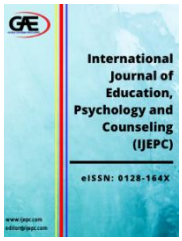
International Journal of Education, Psychology and Counseling
IJEPC
EISSN : 0128-164X
Volume 10 Issue 59 (September 2025) PP. 1231-1252
DOI 10.35631/IJEPC.105990



INTERNATIONAL JOURNAL OF EDUCATION, PSYCHOLOGY AND COUNSELLING (IJEPC)
www.ijepc.com

A DESCRIPTIVE ANALYSIS OF THE IMPACT OF DIGITAL TOOLS ON STUDENT ENGAGEMENT IN HIGHER EDUCATION

Sabiroh Md Sabri[1*], Ismalaili Ismail[2], Nursyamilah Annuar[3], Noor Azreen Mohd Khushairi[4], Normy Rafida Abdul Rahman[5]

[1] Faculty of Business and Management, Universiti Teknologi MARA Cawangan Perlis, Kampus Arau, 02600 Arau, Perlis, Malaysia
Email: sabir707@uitm.edu.my
[2] Faculty of Business and Management, Universiti Teknologi MARA Cawangan Perlis, Kampus Arau, 02600 Arau, Perlis, Malaysia
Email: ismalaili007@uitm.edu.my
[3] Faculty of Business and Management, Universiti Teknologi MARA Cawangan Perlis, Kampus Arau, 02600 Arau, Perlis, Malaysia
Email: nsyamilah@uitm.edu.my
[4] Faculty of Business and Management, Universiti Teknologi MARA Cawangan Perlis, Kampus Arau, 02600 Arau, Perlis, Malaysia
Email: azreenmk@uitm.edu.my
[5] Faculty of Business & Communication, Universiti Malaysia Perlis (UniMAP), Kampus UniCITI Alam, Sungai Chuchuh, 02100 Padang Besar, Perlis.
Email: normy@unimap.edu.my
[*] Corresponding Author

Article Info:

Article history:
Received date: 30.06.2025
Revised date: 17.07.2025
Accepted date: 28.08.2025
Published date: 25.09.2025

To cite this document:

Sabri, S. M., Ismail, I., Annuar, N., Khushairi, N. A., & Abdul Rahman, N. R. (2025). A Descriptive Analysis Of The Impact Of Digital Tools On Student Engagement In Higher Education. *International Journal of*

Abstract:

Student engagement plays a fundamental role in learning, directly influencing knowledge acquisition, skill development, and academic achievement. Research suggests that students who demonstrate high levels of engagement are more likely to participate in class discussions, collaborate effectively with peers, and take ownership of their learning journey. Engaged students also exhibit stronger problem-solving abilities and are more likely to retain and apply knowledge beyond the classroom setting. Despite the increasing adoption of digital tools in higher education, there remains a gap in understanding their direct impact on student engagement. While some studies highlight the benefits of technology-enhanced learning, others question its effectiveness in fostering meaningful engagement. This study aims to examine the impact of digital tools in promoting student engagement in university classrooms. A quantitative research approach was employed, utilizing survey data collected from 404 university students. Descriptive and frequency analysis were conducted using SPSS software to assess students' perceptions of digital

International Journal of Education, Psychology and Counseling
IJEPC
EISSN : 0128-164X
Volume 10 Issue 59 (September 2025) PP. 1231-1252
DOI 10.35631/IJEPC.105990

Education, Psychology and Counseling, 10 (59), 1231-1252.

DOI: 10.35631/IJEPC.1059090

tools in their learning experiences. The findings indicate that digital tools positively influence engagement by enhancing interactivity, accessibility, and participation. However, challenges such as technological distractions and varying digital literacy levels were also identified. The results suggest that while digital tools can be effective in fostering student engagement, their implementation must be carefully structured to maximize benefits. The study provides insights for educators and policymakers on optimizing digital tool usage in higher education, ensuring a more interactive and engaging learning environment.

Keywords:

Student Engagement, Digital Tools, Higher Education, Technology-Enhanced Learning, University Classrooms

Introduction

Student engagement has long been recognized as a critical factor in academic success. Student engagement also influences learning outcomes, retention rates, and overall student satisfaction (Henrie et al., 2015; Bond et al., 2020; Lai & Bower, 2020). Engagement encompasses three primary dimensions: behavioral engagement (BE), which includes participation in academic tasks; cognitive engagement (CE), which involves deep learning and critical thinking (Bond et al., 2020) and emotional engagement (EE), referring to students' sense of belonging and interest in learning. A highly engaged student is more likely to be motivated, persist in their studies, and develop a deeper understanding of course materials. However, maintaining high levels of engagement has become increasingly challenging in modern higher education due to factors such as large class sizes, diverse student needs, and the shift toward hybrid and online learning environments (Bao, 2020; Martin & Bolliger, 2018; Martin et al., 2020; Sun, Xie, & Anderman, 2020).

To address these challenges, educators have turned to digital tools as a means to foster engagement. Digital tools, ranging from interactive learning management systems (LMS) to real-time collaboration platforms, have gained traction as they offer flexible, accessible, and engaging learning experiences (Martin et al., 2020; Redmond et al., 2020; Aguilera-Hermida, 2020). The adoption of these technologies has been further accelerated by the global COVID-19 pandemic, which necessitated a transition to remote and blended learning approaches (Martin et al., 2018; Martin et al., 2020; Garrison & Vaughan, 2020). Despite the widespread use of digital tools in education, their actual impact on student engagement remains an area requiring further empirical exploration. While digital tools have the potential to enhance student engagement, their effectiveness remains a subject of debate. Some scholars argue that technology enriches learning experiences by fostering interaction and active participation, while others highlight potential drawbacks such as reduced face-to-face engagement and an over-reliance on passive learning modes (Bond et al., 2020). These contrasting perspectives underscore the need for a deeper empirical investigation into the role of digital tools in student engagement. Although numerous studies have explored digital learning and engagement, many have focused on theoretical frameworks or small-scale qualitative insights, with limited descriptive data on actual usage patterns in higher education settings.

Despite the widespread adoption of digital tools in higher education, their specific role in shaping student engagement across behavioral, emotional, and cognitive dimensions remains

International Journal of Education, Psychology and Counseling
IJEPC
EISSN : 0128-164X
Volume 10 Issue 59 (September 2025) PP. 1231-1252
DOI 10.35631/IJEPC.105990

underexplored. Much of the existing research emphasizes theoretical perspectives or small-scale qualitative insights, with limited descriptive evidence on how students actually use and perceive these tools in daily learning. This study addresses that gap by providing a comprehensive descriptive analysis of technology use and its influence on student engagement among university students in Malaysia. By focusing on descriptive data across multiple engagement dimensions, this research offers empirical insights that complement existing theory and inform more effective digital learning strategies.

Literature Review

This section presents a review of the literature relevant to this study, focusing on key concepts and findings related to student engagement and the use of digital tools in higher education. It covers the definition and theoretical foundations of student engagement, highlighting its behavioral, emotional, and cognitive dimensions. Additionally, the review explores the role of digital tools in enhancing engagement, examining their benefits, limitations, and effectiveness in various learning environments. Furthermore, challenges associated with technology-based engagement, such as digital fatigue and disparities in digital literacy, are discussed. By synthesizing recent research, this section provides a comprehensive understanding of the existing knowledge in this field while identifying gaps that this study aims to address.

Student Engagement: Definition, Importance, and Challenges

Student engagement is a multifaceted concept that encompasses students' active participation, investment in learning, and sense of connection within an academic environment. Henrie et al. (2015) define engagement as the extent to which students contribute to academic activities, exert effort in their studies, and develop a sense of belonging in their learning environment. This definition aligns with Bond et al. (2020), who describe engagement as a dynamic process involving active involvement in learning tasks, interaction with peers and instructors, and a commitment to achieving educational goals. In the context of digital learning, Martin et al. (2020), Redmond et al. (2020) and Aguilera-Hermida (2020) emphasize that engagement also includes students' willingness and ability to interact with course materials, technology, and instructors in both traditional and online settings. Collectively, these perspectives highlight that student engagement is not just about participation but also about motivation, persistence, and the depth of cognitive involvement in learning.

Three-Dimensional Framework of Student Engagement

Student engagement is widely recognized as a crucial factor in academic success, encompassing the degree of attention, interest, and commitment students demonstrate in their learning process. The three-dimensional framework of student engagement, proposed by Fredricks, Blumenfeld, and Paris (2004), is one of the most widely recognized models in educational research. This framework conceptualizes engagement as a multidimensional construct consisting of behavioral engagement, emotional engagement and cognitive engagement. Each dimension represents a different aspect of how students interact with learning, making it a comprehensive approach to understanding student involvement in academic activities. According to this model, engagement is not merely about participation but also about the quality of a student's involvement in learning, both intellectually and emotionally. Since its introduction, the framework has been extensively used to assess engagement in various educational settings, including traditional classrooms and digital learning environments (Henrie et al., 2015). Figure 1 depicts the Three-Dimensional Framework of Student Engagement as proposed by Fredricks et al. (2004).

