Association for Information Systems
AIS Electronic Library (AISeL)

December 2007

Modeling the Motivating and Enabling Factors of Students' Acceptance of Web-Based Course Management Systems

Michael Williams
Swansea University

Janet Williams
University of Glamorgan

Jun Chen
Swansea University

Follow this and additional works at: http://aisel.aisnet.org/amcis2007

Modeling the Motivating and Enabling Factors of Students' Acceptance of Web-Based Course Management Systems

Michael D. Williams
Swansea University, UK
m.d.williams@swansea.ac.uk

Janet Williams
University of Glamorgan, UK
Jwillia3@glam.ac.uk

Jun Chen
Swansea University, UK
j.chen@swansea.ac.uk

Abstract

Although the online delivery of undergraduate and graduate course materials is a relatively recent phenomenon, the popularity of Web-based learning has been such that both businesses and academic institutions have experienced significant pressures to integrate online course material into their environments. Previous studies have made it clear that gaining a greater understanding of the perspective of the learner is vital in being able to comprehend the various factors involved in successfully introducing online learning. This paper presents the results of an investigation into the use of a Web-based course management system in a UK university, employing a model previously developed and assessed in a US university, and in obtaining a sample size similar to that of the original study, and employing similar analysis techniques, generates a set of results which may be compared with those of the original work. Of the 14 hypotheses tested in these studies, ten produced matching results while four produced conflicting findings, suggesting that additional work in the area is required.

Keywords

Internet, education, online delivery, technology acceptance, structural equation modeling

Introduction

Although the online delivery of undergraduate and graduate courses is a relatively recent phenomenon (Parnell & Caragher, 2003), the popularity of Web-based courses and online learning has been such that both businesses and academic institutions have experienced significant pressures to integrate online course material into their environments (Saade´ & Bahli, 2005). This mass-development of Web-based learning materials has been accompanied by significant financial investment (Dos Santos & Wright, 2001; Shrivastava, 1999), and nowadays, thousands of online courses are offered by educational institutions (Marks et al., 2005) as the perceived value of online learning has become widely recognized and accepted (Saade´ & Bahli, 2005). Online learning is now a widespread method for providing education at the graduate and undergraduate level (Wallace, 2003), with the incorporation of the Web into management education generally taking two principal forms; (i) where instruction is conducted primarily over the Web, or (ii) where traditional classroom instruction is enhanced by use of a Web-based course management system such as WebCT™ or Blackboard™ (Martins & Kellermanns, 2004).

However, the rush to offer Web-based courses has left many questions about what makes them effective and satisfactory (Marks et al., 2005). Convenience and flexibility are often argued to be the distinguishing and most valuable features of Web-based courses (Arbaugh & Duray, 2001), yet research indicates that up to 20% of students prefer the face-to-face environment and believe they learn best in that environment (Hiltz & Turoff, 2005). Moreover, student retention rates in online learning environments are argued to be lower than those of the face-to-face environment (Simpson, 2003). Thus, while the vision of virtually extending the classroom experience appears compelling, there is a growing body of evidence to suggest that many students do not engage with the online learning environment as they lack the capacity and inclination for the type of independent learning demanded (Chung & Ellis, 2003; Mason & Weller, 2000).

Since student perception and attitude is critical to motivation and learning (Smart & Cappel, 2006; Koohang & Durante, 2003), it is clear that gaining a greater understanding of the perspective of the learner is vital in being able to comprehend the factors involved in developing and promoting an engaging online learning environment (Song et al., 2004; Howland & Moore, 2002). Such an environment is more likely to result in approval and use of the technology than mandated use (Venkatesh & Davis, 2000), particularly in blended learning environments where acceptance is an important issue as there may be a temptation to over-rely on the traditional face-to-face component of the course (Martins & Kellermanns, 2004).

The aim of this paper therefore is to contribute to the body of work in this area by presenting the results of an investigation into factors influencing students' acceptance of online education. We present and evaluate a model of student acceptance of a Web-based course management system (Blackboard) which was employed as a supplement to the traditional method of classroom instruction in a number of undergraduate courses at a UK University.

The core of the model employed is Davis' (1989) Technology Acceptance Model (TAM), which has been often used in research into the acceptance and use of technology, and indeed forms the core of the model employed by Martins & Kellermanns (2004) to investigate technology use (WebCT) in management education in a large university in the northeastern United States. We use the theoretical model of Martins & Kellermanns as a starting point, and develop a model

which we consequently test on use of the Blackboard course management system in a UK environment. Thus our work provides a further assessment of the validity of the Martins & Kellermanns model, and also allows for comparison of results obtained from two different education cultural environments and two different supporting technologies (Blackboard and WebCT).

The structure of the paper is as follows. Firstly, we present the research model employed within this study and the associated hypotheses. Secondly we discuss our methodology and our results. Finally, we discuss our findings and their implications for further research.

