

# Impacts of Digital Learning Tools on Enhancing Student Engagement among Private University Students in Malaysia

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## Abstract

The rapid adoption of digital learning tools such as learning management systems (LMS), virtual platforms, and collaborative applications has transformed how university students learn, communicate, and engage with course content. While these tools are widely used at UNITAR International University, their specific impact on student engagement remains insufficiently understood. Guided by the Learning Management System theory, Social Constructivism Theory, and Operant Conditioning Theory, this study examines the relationship between three dimensions of digital learning tools flexibility and accessibility, collaboration and interaction, and real-time feedback and assessment and student engagement, conceptualised as cognitive, emotional, and behavioural involvement. A quantitative, correlational research design is proposed, using a structured questionnaire administered to a stratified random sample of 367 undergraduate students, determined using the Krejcie and Morgan (1970) table from a population of approximately 8,000 students. Data are to be analysed using descriptive statistics and correlation/regression analysis to test three hypotheses linking each dimension of digital learning tools to student engagement. The study addresses a contextual gap in the literature by providing empirical evidence specific to UNITAR, offering practical insights for educators, administrators, and policymakers seeking to strengthen student engagement through the effective use of digital learning tools in blended and online learning environments.

**Keywords:** Digital Learning Tools, Student Engagement, Flexibility and Accessibility, Collaboration and Interaction, Real-Time Feedback

## Introduction

In the current era of technology, digital learning tools have become essential to the learning experience of university students. Tools such as virtual platforms, collaborative applications, and learning management systems (LMS) support interactive learning and encourage greater student engagement by offering flexibility and accessibility (Martin & Bolliger, 2018). Student engagement, understood as the degree of cognitive, emotional, and behavioural involvement

students bring to their learning, is widely recognised as vital to academic success, particularly in university settings (Delfino, 2019).

Understanding what drives this engagement is therefore a pressing concern for higher education institutions generally, and for Malaysian private universities in particular. The growing use of digital learning tools at UNITAR International University has raised questions about how these tools shape student participation, motivation, and interaction, particularly as fully online and blended learning environments become more common (Haleem et al., 2022). Digital learning tools, referring broadly to software and platforms that facilitate teaching and learning such as interactive classrooms, online discussion modules, and LMS (Peng et al., 2019), offer convenience and control, but questions remain about their capacity to sustain meaningful engagement as more educational delivery shifts online (Chiu, 2021).

Digital tools also shape how students collaborate and communicate with peers and instructors, with implications for emotional and social engagement (Rodríguez-Moreno et al., 2021). During the COVID-19 pandemic, digital tools enabled communication and collaborative project work despite physical distance (Almarashdeh, 2016), suggesting a positive relationship between digital tool use and student participation both during and after the pandemic. However, much of this evidence is drawn from broader or international samples and does not speak specifically to UNITAR's student population, motivating the present study. This study therefore investigates the impacts of digital learning tools on student engagement among university students at UNITAR International University, focusing on three research questions: whether there is a significant correlation between (i) perceived flexibility and accessibility of digital learning tools and student engagement, (ii) real-time feedback provided through digital learning tools and student engagement, and (iii) enhanced collaboration and interaction facilitated by digital learning tools and student engagement. The study focuses on the immediate effects of digital learning tools on students' motivation and participation within UNITAR's academic environment, rather than on technical performance or long-term academic outcomes.

This focus is timely. With internet penetration in Malaysia reaching 97.4% of the population, or 33.59 million people, in 2024 (Petrosyan, 2024), and higher education institutions increasingly dependent on digital platforms for content delivery, communication, and assessment, understanding how these tools affect engagement has become an urgent priority. UNITAR's use of the CN Learning Management System as its virtual social learning environment makes it a relevant and timely context in which to examine these relationships (Bervell & Arkorful, 2020).

#### *Research Objectives and Questions*

- RO1 / RQ1: To determine whether there is a significant correlation between the perceived flexibility and accessibility of digital learning tools and students' engagement.
- RO2 / RQ2: To determine whether there is a significant correlation between real-time feedback provided through digital learning tools and students' engagement.
- RO3 / RQ3: To determine whether there is a significant correlation between enhanced collaboration and interaction facilitated by digital learning tools and students' engagement.