International Journal of Education, Psychology and Counseling
IJEPC
EISSN : 0128-164X
Volume 10 Issue 59 (September 2025) PP. 1231-1252
DOI 10.35631/IJEPC.105990

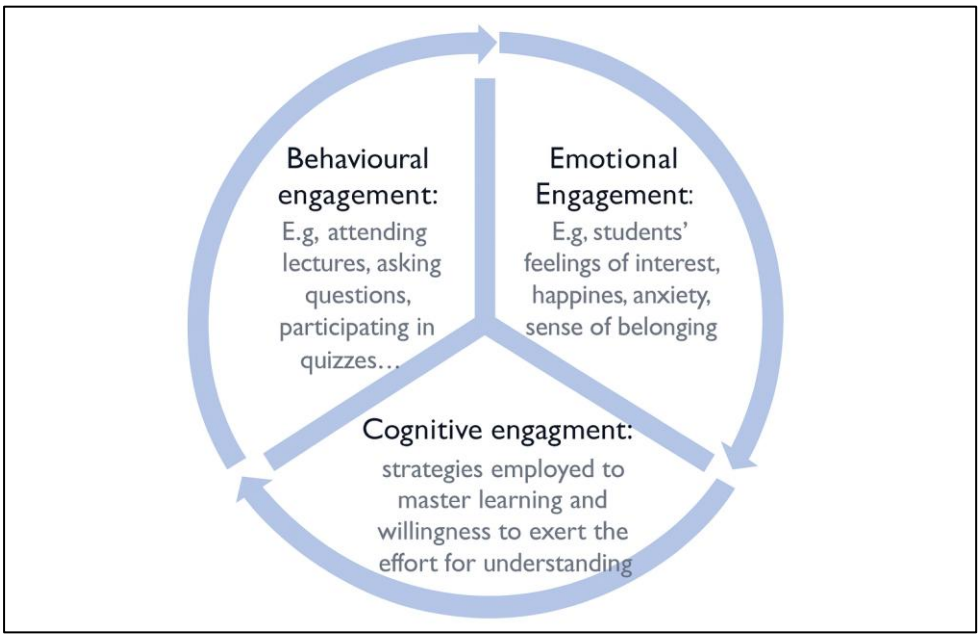


Figure 1: Three-Dimensional Framework of Student Engagement (Fredricks et al., 2004)

Behavioral Engagement

Behavioral engagement refers to students' participation in academic tasks, adherence to classroom rules, and involvement in school-related activities. It is often seen as the most observable form of engagement, as it includes behaviors such as attending classes, completing assignments, participating in discussions, and putting effort into coursework (Fredricks et al., 2004). This type of engagement is crucial because it reflects students' commitment to their education and their willingness to follow structured learning processes. Students who exhibit high behavioral engagement are more likely to complete their studies successfully and demonstrate positive academic behaviors (Martin et al., 2020; Redmond et al., 2020). However, behavioral engagement alone does not guarantee deep learning, as students may participate without being emotionally or cognitively engaged.

Emotional Engagement

Emotional engagement, sometimes referred to as affective engagement, encompasses students' feelings toward their learning experience, instructors, and peers. It involves emotions such as interest, enjoyment, a sense of belonging, and motivation to succeed (Fredricks et al., 2004). When students feel connected to their learning environment and develop positive relationships with educators and classmates, they are more likely to be persistent in their studies and demonstrate resilience when facing challenges (Bond et al., 2020). Emotional engagement is particularly important in digital learning, where the lack of face-to-face interaction can sometimes lead to feelings of isolation or disengagement (Martin et al., 2020). Studies suggest that fostering emotional engagement through interactive and collaborative digital tools can enhance students' motivation and overall learning experience (Moorhouse, 2021).

International Journal of Education, Psychology and Counseling
IJEPC
EISSN : 0128-164X
Volume 10 Issue 59 (September 2025) PP. 1231-1252
DOI 10.35631/IJEPC.105990

Cognitive Engagement

Cognitive engagement refers to the depth of students' investment in learning, including their willingness to exert mental effort, use critical thinking skills, and persist through difficult tasks. This dimension involves self-regulated learning, problem-solving, and the ability to make meaningful connections between new and prior knowledge (Fredricks et al., 2004). Unlike behavioral engagement, which focuses on participation, and emotional engagement, which concerns feelings, cognitive engagement highlights the intellectual commitment required for deep learning. Research has shown that students who demonstrate strong cognitive engagement are more likely to develop long-term academic skills, retain information effectively, and apply their knowledge in real-world scenarios (Gikandi et al, 2011). Digital tools such as adaptive learning technologies, gamified educational platforms, and inquiry-based learning environments have been found to support cognitive engagement by making learning more personalized and interactive (Lai & Bower, 2020).

Fredricks et al.'s (2004) model provides a comprehensive lens through which educators can assess and enhance student engagement in both traditional and digital learning settings. The framework highlights the importance of addressing all three dimensions simultaneously to ensure that students are not just physically present in the learning environment but are also emotionally and intellectually invested. Recent research has expanded on this model by examining how digital learning environments influence engagement across these three dimensions (Henrie et al., 2015). With the increasing adoption of technology in education, understanding the interplay between behavioral, emotional, and cognitive engagement is critical for designing effective learning experiences that promote active and meaningful participation.

The importance of student engagement cannot be overstated, as it directly impacts learning outcomes, retention rates, and overall academic achievement. Research suggests that students who actively engage with course materials, collaborate with peers, and participate in discussions tend to develop better problem-solving skills and retain knowledge more effectively (Lai & Bower, 2020). Engaged students also display higher levels of motivation, which enhances their willingness to explore complex topics and think critically. In contrast, disengagement can lead to decreased academic performance, lower course completion rates, and diminished satisfaction with the learning experience (Bond et al., 2020). Given its significance, institutions and educators are continuously seeking strategies to foster engagement through interactive teaching methods, personalized learning approaches, and the integration of technology into classrooms (Martin et al, 2020; Redmond et al, 2020).

Despite its benefits, maintaining student engagement poses several challenges for educators, especially in the digital era. One of the primary difficulties is sustaining attention in online or hybrid learning environments, where students are more prone to distractions and digital fatigue (Gikandi et al, 2011; Evans, 2020). Additionally, disparities in digital literacy levels among students can hinder engagement, as not all learners possess the same comfort level with using educational technologies (Martin et al., 2020; Garrison & Vaughan, 2020). Educators must also navigate the balance between leveraging digital tools to enhance engagement and preventing over-reliance on passive learning modes, such as pre-recorded lectures that lack interactive elements (Martin & Bolliger, 2018; Martin et al., 2020; Sun, Xie, & Anderman, 2020). Addressing these challenges requires a thoughtful approach that includes well-designed digital

International Journal of Education, Psychology and Counseling
IJEPC
EISSN : 0128-164X
Volume 10 Issue 59 (September 2025) PP. 1231-1252
DOI 10.35631/IJEPC.105990
learning experiences, interactive activities, and ongoing support to keep students actively involved in their education.

Technology Use and Digital Tools in Higher Education

Digital tools in education refer to technology-based resources and platforms that facilitate teaching, learning, and academic collaboration. These tools range from learning management systems (LMS) and virtual classrooms to artificial intelligence (AI) powered applications, gamified learning platforms, and digital libraries (Bond et al., 2020). The purpose of digital tools in education is to enhance accessibility, personalize learning experiences, and foster student engagement through interactive and data-driven approaches (Henrie et al., 2015). As higher education institutions increasingly adopt technology, digital tools have become essential in supporting both traditional face-to-face instruction and online learning environments (Martin et al., 2020).

