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The Influence of Perceived Ease of Use, Perceived Usefulness, Self-Efficacy, Digital Literacy, and Perceived Enjoyment on Online Learning Motivation among Secondary School Students in Baling, Kedah

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ABSTRACT: Online learning motivation is a critical determinant of student success in digital learning environments, particularly among secondary school learners in rural settings who often face both technological and psychological barriers. This conceptual paper proposes and justifies a theoretical model integrating the Technology Acceptance Model (TAM) and Self-Determination Theory (SDT) to explain how perceived ease of use, perceived usefulness, self-efficacy, digital literacy, and perceived enjoyment influence students' motivation for online learning. The model is developed based on a synthesis of recent literature surrounding technology acceptance, psychological motivation, and challenges in rural online education. It is recommended that future empirical testing adopts a sequential explanatory mixed methods design involving PLS-SEM followed by qualitative interviews to deepen interpretation of the findings. The proposed model posits that system related beliefs (ease of use and usefulness), students' technological capability (digital literacy), and psychological drivers (self-efficacy and enjoyment) jointly predict online learning motivation. Digital literacy and perceived enjoyment are highlighted as variables that exert both direct and indirect influences by strengthening ease of use, usefulness, and academic confidence, which ultimately improve motivation. The model offers theoretical advancement by linking TAM and SDT to motivational outcomes and provides practical implications for enhancing rural online learning, suggesting that policies and instructional strategies must support not only access to digital tools but also create enjoyable and competence supportive learning environments. This paper therefore provides a theoretically grounded basis for future empirical research to guide interventions that enhance online learning motivation among rural secondary school students.

INTRODUCTION

The rapid advancement of digital technologies has transformed educational delivery worldwide, making online learning an integral component of 21st-century education systems. In Malaysia, the Digital Education Policy (DPD 2023) and initiatives such as DELIMa and JENDELA reflect strong governmental commitment to digital integration (Kementerian Pendidikan, 2023). Despite these efforts, students in

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rural regions remain disadvantaged due to poor infrastructure, device shortages, and limited teacher preparedness (Abu Seman et al., 2024; Soong Yee Yap et al., 2024).

Learning motivation is essential and central to learning effectiveness. In online contexts, students often face challenges of self regulation and isolation, making learning motivation the determining factor of persistence and success (Hartnett, 2016; Pan, 2023). Studies reveal that Malaysian students, particularly at the secondary level, exhibit lower motivation towards online learning, influenced by barriers such as weak digital literacy, low self efficacy, and the absence of engaging content (Ambotang et al., 2024).

Existing research has largely focused on higher education contexts or students in urban and Western settings (Scherer et al., 2019; Zuo et al., 2022), leaving secondary school students in rural Malaysia underrepresented in the literature. This gap is critical because rural students often face a "double disadvantage": structural barriers such as unstable internet connectivity and device shortages, and psychological barriers such as low self efficacy, weak digital literacy, and limited exposure to engaging online pedagogy (Abu Seman et al., 2024; Ambotang et al., 2024).

Responding to this gap, the present conceptual paper proposes a model in which perceived ease of use (PEOU), perceived usefulness (PU), self efficacy (SE), digital literacy (DL), and perceived enjoyment (PE) interact to influence online learning motivation (OLM) among rural secondary school students in Malaysia. The model is theoretically grounded in the Technology Acceptance Model (TAM) and Self Determination Theory (SDT), thereby integrating technology related beliefs with psychological needs that sustain motivation. By focusing on rural secondary students in Baling, Kedah, the paper aligns with the aspirations of the Digital Education Policy (DPD 2023) and contributes to an emerging body of work seeking to ensure that no learner is left behind in the nation's digital transformation agenda.

