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UNLOCKING THE POWER OF TPB: EXPLORING THE FACTORS, WHICH INFLUENCE LMS ADOPTION AMONG STUDENTS IN SAUDI ARABIA

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Abstract

The study proposes to identify the variables,that influence students' intentions to adopt the Learning Management System (LMS). The researchers collected data from 210 students of University of Hail, by using a survey questionnaire, which was based on previous studies in the area. Structural Equation Modeling and the AMOS software were used to test the hypotheses. It was found that students' attitudes, subjective norms (social influence) and perceived behavioral control were the three key variables, which exercised the most significant impact on their intention to use the LMS. The findings have significant implications for educational institutions in Saudi Arabia. Understanding the factors that influence LMS adoption, can assist in strategic planning and decision-making, resulting in the development of efficient policies and initiatives, that could encourage LMS adoption by students. These findings can be used by Saudi Arabia Universities, to create targeted interventions, which would address the specific issues affecting student acceptance of a learning management system.

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1. Introduction

Introducing technology into education has become a key priority for schools, colleges, and universities worldwide, as it is considered a vital indicator of a country's growth. Governments have made significant investments in educational technology, to develop advanced educational innovations such as computers, electronic whiteboards, which have played a pivotal role in strengthening the educational system (OECD, 2016). By incorporating technology into education, learners, educators, and organizations can access online resources, tools, and courses, that enhance flexibility and convenience, improve teaching strategies and foster better communication and collaboration between teachers and students. Moreover, technology not only creates new knowledge but also helps solve problems and enhances people's ability to work effectively. Therefore, sustained investment in educational technology is critical to improving the quality of education, boosting the skills and knowledge of learners, and making education more effective, efficient, and accessible to all **(Yaser et al., 2023)**.

In Saudi Arabia, technology-enhanced learning is gaining ground in modern education settings, reflecting the global trend of incorporating technology into education for future use. The COVID-19 pandemic has played a pivotal role in accelerating the integration of technology into education. Educational institutions in Saudi Arabia have employed various digital media to support education at different levels. For instance, educational TV channels and online platforms, established by the Ministry of Education, have been utilized to reinforce school education **(Bakarman & Almezeini, 2021)**. Similarly, universities have leveraged online platforms such as LMS and digital tools to deliver teaching instructions and organize classroom activities. The Ministry of Education in the Kingdom of Saudi Arabia has made significant strides to ensure the continuity of education at all levels, consistent with the Vision 2030, which seeks to equip young people with the skills needed to meet regional and global market demands **(Al Ohali et al., 2018)**. Vision 2030 underscores the importance of innovation in advanced technologies and emphasizes the need for educators and learners to embrace technology, including online platforms, to meet international standards of quality in education.

In Saudi Arabia's educational settings, several studies have been conducted to explore the acceptance of technology models. For instance, **Bellaaj et al. (2015)** studied the continuous use of e-learning systems at the University of Tabuk, using the UTAUT model. Their findings indicated that performance expectation and expected effort significantly influence the intention to continue the use of e-learning. Similarly, **Binyamin et al. (2017)** conducted a study to investigate the factors that influence Saudi students' use of LMS, using TAM. Their results revealed that previous experience with the LMS, satisfaction, social influence, computer literacy, and the teacher's role, all positively influenced the use of LMS. **Alenezi (2019)** also used TPB to determine the online teaching intentions of teachers at the University of Hail, and found that attitude, subjective norms, and perceived behavioral control significantly predicted teachers' intention to teach online. This study focuses on exploring the factors that influence Saudi Arabia students' intention to use LMS, by using the TPB model.