Theoretical Background and Hypotheses

A much used method of investigating the acceptance and use of technology is via models of planned behavior, one of the best known and most widely used of which is TAM (Horton et al., 2001). TAM has been extensively used by researchers to study acceptance of technology, and has been found to be a useful predictor of intention to use a technology in various organizational and personal situations (see for instance Taylor & Todd (1995), Gefen & Straub (1997), Venkatesh & Davis (2000), Moon & Kim (2001), and Gefen et al., (2003) among many others). Indeed, Martins & Kellermanns (2004) employ TAM as the core of their model due to it being *well accepted* and *theoretically grounded*, and it having been previously used in education research.

TAM was derived from Ajzen & Fishbein's (1972; 1980) Theory of Reasoned Action (TRA), which states that beliefs influence intentions, and intentions influence actions. According to TAM, perceived usefulness and perceived ease of use of technology influences attitudes toward that technology, which in turn influences an individual's behavioral intention to use that technology, which consequently determines actual usage. Hence, by considering the constructs of the original TAM within the context of the use of a course management system, we can hypothesize the following:

H1: Perceived usefulness of a course management system will be positively related to a student's attitude toward the system.

H2: Perceived ease of use of a course management system will be positively related to a student's attitude toward the system.

H3: A student's attitude toward a course management system will be positively related to the student's intention to use the system.

H4: Intention to use a course management system will be positively related to the student's actual use of the system.

H5: Perceived ease of use of a course management system will be positively related to perceived usefulness of the system.

The model employed by Martins & Kellermanns (2004) to study WebCT acceptance in a US university environment, and accordingly used as the starting point of this study is also based upon the TAM, and is illustrated in Figure 1
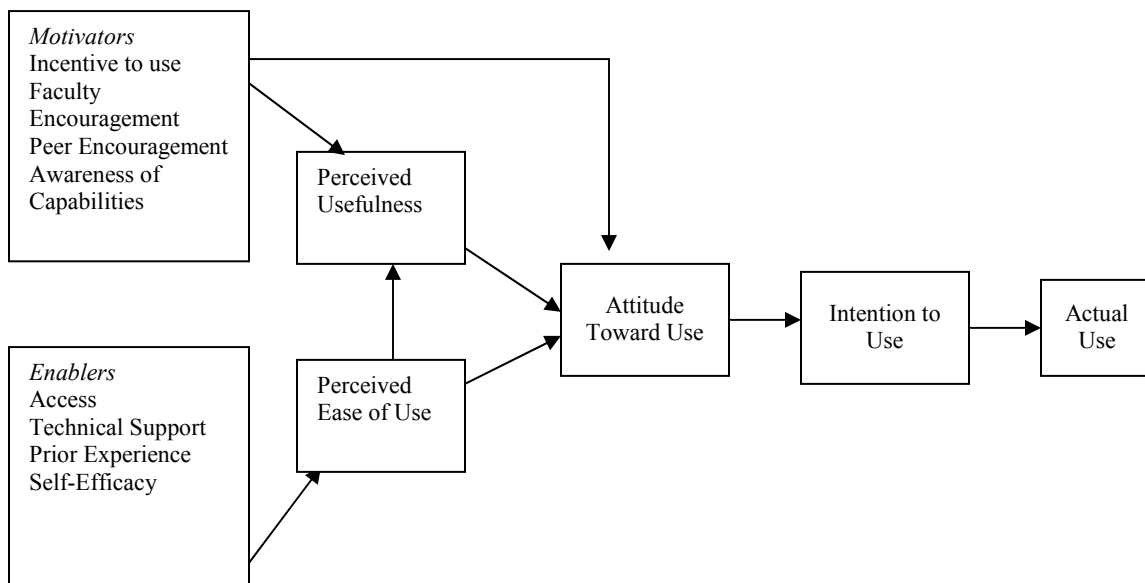

Figure 1. Martins & Kellermanns' (2004) Theoretical Model

It can be seen from Figure 1 that the external variables of Martins & Kellermanns are divided into two distinguishable groups, those motivating use (which they view as influencing both perceived usefulness of and attitude toward use of the WebCT system), and those enabling use (which they argue influences perceived ease of use). Table 1 provides a summary of the source literature employed by Martins & Kellermanns to justify the constructs of the motivator and enabler aspects of their model.

Table 1. Summary of Source Literature for Motivators and Enablers

Motivating Factors	Incentive to use	Compeau et al. (1999); Henry & Stone (1997)
	Faculty Encouragement	Igbaria (1993); Taylor & Todd (1995)
	Peer Encouragement	Karahanna et al. (1999); Taylor & Todd, (1995)
	Awareness of System Capabilities	Nambisan et al. (1999)
Enabling Factors	Access to System	Igbaria et al. (1997); Lederer et al. (2000); Thompson et al. (1991); Miesing (1998)
	Technical Support	Igbaria et al. (1997); Lederer et al. (2000); Thompson, et al. (1991)
	Prior Experience	Compeau & Higgins (1995); Igbaria (1993); Venkatesh (2000); Venkatesh & Davis (1996).
	Self-Efficacy	Miesing (1998); Salmon (2000)

In addition to the hypotheses derived from the TAM within the context of the use of a course management system (*H1-H5*), the following additional hypotheses are derived from the Martins & Kellermanns (2004) model.