### Significance of the Study

While substantial literature exists on digital learning tools generally, empirical studies focused specifically on their effects within the UNITAR context remain limited. This study addresses that gap by providing empirical evidence on how digital learning tools influence student engagement in blended and online learning settings at UNITAR, offering educators and administrators practical guidance for designing more effective digital learning strategies (Rodríguez-Moreno et al., 2021; Martin & Bolliger, 2018). By identifying which features of digital learning tools most strongly relate to engagement, the findings can help UNITAR and similar institutions promote more equitable and effective access to digital learning resources (Bervell & Arkorful, 2020).

The novelty of this study lies in its integration of three theoretically distinct mechanisms — Learning Management System theory, Social Constructivism Theory, and Operant Conditioning Theory — within a single model that links specific features of digital learning tools to specific dimensions of student engagement, an integrative approach that has not previously been tested empirically within a Malaysian private university population. In doing so, the study moves beyond treating digital learning tools and student engagement as undifferentiated constructs, offering a more granular account of which tool features operate through which psychological and pedagogical mechanisms.

Beyond its immediate educational setting, the study contributes to the broader field of social sciences by demonstrating how features of a shared technological environment can be linked to distinct cognitive, emotional, and behavioural outcomes through multiple, theoretically grounded pathways, an approach applicable to organisational, communication, and behavioural research more widely. This multi-theoretical, multi-pathway framing is offered as a transferable model for future studies examining how technology-mediated environments shape human engagement beyond the specific context of higher education.

### Literature Review

The adoption of digital learning tools in higher education has reshaped conventional teaching strategies and influenced student engagement in substantial ways. Research shows that supplementing learning management systems with informal communication platforms can foster a sense of belonging and connection, improving learning outcomes and engagement (Kahu et al., 2022). Similarly, educational technology tools have been found to improve emotional involvement in language classrooms, with LMS-based tools often outperforming general social media platforms for this purpose (Teng & Wang, 2021). Evidence from Merauke Musamus University shows that students using digital tools for classroom management reported greater engagement than those who did not (Thalib et al., 2023), while the type of learning activity supported by a given technology — particularly constructive and interactive activities — is a key determinant of how effectively it fosters engagement (Wekerle et al., 2020).

The COVID-19 pandemic accelerated the shift to online and hybrid learning, underscoring the importance of digital tools in sustaining engagement (Chiu, 2021). A systematic review of online learning in Latin America identified behavioural, cognitive, and affective engagement as key dimensions shaped by internet connectivity, professional training, and emotional support (Salas-Pilco et al., 2022), while other research suggests that differences in

engagement between online and face-to-face learners may be attributable more to student characteristics than to the mode of delivery itself (Paulsen & McCormick, 2020). More recent work highlights those interactive features such as quizzes, discussion forums, and gamification can improve engagement by supplying rapid feedback and a sense of community among learners (Wekerle et al., 2020).

### *Underpinning Theories*

This study draws on three underpinning theories, each corresponding to one dimension of digital learning tools. Learning Management System (LMS) theory emphasises the elements that shape students' engagement with an LMS and the strategies through which that engagement can be strengthened, including the design of teacher–student interaction and course requirements (Bervell & Arkorful, 2020). Related constructivist principles suggest that flexibility and accessibility asynchronous learning, varied material formats, and individualised learning paths increase student autonomy and encourage cognitive and emotional engagement (Kilag et al., 2023), while the Community of Inquiry framework highlights how flexible, accessible platforms support social, cognitive, and teaching presence in online settings (The Community of Inquiry, 2020). Enabling conditions identified in technology-adoption research further suggest that students are more likely to engage with an LMS they perceive as user-friendly and flexible (Venkatesh, Thong, & Xu, 2012; El-Masri & Tarhini, 2017).