One of the most widely used digital tools in universities is the Learning Management System (LMS), which provides a centralized platform for organizing course materials, facilitating discussions, and assessing student performance. Platforms like Moodle, Blackboard, and Canvas enable instructors to manage coursework efficiently while giving students 24/7 access to educational resources (Martin et al., 2020; Redmond et al., 2020; Aguilera-Hermida, 2020). The convenience of LMS platforms enhances flexibility, allowing students to engage with content at their own pace. Another significant advancement in digital education is the increasing use of artificial intelligence (AI) applications. AI-powered tools, such as ChatGPT, Grammarly, and AI-based tutoring systems, support students by providing instant feedback, summarizing information, and personalizing learning materials (Gikandi et al., 2011; Evans (2020). A recent study found that over 90% of undergraduate students in the UK now incorporate AI into their studies, highlighting the growing reliance on AI tools for academic support (Hern, 2023). However, the widespread use of AI has also raised concerns about academic integrity, prompting universities to implement new assessment strategies and guidelines. Gamification and interactive learning applications are also transforming higher education. Game-based elements, such as badges, leaderboards, and real-time quizzes, have been shown to increase student motivation and participation (Lai & Bower, 2020). Digital tools such as Kahoot, Quizizz, and ClassPoint turn traditional lectures into engaging, interactive experiences that encourage active learning. Additionally, digital textbook libraries and online resource platforms, such as Perlego, are helping students overcome financial barriers by providing affordable access to academic materials (Huang et al., 2020).

As technology continues to evolve, higher education institutions must adapt and innovate to ensure that digital tools not only complement but also actively enhance student learning experiences. Effective integration of these tools can foster higher levels of student engagement by promoting interactive learning, real-time feedback, and personalized instruction (Martin et al., 2020). Digital platforms such as gamified learning environments, adaptive assessments, and AI-driven tutoring systems have the potential to increase cognitive engagement by encouraging critical thinking and problem-solving. Likewise, collaborative tools like discussion forums and virtual classrooms support emotional and behavioral engagement by fostering a sense of community and active participation (Martin et al., 2020; Redmond et al., 2020; Aguilera-Hermida, 2020). However, for these tools to be truly effective, institutions must implement them strategically, ensuring accessibility, proper instructor training, and alignment with pedagogical goals to create meaningful and engaging learning experiences.

International Journal of Education, Psychology and Counseling
IJEPC
EISSN : 0128-164X
Volume 10 Issue 59 (September 2025) PP. 1231-1252
DOI 10.35631/IJEPC.105990

The Role of Technology and Digital Tools in Enhancing Student Engagement

Digital tools have become essential in modern education, providing innovative ways to enhance student engagement by making learning more interactive, accessible, and personalized. Engagement, which includes behavioral, emotional, and cognitive involvement, is a critical factor in student success, and technology-driven solutions aim to strengthen these dimensions (Henrie et al., 2015). Learning management systems (LMS), virtual simulations, and gamified learning applications introduce elements of interactivity that keep students motivated and invested in their studies. By incorporating multimedia content, real-time feedback, and collaborative features, these tools cater to different learning preferences, helping students stay actively engaged in their academic journey (Martin et al., 2020; Redmond et al., 2020; Aguilera-Hermida, 2020).

One of the key advantages of digital tools is their ability to support personalized learning experiences. Adaptive learning platforms, powered by artificial intelligence (AI), analyze students' progress and tailor content, accordingly, allowing them to learn at their own pace (Gikandi et al., 2011; Evans (2020). For example, AI-driven tutoring systems provide customized exercises based on students' strengths and weaknesses, promoting cognitive engagement by encouraging problem-solving and deep learning. Similarly, gamified learning environments introduce elements of competition and reward, which have been shown to increase motivation and participation in coursework (Lai & Bower, 2020). These strategies transform traditional passive learning into an active and immersive experience, ultimately leading to higher retention and comprehension rates.

Additionally, digital tools facilitate collaborative engagement, helping students interact with peers and instructors beyond the physical classroom. Online discussion forums, group-based project platforms, and real-time polling tools foster peer-to-peer learning and active participation, even in large lecture settings (Martin et al., 2020; Redmond et al., 2020). Features such as live chat, breakout rooms, and shared digital workspaces make virtual learning more dynamic, allowing students to express their ideas and engage in meaningful discussions. Furthermore, hybrid and online learning models benefit from virtual reality (VR) and augmented reality (AR) simulations, which provide hands-on experiences that might not be possible in traditional classrooms (Martin et al., 2015). These technologies create interactive learning spaces that engage students both emotionally and intellectually, increasing their sense of belonging and motivation.

Despite these advantages, the effectiveness of digital tools in enhancing student engagement depends on multiple factors, including instructional design, students' digital literacy, and institutional support. While research highlights the potential of digital tools to increase engagement, some studies also raise concerns about digital fatigue, technological distractions, and accessibility issues (Garrison & Vaughan, 2020). Not all students have equal access to high-quality internet connections and digital devices, creating disparities in engagement levels. Additionally, excessive reliance on technology without pedagogical strategies that encourage critical thinking, and active participation may lead to passive learning (Martin et al., 2020). Therefore, institutions must adopt a balanced approach, ensuring that digital tools are used effectively alongside interactive teaching methods to foster meaningful engagement in higher education.

International Journal of Education, Psychology and Counseling
IJEPC
EISSN : 0128-164X
Volume 10 Issue 59 (September 2025) PP. 1231-1252
DOI 10.35631/IJEPC.105990

In synthesizing prior studies, two clear themes emerge. First, digital tools consistently demonstrate potential to enhance engagement by supporting interactivity, personalization, and motivation, aligning with the behavioral, emotional, and cognitive dimensions of engagement (Lai & Bower, 2020; Martin et al., 2020). Second, challenges such as digital fatigue, inequitable access, and varied digital literacy temper these benefits, with some scholars questioning whether technology can replicate the social and affective dimensions of traditional classrooms (Aguilera-Hermida, 2020; Redmond et al., 2020). What remains underexplored, however, is large-scale descriptive evidence showing how students actually use digital tools and which dimensions of engagement are most affected. By applying Fredricks et al.'s (2004) framework and focusing on a Malaysian higher education context, this study addresses that gap and contributes empirical insights that bridge theory and practice.

Conceptual Framework

Drawing on the three-dimensional model of student engagement by Fredricks, Blumenfeld, and Paris (2004), this study conceptualizes engagement as comprising behavioral, emotional, and cognitive dimensions. Technology use is positioned as the enabling factor that influences these three dimensions. The framework assumes that the integration of digital tools can:

- enhance participation, collaboration, and task completion (behavioral engagement),
- foster motivation, interest, and a sense of belonging (emotional engagement), and
- stimulate critical thinking, self-regulation, and deeper learning (cognitive engagement).

This conceptual framework provides the theoretical foundation for the study, linking the independent construct of technology use to the three dimensions of student engagement. By doing so, it ensures that the descriptive analysis is not only empirical but also theoretically grounded, bridging the gap between digital tool adoption and holistic student engagement in higher education. Figure 2 below illustrates the conceptual framework of this study.

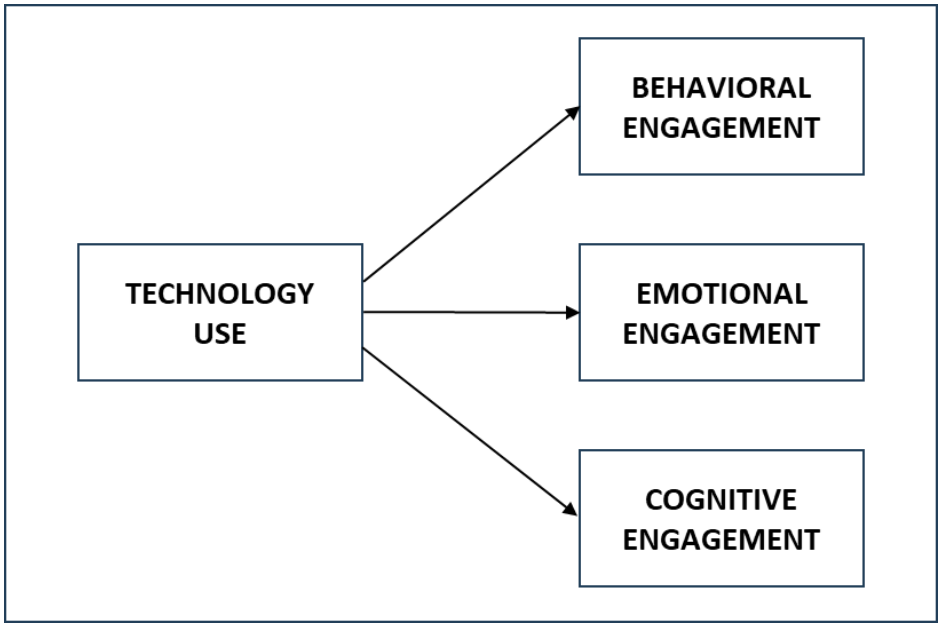


Figure 2: Conceptual Framework of the study (Adapted from Fredricks et al. (2004))

International Journal of Education, Psychology and Counseling
IJEPC
EISSN : 0128-164X
Volume 10 Issue 59 (September 2025) PP. 1231-1252
DOI 10.35631/IJEPC.105990

Methodology

This study adopts a quantitative research approach to investigate the impact of digital tools on student engagement. A structured survey was designed with four constructs: technology use, behavioral engagement, emotional engagement, and cognitive engagement. The technology used referred to the use of a list of digital tools such as Learning Management Systems (LMS), Virtual Reality (VR) and Augmented Reality (AR), Artificial Intelligence (AI), Video Conferencing and Collaboration Tools, E-Assessment Tools, Cloud-Based Storage and Tools and Interactive Whiteboards. Each construct consists of ten items measuring aspects of technology use and student engagement. The survey was conducted for three months 28 November 2024 until 28 February 2025.

