

ACCEPTANCE AND USAGE OF LEARNING MANAGEMENT SYSTEM AMONGST ACADEMICS

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Abstract— The paper evaluates acceptance and usage of an approved Learning Management System (LMS) amongst academics at a leading University of Technology. A total of 111 academics with teaching responsibility participated in the research through an electronic survey (e-survey) followed by semi-structured interviews. The findings reveal a gap between high acceptance and low actual usage, which appears to contradict an important assumption of the Technology Acceptance Model (TAM) framework. The data reveal that academics use the system for course management and communication more often and least for assessment. While collaboration tools like forum discussion, blogs and wikis which can most fruitfully support student-centred learning are not utilized. The paper therefore argues that TAM requires adjustment to successfully account for LMS acceptance at universities and that specific training in the educationally progressive features of LMS appears to be required.

Keywords— *Learning Management System, Higher Education, Technology Acceptance, Technology Usage, e-Learning, Student-centered Learning*

I. INTRODUCTION

Modern world pedagogy requires support from technology such as a Learning Management System (LMS) to benefit information age students by providing various advantages such as synchronous or asynchronous, student's engagement; accessibility, flexibility, self-paced learning, and interactivity [1] as well as increased availability and skill development [2].

Despite the many advantages for teaching and learning in the use of an LMS, researchers have also noted drawbacks that lead to lack of acceptance and usage in HE institutions. As cited by [2] highlight cost associated with acquiring LMS and

the cost of internet connectivity as the LMS is heavily depending on the Internet. In addition, lack of operational support may lead to system failure, and lack of incentives by university as the lectures are not compensated for their time spent on using the system [3], despite the immense effort required by LMS and in turn, resulting in demotivation from lecturers.

The lack of buy-in from academics heavily influences LMS success[4] and is seen as one of the critical factors for lack of acceptance and usage of LMS. Therefore, the objectives of this paper are:

- To evaluate the acceptance of the Blackboard system amongst academics.
- To evaluate the usage of the Blackboard system amongst academics.

To shed more light on the acceptance and usage of the LMS amongst academics in Higher Education (HE) in general. This paper will examine in more detail how LMS can enhance student-centered learning and the important of academics' readiness to use LMS for the support of student-centered learning.

II. STUDENT CENTRED LEARNING THROUGH LMS

Student-centered learning is defined by [5] as a broad teaching approach that encompasses replacing lectures with active learning, integrating self-paced learning programs and/or cooperative group situations, ultimately holding the student responsible for his own advances in education.

Technology, if used appropriately, can support a student-centered environment and student engagement [6], improve student's satisfaction and academic achievement through support received from LMS and academics [6], assist in guiding critical thinking process through information searching, retrieval and generation [7], cultivate lifelong learning process where a student is capable of solving problems independently through studying at their own comfort or making studying interesting and fun using different methods [8]. Motschnig-Pitrik and Holzinger [8] argued that LMS is best suited for student-centered approach.

LMS can support a student-centred learning environment and with a student-centred learning environment, the paradigm shifts from academics to focus heavily on students [9]. This shift has ultimately changed the role of an academic [10, 11] from involving merely the verbal passing on knowledge to one facilitating and mentoring [10] as cited in Bates [12] or e-moderating [13]. Thus, Watson and Watson [14] stated that LMS is "learner ...focused". In a student centered learning approach, the academic's role is flipped from "sage on the stage" to the "guide on the side" [15]. This approach allows students to take an active role in their learning, but with the added responsibilities of organizing, analyzing, and synthesizing content [16] and activities like real-life challenges of student centered learning stimulating critical thinking and problem solving [17]. However, this shift from the verbal passing of knowledge to that of a facilitator or mentor's role poses a great challenge as some academics are ill-prepared for this transition. It is for this reason that academics must be ready for this new role. However, readiness of other stakeholders is critical as well for LMS success.