Social Constructivism Theory holds that learning is fundamentally social, and that students develop understanding through interaction with peers and more knowledgeable others, consistent with the notion of a Zone of Proximal Development achieved through collaborative problem-solving. Applied to digital learning, this theory suggests that tools which support teamwork and active participation will improve engagement and performance (Abdullateef & Shifan, 2021). Digital tools that promote cooperation, continuous discussion, group projects, and real-time feedback have been found to increase interaction and engagement (Haleem et al., 2022; Martin & Bolliger, 2018), while structured digital interaction has been linked to deeper cognitive involvement through its promotion of social and emotional engagement (Rodríguez-Moreno et al., 2021).

Operant Conditioning Theory, originating with Skinner's account of behaviour as shaped by its consequences, offers a framework for understanding how real-time feedback, rewards, and interactive participation strengthen engagement. Digital learning platforms frequently use performance metrics, progress badges, and gamified elements to reinforce productive study behaviours, encouraging students to repeat them (Haryudin & Imanullah, 2021). Adaptive digital tools that adjust task difficulty to a student's progress create a balanced challenge that sustains effort without overwhelming the learner, illustrating how operant-conditioning principles can be embedded in digital learning design.

### *Independent Variables*

Flexibility and accessibility describe the extent to which digital learning tools allow students to access content, participate in activities, and manage their studies according to their own time, place, and pace. Platforms such as LMS, Google Classroom, and mobile applications enable students to arrange and access learning materials regardless of time or location constraints (Kokoç, 2019), while flexible learning approaches that combine digital and face-

to-face components have been shown to improve accessibility and participation across diverse student needs (Santiago et al., 2021). Asynchronous access to course content, in particular, has been associated with greater student interest and engagement (Kumar et al., 2021), and well-integrated flexible learning components such as clear objectives and interactive content further improve engagement and academic achievement (Kilag et al., 2023).

Collaboration and interaction refer to the tools and functions that facilitate communication and teamwork among students and instructors, including discussion forums, group workspaces, and video conferencing. Online collaboration tools have been shown to create an environment where students actively participate in their learning, enhancing both engagement and motivation (Gopinathan et al., 2022). During the COVID-19 pandemic specifically, digital collaboration tools were found to have a positive effect on student involvement and participation (Gopinathan et al., 2022), and structured, purposefully designed interaction treatments have been found more effective at raising student achievement than incidental interaction (Borokhovski et al., 2016).

Real-time feedback and assessment refer to the capacity of digital tools to provide students with immediate information about their academic progress and performance. Feedback delivered through adaptive release of marks and online grade publication has been shown to increase students' engagement with feedback and motivate future learning plans (Parkin et al., 2011), particularly when that feedback is prompt, thorough, and constructive. Digital assessment tools spanning polls, social media, and multimedia platforms support formative, summative, and peer assessment processes that strengthen feedback and student learning (Budhai, 2021), while learning analytics increasingly provide real-time insight into student performance to support formative assessment at scale (Zhang et al., 2023).

#### *Dependent Variable: Student Engagement*

Student engagement is conceptualised in this study as the level of cognitive, emotional, and behavioural involvement students bring to their learning process. Cognitive engagement refers to students' mental investment in learning; emotional engagement captures their attitudes and feelings toward the learning process; and behavioural engagement reflects their participation in academic activities. Motivated, engaged learners tend to show higher completion rates and contribute to a more active learning environment, making engagement a critical outcome for understanding how digital tools shape the student experience at UNITAR.

#### *Relationships between the Variables*

Flexibility gives students control over their study schedules and methods, improving time management and reducing barriers linked to competing personal or work commitments, while accessibility ensures that learning materials remain usable regardless of a student's background or circumstances (Santiago et al., 2021). Platforms that support both synchronous and asynchronous interaction, such as Google Classroom and Zoom, have been found to promote engagement regardless of students' location or socioeconomic status (Santiago et al., 2021), and LMS platforms perceived as flexible and accessible are associated with higher student engagement and satisfaction (Almusharraf, 2024).