H6a: The incentive to use a course management system will be positively related to perceived usefulness of the system.

H6b: Faculty encouragement will be positively related to perceived usefulness of the system.

H6c: Peer encouragement will be positively related to perceived usefulness of the system.

H6d: Awareness of the capabilities of the system will be positively related to perceived usefulness of the system.

H6e: Peer encouragement will be positively related to a student's attitude toward the system.

H7a: Ease of access to the system will be positively related to the perceived ease of use of the system.

H7b: Availability of technical support will be positively related to the perceived ease of use of the system.

H7c: Level of prior experience will be positively related to the perceived ease of use of the system.

H7d: Self efficacy of using computers and the Web will be positively related to the perceived ease of use of the system.

Method

Data were collected using a questionnaire from undergraduates studying various management courses within a single department at a UK university, and resulted in 237 valid responses. In considering the possibility that the students' usage patterns of and attitudes toward the Blackboard system may alter during examination periods, the data were collected well before the main examinations were due to take place. Hence the data reflected students' views of how they perceived and used the Blackboard system during "normal" periods, rather than being skewed due to pressures of examination revision. Participation in the study was voluntary, although in order to increase the response rate, an incentive of a small number of extra credit points was offered to participants.

Measures

Where possible, constructs in the research model were measured using versions of previously employed scales. Given that one of our key aims was to assess the validity of the model proposed by Martins & Kellermanns (2004) in an alternative setting, we adopted the scales used in their study (allowing for contextually motivated alterations) wherever appropriate.

Motivators

Perceived incentive to use the Blackboard system (which measured a student's belief that use of Blackboard would influence grades) was captured using three, five-point Likert-type questions (1 = strongly disagree, 5= strongly agree), resulting in a Cronbach's alpha value of 0.74. Perceived faculty encouragement was captured using seven, five-point Likert-type questions, resulting in a Cronbach's alpha value of 0.76, while perceived peer encouragement was captured using four, five-point Likert-type questions, resulting in a Cronbach's alpha value of 0.83. Awareness of system capabilities was measured using a single five-point Likert-type question.

Enablers

Perceptions of level of access to the Blackboard System (assessed by the extent to which students believed they had convenient and high-speed access to the Web) was captured using four, five-point Likert-type questions, resulting in a Cronbach's alpha value of 0.83. Perceived availability of technical support (including provision of training, and designated help-points) was assessed using four, five-point Likert-type questions, resulting in a Cronbach's alpha value of 0.73. Perceptions of prior experience with computers (including use Microsoft Word™, Microsoft Excel™, and e-mail for both

work and leisure purposes) and the Web were obtained via four, five-point Likert-type questions, resulting in a Cronbach's alpha value of 0.68. Perceptions of overall self-efficacy in using the Web were obtained via four, five-point Likert-type questions, resulting in a Cronbach's alpha value of 0.84.

Original TAM Constructs

Perceived ease of use is defined as the degree to which an individual believes that learning to use new technology will require little effort (Davis, 1989). Student perceptions that Blackboard was easy to use were captured using three, five-point Likert-type questions resulting in a Cronbach's alpha value of 0.83. Perceived usefulness of the Blackboard system was measured using seven, five-point Likert-type questions resulting in a Cronbach's alpha value of 0.90. Overall general attitude toward the Blackboard system (level of acceptance) was measure using three five-point Likert-type questions resulting in a Cronbach's alpha value of 0.75. Students' intentions to use the Blackboard system in future was measured using seven, five-point Likert-type questions, resulting in a Cronbach's alpha value of 0.84. Our study also took the actual use of the Blackboard system into account. Many studies make use of the intention to use construct as a proxy for actual use, but as we had a convenient measure of the *actual* system use of all participants, this measure was factored into our investigation.

Sample

The sample frame consisted of all students registered in four business courses in a business department at a mid-sized campus-based university in the UK. During our study, the Blackboard course management system was used to augment traditional classroom instruction, and in keeping with the approach employed by Martins & Kellermanns (2004), instructors for all courses required registered students to use the Blackboard system to obtain course materials and access supplementary information such as course assignments and links to additional readings. These actions were prescribed as a minimal level of participation, and in addition, students were encouraged (but not required) to make use of the interactive aspects of the system (such as the message-board) in order to further engender a sense of engagement with the class as part of a learning community.

