

The Impacts of Demographic Differences on LMS Acceptance

Muneer Abbad

Prince Mohammad Bin Fahd University, Al-Khobar, Saudi Arabia

David Morris

Coventry University, Coventry, CV1 5FB, UK

and

Faten Jaber

Oxford Brookes University, Oxford, UK

ABSTRACT

The primary question addressed in this paper is: what are the impacts of demographic factors on students' adoption of LMS?

The paper investigates and identifies some of the major factors affecting students' adoption of an e-learning system. Participants in the study consisted of undergraduate students taking first basic computer literacy classes at the Arab Open University (AOU) in Jordan. Data collection was conducted via survey of 470 students. Data was analysed using analysis of variance (ANOVA) to identify some demographic (e.g. gender, age, income, and computer ownership) influences on the factors that affect students' adoption of LMS (for example, perceived usefulness, perceived ease of use, intention to use, subjective norms, Internet experience, system interactivity, self-efficacy, and technical support).

The results showed significant gender differences for Internet experience and self-efficacy. Significant age differences were found for perceived usefulness, intention to use, and self-efficacy. Significant income differences were found for perceived usefulness, intention to use, technical support, Internet experience, system interactivity, and self-efficacy. Significant computer ownership differences were found for perceived usefulness, perceived ease of use, and Internet experience.

The paper concludes by discussing the potential implications of the results for e-learning practice.

Keywords: *E-learning, LMS Acceptance, Jordan*

1. INTRODUCTION

The Internet and the web offer new opportunities to restructure the learning and knowledge transfer environment. In addition, the advanced technology it uses offers distinct advantages to both educators and students [1]. In higher education institutions, the question of how to use modern information and communications technologies (ICT) for learning purposes is important for anyone with a stake in education and training, both educators and students.

In general, e-learning refers to the use of information technologies to deliver a range of learning opportunities [2] and a broad array of solutions that enhance knowledge, instructional process and performance [3]. E-learning systems have been developed recently that integrate a variety of functions. For example, such systems can be used to integrate learning and teaching content management, rich tutor-student and student-student communications, assessment and monitoring and progress tracking. Learning and teaching activities can be conducted

synchronously or asynchronously or use a mixture of the two. In this paper, e-learning is viewed as a just in time (JIT) learning system, the users can learn anywhere and at anytime at their convenience: self-paced, self-directed and self-managed; that is learning on demand deploying a rich mix of pedagogic approaches. We use the widely accepted term learning management system (LMS) to refer to integrated software systems which are specifically designed for learning and teaching purposes.

The purpose of this study is to explore the influence of demographic differences on LMS acceptance. Note that this is not the same as determining which factors (for example, ease of use) underlie LMS acceptance; these issues are dealt with in an earlier paper [4]. Participants in the study consisted of undergraduate students taking first basic computer literacy classes at the Arab Open University (AOU) in Jordan. The vision of AOU is to offer high quality, flexible, blended learning to all members of society, regardless of their background and gender. In particular it seeks to provide access to higher education for social groups who have less access to conventional higher education, for example those with lower incomes and/or who wish to or need to study part-time.

2. VARIABLES INFLUENCING LMS ACCEPTANCE

Perceived usefulness (PU) is defined as “the prospective probability that using a specific application system will increase his or her job performance within an organizational context” and perceived ease of use (PEOU) refers to “the degree to which the prospective user expects the target system to be free of effort” [5]. Perceived ease of use positively influences perceived usefulness and also has a direct effect on attitudes towards the adoption web-based technology; perceived usefulness positively influences attitudes towards and intention to use the technology. Attitudes, in turn, will positively influence intention to use, and intention to

use will positively influence actual web-based technology usage.

A subjective norm refers to a person's perception that significant others think she should or should not perform the behaviour in question [6]. [7] use the term “subjective norms” to refer to a person's perception of the social pressures put on him or her to perform the behavior in question. [8] found that subjective norms significantly influenced perceived usefulness.

An individual's experiences with a technology influence perceptions of ease of use and usefulness of that technology. [9] argued that learner success in distance learning depends on technical skills in computer operation and Internet navigation as well as the ability to cope with the substantive subject matter. [10] found empirical evidence that older students who had more experience of the technology used a LMS (WebCT) more than younger students with less experience of IT.