Collaborative digital tools create an environment where students actively participate in their learning, which in turn enhances engagement and motivation (Gopinathan et al., 2022). Structured, purposefully designed interaction cultivates problem-solving, critical thinking, and communication skills (Borokhovski et al., 2016), and fosters the sense of community central to constructivist accounts of learning.

Real-time feedback shapes both the cognitive and emotional dimensions of engagement. Feedback oriented toward meaning rather than surface-level information has been shown to deepen students' understanding and sustain their interest (Tian & Zhou, 2020), while prompt feedback in high-achievement classes has been linked to greater student happiness and socioemotional wellbeing (Anthony et al., 2019). Feedback tied to assessment further allows students to track their progress, reinforcing motivation and a sense of accomplishment (Ruegg, 2015), and constructive feedback from instructors has been found to support behavioural, cognitive, and affective engagement together (Dressler et al., 2019).

### *Research Framework and Hypotheses*

Based on the reviewed literature and the three underpinning theories, this study proposes that flexibility and accessibility, collaboration and interaction, and real-time feedback and assessment each positively influence student engagement, conceptualised as cognitive, emotional, and behavioural involvement. This leads to the following hypotheses:

- Hypothesis 1: Higher degrees of flexibility and accessibility in learning environments have a positive impact on student engagement in educational settings.
- Hypothesis 2: The collaborative learning approach positively impacts the collaboration and interaction of students.
- Hypothesis 3: Real-time feedback and assessment positively impact cognitive, emotional, and behavioural engagement among UNITAR students.

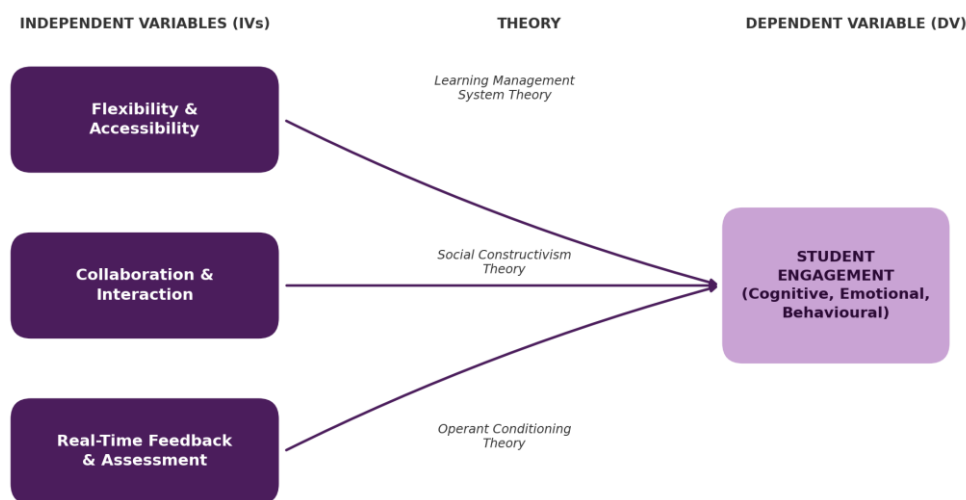


Figure 1. Proposed Research Framework

## **Research Methodology**

### *Research Design*

This study adopts a quantitative, correlational research design, appropriate for systematically examining the relationship between digital learning tools and the cognitive, emotional, and

behavioural dimensions of student engagement. Structured questionnaires distributed to a representative sample of UNITAR students form the primary data collection tool, focusing on perceived flexibility and accessibility, real-time feedback, and collaboration and interaction as predictors of student engagement. This design enables statistical measurement of the strength and significance of these relationships, while the study's scope is limited to the immediate effects of digital learning tools on motivation and participation, excluding long-term academic outcomes or the technical performance of the tools themselves.

#### *Research Instrument*

Data are to be collected through a structured, self-administered questionnaire comprising five sections: demographic and background information (age, programme, year of study, and frequency of digital tool use), followed by four sections measuring flexibility and accessibility, collaboration and interaction, real-time feedback and assessment, and student engagement respectively. Each construct is measured using approximately five items adapted to UNITAR's digital learning context and rated on a five-point Likert scale ranging from "strongly disagree" to "strongly agree", consistent with recommended practice for capturing attitudes and perceptions in education research (Tanujaya et al., 2022).

