

# STUDENT ATTITUDES TOWARD WEB-BASED COURSE MANAGEMENT SYSTEM FEATURES

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## ABSTRACT

*Many colleges and universities are adopting web-based course management systems but little research has been reported about how well these systems are working in terms of student acceptance of the features they provide. This paper examines students' attitudes toward course management system features. Results show students favor all the features to which they were exposed. Perceived ease of use is very important to their acceptance of the features.*

**Keywords:** Web-based, course management system, technology acceptance, ease of use.

## INTRODUCTION

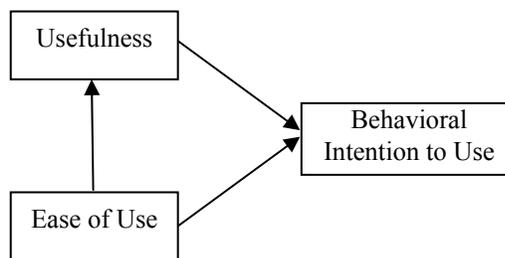
Courseware was originally designed for distance learning, but many colleges and universities have employed some type of web-based course management system (CMS) as a part of their instructional delivery package for local students in traditional programs (1). Some colleges and universities have developed their own course management systems. For example, Clemson University developed CLE 2000 and Virginia State University developed WCM. Others have adopted commercial packages such as WebCT and Blackboard.

Possible advantages of Web-based course management systems include: universal accessibility of course resources to students, increased, timely communication between instructor and students (such as instant feedback from an online test) and saving paper. Eduventures.com (1) examined the use of course management systems by higher education institutions, finding the factors that most significantly influence system selection are ease of use (64 percent), flexibility (47 percent), and price (46 percent). Because there has been little empirical research regarding the use of electronic course management systems, instructors know little about how students feel about course management system features. Continued research in this area may help educators become more effective at selecting and using course management packages.

To investigate student attitudes we adapted the Technology Acceptance Model (TAM). It claims two behavioral beliefs, *perceived ease of use* and *perceived usefulness*, affect individuals' *behavioral intention to use* a technology (Figure 1). Prior research suggests the effects of external variables (e.g., design features of the system) on user behavioral intention are mediated by these two key beliefs (4). Perceived ease of use is the extent to which individuals believe that using the CMS feature will be free of effort. Perceived usefulness is the extent to which individuals believe that using the CMS feature will enhance their knowledge and productivity (2). In our study, we are mainly interested in perceived ease of use and perceived usefulness of each CMS feature, because these variables have been shown in previous studies to serve as

predictors of behavioral intention to use a CMS feature. However we also investigate how well the overall TAM represents the situation under study.

**Figure 1 Modified TAM model**



## COURSE MANAGEMENT SYSTEM FEATURES

In this research we investigate three course management systems having the following common features.

Syllabus. Most syllabi include a class schedule. The instructor can easily update the class schedule online.

Course notes. The instructor may put course notes on the web, including slides and files that students can download.

Online tests. The instructor can set timing for the online tests, such as the test start time, the duration of the test time period, and so forth. Upon student completion of the test, objective type tests can be graded by the software providing instant feedback to students.

Practice Tests. The online test feature can be used to set up practice tests in which correct answer may be disclosed.

Disclosure of Old Tests. The instructor can disclose the correct answer of a prior test with an individual student's wrong answer marked in a different color.

Grade posting. The instructor can post grades that may be viewed privately by students.

Assignments. The instructor can post an assignment on line as soon as it is ready, rather than waiting for the next class meeting.

## RESEARCH APPROACH

### Research Questions

Mainly we wanted to discover the extent to which students intend to use each of the CMS features. Therefore we investigated students' perceptions of *ease of use* and *usefulness* of each feature, because these have been predictors of *behavioral intention to use* in prior studies. (Because we investigated a system already in use, we could also more directly assess students' *behavioral intention to use*. Because it is not necessarily optional for students to use certain features, we intended to find out students' opinions of the *importance* of a feature instead of

directly asking how much they used each feature.) Specifically, we researched the following questions:

1. (Main) To what extent do students intend to use each of the CMS features?
2. (Secondary) How well does TAM fit this situation?
  - 2.1 How strong are the relationships between **CMS version**, ease of use, usefulness, and behavioral intention to use the system?
  - 2.2 What relationships exist among CMS versions, ease of use, usefulness, and behavioral intention to use?

