FACTORS INFLUENCING STUDENT ADOPTION OF DIGITAL STORYTELLING IN A LEARNING MANAGEMENT SYSTEM: EVIDENCE FROM UMS ITEL USING UTAUT

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Received: 15.3.2026 Accepted: 27.4.2026
Revised: 25.3.2026 Published: 4.5.2026
DOI: https://doi.org/10.51200/ijelp.v9i1.7468

Abstract

Digital Storytelling (DST) is one of the innovative pedagogical approaches that enhances student engagement in the learning process. However, its adoption within the Malaysian university e-learning environment remains underexplored. This study investigates undergraduate students' perceptions of DST adoption within Universiti Malaysia Sabah's learning management system called iTEL. This study uses the Unified Theory of Acceptance and Use of Technology (UTAUT) as the guiding framework. Throughout this study, a structured survey instrument was developed to examine the influence of Performance Expectancy (PE), Effort Expectancy (EE), Social Influence (SI), and Facilitating Conditions (FC) on students' Behavioral Intention (BI) to adopt DST. Data collection was conducted among undergraduate students in the information technology field to explore their perceptions of DST and its adoption in iTEL. The findings revealed that PE significantly influences students' BI to adopt DST in iTEL. This implies that the usefulness of DST strongly determines students' intention to use it. In contrast, EE, SI, and FC do not significantly affect students' BI in adopting DST. These results imply that students' willingness to adopt DST is primarily driven by their perception of its performance benefits rather than by ease of use, encouragement by peers or lecturers, or institutional and technical support. This study contributes to the understanding of DST adoption within the Malaysian university e-learning environment.

Keyword(s): *E-learning, digital storytelling, student perceptions, UTAUT, structural equation modeling.*

INTRODUCTION

E-learning is an integral component of higher education. It provides flexible, accessible, and personalized learning experiences that accommodate diverse student needs and improve educational outcomes (Nguyen et al., 2019; Bankovska et al., 2023). With reduced geographical and temporal barriers, e-learning supports a sustainable learning environment for students (Alenezi, 2020). Despite significant advancements in educational technology, many Malaysian university Learning Management Systems (LMS) still focus on teaching and learning content management and delivery. Moreover, there is a lack of understanding of innovative pedagogical approaches, which hinders student engagement in the learning process.

One of the innovative pedagogical approaches that enhances student engagement in the learning process is Digital Storytelling (DST). DST combines narrative and multimedia elements to create engaging learning experiences (Kader, 2023; de Freitas, 2025). Within e-learning environments, DST encourages students to construct knowledge according to their creativity. In this way, students can improve their critical thinking skills and collaboration in solving problems. Although the benefits of DST have been widely acknowledged, its adoption within Malaysian university e-learning environment remains underexplored (Tian & Suki, 2023).

At Universiti Malaysia Sabah (UMS), the institutional LMS called iTEL is used by lecturers as the primary platform for their e-learning activities. While iTEL supports multimedia content and interactive learning features, limited studies examined how students perceive the adoption of DST in this LMS. Understanding student perceptions is important for discovering the potential of this innovative pedagogical approach within the UMS e-learning environment. Therefore, this study investigates undergraduate students' perceptions of DST adoption in iTEL.

To achieve the study objective, this study uses the Unified Theory of Acceptance and Use of Technology (UTAUT) as the guiding framework. Specifically, this study aims to address the following research questions:

(a) What factors influence students' Behavioral Intention (BI) to adopt DST in iTEL?

(b) How do Performance Expectancy (PE), Effort Expectancy (EE), Social Influence (SI), and Facilitating Conditions (FC) influence students' perceptions of DST adoption?

By addressing these questions, this study contributes to the understanding of DST adoption within the Malaysian university e-learning environment. In addition, the findings from this study provide theoretical insights for UMS educators and instructional designers to develop strategies that support the integration of DST within iTEL.

LITERATURE REVIEW

Learning Management Systems

Learning Management Systems (LMS) have been found to be of great significance to the teaching and learning processes of higher education institutions. They have been used to manage the learning content of the students, the communication between the lecturers and the students, the assessment of the students, among other functions (Azmi Murad et al., 2022; Jain et al., 2024; Schukin et al., 2024). In the recent past, LMS have been improving the features of the system to ensure the integration of gamification tools, self-regulated learning tools, and predictive learning analytics. These are expected to enhance the learning of the students (Ferreira et al., 2023).