The resulting data from the 237 valid returns were provided by 120 (50.6 percent) males and 117 (49.4 percent) females. All participants were undergraduates, 141 (59.5 percent) of which were level-two (2nd year of degree) while 96 (40.5 percent) were level three (final year of degree). Almost all participants (97.9 percent) were aged between 18-24, while 2.3 percent were aged between 26-42. In terms of prior experience, 228 (96.2 percent) participants had previously used the Blackboard system for at least one course. Only 9 (3.8 percent) participants had never used it before. Among participants who had prior experience of the Blackboard system, 158 (66.7 percent) had used Blackboard for five or more courses, 19 (8.0 percent) had previously used it for four courses, 29 (12.2 percent) for three courses, 13 (5.5 percent) for two courses, and 9 (3.8 percent) had previously used it for just one course.

Data Analysis

Descriptive analysis, reliability analysis and exploratory data analysis was performed using SPSS v12.0. Results of the Cronbach's alpha analysis indicated a satisfactory reliability level for each of the multi-item constructs under study. In the exploratory factor analysis, principal components analysis with a Varimax rotation was used to examine the underlying factor pattern for each of the constructs and reduce the items to be included in further analysis (Hair et al., 1998). The cut-off point of 0.30 was used to extract items for different factors (Hair et al., 1998). Results indicated a uni-dimensional factor pattern for each of the constructs under investigation.

For the hypothesis testing, structural equation modeling using LISREL 8.7 (Jőreskog and Sőrbom, 1996-2001) was used, which combines multiple regression and confirmatory factor analysis while allowing observed variables and latent variables to be analyzed simultaneously (Byrne, 1998). For this study, a covariance matrix was used as the data input with maximum likelihood estimation in the SEM analysis. Exogenous variables in the model comprised perceived faculty encouragement, perceived incentive to use, peer encouragement, awareness of the capabilities of the system, access to the system, availability of technical support, prior experiences with computers and Web use and self-efficacy. Endogenous variables in the model were perceived usefulness of the system, perceived ease of use of the system, attitude towards the system, intention to use the system and actual system usage. Measurement equations were created to represent the relationships between each of the latent variables and its corresponding composite items. Structural equations in the model testing represented their corresponding hypothesized relationships. As recommended by Byrne (1998), a t-value of 1.96 was used to assess the statistical significance of parameter estimates.

Results

Measurement Model

The following common model-fit measures were used to assess the model's overall goodness of fit: the ratio of chi-square (χ^2) to degrees of freedom (d.f.), root mean squared error of approximation (RMSEA), comparative fit index (CFI), normalized fit index (NFI), relative fit index (RFI) and incremental fit index (IFI). Values that exceed 0.90 for normalized comparative fit index (NFI) and comparative fit index (CFI) are generally considered to indicate acceptable fit. Our model

had an initial $\chi^2 = 2191$ and showed an acceptable fit with a NFI of 0.891 (slightly below the benchmark of 0.9) and CFI of 0.954. The RMSEA for the model was 0.049, which is well below the .08 cut-off for indicating good fit (Hu & Bentler, 1995). The χ^2/df ratio was 1.958 ($p < 0.000$), which is below the suggested 3.0 value, again indicating a good fit (Kline, 1998). Values close to 1 indicate a very good fit for both RFI and IFI. Our model exhibited a good fit with initial values of RFI = 0.883 and IFI = 0.954. Overall, our measurement model indicated a very good fit with the data.

Structural Model

Results obtained from our structural equation modeling activities are presented in Figure 2 and Table 2. Figure 2 illustrates the standardized path coefficients and variance explained for each of the model's dependent variables. It can be seen from Figure 2 that not all of the hypothesized paths suggested by the theoretical model (Figure 1) were supported. Moreover, it can be further seen that a number of previously unspecified paths were in fact supported by the data captured (Table 3).
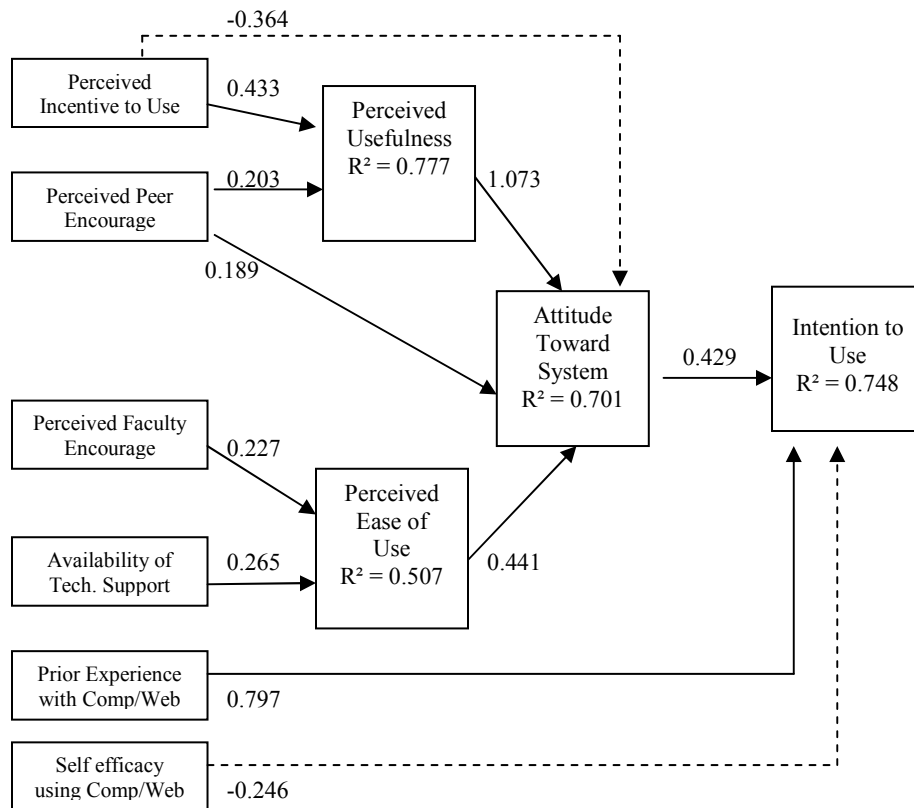