RELATED LITERATURE

Online Learning Motivation (OLM)

Motivation is commonly defined as the internal force that energises, directs, and sustains learners' efforts to initiate and achieve learning goals (Deci & Ryan, 1985; Schunk et al., 2014). In online learning environments, motivation becomes even more central because students must regulate their own learning with less immediate teacher monitoring and more distractions (Hartnett, 2016; Pan, 2023). Motivated students tend to show higher persistence, deeper cognitive engagement, and better academic outcomes in digital settings (Walker et al., 2024).
For secondary school students, motivation is often more fragile compared to university students due to developing self regulation skills and heightened sensitivity to peer and environmental influences (Mohd Ali et al., 2022). Rural students additionally contend with infrastructural limitations and less exposure to high-quality digital learning resources (Abu Seman et al., 2024). In such contexts, understanding how both technological and psychological factors shape OLM is crucial for designing interventions that move beyond mere access to technology towards meaningful and sustained engagement.

Technology Acceptance Model (TAM)

The Technology Acceptance Model (TAM) posits that two core beliefs, perceived ease of use (PEOU) and perceived usefulness (PU) to predict users' attitudes and intention to use a system, ultimately influencing actual usage (Davis, 1989; Venkatesh, 2000). PEOU refers to the degree to which a user believes that using a system will be free of effort, whereas PU refers to the degree to which using the system enhances performance. In educational contexts, TAM has been widely applied to explain students' acceptance of learning management systems, mobile learning, and online platforms (Scherer et al., 2019; Widjaja & Widjaja, 2022).

When students perceive online platforms as easy to navigate, the cognitive load associated with technology decreases, allowing more cognitive resources to be devoted to learning tasks. This can, in turn, increase confidence, reduce frustration, and strengthen motivation. Conversely, systems perceived as complex or unreliable may discourage students from engaging, regardless of the quality of instructional content (Abdul Rahman et al., 2020). PU is especially important in exam-oriented

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schooling systems such as Malaysia's, where students tend to value platforms that clearly support syllabus coverage, exam preparation, and performance (Villano Gaad, 2022). Thus, PEOU and PU are not merely predictors of technology acceptance but also important antecedents of learning motivation in online environments.

Self Determination Theory (SDT)

Self Determination Theory (SDT) offers a complementary lens by emphasising that high-quality motivation arises when three basic psychological needs are satisfied: autonomy (a sense of volition and choice), competence (a sense of effectiveness and mastery), and relatedness (a sense of connection with others) (Deci & Ryan, 2000). When these needs are supported, learners are more likely to experience intrinsic motivation, engaging in an activity because it is interesting or enjoyable in itself rather than merely complying due to external pressures or rewards.

In online learning, SDT has been used to explain how course design, teacher support, and peer interaction influence students' sense of autonomy, competence, and relatedness, which then shape engagement and persistence (Hartnett, 2016; Pan, 2023). For example, opportunities for choice, constructive feedback, and collaborative tasks can support autonomy and relatedness, while scaffolded tasks and clear expectations build competence. However, rural students may experience fewer such supports due to constraints in teacher digital pedagogy and limited interaction opportunities, making SDT informed design principles particularly relevant in this context.

Perceived Ease of Use (PEOU)

Within TAM, PEOU refers to students' belief that digital learning platforms are effortless to learn and use (Davis, 1989). When interfaces are intuitive, content is well organised, and technical problems are minimised, learners are less likely to experience anxiety or frustration, and more likely to persevere with tasks. Studies in Malaysian and international contexts indicate that PEOU is a significant predictor of both technology acceptance and online engagement (Scherer et al., 2019; Abdul Rahman et al., 2020). Chan et al. (2024) further highlight that ease of use strengthens self regulated learning, an essential skill for sustaining engagement in online environments. In SDT terms, high PEOU can support the need for competence because students feel capable of navigating the learning environment without excessive effort.

Perceived Usefulness (PU)

PU is defined as the extent to which learners believe that using an online platform will improve their learning outcomes and academic performance (Venkatesh, 2000). In school settings, PU often relates to perceptions that digital tools help students understand difficult concepts, prepare for examinations, and achieve better grades. Empirical work consistently shows that PU strongly predicts behavioural intention to use and satisfaction with online learning (Widjaja & Widjaja, 2022; Scherer et al., 2019). For Malaysian secondary students, PU may be shaped by alignment between online materials and the national curriculum, the availability of exam-oriented resources, and the perceived relevance of online tasks to real life applications (Villano Gaad, 2022). When students perceive clear academic value, online learning is more likely to be internalised as worthwhile, thereby enhancing their motivation.

