Teaching Online in a Developing Country Context

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Abstract: This study explored lecturer perceptions of their use of a Learning Management System (LMS) at a rural university in the Eastern Cape Province of South Africa. The study took place just prior to the COVID-19 lockdown and provides a brief insight into the thoughts of lecturers at this time. A sample of 141 lecturers from six faculties at the rural university completed an online questionnaire. A factor analysis (using principal component analysis and varimax rotation) of 46 items on lecturers' perceptions of the LMS yielded six factors: their perceptions of usefulness, performance expectancy, self-efficacy, technical support, effort, and institutional support using the LMS. The reliability of factors was confirmed, while group differences were determined with independent sample t-tests and ANOVAs. The results indicate that although lecturers found the LMS to be beneficial, they were reluctant to use it when teaching face-to-face. There was a large discrepancy between the perceived usefulness and their actual use of the LMS. They perceived the LMS to be very useful but found technical- and institutional support to be low, which in turn strongly influenced their low self-efficacy (confidence) to use it. It emerged that increased training and support for lecturers would address both work performance and the confidence of lecturers using the platform. It was also evident that each academic department requires a dedicated teaching and learning consultant and that a centralized teaching and learning division may not be the answer. The one academic department with their own dedicated consultant was the best prepared for the demands of online teaching when the need arose.

Keywords: LMS; Higher education, Lecturers' perceptions, UTAUT, Online teaching and learning, Learning management systems

1. Introduction and Background

The outbreak of Severe Acute Respiratory Syndrome Coronavirus 2 (Sars-CoV-2) exposed the lack of readiness of higher education institutions (HEIs) to teach online globally (Bender, 2020). During the outbreak, higher HEIs were forced to move quickly from face-to-face to online teaching (Snoussi, 2019). Despite being exposed to learning management systems (LMSs), many South African lecturers were mainly accustomed to face-to-face teaching at the time and were not ready for the online mode.

Intergenerational differences between student and lecturer approaches to online teaching complicate the effective implementation of online teaching. While many researchers (Bullen & Morgan, 2011; Nicolini & Cirilli , 2019) identify current students in higher education as Digital Natives and Millennials, most lecturers are from an older generation of Digital Immigrants (Smith et al., 2020). Although students prefer technology incorporated into their teaching and learning, they are very different from previous generations, often display low concentration skills, and cannot sit still for long periods in the classroom (Bullen & Morgan, 2011; Nicolini & Cirilli , 2019). To meet the needs of digital natives, lecturers may still need to incorporate technology into their teaching (Kivunja, 2014). To this end, many HEIs have now made better use of their LMSs (Snoussi, 2019). This study is timely as previous studies have primarily focused on students - neglecting lecturers' points of view on this topic (Cantabella et al., 2018).

2. Literature

To better equip students for the 21st century, HEIs dramatically increased technology use to meet these demands (O'Flaherty & Phillips, 2015). Govender and Mhkize (2015) have reported a more blended approach since 2005. It is already well-known that students can benefit from the integration of information and Communications Technology (ICTs), but the best evidence of the effect of online teaching was seen when schools and HEIs were forced to move to online teaching during the COVID-19 pandemic (Bender, 2020; Sahu, 2020). Numerous studies have documented how the pandemic forced HEIs to switch from face-to-face to online instruction in many countries (Weeden & Cornwell, 2020). HEIs in South Africa also implemented online teaching to overcome this issue, and LMSs were an essential part of this initiative. Alenezi (2018) notes that a LMS is valuable when institutions engage in online teaching. Unfortunately, lecturers only use some LMS features and many tend only to use it for administration and the uploading of content (Washington, 2019).

According to Zanjani et al. (2016), mindset, training, and capacity building are the cornerstones of successful online teaching and learning implementation and are required for the LMS to be effective at HEI. Coleman and Mtshazi (2017) and Jokiaho, May, Specht, and Stoyanov (2018) identify internal (personal) and external

(environmental) elements that affect lecturers' impressions of using an LMS. Fear, worry, a lack of interest in technology, and a sense of incompetence are internal causes. Lack of time to prepare for lectures using technology, organizational issues (such as poor technical support or insufficient training), technological issues (such as restricted access to valuable, relevant, and appropriate hardware and software), and social issues (such as how much peers or institutions encourage or discourage the user from using technology) are examples of external factors.