The questionnaire was distributed using Google Forms, allowing for efficient data collection from a broad group of students. The survey included closed-ended questions to capture students' usage patterns and perceptions of digital tools, as well as their engagement levels. The target population for this study consisted of Universiti Teknologi MARA (UiTM) students, representing various faculties and academic levels. Due to accessibility and participant availability, the study adopted a convenience sampling technique, which is suitable for descriptive research where the objective is to explore patterns and perceptions rather than to generalize findings to a larger population. This approach enabled voluntary participation from students who had access to the survey link. A total of 404 responses were collected, exceeding the recommended sample of 384 based on Krejcie and Morgan's (1970) sample size determination table, thereby ensuring an adequate sample size for statistical analysis.

The analysis of the findings was done in two sections based on the questionnaire where Section E covers the "Demographic Profile of the Respondents", Section D covers the "Technology Use", and Sections A, B and C Section cover the "Student Engagement".

The collected data were analyzed using descriptive statistics, including frequency distributions and percentages, to provide a clear summary of the findings. Descriptive analysis was conducted to examine demographic information, students' frequency of digital tool usage, and engagement levels. Frequency and percentage analyses were used to identify patterns in students' interaction with digital learning tools and their perceived effectiveness in enhancing engagement. The results of this analysis offer insights into how digital tools are utilized in higher education and whether they contribute to student engagement and meaningful learning experiences. The findings will be discussed in relation to existing literature to determine the extent to which digital tools influence student engagement in UiTM.

Results and Discussion

This section presents the findings of the study based on the descriptive analysis, frequency distributions, and percentage calculations conducted on the collected data. The analysis provides insights into students' usage patterns of digital tools, their engagement levels, and the effectiveness of these tools in higher education settings. By examining key trends and relationships within the data, this section highlights how digital tools contribute to student engagement at UiTM. The findings are discussed in relation to existing literature to provide a deeper understanding of their implications for teaching and learning.

International Journal of Education, Psychology and Counseling
IJEPC
EISSN : 0128-164X
Volume 10 Issue 59 (September 2025) PP. 1231-1252
DOI 10.35631/IJEPC.105990

Reliability Test

The reliability analysis using Cronbach's Alpha indicates a high level of internal consistency for all constructs measured in this study. Technology Use (α = .928), Behavioral Engagement (α = .899), Emotional Engagement (α = .950), and Cognitive Engagement (α = .929) all demonstrate excellent reliability, exceeding the commonly accepted threshold of 0.70. The highest reliability is observed in Emotional Engagement, suggesting a strong coherence among the items measuring this construct. These results indicate that the survey items effectively capture the intended dimensions of student engagement and technology use, ensuring the consistency and dependability of the measurement scale for further analysis. Table 1 below summarizes the reliability test results.

Table 1: Reliability Test Result

	Cronbach's Alpha	N of Items
Technology Use (TU)	.928	10
Behavioral Engagement (BE)	.899	10
Emotional Engagement (EE)	.950	10
Cognitive Engagement (CE)	.929	10

Findings and Analysis of Demographic Data

Section E of the questionnaire covers the demographic profile of respondents which is summarized in Table 1 below. The demographic data collected provides insights into the characteristics of the respondents, including gender, age, academic level, semester of study, device ownership, and internet usage patterns.

Table 2: Summary of Demographic Data

Demographic	Subject	Frequency	Percent
Gender	Male	90	22.28
	Female	314	77.72
Age	18–21 years old	220	54.46
	22–25 years old	142	35.15
	Above 25 years old	42	10.40
Academic Level	Diploma	86	21.29
	Bachelor's degree	285	70.54
	Master's degree	24	5.94
	Doctorate	9	2.23
Current Semester	Semester 1	129	31.93
	Semester 2	37	9.16
	Semester 3	48	11.88
	Semester 4	18	4.46
	Semester 5	117	28.96
	Semester 6	29	7.18
	Semester 7	16	3.96
	Semester 8	10	2.48
Own Computer	No	1	0.25
	Yes	403	99.75
	Laptop	283	70.05

International Journal of Education, Psychology and Counseling
IJEPC
EISSN : 0128-164X
Volume 10 Issue 59 (September 2025) PP. 1231-1252
DOI 10.35631/IJEPC.105990

Type of Device	Smartphone	72	17.82
	Tablet	47	11.63
	Desktop	1	0.25
	Other	1	0.25
Use Internet Frequency	1-5 times	29	7.18
	5-10 times	90	22.28
	10-15 times	55	13.61
	More than 15 times	230	56.93

The majority of respondents are female (77.72%, n=314), while male respondents constitute only 22.28% (n=90). This indicates a significant gender disparity among the sample, suggesting that female students may be more actively engaged in the study or more represented in the surveyed population.

The largest proportion of respondents falls within the 18–21 years old category (54.46%, n=220), followed by those aged 22–25 years old (35.15%, n=142). A smaller percentage (10.40%, n=42) are above 25 years old. This age distribution aligns with typical higher education enrolment patterns, where younger students dominate undergraduate programs.

Most respondents are pursuing a bachelor's degree (70.54%, n=285), while 21.29% (n=86) are diploma students. A small percentage are enrolled in master's programs (5.94%, n=24) and doctorate programs (2.23%, n=9). This distribution suggests that the survey is heavily weighted towards undergraduate students.

The respondents are spread across various semesters, with the highest percentage being in Semester 1 (31.93%, n=129) and Semester 5 (28.96%, n=117). Other semesters have lower representation, with Semester 2 at 9.16% (n=37), Semester 3 at 11.88% (n=48), and Semester 6 at 7.18% (n=29). The lowest representations are in Semester 7 (3.96%, n=16) and Semester 8 (2.48%, n=10). This distribution suggests that a significant number of students are in the early stages of their studies.

An overwhelming majority of respondents (99.75%, n=403) own a computer, while only one respondent (0.25%) does not. This indicates that nearly all students have access to a personal computing device, which is crucial for academic activities.

The laptop is the most commonly used device among respondents (70.05%, n=283), followed by smartphones (17.82%, n=72) and tablets (11.63%, n=47). Very few respondents use a desktop (0.25%, n=1) or other types of devices (0.25%, n=1). This suggests that laptops are the preferred choice for academic and digital engagement.

A majority of respondents (56.93%, n=230) use the internet more than 15 times per day, indicating high digital engagement. Meanwhile, 22.28% (n=90) use it 5-10 times per day, and 13.61% (n=55) use it 10-15 times per day. Only a small portion (7.18%, n=29) report using the internet 1-5 times per day. These findings reflect the crucial role of the Internet in students' daily academic and personal activities.

International Journal of Education, Psychology and Counseling
IJEPC
EISSN : 0128-164X
Volume 10 Issue 59 (September 2025) PP. 1231-1252
DOI 10.35631/IJEPC.105990

The demographic analysis highlights that the majority of the respondents are female, aged 18-21, and pursuing a bachelor's degree. Most students own a laptop and frequently use the internet, indicating strong digital accessibility. This data provides valuable insights into the technology engagement patterns among university students and can help inform strategies for digital learning and technology integration in education.

Findings and Analysis of Technology Use and Student Engagement

Section D covers the questions on Technology Use. Sections A, B, and C cover the questions on Student Engagement which include Behavioral Engagement (BE), Emotional Engagement (EE), and Cognitive Engagement (CE). Table 3 below summarized the descriptive statistics analysed from the data.