## Subjects

Because it was desirable to consider more than one course management system, we investigated students from three universities that used different systems. These students used course management systems extensively during the entire semester we considered. Because the five involved instructors used their preferred features for instructional delivery, we considered their groups of students to be separate samples.

Sample #1: two undergraduate classes of 49 students (Introduction to computer applications). The instructor posted syllabus and assignments using CLE 2000. Tests were also conducted on line.

Sample #2: a MBA class of 27 students (Management Information Systems). The instructor posted syllabus and course notes using CLE 2000.

Sample #3: two undergraduate classes of 45 students (Management Information Systems). The instructor posted syllabus, course notes and assignments using CLE 2000.

Sample #4: two undergraduate classes of 48 students (Principles of Management and Management Sciences). The instructor posted syllabus, course notes, tests and assignments using Blackboard.

Sample #5: two undergraduate classes of 42 students (Introduction to Information Systems) and an undergraduate class of 18 students (Management Information Systems). The instructor posted syllabus, course notes, tests and assignments using WCM.

## Questionnaire

A questionnaire was adapted from the TAM that measures the key constructs of: perceived usefulness, perceived ease of use, and behavioral intention. These constructs were operationalized based on an instrument developed in previous research (4). Several questions measure each construct. Students were asked to assess the usefulness and ease of use of the features on a 7-point scale (from -3 to +3, where 0 indicates neutral). To measure behavioral intention to use the system, we asked students to rank the features on how worthwhile they perceived each feature to be. (Students would intend to use a system they consider worthwhile). They were also asked to rank these features on how worthwhile they could be (potentially) if the features were available, were convenient and were actually used. The measurement scales were determined by averaging the scores of the items for each construct (4). The questionnaire was administered toward the end of the semester so that students would have had sufficient exposure to a course management system.

## RESULTS AND DISCUSSION

To investigate the main research question, the extent to which students intend to use each of the CMS features, we used descriptive statistics for *ease of use* and *usefulness*. Also we ran independent-sample t test to find the mean, standard deviation, student t, and significance level for each course management system feature. For the second research question we 1) found correlation coefficients for CMS version, ease of use, usefulness and behavioral intention to use the system, then 2) ran a series of multiple linear regression models to find causal relationships among CMS version, ease of use, usefulness, and behavioral intention to use. Throughout we considered  $\alpha = 0.05$  as the acceptable significance level.

**Table 1. Descriptive Statistics and Significance Levels of CMS features**

		<u>Number of</u>			<u>Significance</u>
		<u>Subjects (N)</u>	<u>Mean</u>	<u>Std. Dev</u>	<u>Level</u>
<b>Syllabus</b>	<b>Ease of use</b>	206	1.8	1.3	0.0383
	<b>Usefulness</b>	206	1.0	1.5	0.1819
<b>Course Notes</b>	<b>Ease of use</b>	164	1.9	1.1	0.0304
	<b>Usefulness</b>	164	1.6	1.3	0.0521
<b>Online Test</b>	<b>Ease of use</b>	130	1.9	1.4	0.0319
	<b>Usefulness</b>	129	1.5	1.4	0.0695
<b>Practice Tests</b>	<b>Ease of use</b>	78	2.3	1.0	0.0111
	<b>Usefulness</b>	77	2.1	1.0	0.0182
<b>Disclosure of Old Tests</b>	<b>Ease of use</b>	75	1.9	1.3	0.0339
	<b>Usefulness</b>	73	2.0	1.0	0.0266
<b>Grade Posting</b>	<b>Ease of use</b>	97	2.4	1.1	0.0095
	<b>Usefulness</b>	97	2.0	1.0	0.0228
<b>Assignments</b>	<b>Ease of use</b>	176	1.8	1.2	0.0332
	<b>Usefulness</b>	176	1.5	1.4	0.0722

From the above table we can see that students thought all the features were easy to use, but grades, disclosure of old tests and practice tests are more useful than the other features. Perhaps this preference indicates students' grade consciousness. Practice tests and disclosure of old tests may help students prepare for tests. The online syllabus had the lowest rating of usefulness. We cannot be sure whether this low rating pertained to syllabus content or to having the syllabus online. If the latter, there is little or no advantage over a paper copy. Students indicated online tests, course notes and assignments were not very useful. According to our experience, students seem to like the instant feedback from the online testing. However, online tests tend to encourage objective type testing, such as multiple choice questions and true/false, whereas students might prefer another format.