Figure 2. Final Model

Table 2. Summary of Hypotheses

Hypothesis	Expected Influence	Estimated Coefficient	t-value	Assessment (p ≤ 0.05)
H1: Perceived usefulness → Attitude	+	1.073	4.72	Significant
H2: Ease of use → Attitude	+	0.441	3.30	Significant
H3: Attitude → Intention to use	+	0.429	6.41	Significant
H4: Intention to use → Actual use	+	11.447	0.71	Non-significant
H5: Ease of use → Perceived usefulness	+	0.099	1.28	Non-significant
H6a: Incentive to use → Perceived usefulness	+	0.433	6.72	Significant
H6b: Faculty encouragement → Perceived usefulness	+	-0.073	-0.80	Non-significant
H6c: Peer encouragement → Perceived usefulness	+	0.203	3.55	Significant
H6d: Capability of system→ Perceived usefulness	+	0.022	0.86	Non-significant
H6e: Peer encouragement→ Attitude	+	0.189	2.12	Significant
H7a: Access to the system → Ease of use	+	0.000	0.01	Non-significant
H7b: Technical support → Ease of use	+	0.265	3.16	Significant
H7c: Prior experience → Ease of use	+	0.337	1.94	Non-significant
H7d: Self efficacy → Ease of use	+	0.099	1.49	Non-significant

The hypotheses derived from the TAM and the Martins & Kellermanns (2004) model enjoy variable levels of support, with *H1-H3* being supported, along with *H6a*, *H6c*, *H6e*, and *H7b*. In addition to these *specified* hypotheses, faculty encouragement was viewed as being related to the perceived ease of use of the system, and perceived incentive to use the system was related to overall attitude toward the system. Both the level of prior experience and the level of perceived self-efficacy were perceived as being related to the student's intention to use the system.

Table 3. Un-Hypothesized Significant Paths

Path	Estimated Coefficient	t-value	Assessment (p ≤ 0.05)
Faculty encouragement → Ease of use	0.227	2.35	Significant
Prior Experience → Intention to use	0.797	3.60	Significant
Self-efficacy → Intention to use	-0.246	-3.40	Significant*
Incentive to use → Attitude	-0.364	-3.02	Significant*

However, the intention to use the Blackboard system appears to have no correspondence to the actual level of use (*H4*). Furthermore, perceived ease of use is not viewed as being positively related to overall usefulness of the system (*H5*). Faculty encouragement (*H6b*), and the perceived capability of the system (*H6d*) are both thought to have no bearing on the perceived usefulness of the system. Neither access to the system (*H7a*), level of prior experience (*H7c*), nor level of perceived self-efficacy (*H7d*) were viewed as being related to the perceived ease of use of the Blackboard system.

Discussion and Implications

Clearly there is still much to discover about online learning, particularly from the learner perspective (Song et al., 2004; Saade & Bahli, 2005). Indeed, according to Saade & Bahli (2005), many aspects of utilizing online teaching materials are not well understood, although there is certainly no obvious shortage of investigative work in this area. Moreover, despite student acceptance being identified in previous management education research as being critical to the successful deployment of Web-based instruction (Martins & Kellermanns, 2004), there has been relatively little interest shown in ascertaining student readiness for, or acceptance of online courses (Parnell & Caragher, 2003; Stoel & Lee, 2003) and therefore there remains a need for additional rigorous research into factors affecting integration of Web-based technologies into the educational environment. This paper has attempted to contribute to the body of knowledge in this area by testing a previously developed model in a new cultural setting.