Despite the improvements of LMS, maintaining the motivation of the students to take an active part in the learning session is still a challenge. The features of the LMS have been found to be of great significance to the learners. In addition to the features of the system, the lack of proper support from the institution is also a challenge to the utilization of the LMS (Alenezi, 2018; Almusharraf, 2024; Chasokela et al., 2024).

Digital Storytelling

On the other hand, Digital Storytelling (DST) is a combination of traditional storytelling and multimedia tools such as images, sound, and videos, which provide interactive and meaningful learning experiences (Ugap et al., 2025). DST has been noted for its ability to encourage students to creatively present their ideas through various multimedia tools, thus promoting creativity and

critical thinking skills while engaging students in the learning process (Dalim et al., 2019; Beck & Neil, 2021; Nunvarova et al., 2023).

Recent studies on DST have shown its potential in motivating and engaging students in various disciplines such as language learning, education, and business studies (Nunvarova et al., 2023; Sakthivel et al., 2025). For example, Malisius (2018) noted that integrating DST into graduate programs at Royal Roads University significantly improved students' multimedia literacy and teamwork skills. This indicates Digital Storytelling's potential as an innovative learning strategy in engaging students in the learning process through student-centered learning in an e-learning environment.

Digital Storytelling Adoption Barriers

Despite the pedagogical benefits associated with DST, various challenges have been cited as barriers to the integration of DST in higher education institutions. Technical challenges associated with DST integration include the need for adequate technological support and the availability of adequate digital resources and tools for effective multimedia application (Beck & Neil, 2021; Ugap et al., 2025). In addition, instructors may face challenges in creating DST activities that meet curriculum standards.

Institutional barriers associated with the integration of DST in higher education institutions are also important factors that may affect the integration process. These barriers may include inadequate technical support, inadequate training for instructors, and the lack of willingness among instructors to incorporate innovative pedagogical approaches associated with DST (Clarke & Adam, 2012; Aditya et al., 2021).

Unified Theory of Acceptance and Use of Technology

The Unified Theory of Acceptance and Use of Technology (UTAUT) is one of the most popular models for understanding the acceptance and use of technology in the context of education. Venkatesh et al. (2003) proposed the UTAUT model, which states that the acceptance and use of technology in education is primarily determined by four constructs, namely Performance Expectancy (PE), Effort Expectancy (EE), Social Influence (SI), and Facilitating Conditions (FC). These constructs ultimately influence Behavioral Intention (BI) for the acceptance and use of a particular technology, as depicted in Figure 1.

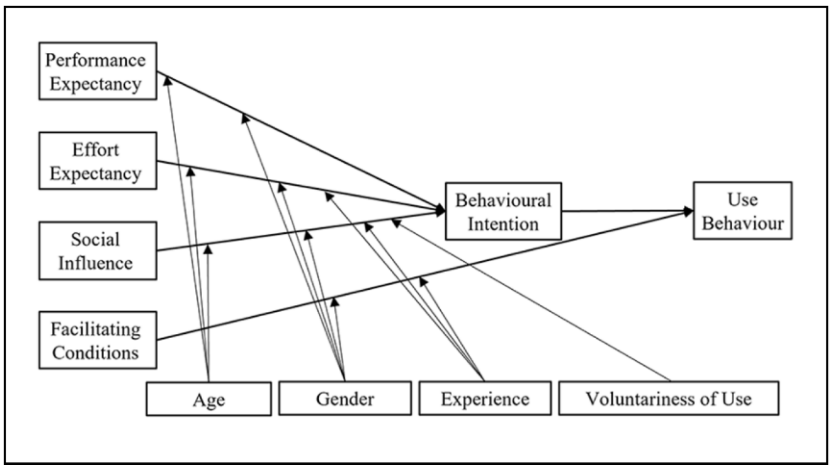

Figure 1: UTAUT model (Venkatesh et al., 2003).

Previous research has shown that PE is a significant predictor for BI, as individuals tend to use technology if they believe it is beneficial for their performance. EE is also a significant predictor for BI, especially in cases where individuals believe that the use of a particular technology is relatively easy. On the other hand, the influence of SI is relatively low in contexts where individuals use technology individually. However, SI is significant in contexts where individuals use technology in a collaborative environment. FC is relatively significant in the context of usage rather than BI (Abbad, 2021; Alblooshi & Abdul Hamid, 2021; Hasan et al., 2025).