Self Efficacy (SE)

Self efficacy, rooted in Social Cognitive Theory, refers to learners' beliefs in their capability to organise and execute actions required to achieve desired outcomes (Bandura, 1997). In online learning, students must manage time, navigate platforms, and troubleshoot basic technical issues. Those with higher SE are more likely to persist in the face of challenges, adopt problem solving strategies, and seek help when needed (Jamidi & Surat, 2021). SE has been found to predict both online engagement and academic performance, and it can mediate the relationship between other factors such as digital literacy and motivation (Popescu et al., 2024). From an SDT perspective, SE is closely related to the need for competence; students who believe they can succeed are more likely to experience intrinsic motivation and positive emotions while learning.

https://doi.org/10.37134/ejoss.vol12.sp.8.2026

Digital Literacy (DL)

Digital literacy encompasses not only technical skills (e.g., operating devices, using software) but also higher-order abilities to locate, evaluate, create, and communicate information using digital tools responsibly (Gilster, 1997). High DL enables students to move beyond basic access towards productive and critical participation in online learning environments. Research shows that students with stronger digital literacy tend to experience lower anxiety, higher self-efficacy, and greater engagement in online learning (Noviyanto & Wijanarka, 2023). In rural Malaysia, however, low levels of DL remain a major barrier that directly weakens students' readiness and confidence to engage with online platforms (Abu Seman et al., 2024). Enhancing DL can thus be seen as a foundational strategy that simultaneously improves PEOU, PU, and SE, creating a more favourable motivational climate.

Perceived Enjoyment (PE)

Perceived enjoyment is an intrinsic motivator recognised in later extensions of TAM (Venkatesh & Bala, 2008). It reflects the degree of pleasure, fun, or satisfaction experienced while engaging with an online system, irrespective of performance outcomes. Studies have shown that PE can significantly predict students' behavioural intention to use online platforms and their sustained engagement, above and beyond extrinsic considerations such as usefulness (Nguyen, 2022; van der Walt et al., 2024). In SDT terms, PE is closely tied to intrinsic motivation and to the satisfaction of autonomy and competence needs students enjoy learning more when they feel in control and capable. For rural secondary students, embedding elements of gamification, interactivity, and culturally relevant content into online lessons may enhance PE and, consequently, OLM.

Integration of TAM and SDT

TAM and SDT have often been applied separately in educational technology research, with TAM emphasising cognitive evaluations of systems (PEOU, PU) and SDT emphasising the quality of motivation (autonomy, competence, relatedness) (Scherer et al., 2019). Integrating the two frameworks allows a more comprehensive explanation of how students move from basic acceptance of technology to sustained, self determined engagement in online learning. In this paper, PEOU, PU, and DL represent system related and skill related antecedents that shape students' beliefs about the usability and value of online learning, while SE and PE capture psychological states that are closely aligned with SDT's competence and intrinsic motivation.

Specifically, DL is expected to enhance PEOU and PU by equipping students with the skills needed to navigate platforms effectively and to recognise their academic benefits. These perceptions then feed into SE, as students' successful experiences build confidence. PE, in turn, reflects the degree to which the learning experience satisfies students' needs for autonomy and competence, making engagement enjoyable rather than merely obligatory. Together, these five constructs are proposed to jointly predict OLM among rural secondary students in Malaysia, offering a theoretically grounded and contextually relevant model for future empirical testing.