Several variables affect LMS use by lecturers (Ivankova, Moss, 2018; Jokiaho et al., 2018; Kiryagana et al., 2017; McConnell, 2018; Shelton, 2017; Ugwoke et al., 2019). Some authors mention a need for more institutional support, training, and motivation to use the LMS for pedagogical purposes (Walker et al., 2016; Wingo et al., 2017; Washington, 2019). Webstock and Fisher (2016) and Govender and Govender (2014) indicate that LMSs are underutilized due to poor digital skills and the lack of incentives for innovation and training. De Paepe, Zhu, and Depryck (2019) and Isabirye et al. (2017) found that a lack of training and poor ICT capabilities lead to inefficient use of an LMS by teaching staff.

3. Theoretical Framework

The unified theory of acceptance and use of technology (UTAUT) was the theoretical underpinning for this study (Venkatesh & Davis, 2000; Venkatesh et al., 2003). Although UTAUT 2 is an upgraded version of the UTAUT model, UTAUT was used for this study because the objective was to understand the factors influencing the lecturer's use of the LMS in an organizational context rather than to evaluate consumer acceptance of new technology (which is where UTAUT2 would be used). The UTAUT model, as used in this study, is presented in Figure 1.

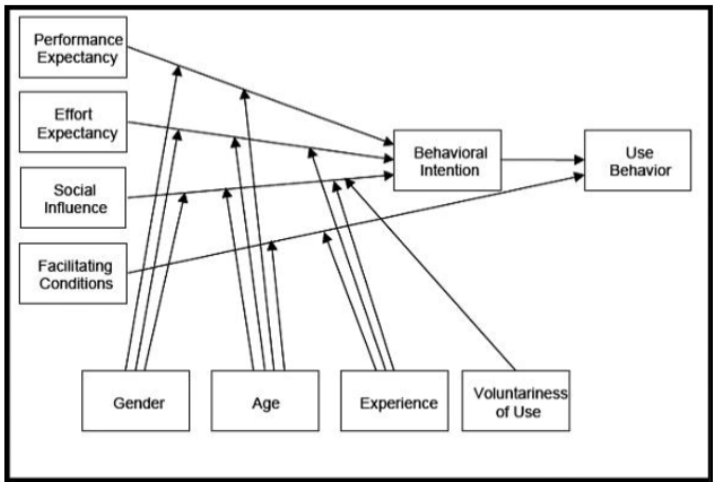

Figure 1: Unified theory of acceptance and use of technology (UTAUT)

Performance expectancy (PE), effort expectancy (EE), social influence (SI), and facilitation conditions (FC) are the four components that make up the UTAUT and have an impact on the behavioral intention and use of online instruction. Performance expectancy is "the degree to which an individual believes that using the system will help him or her to improve job performance" (Venkatesh et al., 2003, p. 447). Effort expectancy (EE) refers to "the degree of ease associated with the use of the system" (Venkatesh et al., 2003, p.450). Social influence (SI) is "the degree to which a person perceives that important others believe that he or she should use the new system" (Venkatesh et al., 2003, p.451). Facilitating conditions (FC) are defined as the "degree to which an individual believes that organizational and technical infrastructure exists to support the use of the system" (Venkatesh et al., 2000, p. 453).

4. Methodology

After reviewing similar studies that measured lecturer perceptions, it was decided that the quantitative approach was the most appropriate (Compare Zaki & Zawaidy, 2014; Alenezi, 2018; Cigdem et al., 2015; Gamdi & Samarji, 2016; Wasserman & Migdal, 2019). The research site, a rural university in South Africa's Eastern Cape Province, included 353 lecturers from six academic departments (including Health Sciences, Social Sciences, Humanities, Education etc.). The online questionnaire was completed by 39.9% of the invited lecturers, generating a sample (Etikan, 2016) of 141 participants.