Table 3: Summary of Descriptive Statistics on Technology Use and Student Engagement

Variable		Strongly Agree (5)	Agree (4)	Neither Agree nor Disagree (3)	Disagree (2)	Strongly Disagree (1)	Total	Mean	Std. Deviation
A. TECHNOLOGY USE									
1. I always use digital platforms.	Count	242	122	33	4	3	404	4.48	.750
	%	59.9	30.2	8.2	1.0	.7	100%		
2. I prefer using the above technology tools for my class-related activities.	Count	200	147	46	6	5	404	4.31	.826
	%	49.5	36.4	11.4	1.5	1.2	100%		
3. It is easy for me to access the technology tools used in my courses	Count	195	159	41	6	3	404	4.33	.777
	%	48.3	39.4	10.1	1.5	.7	100%		
4. I always engage with interactive tools (e.g., virtual whiteboards, discussion forums, online quizzes) during my lessons.	Count	156	162	63	19	4	404	4.11	.900
	%	38.6	40.1	15.6	4.7	1.0	100%		
5. Using technology in my class increases my level of engagement and participation in discussions and activities.	Count	147	178	57	10	12	404	4.08	.931
	%	36.4	44.1	14.1	2.5	3.0	100%		
6. In my class, the technology is integrated into the learning activities (e.g., lectures, group work, assignments) very well.	Count	181	170	42	7	4	404	4.28	.796
	%	44.8	42.1	10.4	1.7	1.0	100%		
7. I always collaborate with my classmates using online tools (e.g., shared documents, discussion boards, video calls).	Count	191	154	43	11	5	404	4.27	.852
	%	47.3	38.1	10.6	2.7	1.2	100%		
8. I am satisfied with the technology tools used in my courses for facilitating my learning and interaction.	Count	151	189	50	7	7	404	4.16	.835
	%	37.4	46.8	12.4	1.7	1.7	100%		
9. It is challenging for me to use technology for learning (e.g., connectivity issues, lack of training, technical problems).	Count	133	128	83	43	17	404	3.78	1.138
	%	32.9	31.7	20.5	10.6	4.2	100%		
10. The use of technology in my courses has improved my learning outcomes (e.g., understanding of materials, better academic performance).	Count	157	185	48	11	3	404	4.19	.805
	%	38.9	45.8	11.9	2.7	.7	100%		
B. BEHAVIOURAL ENGAGEMENT									
1. I actively participate in online classroom discussions or forums.	Count	134	164	84	18	4	404	4.00	.899
	%	33.2	40.6	20.8	4.5	1.0	100%		
2. I use technology to complete my assignments on time.	Count	240	131	29	1	3	404	4.50	.706
	%	59.4	32.4	7.2	.2	.7	100%		
3. I attend virtual or hybrid classes regularly.	Count	225	135	34	6	4	404	4.41	.788
	%	59.4	32.4	7.2	.2	.7	100%		
4. I use educational apps and tools to engage with the course material.	Count	231	132	35	4	2	404	4.45	.736
	%	57.2	32.7	8.7	1.0	.5	100%		
5. I interact with my peers via digital platforms for group projects.	Count	201	147	49	4	3	404	4.33	.784
	%	49.8	36.4	12.1	1.0	.7	100%		
6. I frequently check course announcements and updates on the Learning Management System (LMS).	Count	132	143	97	22	10	404	3.90	1.000
	%	32.7	35.4	24	5.4	2.5	100%		
7.	Count	233	130	35	4	2	404	4.46	.736

International Journal of Education, Psychology and Counseling
IJEPC
EISSN : 0128-164X
Volume 10 Issue 59 (September 2025) PP. 1231-1252
DOI 10.35631/IJEPC.105990

	Variable		Strongly Agree (5)	Agree (4)	Neither Agree nor Disagree (3)	Disagree (2)	Strongly Disagree (1)	Total	Mean	Std. Deviation
	I contribute to online collaborative work, such as group chats or shared documents.	%	57.7	32.2	87	1.0	.5	100%		
8.	I use digital resources (e.g., e-books, research databases) to enhance my learning.	Count	215	138	46	3	2	404	4.39	.755
		%	53.2	34.2	11.4	.7	.5	100%		
9.	I participate in technology-enhanced quizzes, polls, or surveys during class.	Count	207	149	37	8	3	404	4.36	.789
		%	51.2	36.9	9.2	2.0	.7	100%		
10.	I engage in extracurricular learning activities (e.g., online workshops, webinars) related to my course.	Count	132	158	80	24	10	404	3.94	.992
		%	32.7	39.1	19.8	5.9	2.5	100%		
C. EMOTIONAL ENGAGEMENT										
1.	I feel motivated to learn when technology is integrated into the classroom.	Count	150	177	67	6	4	404	4.15	.816
		%	37.1	43.8	16.6	1.5	1.0	100%		
2.	I feel more connected to my instructors when they use technology for communication (e.g., emails, online office hours).	Count	116	168	94	17	9	404	3.90	.939
		%	28.7	41.6	23.3	4.2	2.2	100%		
3.	I enjoy participating in technology-driven learning activities (e.g., virtual labs, educational apps).	Count	130	191	69	10	4	404	4.07	.823
		%	32.2	47.3	17.1	2.5	1.0	100%		
4.	I feel that technology in the classroom makes learning more interesting.	Count	157	181	53	9	4	404	4.18	.816
		%	38.9	44.8	13.1	2.2	1.0	100%		
5.	I feel a sense of belonging when I interact with classmates through digital tools.	Count	111	160	104	18	11	404	3.85	.967
		%	27.5	39.6	25.7	4.5	2.7	100%		
6.	I am excited to use technology to complete assignments and projects.	Count	184	173	38	5	4	404	4.31	.772
		%	45.5	42.8	9.4	1.2	1.0	100%		
7.	I feel that the use of technology helps me build stronger relationships with my peers.	Count	136	165	81	13	9	404	4.00	.932
		%	33.7	40.8	20.0	3.2	2.2	100%		
8.	I feel engaged in the learning process when digital platforms are used in class.	Count	145	185	56	12	6	404	4.12	.859
		%	35.9	45.8	13.9	3.0	1.5	100%		
9.	I feel confident in my ability to succeed when I can access learning materials through technology.	Count	170	175	46	10	3	404	4.24	.804
		%	42.1	43.3	11.4	2.5	.7	100%		
10.	I feel supported in my learning when my instructors provide technology-based resources or feedback.	Count	166	180	45	7	6	404	4.22	.824
		%	41.1	44.6	11.1	1.7	1.5	100%		
D. COGNITIVE ENGAGEMENT										
1.	I use technology to research additional materials beyond the required readings.	Count	208	150	42	3	1	404	4.39	.722
		%	51.5	37.1	10.4	.7	.2	100%		
2.	I use educational apps or online tools to help me understand complex concepts.	Count	225	144	28	5	2	404	4.45	.722
		%	55.7	35.6	6.9	1.2	.5	100%		
3.	I engage in online learning activities (e.g., simulations, games) to improve my skills.	Count	163	164	61	12	4	404	4.16	.859
		%	40.3	40.6	15.1	3.0	1.0	100%		
4.	I set personal learning goals using digital tools (e.g., to-do lists, calendar apps).	Count	143	164	69	24	4	404	4.03	.923
		%	35.4	40.6	17.1	5.9	1.0	100%		
5.	I use technology to track my academic progress and assess my understanding of the material.	Count	144	153	80	21	6	404	4.01	.948
		%	35.6	37.9	19.8	5.2	1.5	100%		
6.	I prefer using digital tools (e.g., videos, podcasts) to explore topics in more depth.	Count	149	154	85	12	4	404	4.07	.886
		%	36.9	38.1	21.0	3.0	1.0	100%		
7.	I find technology enhances my ability to think critically and analyze information.	Count	144	189	57	11	3	404	4.14	.810
		%	35.6	46.8	14.1	2.7	.7	100%		
8.	I rely on technology (e.g., coding platforms, data analysis software) to solve academic problems.	Count	128	159	86	23	8	404	3.93	.966
		%	31.7	39.4	21.3	5.7	2.0	100%		
9.	I use online resources (e.g., forums, blogs) to expand my knowledge of course topics.	Count	164	168	57	13	2	404	4.19	.829
		%	40.6	41.6	14.1	3.2	.5	100%		
10.	I use interactive digital tools (e.g., online discussion boards, quizzes) to deepen	Count	158	170	59	14	3	404	4.15	.849
		%	39.1	42.1	14.6	3.5	.7	100%		

International Journal of Education, Psychology and Counseling
IJEPC
EISSN : 0128-164X
Volume 10 Issue 59 (September 2025) PP. 1231-1252
DOI 10.35631/IJEPC.105990

Variable		Strongly Agree (5)	Agree (4)	Neither Agree nor Disagree (3)	Disagree (2)	Strongly Disagree (1)	Total	Mean	Std. Deviation
my understanding of the content.									
Valid N (listwise)	404								

Analysis on Technology Use

Technology use refers to how frequently and comfortably students incorporate digital tools into their academic routines. The findings indicate that 47.8% of students agree and 40.6% strongly agree that they actively use technology in their learning activities, highlighting a high level of adoption of digital platforms. This suggests that technology-based learning has become a norm, with most students confidently using tools such as learning management systems, productivity apps, and collaborative platforms to support their studies. A smaller group of students (8.9% neutral, 2.2% disagree, and 0.5% strongly disagree) indicates that while most students are comfortable with technology, a minority may still face barriers such as limited access, lower digital literacy, or personal preferences for traditional learning methods. These findings emphasize the importance of ongoing support for students with lower digital confidence or limited access, ensuring inclusive and equitable digital learning experiences across the student population. Figure 3 below illustrate the student response on technology use with digital learning tools.

