Vice-Chancellors Influence on Academic Staff Intentions to Use Learning Management Systems (LMS) For Teaching and Learning

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Abstract

Universities world over are increasingly deploying learning management systems to enhance the quality of teaching and learning as well as to increase access to higher education. However, since technology rejection is common, the future of universities depends on their instructor's capacity to adopt and diffuse such technologies to meet the intricate needs of the academic masses. Consequently, the purpose of this paper is to investigate the factors that inhibit or accelerate the adoption and diffusion of Learning Management System (LMS) by academic staff for teaching and learning activities. The paper is based on a questionnaire survey completed by 82 lecturers from a selected sample of public and private universities in Kenya. The results of analysis indicate that Vice Chancellors/Chief Executive Officer (CEO) characteristics, namely:- keenness on modern information communication and technologies (ICTs), Influence on ICTs development, and, visionary ICT leadership are important determinants of LMS adoption and diffusion by instructors in higher education. Further, organizational variables of Subjective norm (SN), availability of ICTs (AICT), Organizational support (OS), Organizational readiness (OR), and top management support (TMS) were related to behavioural intentions to use (BIU) LMS by academic staff for teaching and learning. In addition, in this paper, the technology acceptance model (TAM) was also extended to include VCs/CEO characteristics, and organizational readiness. Results from the research also determined the factor that was dominant in predicting the acceptance of LMS which was top management support. This paper further validated the use of TAM, as a supportive framework for investigating the academic staff intentions to use Learning Management Systems for teaching and learning.

1. Introduction

Learning Management Systems (LMS) are slowly being introduced in Kenyan Universities to improve learning and instruction as well as to gain competitive advantage (Wannemacher, 2006). Consequently, universities must face the challenge in having to get academic staff to adopt and make effective use of them in teaching and learning since technology rejection is common (Davis F. D., 1989; Davis, Bagozzi, & Warshaw, 1989; Venkatesh & Bala, 2008). Therefore there is a need for more successful mechanisms of increasing the adoption of LMS technologies by academic staff in universities since it is an ideal solution for improving access and the quality of teaching and learning (Yun & Murad, 2006).This need is even more urgent for universities in a developing nation like Kenya where large scale deployment of LMS has not taken off in the past due to internet bandwidth cost and internet limitations (Gerhan & Mutula, 2005). Now that the fibre cable is to connect Kenya with the rest of the world, a window of opportunity for Kenyan universities has opened for them to exploit these technologies to the full. However, one

challenge is eminent, technology rejection by academic staff. The objective of exploratory research presented in this paper is to determine the extent to which Learning Management Systems (LMS) technologies will be employed in Kenyan Universities by academic staff for teaching and learning and to identify those factors that may act as barriers or catalyst to the adoption and diffusion of these technologies. The ubiquitous presence of ICTs in higher education institutions, especially the internet and its derivatives such as web-based learning management systems, and their potential impact on learning, teaching, and research, implies that any endeavour that would shed light on this technology is laudable. This underscores the need to for administrators and instructional leaders, in higher educational institutions to understand the causes and intensity of opposition and resistance by academic staff to using ICTs. In addition, there is a requirement to establish the underlying factors that impede or promote academic staff's response to the web-based Learning Management System (LMS) for instructional and course delivery in universities in Kenya as well as elsewhere on the planet.

1.   Literature Review

Electronic learning is often abbreviated to e-learning. It   can be defined as any learning activity supported by information and communication technologies – or ICTs (Sambrook, 2003). On the other hand Uys, Kiravu, and Mothibi (2004), define eLearning as the appropriate organization of ICTs for advancing student oriented, active, open, collaborative and life-long teaching-learning processes. This definition includes university-wide information systems that embrace blended learning so that students can profit from the appropriate mix of teaching and learning strategies to minimize the constraints that may be posed by distance and limited resources.

Thong and Yap (1995) empirically developed and tested an adoption model which highlighted the role of an organization's CEO characteristics as significant determinants of IS adoption. However, the adoption of e-learning into educational institutions of higher learning has been the latest trend. These technologies have been proven very much effective in the process of teaching and learning in other regions like Malaysia, consequently in recent years; the diffusion process of e-learning has been, at the centre of several recent studies (Ndubisi N. O., 2007). Nevertheless, these researches focused mainly on the USA case, where there has been an exponential adoption both in the public and private sectors (Yun & Murad, 2006). Thus, from this perspective, this paper contributes to understand the diffusion process of e-learning in a specific country and sector and deals with the following question: Are there dominant factors in the organizational context that influence the rate and the model of adoption and diffusion   of ICTs such as e-learning   systems in Kenyan higher education institutions? Building on bandwagon diffusion theories and institutional literature, the paper analyses the antecedents of the LMS adoption and diffusion process in higher education.