The e-questionnaire consisted of two parts, namely a biographical section and a second section with 46 items covering lecturer perceptions of LMS use. Two pre-existing (previously validated) surveys by Alshorman and Bawaneh (2018) and Xu and Mahenthiran (2016) were adapted. The 46 items were subjected to an exploratory factor analysis using Principal Component Analysis (PCA) with Varimax Rotation. The factorability of items was determined using Bartlett's test of sphericity and the Kaiser-Meyer-Olkin criteria of sample adequacy. The Scree Plot suggested a six-factor solution for the analysis. Cronbach's alpha was used to determine the reliability of the factors as a statistical index for internal consistency. Gender group differences were determined using independent sample t-tests, and faculty group differences were determined with a one-way analysis of variance (ANOVA).

5. Results

The study included 141 teachers, aged 24 to 73, from six different academic departments. 116 participants (82.3%) indicated that they used the LMS. It must be noted that this was done just before the pandemic and subsequent lockdown in 2020 and that post-pandemic surveys could have different results. Lecturers at that time indicated that they had been using the LMS on average for 4.21±2.83 years, spending only 28.07 ± 21.39 percent of their teaching time on it. Most of them (83.7%) uploaded materials or course content on the LMS, followed by announcements (69.5%). Less than half of the participants in this survey claimed that they used other LMS features. The LMS is only used by 35% of participants to give homework, compared to 30.5% for tests and quizzes, 23.4% for discussion boards, and 17.7% for group projects. Only 2% of the participants used more sophisticated LMS capabilities, including blogs, journals, and other features.

Before factor analysis through principal component analysis and varimax rotation could commence, the suitability of the data from the 46 items was assessed. Bartlett's test of sphericity (p =.000) obtained statistical significance. At the same time, the Kaiser-Meyer-Olkin value for sample adequacy (.885) exceeded the advised value of .6. These two values substantiated the correlation matrix's factorability. The study did not include items with a factor loading of less than .4. The factor analysis yielded six factors with an Eigenvalue of more than 1, explaining 59.53% of the variance, presented in Table 1.

Table 1: The six results with their eigenvalues, variance, means and standard deviations, and reliability

Factor Name	Eigen value	% of Variance	Cumulative %	Mean	Std. Dev	Reliability
Factor 1: Usefulness	16.12	17.48	17.48	3.99	.664	.937
Factor 2: Performance expectation	3.48	15.00	32.48	3.55	.723	.932
Factor 3: Self-efficacy	2.74	9.75	42.24	3.60	.693	.848
Factor 4: Technical support	1.82	7.96	50.21	3.18	.758	.771
Factor 5: Effort	1.63	4.91	55.12	3.47	.804	.441
Factor 6: Institutional support	1.57	4.41	59.53	2.65	.832	.442

All factors had a high reliability score (Cronbach's alpha > .7) except for factors 5 and 6. These two factors had low reliability scores (Cronbach's alpha < .7). Factors with too few items usually render low reliability. The low reliability of Factors 5 and 6 is attributed to only two items contributing to the factors. Alternatively, the mean inter-item correlation (r = .286 and r = .287) for the two factors, respectively, was high enough (between .2 to .4) to regard the factor as reliable (Briggs & Check, 1986).

The first factor was "Perceived Usefulness" and included items such as, "Using the LMS would improve my performance," and "Using the LMS would enhance my effectiveness." It is consistent with the definition of perceived usefulness (PU) (Davis, 1989) - improving a lecturer's performance by utilizing the system. This factor obtained the highest mean score (3.99; sd =.664), and the findings revealed that 83.7 percent (n = 118) of respondents strongly believed in the LMSs value as a teaching tool.