CONCEPTUAL FRAMEWORK AND HYPOTHESES

Following our literature review, this study uses UTAUT as the guiding framework to examine students' perceptions of DST adoption in iTEL. Since this study focuses on students' perceptions of DST adoption in iTEL rather than on their actual DST usage behavior, we propose a conceptual framework that is limited to PE, EE, SI, and FC, as predictors of BI. Thus, the Use Behavior construct is excluded from our study.

Besides that, students' perceptions of usefulness, ease of use, social encouragement, and institutional support are widely regarded as important determinants of their intention to adopt a new educational technology. Therefore, this study focuses on investigating relationships between PE, EE, SI, and FC → BI. The proposed conceptual framework of this study is illustrated in Figure 2. In addition, Table 1 summarizes the definitions of the constructs used in this study.

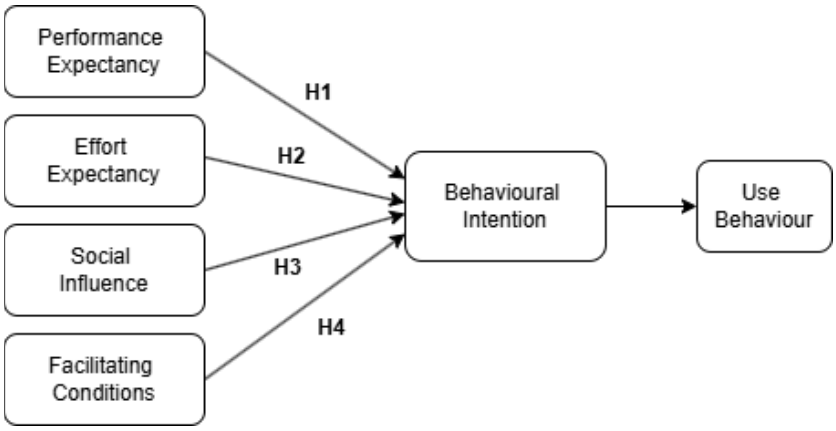

Figure 2: Proposed conceptual framework.

Table 1: UTAUT constructs' definitions for this study.

Construct	Definition
PE	The degree to which students believe that using DST in iTEL enhances their learning engagement.
EE	The extent to which students perceive DST activities in iTEL as easy to learn and understand.
SI	The extent to which students perceive encouragement from peers and lecturers to use DST in iTEL.
FC	The perceived adequacy of institutional and technical support for students to use DST in iTEL.
BI	Students' willingness to continue using DST in iTEL and recommend it to other students.

Based on the UTAUT model presented in Figure 2, the following hypotheses are proposed:
H1: PE has a positive and significant influence on students' BI to adopt DST in iTEL.
H2: EE has a positive and significant influence on students' BI to adopt DST in iTEL.
H3: SI has a positive and significant influence on students' BI to adopt DST in iTEL.
H4: FC has a positive and significant influence on students' BI to adopt DST in iTEL.

RESEARCH METHODOLOGY

To achieve the study objective, this study employed a quantitative research design complemented by limited qualitative feedback. The target population of this study is undergraduate students enrolled in the Discrete Mathematics course during Semester 1, Session 2022/2023 and Semester 1, Session 2025/2026 at UMS Labuan International Campus. These students were selected because they represent potential adopters of DST in iTEL. Their responses and feedback provide valuable insights into the adoption DST within Malaysian university e-learning environment. Their participation was voluntary, and all their responses were treated confidentially.

Data was collected using a structured online questionnaire. The questionnaire consisted of four sections, which can be described as follows. In the first section, students were asked about their prior experience and knowledge with DST. In the second section, students were shown a short introductory video demonstrating how DST can be integrated within iTEL. In the third section, students answered 15 Likert scaled questions, where each construct (PE, EE, SI, FC, and BI) was measured using three questions. A five-point Likert scale, ranging from 1 (Strongly Disagree) to 5 (Strongly Agree), was used to accurately measure students' perceptions. The last section was open-ended questions that requested students' overall opinion about DST and suggestions to improve DST before its integration within iTEL.

For the analysis, the quantitative and qualitative data from the first section was summarized using graphical representations and thematic analysis, respectively. Then, the quantitative data from the third section was analyzed using descriptive statistics and structural equation modeling (SEM). Descriptive statistics such as mean and standard deviation were calculated to summarize students' perceptions according to each of the constructs (PE, EE, SI, FC, and BI). Then, SEM was performed using the semopy library in Python to examine the hypothesized relationships among the constructs (H1, H2, H3, and H4). The qualitative data from the last section of the questionnaire was analyzed using thematic analysis. The aim is to identify common themes in students' overall opinion about DST and suggestions to improve DST before its integration within iTEL.