In the previous section, we presented our results and while the number of rejected hypotheses may cast some doubt on the validity of the model, it must be recognized that our results, despite being obtained in a different cultural setting and focusing upon the use of a different product, largely correspond with those obtained by Martins & Kellermanns (2004) in their original study and were obtained using a comparable sample size (n=237 for this study, n=243 for Martins & Kellermanns). Indeed, our study produced different results for only four of the 14 stated hypotheses. Table 4 provides a comparison of the two sets of results.

Table 4 illustrates that both studies confirm that students' attitudes toward the course management system (and hence the overall level of acceptance) is positively influenced by the perceived usefulness (*H1*) and the perceived ease of use (*H2*) of the system. Both studies also confirm that a student's attitude toward a course management system will in turn be positively influenced by the student's intention to use that system (*H3*).

In a survey of TAM studies published in leading academic journals, Lee et al. (2003) reported that almost 86% (n=101) did not measure the relationship between intention to use and actual use, the common approach being to employ intention to use as a proxy for actual use. Both our study and that of Martins & Kellermanns (2004) did attempt to investigate this relationship, albeit with differing results. We found no support for the hypothesis (*H4*) that actual use of the course management system was related to the stated intention to use the system, whereas Martins & Kellermanns' findings supported the hypothesis. This phenomenon could be attributable to the fact that actual use was measured differently in each investigation. Our study used the actual number of visits to the site during a semester, whereas Martins & Kellermanns were unable to obtain such data and asked students to self-report their level of use.

Martins & Kellermanns also reported support for the hypothesis that perceived ease of use would be positively related to perceived usefulness; however we found no evidence to support this hypothesis (*H5*). This result was unexpected as the relationship between these constructs is an important aspect of the TAM model. However, Lee et al. (2003) highlight controversy surrounding the role of perceived ease of use in many TAM studies, and indeed, our findings suggest that there are more important factors that contribute to students' perceived usefulness of the system than whether it is perceived as being easy to use or not – these factors being incentive to use (H6a) and peer encouragement (H6c). Both studies supported these hypotheses whereas both rejected the influence of awareness of system capabilities (*H6d*) on perceived usefulness.

Both studies also confirmed that perceived ease of use was not influenced by convenient access to the system (*H7a*), nor by perceived level of self-efficacy of using computers and the Web (*H7d*), but was affected by availability of technical support - including basic training where required (*H7b*). Results from both studies also suggest that peer encouragement is positively related to a student's overall attitude (level of acceptance) toward the system (*H6e*).

Interestingly, the hypothesis that faculty encouragement will be positively related to the perceived usefulness of the system (*H6b*) was rejected by this study, but supported by Martins and Kellermanns (this may be a result of different mechanisms employed during the study, but suggests further investigation is required), as was the suggestion that the level of prior experience would be positively related to the perceived ease of use of the system (*H7c*). Whilst faculty encouragement did not load onto perceived usefulness, it did load onto the un-hypothesized path, ease of use. Our results suggest that the level of encouragement provided by faculty may give the impression that the system is easy to use and provides a convenient method for obtaining course materials, but does not occupy a pivotal role in the learning process. It may therefore be the case that students develop a belief that minimal use of the system is acceptable, as they are not fully dependent upon it during their studies. Moreover, our sample included a particularly large proportion of students with prior experience (96.2%), and therefore they might not need faculty encouragement to convince them that the system is useful. Our study also revealed that students' experience over time will not increase ease of use (H7c). With greater experience and familiarity with the system, it appears that students become less concerned with ease of use.

Table 4. Comparison of Results

Hypothesis	Results			
	This Study	**Estimated Coefficient**	**Estimated Coefficient**	**Martins & Kellermanns (2004)**
H1: Perceived usefulness → Attitude	Significant	1.073	0.25	Significant
H2: Ease of use → Attitude	Significant	0.441	0.48	Significant
H3: Attitude → Intention to use	Significant	0.429	0.68	Significant
H4: Intention to use → Actual use	Non-significant	Not supported	0.39	Significant
H5: Ease of use → Perceived usefulness	Non-significant	Not supported	0.28	Significant
H6a: Incentive to use → Perceived usefulness	Significant	0.433	0.25	Significant
H6b: Faculty encouragement → Perceived usefulness	Non-significant	Not supported	0.22	Significant
H6c: Peer encouragement → Perceived usefulness	Significant	0.203	0.38	Significant
H6d: Capability of system→ Perceived usefulness	Non-significant	Not supported	Not supported	Non-significant
H6e: Peer encouragement→ Attitude	Significant	0.189	0.53	Significant
H7a: Access to the system → Ease of use	Non-significant	Not supported	Not supported	Non-significant
H7b: Technical support → Ease of use	Significant	0.265	0.17	Significant
H7c: Prior experience → Ease of use	Non-significant	Not supported	0.18	Significant
H7d: Self efficacy → Ease of use	Non-significant	Not supported	Not supported	Non-significant

Conclusions

Existing studies have made it clear that gaining a greater understanding of the perspective of the learner is vital in being able to comprehend the various factors involved in developing and successfully promoting online learning environments. This issue has gained particular credence in the so-called blended learning environments in which the learner may be tempted to over-rely on the traditional face-to-face component of the course. This paper has presented the results of an investigation onto the use of a Web-based course management system in such a blended learning context in a UK university, thereby contributing to an under-researched area.

