They argued that CMS client-site software could offer faster response time, allow users to work off-line and synchronize, enable dynamic notification for changes in the online course, enable real-time spell checker, allow changes in the look-and-feel, allow set up of a personalized keyboard-driven interface, and more.

Apparently, CMSs have technological drawbacks and therefore need accommodations in order to satisfy educational expectations and user needs. While there are quite a few studies focusing on the numerous benefits and technological advantages of CMSs, which we certainly appreciate, studies that focus exclusively on the technological limitations and inefficiencies of CMSs are almost non-existent. Based on our review of the literature, with the exception of a few qualitative studies, we failed to find empirical work that focused on user attitudes about the efficiency and ease of use of CMSs, and perceived usefulness of potential additional features. In this study we attempted to develop a scale to better define and quantify these constructs. Using student responses to both a Likert-type attitude survey and to an open-ended question, we investigated whether negative findings reported in the literature about CMSs can be replicated, and how much users value specific features/ functionalities that are currently unavailable in most CMSs.

Method

Our sample comprised approximately 300 college students from a large public university in the northeast. These students used WebCT Vista (Vista) in a C++ programming course in Fall 2006. During the semester the instructor had employed a blended learning technique, using Vista to supplement the classroom instruction. According to the instructor and one of the course teaching assistants (who were interviewed), Vista was used for sharing instructional materials (PowerPoint slides, sample code/ exams, assignments/exams solutions), submitting assignments, posting questions /discussions, distributing grades and exam statistics, and taking practice quizzes.

The WebCT Vista Attitudinal Survey (VAT) was administered online, during the last week of classes. The VAT included general questions about the use of Vista such as: Have you used Vista in other classes? On average, for how long did you work in Vista for this course per week? What WebCT Vista tools did you use for this course? To access Vista what computer did you mostly use? In addition, 11 items were designed to assess students' satisfaction with Vista, on a 5-point Likert response scale (from 1= Strongly Disagree to 5= Strongly Agree). Another 8 items were designed to assess students' perceived usefulness of specific new features currently unavailable in Vista, also on a 5-point Likert scale (from 1= Not at all useful to 5 = Extremely useful).

Results and Discussions

A total of 234 students completed the VAT. Most of the students were freshmen (*N* = 198), White (82%), males (N=200), majored in various engineering programs (civil, biomedical, chemical, computer science, electrical, mechanical). The vast majority of students (97%) reported that they had used Vista in other classes. Approximately 75% reported that they accessed Vista mostly using their personal computers/laptops. More than 70% of students reported that, for the specific course, they logged into Vista at least 4 times a week. Approximately 55% reported that they worked in Vista for one to four hours a week; 20% reported working for less than one hour, while another 15% reported working for more than four hours a week. Based these responses, but also from our discussion with the instructor and teaching assistant, we concluded that Vista was extensively used in the specific class. However, the frequency of use of several functions in Vista, as reported by the students, was limited (see Table 1). This confirms, in part, the argument by Ioannou and Hannafin (in press) that often users do not look for the many features that vendors seek to implement in CMSs, but rather for ease of use and speed.

Tool Name	Frequency	Percent
Calendar	85	36.3
Bookmarks	5	2.1
Discussion forums	36	15.4
Internal email	23	9.8
Online journals/notes	38	16.2
Progress review	88	37.6
Real-time chat	11	4.7
Submit assignments	225	96.2
Whiteboard	2	.9

Table 1: Frequency of Use of Several Vista Tools (N=234)

A Principle Axes Factor (PAF) analysis with Oblimin rotation was conducted on the 19 Likert-type items. While two factors were thought to be present, five factors were extracted based on the eigenvalues greater than 1.0 criterion. A PAF with Varimax rotation suggested the same factor structure. The five factors explained 59.0 % of the total variance in the items. Inspection of the pattern coefficients showed that three items loaded highly on more than one factor and therefore were excluded from the final solution.

The first factor was composed of five items including: (1) my overall experience with the course was improved; (2) my anxiety was reduced because I knew where to find class material; (3) it save me time; (4) Vista is a neat tool; and (5) I would like to use Vista in more classes. The subscale was named *user-satisfaction*, and it measured how students liked using Vista. The second and third factors measured the extent to which new (currently unavailable) features would be useful to these WebCT Vista users. The second factor included items: (1) error warning messages; (2) undo and redo functions; and (3) real-time spell checker and was named *corrective feedback*. The third factor included items (1) customizable look and feel and (2) ability to change the organization of the screen, and (3) keyboard driven interface that does not require the mouse and was named *personalized environment*. The fourth factor was composed of items (1) I am satisfied with the system response time and (2) the time required to load material was reasonable. This factor was named *response time* and it measured how student were satisfied with the speed in Vista. The fifth and last factor was composed of items (1) navigation was confusing and (2) it was easy to figure out the functionalities. This factor was named *ease of use* and it measured how student were satisfied with the ease of use of Vista.