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RESEARCH METHODOLOGY

The proposed framework positions PEOU, PU, SE, DL, and PE as predictors of OLM. The relationships are as follows:

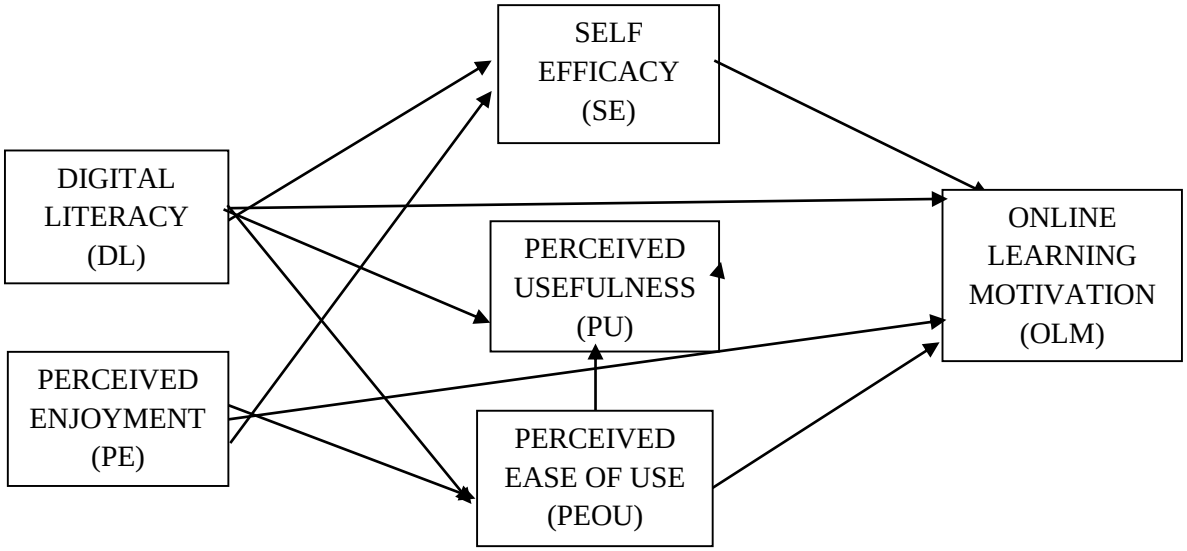

Figure 1 Conceptual Framework

The proposed framework positions perceived ease of use (PEOU), perceived usefulness (PU), self efficacy (SE), digital literacy (DL), and perceived enjoyment (PE) as direct predictors of online learning motivation (OLM) among rural secondary school students. In addition, DL and PE are expected to exert indirect effects through their influence on other constructs, reflecting the integrated logic of TAM and SDT.

First, **PEOU → OLM**: When students perceive online platforms as easy to use, they are less burdened by technical demands and more able to focus on learning tasks. This facilitates positive affect and reduces frustration, thereby enhancing OLM (Davis, 1989; Abdul Rahman et al., 2020).

Second, **PU → OLM**: Students who believe that online learning helps them understand content, prepare for examinations, and achieve better results are more likely to invest effort and persist, leading to higher motivation (Widjaja & Widjaja, 2022; Villano Gaad, 2022).

Third, **SE → OLM**: Learners with higher SE are more confident in their ability to manage online tasks, solve problems, and cope with setbacks. This sense of competence promotes more self-determined forms of motivation, such as intrinsic motivation and identified regulation (Bandura, 1997; Jamidi & Surat, 2021; Popescu et al., 2024).

Fourth, **DL → OLM (direct and indirect)**: DL is hypothesised to have both a direct effect on OLM and indirect effects through PEOU, PU, and SE. Students with higher DL find online platforms easier to use (higher PEOU), more beneficial (higher PU), and feel more capable (higher SE), which together strengthen their motivation to engage (Gilster, 1997; Noviyanto & Wijanarka, 2023; Abu Seman et al., 2024).