3. Research Design

The research design for the study on which this paper is based consisted of a survey seeking input from academic staff in Kenyan private and public universities. Although the survey considered a large number of issues, this paper focuses on the investigation on the factors that influence the diffusion and infusion of LMS by instructors in higher education institutions. These factors were grouped in four categories namely environmental, technological, organizational, and

individual context factors, and adopted the technology acceptance model (TAM) based on (Davis F. D., 1989) and (Davis, Bagozzi, & Warshaw, 1989).The focus for this paper is the organizational factors namely Subjective Norm (SN), Organizational ICT Support (OS), Availability of ICTs (ACT), VC/CEO characteristics (CEO), Organizational readiness (OR), and Top Management support (TMS). These were modelled in addition to the TAM variables Behavioural Intention to Use (BIU), Perceived Usefulness (PU), and Perceived Ease of Use (PEOU). The survey questions were structured to include the following broad constructs: environmental characteristics (Meso, Musa, & Mbarika, 2005; Musa, 2006; Mathieson, Peacock, & Chin, 2001), Technology characteristics (Davis F. D., 1989; Davis, Bagozzi, & Warshaw, 1989; Venkatesh & Bala, 2008), individual characteristics (Crump, Logan, & McIlroy, 2007; Hashim, 2008; Ndubisi N. O., 2007; Ndubisi N. O., 2005; Lynn & Halstead, 2003; Ankem, 2004; Roy & Ghose, 2006) and organizational characteristics (Venkatesh & Bala, 2008). Most items or variables in the survey were mapped to a seven point Likert scale. An overall average of responses to questions in each factor in a category was used to measure each construct. This paper presents the findings on the influence of organizational factors to individual academic staff members to adopt and diffuse LMS using the research model shown in Figure 1.
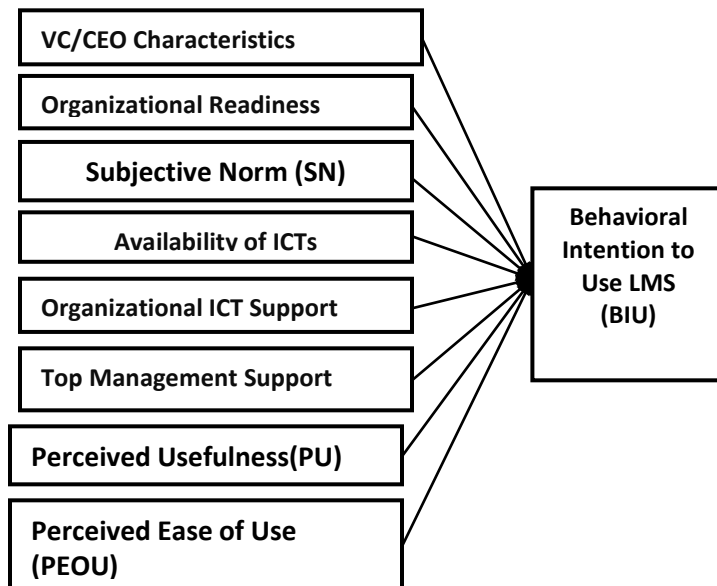
Figure 1: Research Model

Consequently, the following hypothesis was tested using Technology Acceptance Model (TAM):

H1: VC/CEO Characteristics have a positive influence on LMS adoption and diffusion by Academic staff;
H2: University readiness (OR) has a positive influence on LMS adoption and diffusion by Academic staff;

H3: Subjective Norm (SN) has a positive influence on LMS adoption and diffusion by Academic staff;

H4: Availability of ICTs (AICT)   has a positive influence on LMS adoption and diffusion by Academic staff;

H5: Organisational support (OS) has a positive influence on LMS adoption and diffusion by Academic staff;

H6: Top management (TMS) has positive influence on LMS adoption and diffusion by Academic staff;

H7: Perceived usefulness (PU) has positive influence on LMS adoption and diffusion by Academic staff; and

H8: Perceived ease of use (PEOU) has positive influence on LMS adoption and diffusion by Academic staff.

4. Data Analysis and Results

The 82 Lecturers from the participating universities in Kenya, completed a survey questionnaire which included construct items   adapted from previous studies including (Davis F. D., 1989; Davis, Bagozzi, & Warshaw, 1989; Davis F. D., 1993; Venkatesh & Bala, 2008) instruments and some questions on demographics. The questionnaires returned comprised of 50% that were collected completed and useable statistical analysis. The demographic data shown in Table 1 revealed that the sample comprised of gender (23.2% female, 76.8% male), and age (14.6% <26 yrs, 26.8% 26-35yrs, 41.5% 36-45 yrs, 17.1% > 45yrs). The sample also demonstrated that the number of instructors with doctorate degrees were equal to those with masters degree at 37%. In order to test the hypotheses, the hypothesized linear relationships were modelled with a multiple regression model.