Reliability analysis was conducted on each factor. The resulting Cronbach's alphas were: 1) .79 for the user-satisfaction scale; 2) .75 for the corrective-feedback scale; 3) .72 for the personalized environment scale; 4) .67 for the personalized environment scale; and 5) .45 for the ease of use scale. A widely accepted and established level of adequacy for Cronbach's alpha is .70 (Netemeyer, Bearden, & Sharma, 2003), therefore only the first three scales are acceptable. In fact, this was expected for our 2-item subscales, since Cronbach's alpha is heavily affected by the number of items in the subscale (Netemeyer et al., 2003). As a next step, for each person in the dataset, we computed a subscale mean score. Table 1 presents the means and standard deviations for each subscale.

Subscale	# Items	Mean	Standard Deviation

1. User Satisfaction	5	3.84	.65
2. Corrective Feedback	3	3.32	.93
3. Personalized Environment	3	2.58	.94
4. Response Time	2	3.67	.84
5. Ease	2	3.59	.73

Table 1: Subscales Statistics (N=234)

The mean for the user-satisfaction subscale is reasonably high, suggesting that students were generally happy with WebCT Vista. However when users were asked to think about new features that are currently unavailable in Vista, they tended to rate those features as useful (see means for subscales 2, 4, and 5), a fact that might support the argument put forth by Ioannou and Hannafin (in press) that users are impressed by the considerable functionality of the instructional tool, and might have not yet critically examined these tools to ask for accommodations that will improve their learning experiences. We further explored this hypothesis by running frequencies on relevant individual items. Almost 90% of the students reported that having "undo" and "redo" functions in Vista would be at least useful (3 or more on a 5-point Likert scale). More than 82% of the students reported that having "electronic notification for changes in the course, arriving in the form pop-up window or sound" would also be at least useful. The majority of the students reported that functions such as real-time spell checker with wavy red underlines (78%), error warning messages (78%), and ability to change the organization of the screen (60%) would be at least useful.

The open ended responses also seemed to support this claim. Students were asked whether they ever learned after the fact that they had missed something on the Vista course area. Approximately 16% (37 students) responded positively. In a followed up question asking students to explain what they had missed, the responses seemed to be related to the need for dynamic notification for changes in the online course, as discussed by Ioannou and Hannafin (in press). Specifically, students reported missing new assignments posted, changes in the instructional material posted, changes in dues dates, changes in the calendar/ announcements, and important discussion postings. Sample responses include: "I missed changes in assignments due dates"; "I was unaware that a new online exam had been posted"; "I've missed things on discussion boards, I never knew when something new was posted"; "When some of the assignments were modified slightly I missed it, as well as hints about the homework"; "I didn't look at the discussion boards when there were hints about the homework/lab assignments"; "I missed announcements about classroom change."

Nine students made negative comments regarding submitting their assignment on Vista. Consistent with Jafari's et. al. (2006) discussion about lack of feedback, warning, and notification mechanisms within the system, five students reported that although they thought that they had submitted their assignments successfully, they found later on that they had not (e.g., "I thought I submitted a homework assignment, but then a few days later the computer said I did not submit it"). Another four students complained that they failed to submit an assignment (or the correct assignment), because the uploading procedure was confusing (e.g., "Uploading assignments can get confusing, which led to sending the wrong assignment"). This is consistent with Siemens' (2004) discussion about CMSs having confusing interfaces.

Limitations and Future Directions

Review of the literature revealed that we haven't yet systematically measured user attitudes about CMSs. Future studies should focus on the further development of more reliable and valid scales. In this study, we attempted to quantify college students' satisfaction with WebCT Vista, and to assess the perceived usefulness of specific new features currently unavailable in Vista. Results from the PAF did not confirm the two factors that were initially hypothesized. Five factors were retained, but two of those did not have acceptable internal consistency. Thompson (2004) explained that poor score reliability may compromise the ability of the scores to measure intended constructs. In the future, we should improve the VAT scale, based on the 5-factors structure we obtained. More items should be developed for the subscales (corrective feedback, personalized environment, response time, and ease of use) to not only improve their reliability, but to also improve the content coverage (validity) of the construct. Once a good measure of the constructs of interest is finalized, future studies could explore how CMSs can be improved, and how users with different characteristics and learning styles might score differently on an attitudinal scale about CMSs.

Our present results, based on both the quantitative and qualitative analysis, provide evidence that CMS, such as WebCT Vista, have weaknesses that need to be addressed. Future studies need to focus on of CMSs'

technological drawbacks, because technology's affordances and limitations highly affect the quality of the instruction (Kozma, 1994). On the other hand, users should continue to critically evaluate the current tools to determine what accommodations might improve their online experiences, and make learning with CMSs more efficient and enjoyable. CMSs are widespread in nearly every campus around the world, supporting thousands of instructors and learners. These tools are here to stay so why wait to address technological (along with pedagogical) issues associated with CMSs?

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