2. Review of Literature

2.1 Overview of Learning Management Systems (LMS)

Training materials and programs can be distributed, managed, and tracked more easily with the use of LMSs, which are software

platforms. They frequently have tools for course management, content creation, student tracking, progress observation and evaluation. Many organizations, including companies, government organizations, and educational institutions, use LMSs extensively to deliver training and instruction to their workers and students **(Aqlan et al., 2021)**. LMSs have grown in popularity recently in the sphere of education, especially in Saudi Arabia **(Alfalah, 2023; Abubakar et al., 2023)**. These systems give teachers a platform on which to arrange course materials, keep track of students' development, make assessments, and interact with them. They also include a variety of features and tools, like chat rooms, discussion forums, and video conferencing, to improve cooperation and communication between teachers and students. Because they enable learners to access education from any location, at any time, and by removing barriers like time and distance, LMSs are regarded as a crucial component of blended and online learning settings. LMSs have improved accessibility and inclusivity in education **(Bradley, 2021; Al-Mamary and Al-Shammari, 2023; Alkhaldi et al., 2021; Sudhahar, J. et al., 2006)**. Increasing access to educational and training opportunities and attaining the country's overall development goals, have been seen as prerequisite for the development of Saudi Arabia, where the adoption of LMSs has been seen as a crucial step **(Al-Ghurbani et al., 2022)**. The usage of LMSs is anticipated to increase further in Saudi Arabia, resulting in better access to educational and training opportunities, the improvement of students' and workers' competences, and the general advancement of the country.

2.2 Theory of Planned Behavior (TPB)

The TPB model is a widely used paradigm in social psychology, that aims to describe human behavior in a variety of circumstances. It was created by social psychologist, **Icek Ajzen,** in the late 1980s. The foundation of the TPB framework is the notion that a person's intentions are what ultimately determine their conduct. Three critical elements of attitudes, subjective norms and perceived behavioral control have an impact on these intentions. A person's overall assessment of a given activity is referred to as their attitude, and it is based on their values and beliefs regarding the behavior's impact. Subjective norms, on the other hand, are the societal expectations and external influences that a person feels are influencing their behavior. Finally, perceived behavioral control refers to a person's belief in their ability to successfully carry out a behavior, taking into account their skills, resources, and any barriers that might exist **(Ajzen, 1991; Alshebami, 2022; Al-Mamary & Alraja, 2022; Balder et al., 2020; Selvam et al., 2016)**.

2.3 TPB in the Field of LMS

According to research, conducted by **Binyamin et al. (2017) and Alenezi (2019),** previous experience with the LMS, satisfaction, social influence, computer literacy, and the role of the teacher, were identified as having a positive impact on LMS usage. Meanwhile, **Alenezi (2019)** highlighted that perceived behavioral control, subjective norms, and attitude were critical factors, which influenced teachers' willingness to teach online. Therefore, applying the TPB framework in the context of LMS can provide valuable insights into the factors that affect the acceptance and use of these systems and promote their effective implementation in education. The field of LMS studies in Saudi Arabia has extensively employed TPB to better understand how people embrace and utilize technology. Through various studies, TPB has proved to be an effective framework in examining the factors that affect people's intentions to use LMS in Saudi Arabia **(Yaser, 2022)**.

3. Statement of the Problem

Although LMS has been introduced and implemented in many educational institutions in Saudi Arabia, there is still uncertainty about the extent to which students have accepted and used LMS for educational purposes. It is uncertain whether students are completely leveraging this technology to improve their learning experiences, despite major investments in educational technology and the incorporation of LMS into education. The elements that affect Saudi Arabian students' intention, concerning the implementation and use of LMS, have not engaged the academicians. The elements that influence students' adoption of LMS, their intention to use it, and the difficulties they run into while using it in educational institutions, must be researched.

4. Need of the Study

In order to enhance the integration of technology with education and improve student learning outcomes, a study of TPB, in connection with LMS, among Saudi Arabian students is important. Teachers and decision-makers may create successful deployment plans that will solve the difficulties and hurdles to LMS adoption, which can eventually result in a better educational experience for students by understanding the elements that influence their acceptance and use of LMS.

5. Objectives of the Study

a) To investigate the impact of attitude on students' intention to use LMS in Saudi Arabia.

b) To examine the impact of subjective norms on students' intention to use LMS in Saudi Arabia.

c) To analyse the impact of perceived behavioral control on students' intention to use LMS in Saudi Arabia.

6. Hypotheses of the Study

The following hypotheses were advanced in the study:

H1: Students' intentions to use the LMS are significantly and positively affected by attitude.

H2: Students' intentions to use the LMS are significantly and positively affected by subjective norms.

H3: Students' intentions to use the LMS are significantly and positively affected by perceived behavioral control.