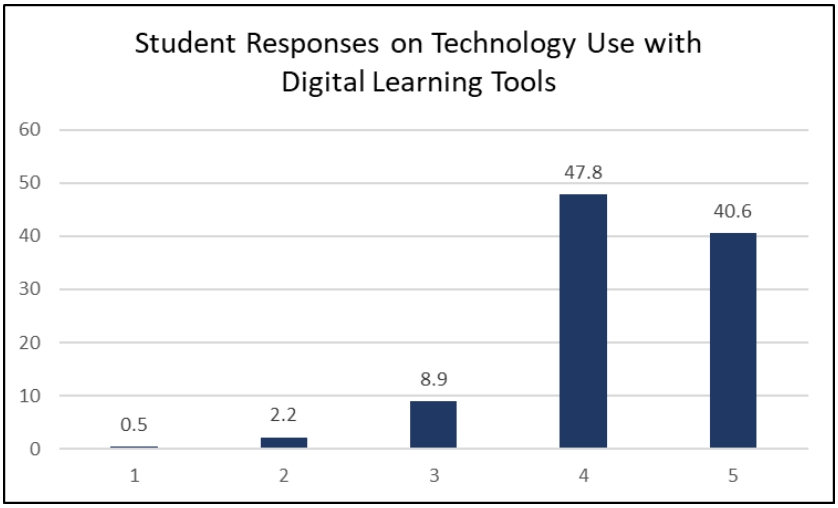


Figure 3: Student Response on Technology Use with Digital Learning Tools

The variation in technology use among students may stem from several factors. While many students appear confident and proficient in integrating digital tools into their learning, others may face challenges such as inconsistent internet access, limited availability of personal devices, or unfamiliarity with specific platforms. Additionally, differences in prior exposure to technology, learning environments (urban vs. rural), and academic discipline may influence the extent to which students use digital tools. For example, students in more digitally driven programs may be more accustomed to online resources than those in traditionally lecture-based fields. Furthermore, students' personal preferences and learning styles may also impact their willingness to engage with technology. Some may find digital tools overwhelming or distracting, particularly if they lack structured guidance or training. To bridge this gap,

International Journal of Education, Psychology and Counseling
IJEPC
EISSN : 0128-164X
Volume 10 Issue 59 (September 2025) PP. 1231-1252
DOI 10.35631/IJEPC.105990

institutions should invest in digital literacy initiatives, provide consistent access to devices and internet, and ensure that digital tools are intuitive and well-integrated into course design.

The technology use construct recorded a mean score of 4.48 with a standard deviation of 0.71, indicating a high level of agreement among students regarding their frequent use of digital tools in learning. The high mean suggests that most students consistently integrate technology into their academic activities, such as accessing materials, completing assignments, and collaborating online. However, the moderate standard deviation reflects some variation in responses, implying that while many students are highly engaged with technology, others may use it less consistently. This variation may be influenced by differing levels of digital access, confidence in using certain platforms, or the degree to which instructors incorporate technology into their teaching. Despite these differences, the overall result highlights that technology use is well-established among the majority of students.

Analysis on Behavioral Engagement

Behavioral engagement refers to students' participation and involvement in learning activities facilitated by technology. The findings indicate that 49.3% of students agree and 43.1% strongly agree that they actively engage with interactive learning tools such as educational apps, online discussions, and simulations. This indicates that a vast majority of students not only use digital tools but also interact with them meaningfully, participating in learning activities that require active involvement. Meanwhile, 6.9% of students remain neutral, and only 0.7% express disagreement (combining 0.5% for "Strongly Disagree" and 0.2% for "Disagree"), suggesting that very few students are less engaged in technology-mediated learning. These students may prefer more passive forms of digital content consumption, such as reading notes or watching pre-recorded lectures, rather than interactive tools that demand greater participation. Figure 4 below illustrate the student response on behavioral engagement.

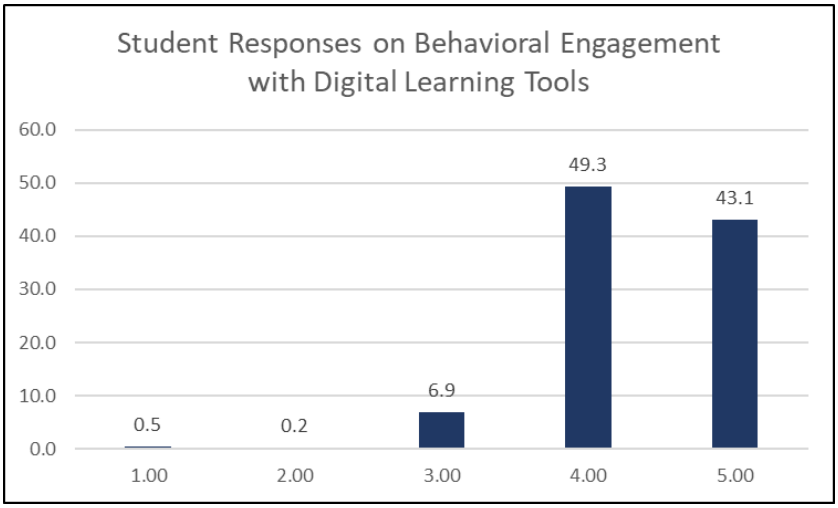


Figure 4: Student Responses on Behavioral Engagement with Digital Learning Tools

The variation in behavioral engagement could be due to differences in learning styles, digital literacy, or motivation levels. While some students thrive in interactive environments, others may require additional support or motivation to participate in discussions, collaborate on digital platforms, or utilize simulation tools effectively. The presence of disengaged students highlights the need for more inclusive digital learning strategies, ensuring that interactive tools

International Journal of Education, Psychology and Counseling
IJEPC
EISSN : 0128-164X
Volume 10 Issue 59 (September 2025) PP. 1231-1252
DOI 10.35631/IJEPC.105990

are not only available but also tailored to diverse learning preferences. Instructors could implement gamification elements, real-world case studies, or collaborative digital tasks to encourage participation among students who are less engaged with interactive tools.

The behavioral engagement construct, which includes items such as "I always engage with interactive tools (e.g., educational apps, simulations, online discussions)," recorded an average mean score of 4.11 (SD = 0.90). This suggests that students generally perceive themselves as behaviorally engaged when using digital tools. However, the relatively higher standard deviation indicates variation in responses, while many students are actively participating, others may be less engaged. This difference may reflect individual learning preferences, digital literacy, or perceived usefulness of interactive tools. To address this gap, educators can design more engaging, gamified, or collaborative digital activities to encourage wider participation. The variation in engagement could be due to differences in learning preferences, digital literacy, or perceived usefulness of interactive tools. Some students may prefer passive learning methods (e.g., watching videos) rather than engaging in interactive discussions, simulations, or digital problem-solving tasks. To address this, educators can design more engaging, gamified, or collaborative digital activities to encourage participation among students who are currently less involved.

Analysis on Cognitive Engagement

Cognitive engagement refers to students' depth of thinking and learning involvement when using technology. The findings indicate that a majority of students, 49.3% agree and 37.4% strongly agree, feel cognitively engaged when using digital learning tools. This suggests that technology is widely perceived as effective in promoting deeper learning, enabling students to process, analyze, and retain information more meaningfully. However, 11.9% of students remain neutral, which implies that a portion of learners may not perceive a strong cognitive benefit. This could be due to the way technology is integrated, if used primarily for passive content delivery, it may fail to stimulate critical thinking. Additionally, 1% disagree and 0.5% strongly disagree, representing a small group who do not find technology helpful for their learning engagement. Factors such as distraction, usability issues, or lack of motivation may contribute to this perception. To foster greater cognitive engagement, educators should design digital tasks that involve problem-solving, analysis, and application. Tools that encourage higher-order thinking, such as simulations, case-based learning, or collaborative digital projects, can bridge the gap between content delivery and cognitive involvement. Figure 5 below illustrate the student response on cognitive engagement.

The variation in cognitive engagement may stem from differences in students' critical thinking abilities, self-regulation skills, or the perceived relevance of digital content. While many students demonstrate deep involvement with technology-enhanced learning, others may struggle to engage meaningfully with content that requires sustained attention or analytical thinking. This disparity highlights the importance of designing digital learning experiences that are not only informative but also intellectually stimulating. For students who are less cognitively engaged, instructors can integrate higher-order thinking tasks such as digital problem-solving activities, reflective online discussions, or scenario-based simulations. Tailoring content to challenge learners at different cognitive levels helps ensure that all students, regardless of their preferred learning style or academic confidence, have opportunities to engage deeply with the material.