RESULTS & DISCUSSION

A total of 41 valid responses were collected from the survey. The following are the results from the data analysis conducted.

Descriptive Results

Figure 3 shows the distribution of students' prior experience with DST. Most students (70.7%) stated that they had occasionally used DST, which suggests a moderate level of familiarity with DST. A smaller percentage of students (14.6%) stated that they use DST frequently, which

indicates they are relatively experienced users. Meanwhile, another 14.6% stated that they had never used DST.

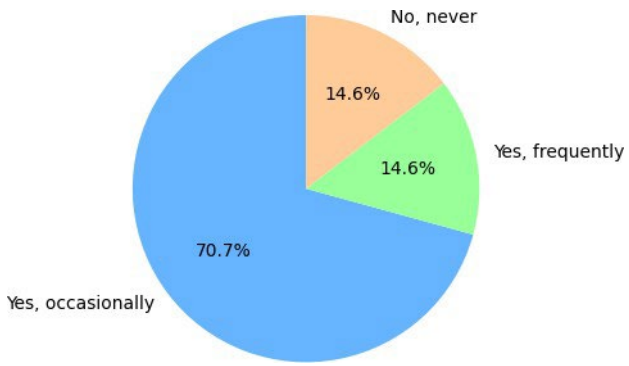

Figure 3: Distribution of students' prior experience with DST.

Table 2 presents the thematic distribution of students' knowledge of DST. Most students (~34%) stated that DST is a type of storytelling that combines digital tools and multimedia elements. This group of students demonstrates a strong awareness of educational technology. The second most frequent theme (~17%) related DST to learning enhancement. It indicates that several students perceive DST as a tool that facilitates better understanding of learning materials. Approximately 15% of students highlighted DST as engaging, fun and interactive tool for learning. They also emphasized DST's ability to attract and maintain learners' attention in learning process. Smaller number of students perceive DST as a modern form of traditional storytelling (~12%) or as a creative multimedia process (~10%). Overall, these results suggest that most students conceptualize DST as a technology-enhanced and engaging pedagogical approach.

Table 2: Distribution of themes on students' knowledge of DST.

Theme	Description	Frequency
Use of Digital Tools and Multimedia	DST is described as storytelling through digital tools or media, combining images, videos, sound, and text.	14
Learning Enhancement and Understanding	DST helps in understanding content better, improving comprehension and interest in learning.	7
Engagement and Interactivity	Students describe DST as engaging, fun, and interactive learning that attracts attention.	6
Modern Storytelling Method	DST is seen as a digital or modern version of traditional storytelling, replacing books or oral methods.	5
Multimedia Creation Process	DST is viewed as a process involving storyboarding, designing, or producing multimedia-based narratives.	4
Creativity and Emotional Expression	DST is identified as a creative art form to make stories expressive, emotional, and visually appealing.	2
Examples and Platforms	Mentions of platforms or formats where DST can occur.	2
General Positive Descriptions	Broad or non-specific positive remarks reflecting general appreciation of DST.	1

Table 3 presents the descriptive statistics for the five constructs (PE, EE, SI, FC, and BI) measured in this study. This study found that students have positive perceptions of DST adoption in iTEL. Out of five constructs, PE recorded the highest mean (M = 4.35, SD = 0.78). This result indicates that students strongly believe DST enhances their learning effectiveness and understanding of course topics. Then, BI also showed a high score (M = 4.22, SD = 0.75), which

suggests students' strong willingness to continue using DST in the future. Meanwhile, EE (M = 4.05, SD = 0.91) and FC (M = 4.00, SD = 0.87) demonstrate that students generally perceive DST as easy to use and believe that adequate institutional and technical support encourages them to use DST in iTEL. Finally, SI (M = 3.86, SD = 0.97) has the lowest score among the five constructs. However, the mean value reflects encouragement from peers, and lecturers can still encourage them to use DST.

Table 3: Mean (M) and standard deviation (SD) of UTAUT constructs.

Construct	M	SD
PE	4.35	0.78
EE	4.05	0.91
SI	3.86	0.97
FC	4.00	0.87
BI	4.22	0.75

Structural Model and Hypotheses Testing

Figure 4 illustrates the structural model involving the five constructs considered in this study with standardized path coefficients (β) and significance levels. Using this model, we can understand how the constructs PE, EE, SI, and FC influence BI and which question items that significantly contribute to the influence of constructs. Based on Figure 4, all items PE1, PE2, and PE3 significantly contribute to the PE construct, as the p-values are less than 0.05. Similar pattern is shown by all other constructs.