III. PRINCIPAL STAKEHOLDERS' READINESS FOR LMS

LMS requires readiness of three principal stakeholders (university, academic and student) for a successful implementation and it has to address all stakeholders' needs.

However, this paper placed more emphasis only on the academics' readiness and their acceptance and usage.

Academic's readiness for LMS

[18] define readiness as an individual's willingness to beneficially engage in a given learning process. Whereas E-learning readiness can also refer to an entity's (school, academic or student) willingness to engage in using e-learning tools as a preferred mode for instructional delivery [18].

Factors that impede academics' readiness to accept and use LMS include computer experience, confidence, attitude and ICT experience among others [19]. Thus ICT experience is influential in facilitators' decision to blend technology into teaching and learning [20]. Moreover, academics' readiness for e-learning also requires academics to have traits such as planning, organization, and self-discipline. These traits are not unique to e-learning, but are also required in traditional learning. However, e-learning requires more time for content preparation and development [19]. Due to its time consuming nature, factor like incentives can promote LMS use [3, 19] and universities can be creative in rewarding LMS users, such as, setting aside time for LMS use so that it is not done just for ticking the box.

IV. THEORETICAL FRAMEWORK

The acceptance of Information System (IS) where LMS is, has been measured in many academic publications using various conceptual as theoretical frameworks. However, most of these frameworks place much emphasis on the IS's technical aspects, overlooking the social aspects of the IS's effectiveness. Technology Acceptance Model (TAM) [21] and Theory of Reasoned Action (TRA) [22] are models that place much emphasis on social aspects of the IS. TAM was used to evaluate the acceptance and usage of the LMS by academics. As suggested by [21], perceived usefulness (PU) is directly influenced by perceived ease of use (PEOU) and both these determinants directly influence attitude toward use (A). Furthermore, behavioural intention (BI) is directly influenced

by attitude toward use and perceived usefulness. In addition, behavioural intention influences the actual use of the system. TAM was used as a baseline to propose a conceptual framework with various suitable external variables (as shown in APPENDIX 1) which predict LMS acceptance and usage by academics in higher educational institutions.

V. METHODOLOGY

A. Participants

The study was conducted in Durban University of Technology (DUT), located in the province of KwaZulu-Natal of South Africa. It was specifically chosen as it embraced student-centred learning across the university within its major re-circulation drive. A mixed-methods of quantitative and qualitative approach was used to collect data from only permanent academics with a teaching responsibility. The questionnaire was administered to 550 permanent academics of DUT with a teaching responsibility on Durban and Pietermaritzburg campuses and 111 responded to an e-survey; a follow-up of 10 voluntary interviews were conducted to gain sufficient depth, and provide new insight into acceptance and usage of the LMS amongst academics. This response rate is similar to other comparable studies [23].

B. Data Analysis

The Chi-Square Goodness-Of-Fit test, Wilcoxon Signed Ranks test, Regression analysis test, Pearson's correlation and Kruskal Wallis test were performed on the study data of the questionnaire with the aid of SPSS version 22 software. Data collected through the interviews was analysed by using narrative analysis and the interview questions were informed by the results of the questionnaire to validate the result of the quantitative data by means of qualitative method.

VI. FINDINGS

The results of all constructs from Mean and Standard Deviation, and Wilcoxon Signed Ranks Test (as depicted in TABLE I and TABLE II) revealed a significant difference from 3 (which is the central score). Moreover, the System

Usage construct indicated a significantly low usage, while all the other constructs indicated that the participants were significantly in agreement. In brief, this implies that something happens between Intention to Use and Actual Usage. The cause for low usage of the system, even though the intention is high, is not explained by TAM.