International Journal of Education, Psychology and Counseling
IJEPC
EISSN : 0128-164X
Volume 10 Issue 59 (September 2025) PP. 1231-1252
DOI 10.35631/IJEPC.105990

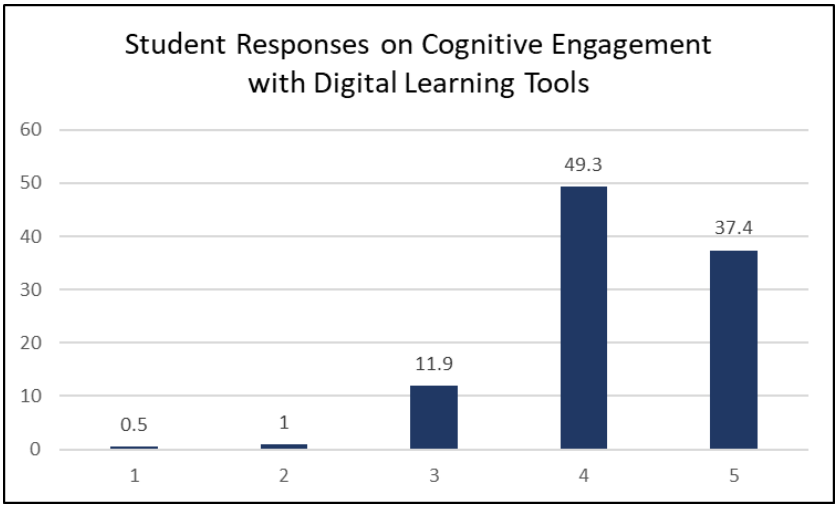


Figure 5: Student Responses on Cognitive Engagement with Digital Learning Tools

The cognitive engagement construct recorded a mean score of 4.08 with a standard deviation of 0.93, indicating that students generally agree that digital tools enhance their cognitive involvement in learning. However, the relatively high standard deviation suggests noticeable variation in responses, while many students find technology beneficial for stimulating thinking and understanding, others may be less convinced of its impact. This variation could be attributed to differences in how technology is integrated into coursework. Not all digital learning experiences are equally effective in fostering deep learning; for some students, the tools may support higher-order thinking, while for others, they may feel superficial or disconnected from meaningful engagement.

A potential explanation for this variation is that some students may find traditional learning methods more effective, or they may feel overwhelmed by certain digital platforms. Others may struggle with distractions in online learning environments, reducing their cognitive engagement. To address this, educators should consider implementing structured digital activities that promote higher-order thinking skills, such as problem-solving, analytical discussions, and project-based learning using technology. Ensuring that technology use is purposeful and interactive can help maximize cognitive engagement for all students.

Analysis on Emotional Engagement

Emotional engagement refers to students' feelings, attitudes, and motivation toward technology-enhanced learning. The results indicate that a majority of students feel positively toward using digital tools in their studies, with 51.7% agreeing and 33.9% strongly agreeing that technology contributes to a positive learning experience. This high level of agreement suggests that most students feel emotionally connected and motivated when learning with digital platforms. Contributing factors may include the flexibility, personalization, and interactivity that technology offers. However, 11.4% of students reported a neutral stance, while 2.5% disagreed and 0.5% strongly disagreed, indicating that a small portion of students may not feel emotionally engaged. These students might experience frustration, lack of motivation, or disconnection due to impersonal digital environments or unfamiliarity with the tools used. Addressing emotional engagement may require fostering a more supportive, interactive, and inclusive digital learning atmosphere that considers students' emotional needs

International Journal of Education, Psychology and Counseling
IJEPC
EISSN : 0128-164X
Volume 10 Issue 59 (September 2025) PP. 1231-1252
DOI 10.35631/IJEPC.105990

alongside academic goals. Figure 6 below illustrate the student response on emotional engagement.

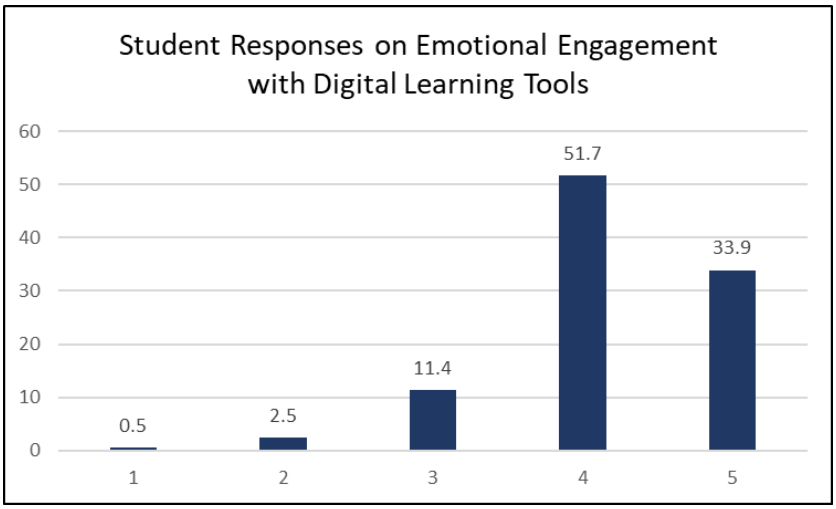


Figure 6: Student Responses on Emotional Engagement with Digital Learning Tools

Several factors could contribute to lower emotional engagement among some students. Technological anxiety, lack of familiarity, or preference for traditional face-to-face interactions may hinder their emotional connection with digital learning. Some students may feel isolated in online learning environments or struggle with motivation when learning through screens rather than in a classroom setting. To enhance emotional engagement, institutions could implement mentorship programs, digital literacy workshops, and peer collaboration strategies to foster a sense of community and belonging in digital learning spaces. Ensuring that technology supports both academic success and emotional well-being will help students develop a more positive attitude toward digital learning. The findings also indicate that students generally have a positive emotional connection to technology, as shown by the consistently high mean scores across statements related to technology use and engagement. However, some students remain neutral or express slight disagreement, as reflected in the standard deviation values, which are generally higher for engagement variables compared to technology usage variables.

The emotional engagement construct recorded a mean score of 4.06 with a standard deviation of 0.87, indicating that students generally agree that digital tools contribute positively to their emotional connection with learning. However, the standard deviation suggests some variability in students' emotional responses. While many students feel motivated, interested, and supported when using technology, others may not share the same positive sentiments. This variation could be influenced by factors such as the quality of digital content, the level of personalization in learning platforms, or students' prior experiences with online learning. For emotionally disengaged students, impersonal interfaces, technical difficulties, or lack of social interaction may reduce feelings of belonging or motivation. To enhance emotional engagement, institutions can implement digital mentorship programs, peer collaborations, and interactive support systems that help students develop a stronger sense of connection in online learning spaces.

International Journal of Education, Psychology and Counseling
IJEPC
EISSN : 0128-164X
Volume 10 Issue 59 (September 2025) PP. 1231-1252
DOI 10.35631/IJEPC.105990

Discussion

The findings from this study offer compelling evidence that digital tools significantly influence student engagement in university classrooms, affirming the importance of purposeful technology integration in higher education. Students' positive responses across behavioral, emotional, and cognitive engagement dimensions suggest that digital tools are not merely supplementary but central to shaping learning experiences. The analysis reveals widespread use and favorable perceptions of digital tools among students, with high mean scores indicating strong agreement on their accessibility, usability, and effectiveness in supporting academic tasks. These results align with earlier studies by Martin et al. (2020) and Gikandi et al. (2011), which emphasized the increasing normalization of digital tools in learning environments. Importantly, nearly all students reported access to personal computing devices and frequent internet usage, highlighting the digital readiness of the sampled population. This accessibility likely enhances their capacity to engage with technology-rich content.

The high levels of behavioral engagement observed, including timely assignment submission, regular class attendance, and participation in quizzes and group activities, reinforce the role of digital tools in supporting consistent student involvement. These outcomes echo Fredricks et al. (2004) and Lai & Bower (2020), who suggested that when students are provided with structured, interactive digital environments, they are more likely to demonstrate proactive learning behaviors. However, the slightly lower scores for checking LMS updates and participation in extracurricular webinars suggest that not all digital behaviors are equally embraced. This may point to the need for more engaging communication strategies or incentive structures to encourage full use of digital ecosystems. Students generally reported strong emotional connections to technology-enhanced learning, particularly in terms of motivation, enjoyment, and confidence. These findings are consistent with Martin et al. (2020), who argued that emotional engagement can be fostered through interactive tools and personalized learning paths. Nevertheless, responses related to feelings of belonging and peer connection, while positive, were relatively lower. This suggests that while technology can enhance motivation and interest, it may not fully replicate the social-emotional benefits of in-person learning. Institutions may need to design more collaborative and community-based digital learning opportunities to strengthen this dimension.