The study presented made use of a model previously developed and assessed in a US university, and in obtaining a sample size similar to that of the original study, and employing similar techniques for data capture and analysis, has provided a set of results which may be viewed as being comparable with those of the original work.

The two studies each tested 14 hypotheses, the results of this study being broadly similar to those of the original study in that equivalent results were produced for ten of these hypotheses. However, the fact that four of the hypotheses were rejected by this study yet supported by the original work suggests that further work is still required.

References

Arbaugh, J. B., & Duray, R. (2001). Class Section Size, Perceived Classroom Characteristics, Instructor Experience, and Student Learning and Satisfaction with Web-Based Courses: A Study and Comparison of Two Online MBA programs. In D. Nagao (Ed.), *Academy of Management Best Papers Proceedings* [CD-ROM] (pp. A1-A6).

Ajzen, I. & Fishbein, M. (1972). Attitudes and Normative Beliefs as Factors Influencing Intentions. *Journal of Personality and Social Psychology*, 21(1), 1–9.

Ajzen, I., & Fishbein, M. (1980). *Understanding Attitudes and Predicting Social Behaviour*. Englewood Cliffs, NJ: Prentice-Hall.

Byrne, B. M. (1998). Structural Equation Modeling with LISREL, PRELIS, and SIMPLIS: Basic Concepts, Applications, and Programming. Lawrence Erlbaum Associates, NJ.

Chung, K-C., & Ellis, A. (2003). Online Education: Understanding Market Acceptance In The Higher Education Sector of Singapore. In G. Crisp, D. Thiele, I. Scholten, S. Barker and J. Baron (Eds), *Proceedings of the 20th Annual Conference of the Australasian Society for Computers in Learning in Tertiary Education*, pp. 115-125.

Compeau, D. R., & Higgins, C. A. (1995). Application of Social Cognitive Theory to Training for Computer Skills. *Information Systems Research*, 6(2), 118-143.

Compeau, D., Higgins, C. A., & Huff, S. (1999). Social Cognitive Theory and Individual Reactions to Computing Technology: A Longitudinal Study. *MIS Quarterly*, 23(2), 145-158.

Davis, F. (1989). Perceived Usefulness, Perceived Ease Of Use and User Acceptance of Information Technology. *MIS Quarterly, 13*(3), 319–340.

Dos Santos, B. L., & Wright, A. L. (2001). Internet-Supported Management Education. *Information Services & Use, 21*, 53-64.

Gefen, D., Karahanna, E., & Straub, D. W. (2003). Trust and TAM in Online Shopping: an Integrated Model. *MIS Quarterly*, 27(1), 51–90.

Gefen, D., & Straub, D. W. (1997). Gender Differences in the Perception and Use Of E-Mail: An Extension to the Technology Acceptance Model. *MIS Quarterly, 21*(4), 389-400.

Hair, J. F., Anderson, R.E., Tatham, R.L., & Black W.C. (1998). *Multivariate Data Analysis* (5th Edition), Prentice-Hall, Upper Saddle River, NJ.

Henry, J. W., & Stone, R. W. (1997). The Development and Validation of Computer Self-Efficacy and Outcome Expectancy Scales in a Nonvolitional Context. *Behavior Research Methods, Instruments & Computers*, 29(4), 519-527.

Hiltz, S. R., & Turoff, M. (2005). The evolution of Online Learning and the Revolution in Higher Education. *Communications of the ACM, 48*(10), 59-64.

Horton, R. P., Buck, T., Waterson, P. E., & Clegg, C. W. (2001). Explaining Intranet Use with the Technology Acceptance Model. *Journal of Information Technology, 16*, 237–249.

Howland, J. L., & Moore, J. L. (2002). Student Perceptions as Distance Learners in Internet-Based Courses. *Distance Education*, 23(2), 183-195.

Hu, L., & Bentler, P. M. (1995). Evaluating Model Fit, In: Hoyle, R. H. (Ed), *Structural Equation Modeling: Concepts, Issues, and Applications*. Sage Publications, Thousand Oaks, CA.

Igbaria, M. (1993). User Acceptance of Microcomputer Technology: An Empirical Test. *OMEGA International Journal of Management Science*, 21(1), 73-90.

Igbaria, M., Zinatelli, N., Cragg, P., & Cavayne, A. L. M. (1997). *Personal Computing Acceptance Factors in Small Firms: A Structural Equation Model*. MIS Quarterly, 21(3), 279-305.