Factor 2 was "Perceived Performance Expectation" and included items like, "I find that using the LMS increases the involvement of my students in the classroom," and "I use the LMS because it helps to clarify the content of my course." According to Visvanath et al. (2003, p 447), perceived performance expectations are "the degree to which an individual believes that using the system will help him or her to attain gains in job performance," which implies that using the LMS will help them achieve their specific performance goals in the modules they teach. The factor mean was 3.55 (standard deviation = .723), with 58.5 percent (n = 85) of lecturers having a high perception that the LMS would assist them in achieving their performance goals in the modules they teach.

As the lecturer's impression of their ability to use an LMS for the particular courses they teach, factor three was labeled 'Perceived Self-efficacy.' Coleman and Mtshazi (2017) describe perceived self-efficacy as the user's computer expertise, knowledge, and abilities, which may significantly impact whether or not they are willing to utilize a LMS. The factor included items like, "I have the necessary skills to implement the LMS as the e-learning platform," and "I am confident to use the LMS as my e-learning platform." Factor 3 had the second highest mean (3.60; standard deviation = .693), with 61.7 percent (n = 87) of the lecturers showing high self-efficacy (high confidence) in using the LMS.

Factor 4 was "Perceived Technical Support." This factor represents how lecturers believe they can get technical help when using the LMS. Items include "I received adequate training on using the LMS " and "When I am stuck, technical support is available." This is consistent with Facilitating Conditions (FC), which outline the conditions necessary for using the LMS, such as technical assistance and instructor training. The median score for factor 4 was 3.18 (standard deviation:.758). According to the data, only 48.9% of respondents (n = 69) felt they could access enough technical help. In fact, most instructors believe that technical assistance needs to be improved.

Factor 5 was Perceived Effort and consisted of items such as "It takes too much of my time to use the LMS " and "My workload is already too high to spend additional time on e-learning." The term "Perceived Effort" was given because it measures how much an instructor thinks they would have to work to make the LMS a useful e-learning platform. This is consistent with effort expectation (EE) which Viswanath *et al*. (2003) defined as "the degree of ease associated with using the system." The factor produced a mean score of 3.47 (with a 0.804 standard deviation). The findings revealed that 59.6 percent (n = 84) believed using the LMS in their teaching program would require too much work.

The "Perceived Institutional Support", factor 6, measures a lecturer's perception of how much assistance they believe they receive from their university to utilize the LMS successfully. This is consistent with what Viswanath et al. (2000) define as Facilitating Conditions (FC), which is the "degree to which an individual believes that organizational and technical infrastructure exists to support the use of the system" and what Kleinveldt et al. (2016) and Webstock and Fisher (2016) refer to as Social Influence (SI), which describes how other people, such as Institution or management, can motivate or hinder the use of the LMS by the lecturers. The factor included two items: "My university's e-learning policy provides clear and proper strategies for the use of e-learning." and "My institution provides incentives for integrating e-learning into programs." With just 21.3 percent (n = 30) of lecturers claiming good institutional support for LMS use, this factor had the lowest mean of 2.65 (standard deviation =.832), indicating the lowest score by lecturers in this study. This is concerning and shows that most lecturers (78.8%) require institutional support for the LMS.

While no gender group differences were observed (p-value > .05), some faculty group differences were observed. Statistically significant differences between faculties were found for perceived usefulness and perceived technical support. A statistically significant difference (p = .013) was found between lecturers' perceptions in the Faculty of Health Sciences and Social Sciences and Humanities. Lecturers in the Faculty of Health Sciences perceived the LMS to be much more helpful (mean = 4.30; standard deviation = .560) than lecturers in the Faculty of Social Sciences and Humanities (mean = 3.69; Standard deviation = .792).

The perception of technical support by lecturers was the other statistically significant difference across faculties (p =.000). It appears that lecturers in the Faculty of Health Sciences had a significantly higher opinion of the technical support the university offered (mean = 3.75; standard deviation =.673) than lecturers in the Faculty of Social Sciences and Humanities (mean = 2.85; standard deviation =.867) and the Faculty of Education (mean = 2.81; standard deviation =.520).