Cognitive engagement outcomes indicate that students actively use technology to explore content beyond the classroom, develop critical thinking, and assess their own learning. This is especially encouraging as it signals deep learning behaviors, consistent with the literature emphasizing the cognitive benefits of adaptive learning systems and digital content curation (Henrie et al., 2015; Gikandi et al, 2011). However, the broader standard deviations in some items suggest variability in student experiences, potentially due to differences in digital literacy or the types of technologies implemented across courses.

The use of Fredricks et al.'s (2004) three-dimensional engagement model proves instrumental in understanding how digital tools affect student learning holistically. Behavioral engagement was most consistently high, indicating effective task completion and participation. Emotional and cognitive engagement also reflected strong trends but revealed areas where more intentional instructional design could further enhance learning, particularly in fostering peer connection and deeper thinking. These findings have significant implications for educators and institutions aiming to leverage digital tools for engagement. It is not enough to provide access to technology; digital tools must be integrated thoughtfully into pedagogical practices.

International Journal of Education, Psychology and Counseling
IJEPC
EISSN : 0128-164X
Volume 10 Issue 59 (September 2025) PP. 1231-1252
DOI 10.35631/IJEPC.105990

Educators should balance structured, interactive, and reflective learning activities across platforms to engage all three dimensions of student engagement. Institutions, meanwhile, must continue addressing digital equity by ensuring all students have access to reliable devices, internet, and support resources.

This study makes three important contributions. First, at the theoretical level, it extends the application of Fredricks et al.'s (2004) three-dimensional engagement model by demonstrating how digital tools map onto behavioral, emotional, and cognitive engagement in a Malaysian higher education context. Second, at the empirical level, it provides large-sample descriptive evidence that complements existing qualitative and conceptual studies, offering concrete patterns of how students use and perceive digital tools in their daily academic routines. Third, at the practical level, the findings inform educators and policymakers by highlighting both the strengths of digital tools (e.g., interactivity, flexibility, and motivation) and the challenges of digital fatigue, unequal digital literacy, and varying levels of participation. Together, these contributions enrich the existing literature while guiding more intentional, balanced strategies for leveraging technology to foster meaningful student engagement.

Conclusion

This study explored the impact of digital tools on student engagement in higher education through a descriptive analysis of survey responses from 404 university students. The findings revealed that digital tools play a significant role in enhancing student engagement across behavioral, emotional, and cognitive dimensions. Students reported frequent use of digital platforms, positive attitudes toward technology integration in the classroom, and strong engagement in technology-mediated learning activities. Behaviorally, students actively participated in class discussions, completed assignments on time, and utilized interactive tools for collaboration. Emotionally, they expressed motivation, enjoyment, and confidence when using digital technologies for learning. Cognitively, students demonstrated a willingness to explore content beyond required readings, engage in critical thinking, and use digital tools for self-regulated learning. These outcomes affirm that digital tools, when effectively integrated, can enrich the overall learning experience and promote deeper academic involvement.

From a practical standpoint, the study underscores the importance of structured and purposeful use of digital tools in university classrooms. Educators should design learning experiences that go beyond content delivery by incorporating interactivity, collaboration, and reflection. Institutions, in turn, should ensure digital equity by providing reliable access to devices, stable internet connectivity, and digital literacy support for all students. Additionally, professional development programs for instructors can help optimize the pedagogical use of educational technologies. Despite the insightful findings, this study has several limitations. First, the use of convenience sampling may limit the generalizability of the results beyond the surveyed population. Second, the study relied solely on self-reported data, which may be influenced by response bias or subjective interpretation of engagement. Third, the analysis focused on descriptive statistics, which do not capture causal relationships between variables.

Future research should consider employing mixed-methods or longitudinal approaches to explore how digital tools influence engagement over time and in different educational contexts. Investigating the effectiveness of specific technologies or instructional strategies across diverse student populations can offer deeper insights. Additionally, future studies could incorporate performance-based measures of engagement and learning outcomes to complement self-

International Journal of Education, Psychology and Counseling
IJEPC
EISSN : 0128-164X
Volume 10 Issue 59 (September 2025) PP. 1231-1252
DOI 10.35631/IJEPC.105990

reported perceptions. In conclusion, digital tools hold considerable promise for enhancing student engagement in higher education. However, their success depends on how thoughtfully they are implemented. By aligning technology use with sound pedagogical practices and drawing on insights from recent advances in AI integration (Zawacki-Richter et al., 2020), educators and institutions can create more engaging, inclusive, and effective learning environments for the digital age.

Acknowledgement

The authors would like to express their gratitude to the students of Universiti Teknologi MARA (UiTM) who participated in this study. Their valuable time and responses made this research possible. The authors also acknowledge the support of the Faculty of Business and Management, UiTM Cawangan Perlis for providing the necessary academic environment to conduct this research.

References

Aguilera-Hermida, A. P. (2020). College students' use and acceptance of emergency online learning due to COVID-19. *International Journal of Educational Research Open, 1*, 100011. https://doi.org/10.1016/j.ijedro.2020.100011

Bao, W. (2020). COVID-19 and online teaching in higher education: A case study of Peking University. *Human Behavior and Emerging Technologies, 2*(2), 113–115. https://doi.org/10.1002/hbe2.191

Bond, M., Bedenlier, S., Marín, V. I., & Händel, M. (2020). Emergency remote teaching in higher education: Mapping the first global wave of COVID-19 research. *Computers in Human Behavior Reports, 2*, 100009. https://doi.org/10.1016/j.chbr.2020.100009

Fredricks, J. A., Blumenfeld, P. C., & Paris, A. H. (2004). School engagement: Potential of the concept, state of the evidence. *Review of Educational Research, 74*(1), 59–109. https://doi.org/10.3102/00346543074001059

Gikandi, J. W., Morrow, D., & Davis, N. E. (2011). Online formative assessment in higher education: A review of the literature. *Computers & Education, 57*(4), 2333–2351. https://doi.org/10.1016/j.compedu.2011.06.004

Hern, A. (2023). ChatGPT use widespread among students, say UK universities. *The Guardian*. https://www.theguardian.com/education/2023/feb/22/chatgpt-widespread-use-university-students

Henrie, C. R., Bodily, R., Manwaring, K. C., & Graham, C. R. (2015). Exploring student engagement in blended learning. *Computers & Education, 80*, 152–175. https://doi.org/10.1016/j.compedu.2014.08.012

Lai, C., & Bower, M. (2020). Technology-mediated learning and student engagement: A meta-analysis of research findings. *Educational Technology Research and Development, 68*(5), 1981–2008. https://doi.org/10.1007/s11423-020-09715-7

Martin, F., & Bolliger, D. U. (2018). Engagement matters: Student perceptions on the importance of engagement strategies in the online learning environment. *Online Learning, 22*(1), 205–222. https://doi.org/10.24059/olj.v22i1.1092

Martin, F., Sun, T., & Westine, C. D. (2020). A systematic review of research on online teaching and learning from 2009 to 2018. *Computers & Education, 159*, 104009. https://doi.org/10.1016/j.compedu.2020.104009

Martin, F., Wang, C., & Sadaf, A. (2018). Student perception of helpfulness of facilitation strategies that enhance instructor presence, connectedness, engagement and learning in

International Journal of Education, Psychology and Counseling
IJEPC
EISSN : 0128-164X
Volume 10 Issue 59 (September 2025) PP. 1231-1252
DOI 10.35631/IJEPC.105990

online courses. *The Internet and Higher Education, 37*, 52–65. https://doi.org/10.1016/j.iheduc.2018.01.003

Redmond, P., Heffernan, A., Abawi, L., Brown, A., & Henderson, R. (2020). Challenges and opportunities of online learning during the COVID-19 pandemic. *Australian Journal of Teacher Education, 45*(4), 1–13. https://doi.org/10.14221/ajte.2020v45n4.1

Sun, J. C. Y., Xie, K., & Anderman, E. M. (2020). The role of self-regulated learning in students' engagement in online learning. *Educational Psychologist, 55*(4), 193–212. https://doi.org/10.1080/00461520.2020.1863187

Zawacki-Richter, O., Marín, V. I., Bond, M., & Gouverneur, F. (2020). Systematic review of research on artificial intelligence applications in higher education – Where are the educators? *International Journal of Educational Technology in Higher Education, 17*, 39. https://doi.org/10.1186/s41239-020-00200-8