To investigate our secondary research question, we combined measures for four features common to all CMS WCM systems in this study: syllabus, assignment, course notes, and online tests. We defined each of the five different combinations of instructor and CMS package as a different "CMS Version" and coded each using different values of a dummy (categorical) variable. The Pearson correlation coefficients (Table 2) show a relatively strong relationship (in

descending order) between ease of use and behavioral intention to use, ease of use and usefulness, and usefulness and behavioral intention to use. CMS version has a very weak relationship with perceived usefulness and an even weaker relationship with ease of use. This reinforces results of the independent-sample t test that showed students thought all the features were easy to use.

**Table 2. Correlations**

	<b>CMS version</b>	<b>Usefulness</b>	<b>Ease of Use</b>	<b>Behavioral Intention To Use</b>
<b>CMS version</b>		<b>0.162***</b>	<b>0.073*</b>	<b>-0.009</b>
<b>Usefulness</b>			<b>0.765***</b>	<b>0.744***</b>
<b>Ease of Use</b>				<b>0.796***</b>
<b>Behavioral Intention to Use</b>				

\* correlation is significant at 0.05 level (2-tailed)

\*\*\* correlation is significant at 0.001 level (2-tailed)

We then performed regression analyses to study the causal relationships among variables (Table 3). We employed standardized variables (having a mean of 0 and standard deviation of 1) to get a better understanding of the relative importance of the predictors (3). The t-values and p-values are used to assess the significance of the beta weights.

First we noted that CMS Version was such an unimportant, although significant, predictor of usefulness and ease of use that we do not believe it confounded our investigation of the main research question.

In accordance with TAM: 1) perceived ease of use is an important predictor of perceived usefulness (Model 1), 2) perceived ease of use is a relatively important predictor of behavioral intention to use (Model 2), and (3) perceived usefulness is a relatively less important predictor of behavioral intention to use (Model 2).

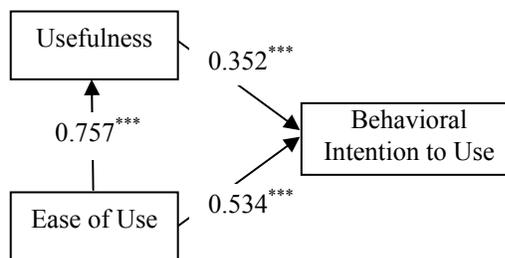
**Table 3. Regression Analysis (N=748)**

<u>Regression Model</u>	<u>Dependent Variable</u>	<u>R<sup>2</sup></u>	<u>Independent Variable</u>	<u>Standardized Coefficients (Beta)</u>	<u>T</u>
1	Usefulness	0.597***	Ease of Use	0.757	32.805***
			CMS Version	0.107	4.628***
2	Behavioral Intention to Use	0.830***	Ease of Use	0.534	16.926***
			Usefulness	0.352	11.055***
			CMS Version	-0.105	-5.097***

\*\*\*p<0.001

The summary of the standardized coefficients is shown in Figure 2.

**Figure 2 Extended TAM model results**



\*\*\* significant at 0.001 level

### CONCLUDING REMARKS

Students felt all the web-based course management system features were easy to use. They felt that some features such as online grades, disclosure of old tests and practice tests were more useful than the other features. Intuitively, students like the features that give them instant feedback and direct assistance in improving their performance in a class. Differences in CMS versions had very low impact on perceived ease of use and perceived usefulness of the systems, suggesting it may not be important which system one adopts as long as it effectively provides popular features. University administration and faculty can look into other factors such as price and special requirements for features when selecting a web-based course management system. Perceived ease of use had a relatively strong impact on students' perception of usefulness of the features. Perceived ease of use is more important than perceived usefulness of the features with respect to influencing the students' intention to use the web-based course management systems. Overall, ease of use of the features should be the number one priority when selecting a web-based course management system.

For further research, we may want to know if perceived usefulness affects students' perceived ease of use of the system. (If students feel the system is useful, they are more willing to use it. In return, the more they use the system, the easier it will be.) In future studies it may be helpful to directly measure hands-on experience with each feature. Also, one could account for other variables that may influence users' perceived ease of use and usefulness, for example, responsiveness (speed) of the system that depends partly on speed of the Internet connection.

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