6. Conclusions

According to O'Flaherty & Phillips (2015), there is a tremendous demand for HEIs worldwide to adapt to an increasingly technology-oriented world. This pressure is enhanced by the current cohort of students who grew up with technology and prefer technology in the classroom. Older lecturers and digital natives are very different in how they perceive and utilize technology today (Smith et al., 2020). Since this study aimed to comprehend the factors influencing the use of an LMS in an organizational setting at a rural university, UTAUT was utilized to define and understand technology adoption in an organizational context. In this study, only some lecturers at the rural university actively engaged students in LMS features and activities. However, while lecturers did not participate much in online teaching before the pandemic, they thought it was beneficial and a substantial part of the future of education.

The research site had been using the LMS before the pandemic, but lecturers primarily used face-to-face instruction at the time. In fact, very little time was spent engaging with course materials and teaching via the LMS. The length of time that lecturers spent using it had little bearing on how much of their class time they spent using the LMS. The time needed to prepare lecturers was a significant deterring factor for lecturers not using the LMS for teaching activities. The various functionalities of the LMS were also used inconsistently at that time. It was evident that the platform was primarily used for uploading content and announcements. However, the assessment tools for assignments, tests, and quizzes were often utilized. Blogs and journals were features that the lecturers seldom ever used. Similar patterns have been reported previously (Eldridge, 2014; Kitoo, 2020).

A six-component solution for the sub-structure of the questionnaire emerged from the factor analysis using PCA on the questionnaire items. These factors were usefulness, performance expectation, self-efficacy, technical assistance, effort, and institutional support. These elements were evaluated for their dependability and the lecturer's perceptions of them as obstacles to, or justifications for using an LMS. The lecturers strongly agreed that the LMS was helpful but also concurred that there is a significant discrepancy between this perception and the actual use of the LMS. This concurs with the findings of a Kenyan study (Maina & Nzuki, 2015) which found the same patterns.

Usefulness is a vital component of the UTAUT model that affects performance expectations and is based on how much an instructor believes the LMS is useful. Lecturers at this rural university had a lower perception of the effectiveness of the LMS in achieving their teaching goals. Effort expectancy was perceived as being low by the lecturers; however, according to Moonsamy and Govender (2018), 80% of lecturers from another South African institution had a high performance expectancy, while their effort expectancy was relatively low. This is very similar to this study at the rural university. Low effort expectancy can result from a lack of training and assistance in LMS use. Since their evaluations of technical and institutional support were much lower than their perceptions of the LMSs usefulness, most lecturers felt they needed more technical and institutional help from the university. The strong correlation between the six variables implies that poorer views of technological and institutional support are linked to lower perceptions of utility, performance expectations, and effort. Thus, this strengthens the case that lack of assistance may be a factor in lecturers' decreased use of the LMS.

Many studies confirm that a lack of training, institutional support, and technical support have a negative effect on the effectiveness of the use of an LMS by lecturers (Al-Meajel & Sharadgah, 2018; De Paepe et al., 2019; Jokiaho et al., 2018; Maina & Nzuki, 2015; Okiaho et al., 2018). It was determined that ongoing technical assistance and appropriate training would help lecturers gain greater confidence using the LMS and make them aware of the advantages of utilizing the LMS.

There were no variations in this study between the gender groups regarding how university instructors felt about the LMS. However, the study did find discrepancies amongst departmental groups. The LMS was seen as far more beneficial by lecturers in the Faculty of Health Sciences than by lecturers in the other faculties. This can be ascribed to the Faculty of Health employing an e-learning specialist to help lecturers become more proficient on the platform. LMS use among lecturers increased as a result. Even though the Teaching and Learning Centre trained the other faculties, lecturers needed to engage.

A recommendation that stems from our findings is that institutional and technical assistance is essential to promote instructor use of LMSs, essential. This was seen during the lockdown, where continuous support and training were given to the lecturers at this rural university, and the confidence of the lecturers grew in using the LMS for online teaching. Each faculty also needs a dedicated support staff member who constantly supports and trains the lecturers of the specific faculty. The technical staff should also be more visible. An e-

learning policy also needs to be constructed, and e-learning should be included in the IPA process to incentivize the lecturers to use the LMS.

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