Table 4 tabulates the results of the hypothesis testing of H1, H2, H3, and H4. Firstly, the coefficient of determination for BI was $R^2 = 0.729$. This result indicates that approximately 72.9% of the variance in BI is jointly explained by PE, EE, SI, and FC. In other words, the structural model is sufficiently statistically valid. By looking at each hypothesis, this study found that PE (β = 0.623, p = 0.0074) has a positive and statistically significant influence on BI. This result shows that students' perceptions of the usefulness and learning benefits of DST strongly affect their intention to adopt DST in iTEL. Therefore, H1 is supported.

However, EE (β = 0.199, p = 0.645), SI (β = −0.009, p = 0.956), and FC (β = −0.195, p = 0.703) do not show statistically significant effects on BI. These results suggest that these factors do not affect students' intention to adopt DST as their learning tool. Consequently, H2, H3, and H4 are not supported.

Table 4: Hypotheses testing results.

Hypothesis	Path	β	p-value	Significance	Remark	R^2
H1	PE → BI	0.623	0.0074	Yes	Supported	0.729
H2	EE → BI	0.199	0.6446	No	Not Supported	
H3	SI → BI	-0.009	0.9561	No	Not Supported	
H4	FC → BI	-0.195	0.7028	No	Not Supported	

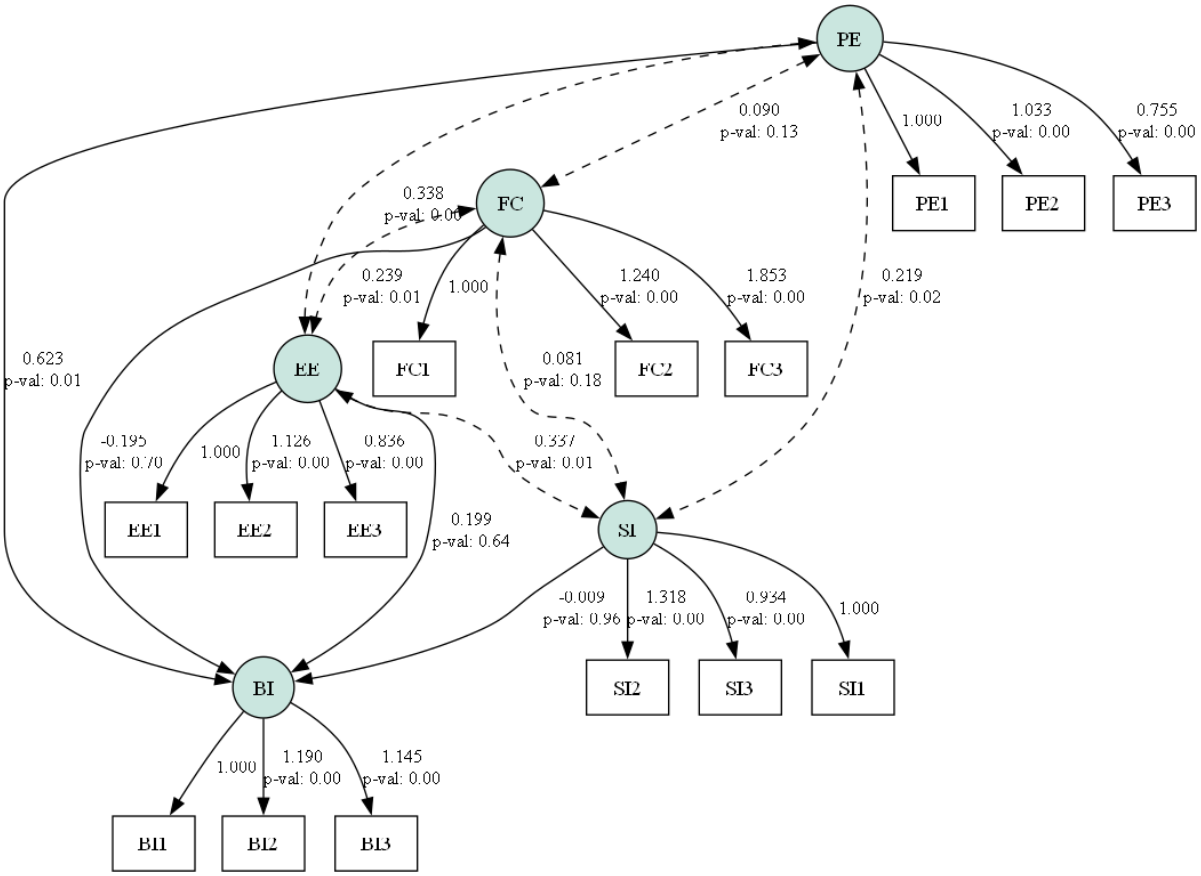

Figure 4: Schematic illustration of the structural model.