The key elements of learning processes are the interactions among students themselves, the interactions between faculty and students, and the collaboration that results from these interactions. A major source of developments in e-learning has come via technologies that promote increased learner interaction, whether synchronous or asynchronous. Thus, system interactivity is one of the factors that may affect students' adoption of e-learning systems.

Self-efficacy is an individual's belief in his or her capability to perform certain behaviors or one's personal beliefs about their ability to perform certain tasks successfully [11]. Several studies have found that self-efficacy influences decisions about what behaviors to undertake, persistence in attempting certain behaviors, and the performance attainments of the individual with respect to those behaviors [12, 13]. A student who has a strong sense of his capability in dealing with a LMS may have a more positive perception of its ease

of use and usefulness and is likely to be more willing to accept and use the system.

The availability of technical support is an important factor in determining the acceptance of technology for teaching and learning. This is especially the case in the early stages of technology adoption. Empirical evidence shows that e-learning projects that were not successful in achieving their goals did not have access to technical advice and support [14, 15].

3. MEASURING THE VARIABLES

The variables were measured using a 40 item questionnaire. Each of the items comprised a 7-point Likert scale seeking an opinion on a statement of potential relevance to one or more of the variables. For example the statement "Using the LMS would allow me to accomplish learning tasks more quickly" was included as a potential measure of perceived usefulness. The questionnaire also asked for twelve items of classification data covering demographics, computer ownership, internet availability and use. Questionnaire data was analyzed using Factor Analysis. Eight factors were

extracted corresponding to the variables discussed above.

Participants in the study consisted of undergraduate students who were taking the last lecture of the first basic computer literacy classes at the Arab Open University (AOU) in Jordan. Participation in this study was voluntary, and 470 of 654 students (71.9%) who were enrolled in these classes took part. Full details of the questionnaire, method and study population can be found in [16].

4. THE IMPACTS OF DEMOGRAPHIC DIFFERENCES

Analysis of variance (ANOVA), as explained by [17], is a statistical technique used to determine whether samples from two or more groups come from populations with equal means; put another way it asks whether or not the groups' means differ significantly. The results of the ANOVA tests are shown in Table 1. The F-test was used to test for significant differences between the means on the factor scores for each group.

Table 1: F-scores for ANOVA comparisons

Factor	Gender Female = 319 Male = 151	Age Under 30 = 314 30 and over = 156	Income Low = 259 Higher = 211	Computer Ownership Yes = 381 No = 89
Perceived usefulness	2.160	5.643 (-0.018)	5.658 (-0.018)	2.930 (0.088)
Perceived ease of use	0.109	2.119	13.045 (-0.000)	13.427 (0.000)
Intention to use	0.637	5.990 (-0.015)	12.589 (-0.000)	1.470
Subjective norms	0.758	0.216	1.526	0.433
Internet experience	3.829 (-0.051)	0.001	7.881 (-0.005)	9.992 (0.002)
System interactivity	1.506	1.059	8.050 (-0.005)	0.971
Self-efficacy	3.131 (0.077)	4.775 (-0.029)	6.912 (-0.009)	0.436
Technical support	1.897	0.411	5.547 (-0.019)	0.218

Figures in bold show the results of ANOVA tests where the differences in means were significant; the cut-off point used is the 10% level. Figures in brackets show the significance levels. A minus sign in front of the significance level indicates the direction of the difference in favor of the second group listed in the column header. Thus for example, the higher income group exhibited greater levels of perceived usefulness of the LMS than lower income groups. On the other hand, those who did not own their own computer (unsurprisingly) believed the LMS to be less useful than those who did.

The “headline” results indicate that the greatest differences in LMS acceptance are related to income levels and that the most pervasive factor in explaining differences in LMS acceptance between the demographic groups is self-efficacy. Students from the higher income group exhibited significantly higher average factor scores on all dimensions of LMS acceptance except subjective norms. The low income group is defined as those having a monthly income of less than JD200 (200 Jordanian dinars),

equivalent to \$282 per month. According to the International Labor Organization (ILO) average pay for women was JD314 per month and for men JD364 (2008 data). Two hundred dinars a month is thus a low income level. Students with higher income levels showed, on average, higher factor scores on seven of the determinants of LMS acceptance.