Table 1: Demographics of the sample

Item	N	%
Gender		
Male	63	76.8
Female	19	23.2
Age Group		
Below 26	12	14.6
26– 35	22	26.8
36 – 45	34	41.5
Over 45	14	17.1
Education Level		
Bachelor	19	23.2
Masters	31	37.8
Doctoral	31	37.8
ICT Experience		
Poor	2	2.4
Weak	1	1.2
Below Avg.	7	8.5
Average	25	30.5

Above Avg.	11	13.4
Good	26	31.7
Excellent	10	12.2

The questionnaire items measuring instructor's perceptions relating to each of the eight ICT and LMS adoption variables were adapted from the previous studies. Following pilot surveys and discussions with the ICT instructors, some changes were recommended to the questionnaire by the instructors due to their repetitiveness and/or lack of relevance to LMS use in the universities teaching and learning contexts. The CEO and Organizational readiness constructs were added to the final measurement instrument, since the ICT instructors viewed these items as important factors in the study context. In summary, a total of eight multi-item scales were used to measure the independent variables in this study. Four single item measures asking instructors about their intended future use of the LMS were utilized to measure the dependent variables in this paper. All items were measured on a seven point Likert scale with polar anchors "Very strongly disagree" and "very strongly agree".

Mean scores were calculated from the summated responses to the items forming each independent variable. In this study Cronbach's alpha was used to assess the internal consistency reliability of each of the nine LMS diffusion variables. The results shown in Table 2 indicate that all variables displayed acceptable results for internal consistency reliability

Table 2: Measurements Reliability

	Variables	N	N of Items	Cronbach's Alpha
1.	**PU**-Perceived Usefulness	76	4	0.506
2.	**PEOU**-Perceived Ease of Use	76	5	0.911
3.	**BIU**- Behavioural Intension to Use	76	2	0.862
4.	**SN-**Subjective Norm	80	4	0.910
5.	**AICT**-Availability of ICTs in the Organization	81	4	0.855
6.	**OS**-Organizational Support	81	4	0.930
7.	**CEO** –VC's Characteristics	81	3	0.813
8.	**OR-**Organizational Readiness-	81	3	0.892
9.	**TMS-**Top Management Support	80	4	0.903

On the other hand, Table 3 shows that top management support had the highest mean score.

Table 3: Descriptive Statistics

	N	Min	Max	Mean	Std. Deviation
PU	76	1.00	7.00	4.9178	1.52063
PEOU	76	1.00	7.00	4.6645	1.46887
BIU	79	1.00	7.00	5.4114	1.38619
SN	80	1.00	7.00	5.0625	1.44438
AICT	81	1.75	7.00	4.9290	1.44278
OS	77	1.00	7.00	4.8539	1.59479
CEO	82	2.00	7.00	5.4187	1.25905
OR	81	1.00	7.00	5.4486	1.25295
TMS	80	1.00	7.00	5.5969	1.11980
Valid N (listwise)	63				

To establish the construct validity of the instrument used in this study factor analyses were performed using the principal components method of analysis. The results had loading onto eight distinct factors. All loadings were in the acceptable (>0.5) to excellent range >0.9) providing further support for the instrument used in this study. A multiple regression analysis was conducted of all eight LMS adoption variables on the dependent variable intention to use LMS for teaching and learning. The results indicate strong support for hypothesis 1 (see table 4).

Table 4: Full Model Regression

Model	Sum of Squares	df	Mean Square	F	Sig.
Regression	35.063	8	4.383	4.074	.001(a)
Residual	64.554	60	1.076		
Total	99.617	68			

a Predictors: (Constant), TMS, PU, AICT, OS, PEOU, SN, OR, CEO
b Dependent Variable: BIU

The full model regression equation was statistically significant (p < .001) and explained approximately 35% of the variation in BIU (R^2 = .352). Model reduction techniques were then used to formulate a reduced model including only the significant variables of Subjective norm, availability of ICTs, Organizational support, CEO characteristics, Organizational readiness, and top management support.

The results shown in Table 5 indicate that the reduced model regression equation was statistically significant (p < .0001) and there was no significant difference between the full and reduced model in terms of their ability to explain variation in BIU (R^2 = .34.704).

Table 5: Reduced Model Regression

Model	Sum of Squares	df	Mean Square	F	Sig.
Regression	34.704	6	5.784	5.630	.000(a)
Residual	68.827	67	1.027		
Total	103.530	73			

a Predictors: (Constant), TMS, AICT, SN, OS, OR, CEO
b Dependent Variable: BIU

The results also indicate that Subjective norm, availability of ICTs, Organizational support, CEO characteristics, Organizational readiness, and top management support have a positive and significant relationship with BIU. Similarly, Pearson correlation analysis was conducted to examine all the bivariate relationships among the factors as depicted in Table 6.