7. Research Methodology

7.1 Sample Selection

For this research, data were collected from the University of Hail in Saudi Arabia. The participants in this study were students from the College of Business Administration, who were studying Management Information Systems (MIS), Management, Finance and Accounting. A total of 210 students, consisting of both males and females, were selected for this study through purposive sampling, to ensure that the sample represented a diverse range of students from various academic programs. The data were collected through a survey questionnaire that was sent to the participants.

7.2 Sources of Data

Using a structured questionnaire is a common and reliable method to collect data for research studies. For this particular study, a questionnaire was designed and sent out via Google Forms to gather data from a sample of the population. The survey's questions were thoughtfully prepared and based on the theory of planned behavior, which has frequently been used to gauge undergraduate students' intentions towards the usage of LMS. The survey was designed in such a way that it could capture

precise data, pertinent to the study while being simple enough for all participants to understand and respond. This was accomplished by making sure the questions were clear, uncomplicated, and simple to understand. Because ambiguity or uncertainty in the questions could result in erroneous or unreliable data, the researchers wished to avoid any such issues.

7.3 Period of Study

The research project, that explored the relationship between TPB and LMS utilization among students in Saudi Arabia, covered three months, spanning from August 2022 to October 2022. The research duration was deliberately chosen to provide enough time for data collection, analysis, and interpretation. The study schedule was thoughtfully planned to eliminate any external factors, such as academic events or holidays, that might influence the research findings.

7.4 Tools used in this Study

SEM was used in this study to examine the relationships between the variables. AMOS program version 21.0 was employed to carry out the SEM study. Researchers used this software package to assess models, calculate parameters, and test hypotheses. Due to its convenient interface and capability to handle complex models with ease, AMOS is frequently utilized by researchers.

8. Data Analysis and Interpretation

8.1 Measurement Model of the Study with Variables

A measurement model is a statistical model that seeks to describe the links between observed variables and the underlying variables that they reflect. The measurement model is important because it helps to validate the construction of research tools or questionnaires, which is crucial for drawing accurate conclusions from the data. In the social and behavioral sciences, a well-defined measurement model is essential for reliable and valid research. **Figure-1** shows the measurement model, with the values at 0.78, 0.81, 0.83, 0.66, 0.81, 0.77, 0.85, 0.89, 0.83, 0.83, 0.87, 0.85 and 0.79, for ATT1, ATT2, ATT3, SN1, SN2, SN3, PBC1, PBC2, PBC3, ITU1, ITU2, ITU3 and ITU4 respectively. The TLI, CFI, and NFI indices reported values above 0.90. Similarly, the Chi-Square/df ratio was less than 0.03 and RMSEA was less than 0.08, representing the goodness-of-fit (GOF) indices and the **Figure-1** provides evidence that the measurement model was fit. Hence the hypothesis **H1** was accepted.

8.2 Convergent and Discriminant Validity

The evaluation of construct validity in SEM involves assessing both convergent and discriminant validity, both of which are crucial aspects of construct validity. Both convergent and discriminant validity are crucial for establishing the construct validity of a measurement model in SEM and increasing confidence in the reliability and validity of the measures. As shown in **Table-1** all Factor Loading was more than 0.6 and Cronbach Alpha >= 0.7, CR >= 0.7 and AVE >= 0.5. In addition, as shown in **Table-2,** the correlation between one dependent variable (ITU) and three independent variables (ATT, SN and PBC) were 0.659, 0.756 and 0.561 respectively. Other construct was smaller than the square root of AVE recovered by the construct. In other words, the present study provided evidence of both convergent and discriminant validity and therefore, the hypothesis **H2** was accepted.

8.3 Structural Model

The structural model is a crucial tool for researchers, to test their theories and make predictions about the relationships between variables. It also aids in identifying the most

important variables influencing the outcome variable, which can inform policies and interventions. A well-defined structural model can offer valuable insights into complex social and behavioral phenomena. **Figure-2** demonstrates the structural model to be appropriate representation of the data, with the TLI, CFI and NFI GOF values lying above 0.90. The standardized regression weights were 0.52 for ITU-ATT, 0.09 for ITU-SN and 0.28 for ITU-PBC. Additionally, the Chi-Square (ChiSq) to degrees of freedom (df) ratio was less than 0.03 and RMSEA was less than 0.08, indicating the goodness-of-fit (GOF). **Figure-2** demonstrates that the structural model was fit. Hence the hypothesis **H3** was accepted. The results of the hypothesis test are presented in **Table-3,** which shows the statistical significance of the relationships between variables in the structural model. As shown in **Table-3,** p values were higher than 0.05 for all hypotheses, implying that all hypotheses were accepted.