Discussion

Based on the descriptive statistics and hypothesis test results, we found that PE is the most influential factor shaping students' BI to use DST in iTEL. This finding indicates that students are more likely to adopt DST when they perceive it as a useful tool that enhances their learning effectiveness and engagement in learning process. The obtained result aligns with previous studies emphasizing the importance of perceived usefulness in educational technology adoption, particularly when digital tools provide clear learning benefits (Ugap et al., 2025).

In contrast, this study found that EE, SI, and FC do not affect students' BI to use DST in iTEL. This result suggests that students' intentions to use DST are not strongly influenced by ease of use, encouragement by peers or lecturers, or institutional and technical support. One possible explanation is that university students today are already familiar with interactive and multimedia technologies. Thus, perceived ease of use becomes a less critical factor in their decision to adopt DST. Then, the limited influence from peers or lecturers and facilitating factors like institutional and technical support may indicate that students' intention to adopt DST is mainly self-driven. In other words, students have a greater emphasis on perceived learning benefits rather than external encouragement or infrastructure availability.

The relatively high R^2 value of 0.729 implies that the structural model derived from this study explains a substantial portion of the variance in students' intention to adopt DST. This finding suggests that students' willingness to adopt DST primarily depends on their perception of

its effectiveness in improving learning outcomes. Therefore, we suggest that UMS educators and instructional designers should develop strategies that support the integration of DST within iTEL.

Qualitative Insights

To support the findings from quantitative analysis, we obtained a variety of opinions and suggestions from the open-ended responses, which provide deeper insights into students' perceptions of DST in iTEL. Many students reported that DST makes learning more engaging and easier to understand. They agreed that using the combination of visuals, narration, and interactive elements helps them in visualizing complex concepts from the course topics. They also highlighted that the creative and interactive nature of DST improves their concentration in learning and creates meaningful learning experiences.

Besides that, several areas for improvement are identified. These areas include the integration of AI-based feedback, multilingual subtitles, and collaboration tools to make DST more adaptive. Some students also suggested implementing augmented and virtual reality features for enhanced immersion and interactivity. Additionally, some students emphasized the importance of smooth system performance, clear instructional tutorials, and structured guidance to maximize the benefits of DST in iTEL. Overall, these qualitative insights show that students have a positive perception of the adoption of DST in iTEL and recognize its potential to promote engaging learning experiences.

CONCLUSION

This study examined the perceptions of students towards the adoption of DST in UMS' iTEL. A UTAUT-based conceptual framework was proposed in this study. Findings revealed that only PE is a significant predictor of BI. This indicates that the readiness of the students to adopt DST is significantly influenced only by their perception of the effectiveness of DST in enhancing their learning effectiveness. On the other hand, EE, SI, and FC failed to prove their significant influence on the students' BI towards adopting DST. This indicates that the students are already familiar with the technologies and that facilitating conditions are already in place.

The findings of this study have significant implications for the adoption of DST in the Malaysian university e-learning environment. Educators and instructional designers should develop strategies for facilitating the integration of DST in LMS.

For future research, this study will be extended to explore the influence of other variables such as hedonic motivation, self-efficacy, and learning engagement in capturing a wider array of motivational factors affecting the adoption of DST. A longitudinal research approach will also be considered to provide deeper insights into the dynamic nature of the students' perceptions towards DST.

Co-Author Contribution

The authors declare no conflict of interest. N. D. F. Mokhtaruddin, N. A. Suhaimi and L. Jekul conducted fieldwork, prepared the literature review, and oversaw the writing including results interpretation. J. C. V. Lung handled research methodology and performed statistical analysis.

Acknowledgements

The authors would like to express their sincere appreciation to undergraduate students at UMS Labuan International Campus who participated in this study.

Ethics Statement

This study followed all applicable ethical standards. Participation was voluntary, and confidentiality was ensured.

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