Table 6: Pearson Correlations

ITEM	BIU
BIU	1
PU	.236(*)
EOU	.161
SN	.245(*)
ACT	.194
OS	.382(**)
CEO	.290(*)
OR	.247(*)
TMS	.494(**)

Statistical results show that significant correlations exist between behavioural intentions towards learning management systems adoption with Subjective norm, availability of ICTs, Organizational support, CEO characteristics, Organizational readiness, and top management support. The independent variable, BIU has a highest positive correlation with top management support variable at .494.

Meanwhile, Table 7 shows the results of regression analysis that was conducted between variables. There is evidence of a significant relationship between the independent variables and the behavioural intention towards learning management systems adoption. The F value of 4.074 is significant at p<.005, indicating that there exists at least one significant predictor. R^2 value of .352 indicates that about 35% of the variance in LMS adoption can be explained by the independent variables.

Table 7: Regression Coefficients

	B	t	sig
(Constant)	2.505	3.534	.001
PU	.139	1.143	.258
PEOU	-.131	-1.102	.275
SN	-.144	-1.228	.224
AVICT	.168	1.344	.184
OS	.247	1.936	.058
CEO	-.155	-.853	.397
OR	-.165	-1.048	.299
TMS	.590	3.445	.001
F value	4.074		
Sig. F	0.001		
R^2	0.352		
Durbin-Watson	1.880		

a Dependent Variable: BIU

5. Discussion and Conclusion

The goal of this paper was to provide more insight in the adoption and diffusion of learning management systems by university academic staff and the role of the university vice chancellors (VC/CEO), in addition to the   other universities' factors in the LMS adoption process, which so far has received very little attention in the ICT diffusion   literature. The outcomes of the multivariate analyses indicate that while controlling for characteristics of the universities, the Vice Chancellor characteristics such as keenness on modern ICTs, Influence on ICTs development, and, visionary ICT leadership matter for the adoption and diffusion of learning management systems by academic staff. Further, the results show that organizational readiness plays a key role in LMS diffusion. Consequently, future empirical research should take this into account when assessing the factors that determine LMS adoption by instructors in higher education. Table 8 summarizes the finding of this paper.

Table 8: Results of the hypothesis testing

H	Description	Support
H1	VC/CEO Characteristics have a positive influence on LMS adoption and diffusion by Academic staff	Yes
H2	University readiness has a positive influence on LMS adoption and diffusion by Academic staff	Yes
H3	Subjective Norm has a positive influence on LMS adoption and diffusion by Academic staff	Yes
H4	Availability of ICTs have a positive influence on LMS adoption and diffusion by Academic staff	No
H5	Organisational support has a positive influence on LMS adoption and diffusion by Academic staff	Yes
H6	Top management has positive influence on LMS adoption and diffusion by Academic staff	Yes
H7	Perceived usefulness has positive influence on LMS adoption and diffusion by Academic staff	Yes
H8	Perceived ease of use has positive influence on LMS adoption and diffusion by Academic staff	No

The findings of this paper agree with those of (Ani, Esin, & Edem, 2005) who found an association between vice chancellors attitude towards ICTs, and ICT adoption in their respective libraries. Ani et Al., (2005) further suggested that national wide seminars and workshops for all vice chancellors to address their attitude on ICTs to make them give way to positive ones that enhance rapid adoption of ICT in their university libraries. From the results of this paper, we can therefore generalize that Vice chancellors characteristic related to ICTs influence academic staff to adopt and diffuse LMS in their teaching and learning.

6. Recommendations For Future Directions
Based on the results of the study, the following recommendations will be of contributory values to the Vice chancellors and university councils, information systems (IS) field, higher education sector, Ministry of higher education, ICT development partners in higher education, and LMS software vendors. This study found that VC's characteristics are crucial to LMS adoption by academic staff. This implies that for universities to have a success in LMS implementation, adoption and diffusion by instructors, the VC's must not only have a clear ICT vision, but also offer ICT leadership, and be keen to equip their universities with modern ICT facilities.

Vendors have to ensure that before they sell an LMS, they have created the right organizational environment, where the VC is the project champion with a clear vision and offers project leadership. The academic staff will need modern equipment. However it is noted from the result

of this paper that the availability of ICT equipment even if it is perceived to be easy to use has little influence on academic staff uptake of LMS. This implies that the factors of subjective norm, organizational support, and top management support in addition to organizational readiness and CEO characteristics are more critical in LMS adoption and diffusion.

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