Jŏreskog, K. G. and Sŏrbom, D. (1996-2001). *LISREL®8: User's Reference Guide*. Scientific Software International, Inc.Lincolnwood, IL.

Karahanna, E., Straub, D. W., & Chervany, N. L. (1999). Information Technology Adoption Across Time: A Cross-Sectional Comparison of Pre-Adoption and Post-Adoption Beliefs. *MIS Quarterly*, 23(2), 183-213.

Kline, R. B. (2005). *Principles and Practices of Structural Equation Modeling* (2nd edition), The Guilford Press New York, NY.

Koohang, A., & Durante, A. (2003). Learners' Perceptions Toward the Web-Based Distance Learning Activities/Assignments Portion of an Undergraduate Hybrid Instructional Model. *Journal of Informational Technology Education 2*, 105-113.

Lee, Y. Kozar K.A. & Larsen, K.R.T. (2003). The Technology Acceptance Model: Past, Present and Future, *Communications of the Association of Information Systems, 12*(Article 50), 752-780.

Lederer, A. L., Maupin, D. J., Sena, M. P., & Zhuang, Y. (2000). The Technology Acceptance Model and the World Wide Web. *Decision Support Systems*, 29(3), 269-282.

Marks, R. B., Sibley, S. D., & Arbaugh, J. B. (2005). A Structural Equation Model of Predictors for Effective Online Learning. *Journal of Management Education*, *29*, 531-563.

Martins, L. J., & Kellermanns, F. W. (2004). A Model of Business School Students' Acceptance of a Web-Based Course Management System. *Academy of Management Learning & Educatio*n, *3*(1), 7-26.

Mason, R., & Weller, M. (2000). Factors Affecting Students' Satisfaction on a Web Course. *Australian Journal of Educational Technology*, *16*(2), 173-200.

Miesing, P. (1998). B-Schools on the I-Way: Avoiding Potholes, Dead Ends, and Crashes. *Journal of Management Education*, 22(6), 753-770.

Moon, J., & Kim, Y. (2001). Extending the TAM for a Worldwide-Web Context. *Management Science*, 38(4), 217–230.

Nambisan, S., Agarwal, R., & Tanniru, M. (1999). Organizational Mechanisms for Enhancing User Innovation in Information Technology. *MIS Quarterly*, 23(3), 365-395.

Parnell, J. A., & Carraher, S. (2003). The Management Education by Internet Readiness (MEBIR) Scale: Developing a Scale to Assess Personal Readiness for Internet-Mediated Management Education. *Journal of Management Education*, *27*, 431-446.

Saade´ R., & Bahli, B. (2005). The Impact of Cognitive Absorption on Perceived Usefulness and Perceived Ease of Use in On-Line Learning: An Extension of the Technology Acceptance Model. *Information & Management*, *42*, 317–327.

Salmon, G. (2000). Computer Mediated Conferencing for Management Learning at the Open University. *Management Learning*, 31(4): 491-502.

Simpson, O. (2003). *Student Retention in Online, Open, and Distance Learning*. London: Kogan Page.

Shrivastava, P. (1999). Management Classes as Online Learning Communities. *Journal of Management Education, 23*(6), 691-702.

Smart, K.L., & Cappel, J.J. (2006). Students' Perceptions of Online Learning: A Comparative Study. *Journal of Information Technology Education, 5*, 201-219.

Song, L., Singleton, E. S., Hill, J. R., & Koh, M. H. (2004). Improving Online Learning Student Perceptions of Useful and Challenging Characteristics. *Internet and Higher Education*, *7*, 59-70.

Stoel, L., & Lee, K. H. (2003). Modeling the Effect of Experience on Student Acceptance of Web-Based Courseware. *Internet Research: Electronic Networking Applications and Policy*, *13*(5), 364-374.

Taylor, S., & Todd, P. A. (1995). Understanding Computer Technology Usage: A Test of Competing Models. *Information Systems Research, 6*(2), 144-176.

Thompson, R. L., Higgins, C. A., & Howell, J. M. (1991). Personal Computing: Toward a Conceptual Model of Utilization. *MIS Quarterly*, 15(1), 125-143.

Venkatesh, V. (2000). Determinants of Perceived Ease of Use: Integrating Control, Intrinsic Motivation, and Emotion into the Technology Acceptance Model. *Information Systems Research*, 11(4), 342-365.

Venkatesh, V., & Davis, F. D. (1996). A Model of the Antecedents of Perceived Ease of Use: Development and Test. *Decision Sciences,* 27, 451-481.

Venkatesh, V., & Davis, F. D. (2000). A Theoretical Extension of the Technology Adoption Model: Four Longitudinal Field Studies. *Management Scienc*e, *46*(2), 186-204.

Wallace, R. M. (2003). Online Learning in Higher Education: A Review of Research on Interactions Among Teachers and Students. *Education, Communication & Information, 3*(2), 241-280.