Fifth, **PE → OLM (direct and indirect)**: PE is expected to influence OLM directly, as students who enjoy online learning are more likely to continue participating even when tasks are challenging (Nguyen, 2022; van der Walt et al., 2024). Indirectly, PE may shape PEOU and PU by colouring students' affective evaluations of the platform; enjoyable experiences can make systems feel easier and more worthwhile to use, thereby reinforcing acceptance and motivation (Venkatesh & Bala, 2008).

https://doi.org/10.37134/ejoss.vol12.sp.8.2026

Overall, the framework contributes theoretically by merging TAM's system focused constructs (PEOU, PU, DL) with SDT aligned psychological constructs (SE, PE) to provide a holistic explanation of OLM in rural online learning contexts. It acknowledges that bridging the digital divide requires not only technical solutions and skills but also attention to students' psychological experiences of competence, enjoyment, and value in digital learning environments.

METHODOLOGY

This theoretical paper proposes a sequential explanatory mixed method design as a suitable approach for empirically testing the conceptual framework. In the quantitative phase, data will be collected from rural secondary school students in Baling, Kedah on their perceptions of ease of use, usefulness, self-efficacy, digital literacy, perceived enjoyment, and online learning motivation. To ensure reliability and content validity, a structured questionnaire will be adapted from established scales in previous studies aligned with TAM and SDT.

Quantitative data will be analysed using Partial Least Squares Structural Equation Modelling (PLS-SEM), which is recommended for predictive and exploratory studies as well as models that include higher-order constructs and mediation effects (Hair et al., 2022). PLS-SEM will allow the examination of both direct and indirect relationships among PEOU, PU, SE, DL, PE, and OLM, including the mediating roles of SE, PEOU, and PU as theorised in the model.

In the subsequent qualitative phase, semi structured interviews will be conducted with a purposive sample of students representing different levels of motivation and digital readiness. The interviews will explore students' lived experiences of online learning, focusing on how they perceive ease of use and usefulness, how they build or lack self-efficacy, how digital literacy facilitates or hinders their engagement, and how enjoyment (or its absence) shapes their willingness to continue learning online. The qualitative data will be thematically analysed to identify patterns, illustrative narratives, and contextual factors that can explain and enrich the quantitative findings.

This sequential explanatory design ensures that the proposed model is not only statistically validated but also interpreted within the real-world realities of rural schooling. The integration of quantitative and qualitative insights is expected to generate nuanced, contextually grounded recommendations for improving online learning motivation among rural secondary students.

DISCUSSION AND IMPLICATIONS

The proposed framework offers several important theoretical and practical implications for understanding and enhancing online learning motivation among rural secondary school students in Malaysia. Theoretically, the framework advances the educational technology literature by integrating TAM and SDT to explain not only whether students accept digital platforms, but also why and how they remain motivated to engage in learning once they are online. By explicitly linking PEOU, PU, SE, DL, and PE to OLM, the model extends TAM beyond behavioural intention and system usage to motivational outcomes, and simultaneously extends SDT into a technology-mediated context where psychological needs are satisfied (or thwarted) through digital interactions (Scherer et al., 2019; Pan, 2023).

The inclusion of digital literacy (DL) as a core antecedent highlights that online learning motivation is partly a function of students' competence with technology. In rural settings, where students may have fewer opportunities to develop such skills, low DL can undermine PEOU and PU by making platforms appear difficult and unhelpful (Abu Seman et al., 2024; Noviyanto & Wijanarka, 2023). The framework therefore strengthens existing TAM-based models by positioning DL not as a peripheral variable but as a foundational capability that shapes perceptions of ease, usefulness, and self-efficacy. From an SDT perspective, DL also supports the need for competence, thereby promoting more self-determined forms of motivation.

The model further underscores the importance of self efficacy (SE) and perceived enjoyment (PE) as psychological mechanisms linking technological conditions to motivation. Even when systems are accessible and aligned with curriculum goals, students who doubt their own abilities may disengage or avoid online tasks. Conversely, when SE is high, students are more likely to persist, experiment with new tools, and view challenges as opportunities for growth (Bandura, 1997; Jamidi & Surat, 2021;

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Popescu et al., 2024). PE adds an affective dimension by capturing whether online learning is experienced as enjoyable rather than burdensome. Studies suggest that enjoyment can sustain engagement even under less than ideal conditions, making it a powerful buffer against structural barriers (Nguyen, 2022; van der Walt et al., 2024). By integrating SE and PE with PEOU, PU, and DL, the framework offers a more nuanced explanation of how system design and psychological experiences jointly shape OLM.