9. Findings of the Study

- The results of the study revealed that having a positive attitude towards the use of LMS, did have significant impact on the intention to use them, which is consistent with prior research. While attitude influences intention to complete an act, this intention will directly affect the behavior.

- The findings of the study supported the hypothesis that subjective norms, or social influence, did have positive and significant impact on the intention to use LMS, which is in line with the previous research.

- A person's social environment, which includes their friends, teachers, and peers, influenced how they perceived technology, which, in turn, influenced how they behave in a social setting.

- Teachers should, therefore, build a friendly and inclusive learning environment while taking into account the social elements that affect students' intention to utilize LMS.

- The study also supported the H3, which asserts that perceived behavioral control influences LMS adoption in a favorable and significant manner. The degree to which a person perceives an action to be easy or difficult to carry out, is strongly correlated with their level of behavioral control.

10. Suggestions

The connection identified between TPB model and the intention to utilize LMS, makes the study significant since it can be used as a starting point for further research in Saudi Arabia and other Arab Gulf nations. To promote LMS usage among students, it is suggested that Saudi universities acknowledge the crucial role of attitude, subjective norms, and observed behavioral control. Additionally, the findings of the study can be utilized by universities, to enhance LMS design and implementation, leading ultimately to increased student satisfaction and improved learning outcomes.

11. Conclusion

This study sheds light on the variables that influence university students' intention in Saudi Arabia to utilize LMS by using the theory of planned behavior. The findings underscore the importance of attitude, subjective norms, and perceived behavioral control, in determining the likelihood that a person will use an LMS. In addition, this study contributes to the understanding of LMS adoption in the Arab Gulf region, by providing empirical evidence of the relevance of the theory of planned behavior in the context of LMS use in Saudi Arabian higher education. Therefore, other universities in the Arab world, that aim to encourage efficient LMS

use in their educational institutions, may find the study's results useful.

12. Limitation of the Study

It would be useful to conduct further research that includes a more diverse range of students, from different universities in the Arab Gulf region to examine the generalizability of these findings. Exploring these elements, in a broader Arab context, could provide a more comprehensive understanding of the factors that impact LMS adoption in higher education. To determine whether the factors investigated in this study are consistent across various institutions and student demographics, this could involve looking at other Gulf or Arab colleges.

13. Scope for Future Research

Future studies should examine the efficiency of various LMS applications and how they affect student performance and engagement. Comparing the results of several LMS platforms, in terms of student satisfaction, motivation, and academic accomplishment, could be one way to do this. Investigating the factors that affect administrators' and instructors' use of LMSs, could also yield useful information for boosting LMS implementation and effectiveness in educational settings. This could entail looking into factors like instructor assistance and training, institutional policies, and technology resource availability and accessibility. Researchers could find areas for improvement by looking at these elements in order to promote more widespread and successful LMS use in higher education in Saudi Arabia and elsewhere.