TABLE I. MEAN AND STANDARD DEVIATION

Constructs	No.	Mean	Std. Deviation
Perceived Usefulness	111	3.3724	0.85545
Perceived Ease of Use	111	3.4288	0.78617
Attitude	111	3.5261	0.72359
Intention to Use	111	4.0631	1.00254
System Usage	111	2.5207	1.12727

TABLE II. WILCOXON SIGNED RANKS TEST

Test Statistics ^c					
	Threes - Perceived Usefulness	Threes - Perceived Ease of Use	Threes - Attitude	Threes - Intention to Use	Threes - System Usage
Z	-4.374 ^a	-5.225 ^a	-6.486 ^a	-7.257 ^a	-3.805 ^b
Asymp. Sig. (2-tailed)	.000	.000	.000	.000	.000
a. Based on positive ranks					
b. Based on negative ranks					
c. Wilcoxon Signed Ranks test					

The result of Wilcoxon Signed Ranks (as depicted in TABLE II) test shows that the averages are all significantly different from 3. However, System Usage in Mean and Standard Deviation (as depicted in TABLE I) shows significant low mean, being less than 3, while the others are all above 3. This implies participants were in agreement with the majority of the statements of the four constructs, namely, perceived usefulness, perceived ease of use, attitude toward use, and behavioural intention, except System Use.

A. Research Model's Path Analysis

The result of Pearson's correlation (as depicted in Fig. 1) shows that all constructs of the model are significantly correlated, with the exception of Actual Use and behavioural intention. This section will only highlight the important path on the model, based on the higher coefficients' values. The result shows that perceived ease of use ($r=0.470$, $p<0.0005$) and perceived usefulness ($r=0.746$, $p<0.0005$) are both

predictors of attitude toward use, showing strong and medium strength, respectively, and correlating positively with attitude toward use. Meanwhile, the Actual Use is not significantly correlated with behavioural intention ($r=0.149$, $p=0.118$), the strength being low. This result indicates a gap between Actual Use and behavioural intention. However, this result contradicts the TAM, as it states that the actual use of any IS system is determined by behavioural intention.

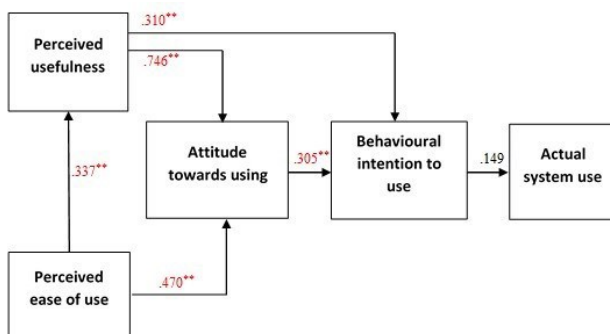


Fig. 1 Path of Research Model Coefficients

DISCUSSION

The consolidated results from the e-survey and interviews were used to evaluate the acceptance and usage of LMS amongst academics.

B. LMS Usage

Proper LMS usage can unlock the benefits of LMS in teaching and learning such as accessibility, flexibility, self-paced learning, and interactivity [1], as well as increased availability and skill development [2]. The results of Wilcoxon Signed Ranks test (as depicted in TABLE II) shows that the majority of academics intend to use the system, while few actually use it. Only 5% use it more than once a day; only 4% of the academics indicated that they use the system once a day. The result of the Chi-Square Goodness-Of-Fit test also showed that 31% of the academics do not use the Blackboard system at all, while 27% use it about once a week.

Pearson's correlation and regression analysis tests were also performed to evaluate LMS usage. Not only is correlation not

significant between Actual usage and behavioural intention as per Pearson's correlation test, but the regression analysis test also showed that behavioural intention does not predict Actual Usage at all. This contradicts what TAM posits, which is an assumption that if someone has the intention to use the system, most likely they will actually use the system. This calls for the revision of TAM to consider other factor(s), as these results clearly indicate that behavioural intention does not always predict the actual usage of the system as TAM could not assist in identifying key factors that contribute to low usage despite high of acceptance amongst academics. Furthermore, the findings of this study concur with all TAM's determinants relationships except behavioural intention and actual usage. The findings by [24] also discovered a positive but weak relationship between LMS use and behavioural intention.

