

TVET Learning Management System Success Model

Model Kejayaan Sistem Pengurusan Pembelajaran TVET

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ABSTRACT

Learning Management Systems (LMS) serve as collaborative online learning platforms that facilitate continuous access to educational resources and activities. However, limitations in LMS implementation have affected its effective utilization within Malaysian Polytechnics. Existing models are also insufficient in explaining actual LMS usage in Technical and Vocational Education and Training (TVET), where psychomotor skills play a crucial role in students' practical learning experiences. This study identified nine factors and 58 measurement items derived from the integration of the DeLone and McLean Information Systems Success Model (2003), the Technology Acceptance Model (TAM), and Simpson's Psychomotor Taxonomy (1972). A quantitative research approach was employed, incorporating literature review, expert validation, and questionnaire survey methods to address the research objectives. A total of 585 responses were collected from engineering students at Politeknik Seberang Perai (Penang), Politeknik Ungku Omar (Perak), Politeknik Sultan Haji Ahmad Shah (Pahang), Politeknik Nilai (Negeri Sembilan), and Politeknik Ibrahim Sultan (Johor). Statistical analysis revealed that 10 hypotheses were supported, while 5 hypotheses were rejected. The findings indicate that practical training and system quality are among the dominant factors influencing actual LMS usage. Furthermore, the proposed model demonstrated strong predictive accuracy, with an R^2 value of 0.708. The study recommends that Malaysian polytechnics integrate virtual practical activities and skill-based assignments into TVET LMS platforms to better align with industry requirements and support the nation's TVET development agenda.

Keywords: TVET, LMS

ABSTRAK

Sistem Pengurusan Pembelajaran (SPP) merupakan medium pembelajaran kolaboratif online yang boleh digunakan sepanjang masa. Kelemahan dalam penggunaan SPP memberi kesan kepada penggunaan SPP di Politeknik Malaysia. Model sedia ada juga tidak cukup untuk menerangkan penggunaan sebenar SPP dalam PdP TVET yang memerlukan penekanan faktor psikomotor dalam latihan amali pelajar. Sebanyak 9 faktor dan 58 item hasil gabungan faktor daripada Model Kejayaan Sistem Maklumat Delone dan Mclean (2003), Model Penerimaan Teknologi (TAM) dan Taksonomi Psikomotor Simpson (1972) dikenal pasti dalam kajian ini. Kajian ini menggunakan pendekatan kuantitatif dengan sorotan susastera, penilaian pakar dan kajian soal selidik bagi menjawab persoalan kajian. Sebanyak 585 soal selidik diperoleh melibatkan pelajar kejuruteraan Politeknik Seberang Perai Pulau Pinang, Politeknik Ungku Omar, Perak, Politeknik Sultan Haji Ahmad Shah (POLISAS) Pahang, Politeknik Nilai dan Politeknik Ibrahim Sultan, Johor. Hasil analisis statistik menunjukkan 10 hipotesis diterima manakala 5 hipotesis ditolak. Dapatan kajian menunjukkan faktor latihan praktikal dan kualiti sistem merupakan antara faktor dominan yang menyumbang kepada penggunaan sebenar SPP. Model yang dibangunkan turut menunjukkan ketepatan ramalan yang tinggi dengan nilai R^2 sebanyak 0.708. Politeknik disaran mengintegrasikan amali maya dan tugas berasaskan kemahiran dalam SPP TVET bagi memenuhi keperluan industri TVET negara.

Kata kunci: SPP, TVET

INTRODUCTION

Malaysian Polytechnics are among the key institutions responsible for producing a skilled workforce in Malaysia. The use of Learning Management Systems (LMS) in Technical and Vocational Education and Training (TVET) plays a crucial role in providing a flexible learning platform for students, thereby enhancing the development of TVET education in the country. Through the Twelfth Malaysia Plan (RMK-12), a total allocation of RM6.6 billion was provided to strengthen Technical and Vocational Education and Training (TVET) in Malaysia (Zia et al. 2022).

RELATED WORK

A Learning Management System (LMS) is defined as an information technology system that provides users with the flexibility to create, maintain, and update course-related information accessible through a web-based platform (Ghazal, Aldowah & Umar 2018). LMS serves as a platform to support and manage students' learning processes. It is developed as a comprehensive online platform that integrates various learning resource management features to facilitate the delivery, administration, and monitoring of educational activities (Oktarin et al. 2023).