#### *Ethical Considerations*

The study will be conducted under formal approval from UNITAR International University, with a university letter confirming the study's scope and ethical compliance. Respondents will be provided with information explaining the purpose of the study, their right to withdraw at any time, and the voluntary nature of participation. Personal data will be anonymised and stored securely in accordance with the university's research code of conduct and data protection requirements, consistent with standard practice for safeguarding respondent confidentiality in survey-based research.

#### *Population, Sampling, and Data Collection*

The target population comprises the approximately 8,000 undergraduate and postgraduate students enrolled at UNITAR International University across its various academic programmes. Using the Krejcie and Morgan (1970) table for determining sample size, a minimum sample of 367 students is required for this population size. A stratified random sampling technique will be used, with strata formed according to students' academic programmes (such as business, education, and information technology) and year of study (Year 1 to Year 4), ensuring proportionate representation across the student body. Within each stratum, respondents will be selected at random until the target sample size is reached. The finalised questionnaire will be distributed electronically via social media channels and in person on campus, in order to reach the target sample efficiently. Follow-up reminders will be issued during the data collection period to improve response rates, after which responses will be compiled, checked for consistency and completeness, and prepared for analysis.

#### *Method of Analysis*

Quantitative data collected through the questionnaire will be analysed using descriptive statistics to summarise respondent demographics and general response patterns, followed by correlation and regression analysis to test Hypotheses 1 to 3 and determine the strength and direction of the relationships between each dimension of digital learning tools and student engagement. Reliability of each construct will be assessed prior to hypothesis testing

to ensure the internal consistency of the measurement items. Where feasible, open-ended questionnaire items may supplement the quantitative data, providing additional context on students' experiences with digital learning tools and the ways in which these tools support or hinder their engagement.

### **Conclusion and Conceptual Framework**

This study set out to examine how digital learning tools influence student engagement among students at UNITAR International University. The literature reviewed indicates that digital learning tools have become central to how students experience higher education, shaping not only what they learn but how motivated, connected, and involved they feel throughout the process. Three dimensions of digital learning tools — flexibility and accessibility, collaboration and interaction, and real-time feedback and assessment — each appear to play a distinct but complementary role in shaping cognitive, emotional, and behavioural engagement, supported respectively by Learning Management System theory, Social Constructivism Theory, and Operant Conditioning Theory.

Flexibility and accessibility allow students to manage their learning around personal circumstances, supporting autonomy and sustained participation. Collaboration and interaction recreate the social dimension of learning within digital environments, supporting the kind of peer and instructor connection that constructivist theory identifies as central to knowledge-building. Real-time feedback and assessment allow students to track their progress and stay motivated, reinforcing productive learning behaviours in line with operant-conditioning principles.

Based on the reviewed literature, this study concludes that digital learning tools are expected to have a direct, positive relationship with student engagement at UNITAR, with flexibility and accessibility, collaboration and interaction, and real-time feedback and assessment serving as key predictors. The proposed research framework and quantitative methodology provide a foundation for future empirical testing among UNITAR's student population.

### **Research Contributions**

#### *Theoretical and Contextual Contributions*

This study offers theoretical and contextual contributions to the literature on digital learning and student engagement. Theoretically, the study integrates three distinct theoretical perspectives — Learning Management System theory, Social Constructivism Theory, and Operant Conditioning Theory — into a single framework linking specific features of digital learning tools to specific dimensions of student engagement, rather than treating digital learning tools or engagement as undifferentiated constructs. This multi-theoretical approach offers a more nuanced account of how different tool features operate through different psychological and pedagogical mechanisms.

Contextually, this study contributes empirical evidence from UNITAR International University, a Malaysian private institution with an established digital learning infrastructure but limited prior research on the specific effects of its digital tools on student engagement. By focusing on this setting, the study provides findings directly relevant to UNITAR's own teaching and learning strategy, while also offering a transferable model for similar private higher education institutions seeking to strengthen student engagement through digital learning tools.

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