Self-efficacy was higher, on average, amongst women, older students and those with higher incomes. The peer pressure of subjective norms did not differ between any of the groups. Older students were more positive towards the potential benefits of using the LMS than younger students. Subjective norms do not differentially affect LMS acceptance along any dimension, although our earlier research does show that subjective norms are an important determinant of LMS acceptance overall [4].

5. CONCLUSIONS

The only demographic characteristic to significantly affect all the variables in this study, except subjective norms, was income. This is consistent with previous studies of new product adoption [18] and Internet-based marketing [19] where income was found to positively affect user adoption. A possible explanation for this effect is the imbalances in resources and skills needed to effectively participate in e-learning systems. Distance learning institutions with a mission to promote access to higher education can only succeed if they pay attention to the special characteristics of their students and

6. REFERENCES

- [1] Banga, S. and Downing, K. J. (2000) Moving towards global education in the twenty-first century. IN M. Abramson, M., *Towards the Global University: Reading Excellence in the Third Millennium*, Preston: University of Central Lancashire
- [2] Sanders, J and Walsh, K (2004). E-learning for general practitioners: Lessons from the recent literature. *Work Based Learning in Primary Care* 2 (4): 305-314.
- [3] Poon, W., Low, K. L. and Yong, D. G. (2004). A study of Web-based learning (WBL) environment in Malaysia. *The International Journal of Educational Management* 18, (6) 374-385.
- [4] Abbad, Muneer Mahmoud; Morris, David and De Nahlik, Carmel (2009). Looking Under the Bonnet: Factors Affecting Student Adoption of E-Learning Systems in Jordan, *The International Review of Research into Open and Distance Learning*, 10 (2). Available at: <http://www.irrodl.org/index.php/irrodl/article/view/596/1232>.
- [5] David, F. D. (1986). *A technology acceptance model for empirically testing new end-user information systems: Theory and results*. Doctoral dissertation: Sloan School of Management, MIT.
- [6] Fishbein, M. and Ajzen, I. (1975) *Belief, attitude, intention and behavior: An introduction to theory and research*. Reading, MA: Addison-Wesley.
- [7] Taylor, S and Todd, P. A. (2005). Understanding information technology usage: a test of competing models. *Information Systems Research* 6 (2): 144-176.
- [8] Lee, Y.C. (2006) An empirical investigation into factors influencing the adoption of an e-learning system. *Online Information Review* 30, (5) 517-541.
- [9] Kerka, S. (1999) *Distance learning, the Internet, and the World Wide Web*. ERIC Digest, ERIC Document Reproduction Service No. ED 395214.
- [10] Morss, D.A. (1999). A study of student perspectives on Web-based learning: WebCT in the classroom. *Internet Research*, 9(5), 393-408.
- [11] Bandura, A. (1997) Self-efficacy: toward a unifying theory of behavioral change. *Psychological Review*, 82, (2) 191-215.

[12] Brown, I. Jr., & Inouye, D.K. (1978). Learned helplessness through modeling: The role of perceived similarity in competence. *Journal of Personality and Social Psychology*, 36 (8): 900-908.

[14] Alexander, S. and McKenzie, J. (1998) *An Evaluation of Information Technology Projects in University Learning*. Department of Employment, Education and Training and Youth Affairs, Canberra: Australian Government Publishing Services.

[15] Soong, M.H.B., Chan H.C., Chua, B.C. and Loh, K.F. (2001) Critical success factors for on-line course resources. *Computers and Education* 36, (2) 101-120.

[16] Abbad, Muneer (2009). *Factors Affecting Students' Adoption of E-learning Systems in Jordanian Universities*. PhD Thesis: Coventry University, UK.

[13] Wood, R. & Bandura, A. (1989). Social cognitive theory of organizational management. *Academy of Management Review*, 14(3), 361-384.

[17] Hair, J., Black, B., Babin, B., Anderson, R. E., & Tatham, R.L. (2006). *Multivariate data analysis* (6th ed.). Englewood Cliffs: Prentice Hall.

[18] Im, S; Bayus, B. L. and Mason, C. H. (2003). An empirical study of innate consumer innovativeness, personal characteristics and new product adoption behavior. *Journal of the Academy of Marketing Science*, 31 (1): 61-73.

[19] Kolodinsky, J and Hogarth, J. M. (2001). The adoption of electronic banking technologies by American consumers. *Consumer Interests Annual* 47 (1): 1-9.