The Learning Management System (LMS), known as Curriculum Information Document Online System (CIDOS), has been implemented in Malaysian Polytechnics since 2010, beginning with its adoption at Merlimau Polytechnic, Melaka. The LMS offers numerous advantages in supporting the learning process by providing a digital platform that enables students to access learning materials more efficiently and systematically, regardless of time and location constraints (Marliansyah, Etfita & Wahyuni 2022). In addition, the LMS facilitates the development of instructional materials, supports platform-based assessment systems, and enables continuous monitoring of students' academic performance (Oktarin et al. 2023).

Despite the numerous advantages associated with Learning Management Systems (LMS), preliminary findings from Polytechnic Seberang Perai, Penang, indicate that the utilisation of the Curriculum Information Document Online System (CIDOS) has remained inconsistent across different years, suggesting the need for further investigation. Table 1 illustrates the trend of CIDOS usage among students at the institution. Hasnan and Mohin (2021) reported that limited system accessibility is among the major barriers to LMS adoption. Their findings also highlighted system reliability, software quality, internet connectivity, and active communication as significant determinants influencing LMS usage.

Furthermore, the implementation of LMS in Technical and Vocational Education and Training (TVET) settings differs substantially from that in conventional educational institutions. TVET-oriented LMS platforms are required to support psychomotor skill acquisition and practical-based learning activities, whereas conventional LMS environments predominantly emphasise cognitive learning processes (Rasheed et al. 2020). As a result, the integration of LMS within TVET education presents unique challenges in facilitating psychomotor skill development, thereby necessitating further research to identify factors that can enhance the effective adoption and utilisation of LMS in TVET contexts.

TABLE 1. Utilisation of the Learning Management System (LMS) among Students at Seberang Perai Polytechnic, Penang.

Year	Total of Utilisation
2023	431,854
2022	12,737
2021	275,427
2020	126,494
2019	215,370
2018	301,593
2017	182,275

The conceptual framework for this study is illustrated in Figure 1. This framework was developed by integrating and adapting constructs from the DeLone and McLean Information Systems Success Model (2003), the Technology Acceptance Model (TAM), and Simpson's Psychomotor Taxonomy (1972). The integration of these models provides a comprehensive foundation for examining the factors influencing the utilisation of Learning Management Systems (LMS) in the Technical and Vocational Education and Training (TVET) context.

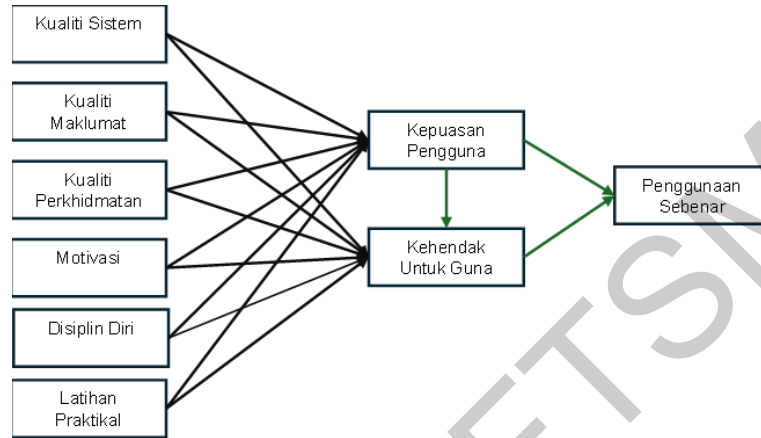


FIGURE 1. The Conceptual Framework.

System quality, information quality, and service quality are among the most commonly examined factors in previous studies as determinants influencing user satisfaction and behavioural intention to use a system (Fitria et al. 2024; Theresiawati et al. 2020; Winarno & Legowo 2024). According to Deci and Ryan (2000), motivation plays a crucial role in ensuring that students remain actively engaged in self-directed learning within the field of Technical and Vocational Education and Training (TVET).

Choy and Quek (2024) further stated that TVET students with a high level of self-discipline tend to spend more time participating in collaborative activities within Learning Management Systems (LMS), while also enhancing their critical thinking skills. TVET education emphasises practice-based learning and hands-on training. According to Leong (2024), online practical training not only enhances the learning experience but also encourages students' motivation to remain actively engaged in their enrolled courses.