It also emerged from the interviews that the system is used mostly for managing the course, for communication, and least of all for assessments. The questionnaire results were in agreement with the results of interviews, indicating that managing the course and communication are the features most used, whereas for assessment it is underutilized. While the assessment feature is important as it automatically mark the assessment, therefore, reducing academic's workload, provide students with quick response and measure their progress. From the results of the Kruskal Wallis test, the usage of the system is affected by LMS experience and age.

The correlation between Computer skills and Actual Usage was performed for this study and showed that the greater the academics' computer skills, the higher the usage of the system. In support of this result, the literature indicates that adroit computer usage is influential in LMS usage. Academics with greater computer skills are most likely to be at ease with a system than someone less experienced [22]. Computer skills are significant in the LMS usage [25] and the decision to blend technology with teaching and learning is influenced by ICT experience [20]. The participants showed significant

agreement with all the statements of behavioural intention. The result also reveals that behavioural intention positively correlated with perceived usefulness ($r = 0.310$, $p = 0.001$) and attitude toward use ($r = 0.305$, $p = 0.001$), both indicating medium strength. Moreover, TAM findings confirmed that behavioural intention also positively correlated with perceived usefulness and attitude toward use [26]. Alharbi and Drew [4] arrived at the same conclusion.

C. LMS Acceptance

The results of the Wilcoxon Signed Ranks test shows that the majority of the academics perceive the system as being useful, easy to use and they exhibit a positive attitude towards using the system. Perceived usefulness and perceived ease of use directly influences the attitude toward use, this finding concurs with other studies [21], [27], and [28]. In another study examining academics' adoption behaviour of LMS, findings indicated that the academics perceived it as easy to use and a useful tool for teaching and learning [25]. As a matter of fact, the participants in the study conducted by Fathema and Sutton [25] concurred with this result. They perceived the usefulness of the Blackboard system as simplifying their teaching activities and saving them time. However, users of the system were selective of the feature because they are unfamiliar or uninterested on the other features like student tracking, forum discussion and collaboration which are important features that supports student-centred learning. TAM has emphasized the significance of perceived usefulness in the acceptance of new technology [21, 27, 28]. Al-alak and Alnawas [29], state that the greater the usefulness of LMS is perceived by academics, the greater the likelihood of using it.

The attitude towards use produced a significant correlation between perceived usefulness (with a medium strength of $r = 0.470$) and perceived ease of use (with a high strength of $r = 0.746$). Additionally, these results match the findings of [4]. regression analysis was also performed to evaluate LMS acceptance with results clearly demonstrating that perceived

usefulness ($\beta = 0.663$, $p < 0.0005$) and perceived ease of use ($\beta = 0.247$, $p < 0.0005$) significantly predicted attitude toward use. The participants not only agreed that using the Blackboard system was a good idea, enjoyable and not boring, they also agreed, significantly, that using the Blackboard system was worth the time and effort spent in preparing the content, managing the course, and in assessment. The questionnaire results indicate a positive attitude towards using the system; however, these results differ from interview results which indicate a negative attitude towards using the system. The participants were not sure why they used the system, a participant indicating that the university forced one to use it.

VII. CONCLUSION

The results suggest that TAM needs to be re-visited to consider other factor(s) that influence system usage as behavioural intention does not always translate to system use. The university must take advantage of the highly positive acceptance of the system by embarking on an educational drive to highlight the need for and benefits of the system in supporting the student-centered learning. This could possibly enlighten academics on the impact of this system to their work experience and workload. The low usage of the system is affected by factors such as LMS experience, computer skills, and age; therefore, more robust training to upskill academics on adequate use of the system is imperative. However, the limitation of the study was the insufficiency of South African literature focusing on the acceptance and usage of LMS in higher education and the study is also limited to the factors of the proposed conceptual framework but limitations of this study have afforded some valuable future research for scholars to consider. The future research would be a study to further test the proposed conceptual framework for similar results in a different context (country or institution or population).

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APPENDIX I