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Figure-1: Measurement Model of the Study with four variables ATT, SN, PBC, and ITU
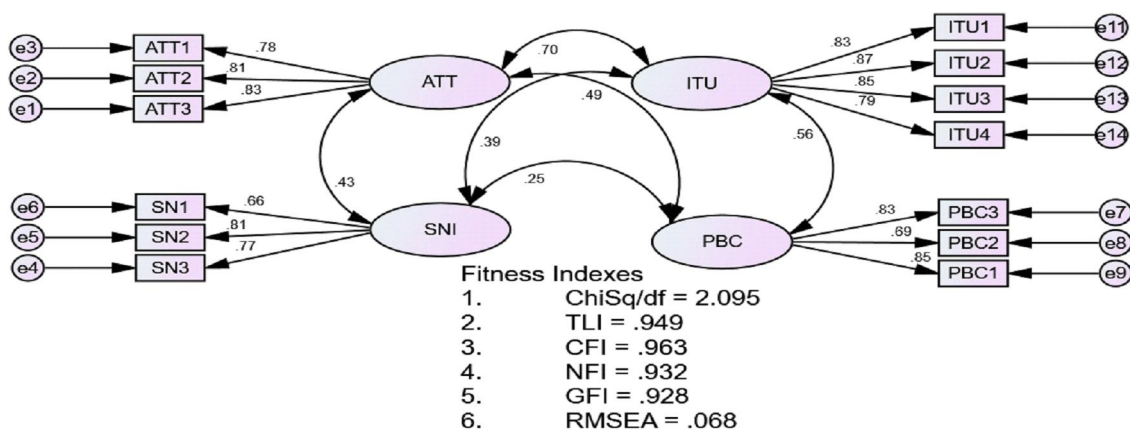
Source: Primary Data computed using Amos version 21

Figure-2: Structural Model of the Study with Standardised Regression Weights of Factors and its impact on Student's Intention to Use
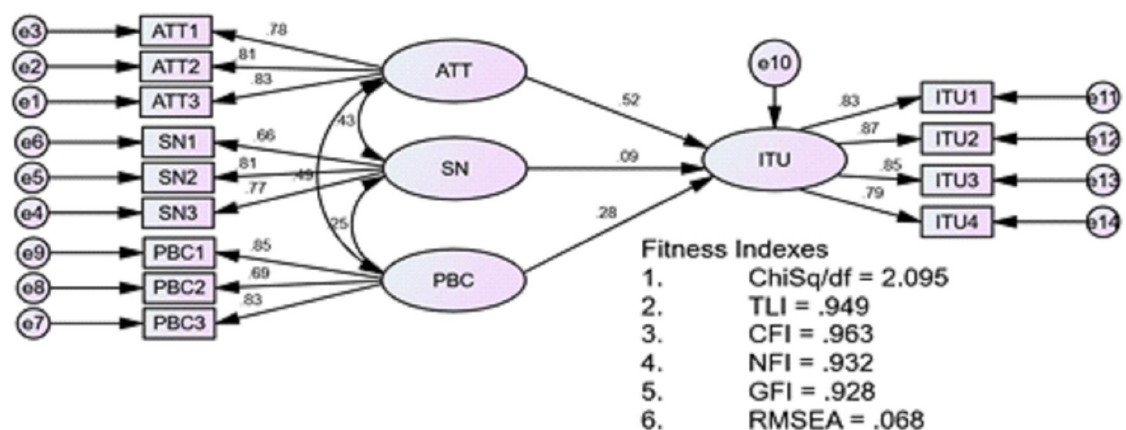
Source: Primary Data computed using Amos version 21

Table-1: Result of the CFA Report: Convergent Validity of Factors which Influence LMS Adoption among Students in Saudi Arabia

Construct	Item	Factor Loading	Cronbach Alpha (>= 0.7)	CR (>= 0.7)	AVE (>= 0.5)
ATT	ATT1	0.78	0.869	0.875	0.701
	ATT2	0.81			
	ATT3	0.83			
SN	SN1	0.66	0.864	0.868	0.688
	SN2	0.81			
	SN3	0.77			
PBC	PBC1	0.85	0.831	0.834	0.628
	PBC2	0.89			
	PBC3	0.83			
ITU	ITU1	0.83	0.901	0.905	0.704
	ITU2	0.87			
	ITU3	0.85			
	ITU4	0.79			

Source: Author's own creation

Table-2: Results of Discriminant Validity Test of Factors which Influence LMS Adoption among Students in Saudi Arabia

	ATT	SN	PBC	ITU
ATT	**0.837**			
SN	0.716	**0.829**		
PBC	0.445	0.644	**0.792**	
ITU	0.659	0.756	0.561	**0.839**

Source: Author's own creation

Table-3: Result of Hypothesis Test Regarding Factors which Influence LMS Adoption among Students in Saudi Arabia

Hypothesis	P	Result
ITU <--- ATT	0.002	Supported
ITU <--- SN	0.003	Supported
ITU<--- PBC	0.009	Supported

Source: Author's own creation