METHODOLOGY

The quantitative study conducted in this research involves thematic analysis, content validity assessment, and Partial Least Squares Structural Equation Modelling (PLS-SEM) analysis. This study adapts the research framework proposed by Urbach and Ahlemann (2010) and is implemented in several phases. For the first research objective, which is to identify factors that measure the success of the Technical and Vocational Education and Training (TVET) Learning Management System, the respondents consist of engineering students from Malaysian polytechnics, namely Seberang Perai Polytechnic, Penang; Ungku Omar Polytechnic, Perak; Sultan Haji Ahmad Shah Polytechnic (POLISAS), Pahang; Nilai Polytechnic; and Ibrahim Sultan Polytechnic, Johor.

The selection of respondents was carried out using stratified sampling techniques. According to Jamaludin and Abdullah (2025), stratified sampling increases the likelihood that all sub-populations are adequately represented, while also improving estimation accuracy by reducing variance within each stratum. A total of 585 completed questionnaires were collected and used for analysis.

In the initial phase of the study, thematic analysis was conducted through a systematic review of the literature. A total of 200 articles were initially identified and screened, leading to the final selection of 34 articles to serve as references for the study. During this phase, nine key factors were identified, which were then carried forward for further analysis in the subsequent stages of the research.

To address the second research objective, which is to develop a success model for the TVET Learning Management System (LMS), the subsequent phase involved the assessment of content validity. Lawshe (1975) defined content validity as a method used to determine and evaluate the validity of a research instrument or questionnaire, ensuring that the constructed items adequately represent the intended constructs through expert judgment. In this study, seven expert panel members were engaged for this purpose. The analysis at this stage yielded nine factors comprising 58 validated items for the research instrument.

For the third research objective, which is to validate the TVET Learning Management System (LMS) success model, Partial Least Squares Structural Equation Modelling (PLS-SEM) was employed to examine the complex relationships among the study variables. At this stage, the proposed hypotheses were tested through the PLS-SEM analysis.

RESULTS AND DISCUSSION

In the initial stage of the study, thematic analysis was conducted, through which several factors influencing the use of the TVET Learning Management System (LMS) were identified. These factors were subsequently tested in the following phase. Next, content validity analysis was carried out, whereby nine key factors and 58 final items were obtained and validated by a panel of experts. These items were then used in the final research instrument. Following the administration of the final questionnaire, PLS-SEM analysis revealed that, out of 15 hypotheses tested, 10 were supported while five were rejected.

In addition, the descriptive analysis revealed that the majority of respondents in this study were male (77.9%), while 22.1% were female. In terms of ethnicity, most respondents were Malay (83.4%), followed by Indian (10.1%), other ethnicities (3.4%), and Chinese (3%). Regarding academic level, the majority of respondents were in Semester 4 or 5 (60.2%), followed by Semester 2 or 3 (35.8%), Semester 1 (4%), and Semester 6 and above (3.6%).

In terms of computer proficiency, 49.1% of respondents considered themselves proficient, while 42.9% reported an intermediate level, 6.1% indicated a very high level of proficiency, and 1.9% stated that they were less proficient. Regarding experience in using the Learning Management System (LMS), 62.7% of respondents reported having 1–3 years of experience, indicating that the respondents had relevant exposure to LMS usage. Respondents were also asked whether they had experience using other LMS platforms besides CIDOS. The findings showed that 60.6% reported no prior experience, while 39.4% indicated that they had such experience.

In summary, the study found that system quality, service quality, motivation, self-discipline, and practical training are key predictors of user satisfaction and behavioural intention to use the TVET Learning Management System (LMS). In terms of the predictive power of the developed model, the coefficient of determination (R^2) analysis indicated that the model has a predictive strength of 0.708 in explaining the actual usage of the TVET LMS.

CONCLUSION

This study was conducted to develop a Learning Management System (LMS) Success Model within the context of Technical and Vocational Education and Training (TVET). Overall, the factors contributing to the success of LMS utilisation in TVET have been identified, namely system quality, information quality, service quality, motivation, practical training, self-discipline, behavioural intention to use, and user satisfaction, which are expected to influence actual system usage. This study provides significant contributions from theoretical, practical, and policy perspectives in the development of a more effective TVET LMS. It is also anticipated that this study will assist polytechnics in producing more competitive and highly skilled TVET human capital.

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