In terms of current policy and practice, the framework directly aligns with Malaysia's Digital Education Policy (DPD 2023) and initiatives such as DELIMa and JENDELA, which aim to expand digital access and enhance the quality of technology-enabled teaching and learning (Kementerian Pendidikan Malaysia, 2023). However, the model also cautions that infrastructure and devices alone are insufficient to guarantee motivated learners. For rural communities like Baling, Kedah, motivation may remain low if students perceive platforms as difficult to use, irrelevant to examinations, or emotionally unengaging. Thus, national initiatives need to move beyond hardware provision to systematically address DL, SE, and PE among students and teachers.

Practically, the framework suggests several concrete implications:

• **For teachers**, online lessons should be designed to maximise PEOU and PU by using clear navigation structures, consistent layouts, and resources that map explicitly to the KSSM curriculum and assessment standards. Teachers can build SE through scaffolded tasks, timely feedback, and modelling of digital problem-solving strategies. Incorporating interactive elements such as quizzes, games, and project-based activities particularly those that reflect students' rural realities can enhance PE and make online learning more meaningful and enjoyable.

• **For school leaders and district officers**, targeted professional development is needed to strengthen teachers' own DL and digital pedagogical skills so that they can confidently design and facilitate engaging online experiences. School level policies should support blended learning models that gradually develop students' self regulation and digital competence, rather than relying on ad hoc or emergency online teaching approaches that may exacerbate inequities.

• **For policymakers**, the framework highlights that interventions to bridge the digital divide must integrate technical, pedagogical, and psychological dimensions. Investment in rural connectivity and devices should be complemented by programmes that explicitly build students' and teachers' DL, strengthen SE through mentoring and peer support, and foster PE through innovative, culturally relevant digital content. Monitoring and evaluation systems should include motivational indicators not only usage statistics to capture whether students are genuinely engaged in online learning.

• **For curriculum designers and educational technology developers**, the model emphasises the need to embed motivational design principles in digital resources. This includes aligning content with examination requirements (to support PU), ensuring user-friendly interfaces (PEOU), providing adaptive feedback and differentiated tasks (SE and competence), and integrating elements of choice, collaboration, and playfulness (autonomy, relatedness, and PE). For rural students, locally contextualised examples, stories, and problem situations can increase relevance and enjoyment, thus enhancing OLM.

Overall, the proposed framework suggests that addressing the persistent motivational deficit in online learning especially among rural secondary students requires a shift from viewing technology as an end in itself towards conceptualising it as part of a motivational ecosystem. In such an ecosystem, PEOU, PU, DL, SE, and PE are intentionally cultivated through policy, pedagogy, and design, enabling students not only to access digital tools but also to thrive within them.

CONCLUSION

This paper presents a conceptual model that integrates TAM and SDT to explain the influence of perceived ease of use, perceived usefulness, self efficacy, digital literacy, and perceived enjoyment on online learning motivation among rural secondary school students. By recognising the interplay between system-based perceptions, foundational digital skills, and intrinsic psychological needs, the model offers a comprehensive lens for understanding student engagement in online environments.

https://doi.org/10.37134/ejoss.vol12.sp.8.2026

Empirical validation through PLS-SEM and a follow up qualitative phase will provide deeper insights into how these constructs operate in the specific context of rural Malaysia, thereby informing more targeted interventions. Ultimately, fostering online learning motivation requires going beyond hardware provision toward creating learning environments that are engaging, empowering, and responsive to students' needs for competence, autonomy, and enjoyment within the realities of the current digital education landscape.

DECLARATION OF GENERATIVE AI

During the preparation of this work, the author(s) used **CHATGPT** to enhance the clarity of the writing. After using the **CHATGPT**, the author(s) reviewed and edited the content as needed and take(s) full responsibility for the content of the publication.

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