



Analysis of Student Engagement in Digital Learning in Higher Education

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ABSTRACT

This study aims to analyze student engagement in digital learning in higher education by exploring how students experience, interpret, and sustain their participation in online learning environments. Using a qualitative case study approach, data were collected through semi-structured interviews, limited participatory observation, and documentation involving undergraduate students, lecturers, and academic staff who were directly involved in digital learning practices. The data were analyzed thematically to identify patterns of meaning related to students' learning experiences. The findings reveal four main themes: meaningful presence in digital classrooms, interaction as the foundation of engagement, digital fatigue and selective participation, and self-regulated strategies for sustaining engagement. The study shows that engagement is not limited to visible indicators such as attendance, LMS access, or assignment submission, but also includes less visible forms of participation, such as reviewing materials, managing learning schedules, peer discussion, and maintaining motivation. These findings contribute to a deeper understanding of student engagement as a relational and contextual process shaped by pedagogical design, lecturer support, peer interaction, technological access, and students' personal learning conditions. The study implies that lecturers and institutions need to design digital learning that is interactive, flexible, inclusive, and supportive of students' well-being. Further research is recommended to examine engagement across different institutional settings and to integrate qualitative findings with learning analytics.



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1. Introduction

The rapid digital transformation of higher education has reshaped the ways students access knowledge, communicate with lecturers, collaborate with peers, and construct learning experiences. Globally, digital learning is no longer viewed merely as an emergency response to the COVID-19 pandemic, but as an increasingly institutionalized component of contemporary university education. It includes learning management systems, synchronous virtual meetings, asynchronous forums, digital assignments, interactive quizzes, video-based learning, and collaborative online platforms. However, the expansion of digital learning has raised an important question: to what extent are students genuinely engaged in digital learning environments? Martin and Borup (2022) argue that online learner engagement is a multidimensional construct that cannot be reduced to platform attendance or login frequency, because it also involves cognitive, emotional, behavioral, and social participation in learning activities.

In national higher education contexts, including developing educational systems, universities have increasingly adopted digital platforms to support teaching and learning. Nevertheless, empirical realities indicate that technological availability does not automatically produce meaningful student engagement. In many digital classrooms, students may attend virtual sessions while turning off cameras, remain silent during discussions, submit assignments only to meet formal requirements, or experience fatigue due to repetitive screen-based learning. Yeung and Yau (2022) found that higher education students experienced challenges in online learning related to limited interaction, environmental distractions, time-management difficulties, and the need for stronger institutional support. These findings suggest that the central issue in digital learning is not only technological readiness, but also how students experience presence, participation, interaction, and academic belonging in virtual learning spaces.

Student engagement in digital learning is important because it is closely related to academic persistence, learning motivation, student satisfaction, and the development of self-regulated learning. From an educational perspective, engagement reflects students' active involvement in learning tasks, their willingness to interact with lecturers and peers, and their capacity to construct meaning from learning experiences. Brown et al. (2022) developed a conceptual framework showing that online student engagement in higher education is shaped by course design, emotional support, learning structure, social interaction, and students' ability to manage both positive and negative learning experiences. From a social and cultural perspective, engagement is also connected to digital access, communication norms, academic culture, social presence, and students' sense of belonging within the university learning community.

Recent studies show that digital learning can enhance flexibility, participation, and student autonomy when it is designed interactively and pedagogically. Gamage et al. (2022) reported that online and hybrid learning can strengthen student engagement and experience when teaching strategies, feedback mechanisms, and collaborative activities are carefully structured. However, other studies demonstrate that digital learning may reduce social connectedness, particularly among students who are new to higher education or unfamiliar with online academic environments. Tang et al. (2023) found that online learning influenced first-year students' sense of belonging, especially when academic and social interactions were not naturally developed. This indicates that student engagement should not be understood only as an individual response, but as a relational and contextual process shaped by pedagogical design, institutional support, peer interaction, and students' subjective learning experiences.

Although research on student engagement in digital learning has expanded significantly, many existing studies still emphasize quantitative measurement, platform effectiveness, student satisfaction, academic performance, or relationships among variables. El-Sayad et al. (2021), for example, examined students' perceived online engagement and satisfaction through a survey-based approach, which provides useful general patterns but does not fully capture the meanings and lived experiences behind students' participation. Farrell and Brunton (2020) revealed that online student engagement is a complex "balancing act" involving academic demands, personal circumstances, motivation, and learning design. Therefore, a literature gap remains in qualitative studies that explore how students interpret their engagement, how engagement is formed through digital interactions, and what factors make students feel present, connected, or alienated in digital learning environments.

Based on this background, the present study aims to analyze students' experiences, meanings, and processes of engagement in digital learning within higher education. The study focuses on how students understand engagement, what forms of engagement emerge in digital learning activities, what factors support or hinder engagement, and what strategies students use to maintain academic participation in virtual spaces. Theoretically, this study is expected to enrich the literature on student engagement by placing students' subjective experiences at the center of analysis. Burke et al. (2022) emphasize that not all meaningful forms of student engagement can be captured through visible or measurable indicators, because pedagogical care, emotional

support, and relational learning also matter. Practically, this study may provide insights for lecturers, study programs, and higher education institutions in designing digital learning that is more interactive, inclusive, reflective, and meaningful for students.

2. Materials and Methods

This study employs a qualitative approach using a case study design. This design is selected because the purpose of the study is not to statistically measure the level of student engagement, but to understand in depth the experiences, meanings, and processes through which students engage in digital learning. A case study allows the researcher to examine student engagement contextually, particularly because engagement is shaped by course design, academic culture, technological support, lecturer–student interaction, peer communication, and students' personal learning conditions. Armellini et al. (2021) showed that students' learning experiences in active blended learning are strongly influenced by institutional context, variations in learning activities, and the perceived quality of lecturer support.

The research may be conducted at a higher education institution that has implemented digital learning through a learning management system, video-conferencing applications, online discussion forums, and digital assessment platforms. The study period may last approximately three to four months, covering preliminary observation, participant recruitment, data collection, data analysis, validation of findings, and report writing. The research participants consist of active undergraduate students who have experienced digital learning for at least one semester, lecturers who teach digital or blended courses, and, where necessary, academic staff or LMS administrators as supporting informants. Participants are selected purposively because they are directly involved in digital learning practices. Curelaru et al. (2022) demonstrated that students' perceptions of online learning vary depending on their learning experiences, challenges, and adaptation strategies.

The number of participants in this qualitative study is flexible and follows the principle of data sufficiency or saturation. Operationally, the study may involve 15–25 students from several study programs, 3–5 lecturers, and 1–2 academic or digital learning administrators. Student participants should meet several criteria: they are active university students, have participated in digital learning, have used LMS or other online learning platforms, are willing to be interviewed, and are able to reflect on their learning experiences. Purposive sampling is used at the initial stage to identify participants who are relevant to the research focus. Snowball sampling may also be applied when additional participants are needed, especially students who show high engagement, low engagement, or particular difficulties in digital learning. Stevanović et al. (2021) found that students' distance learning experiences are diverse, indicating the importance of selecting participants based on variation of experience rather than numerical representation alone.

Data are collected through semi-structured interviews, limited participatory observation, and documentation. Semi-structured interviews are used to explore students' experiences of digital engagement, including their motivation, participation in discussion, interaction with lecturers and peers, technical barriers, digital fatigue, learning strategies, and interpretation of presence in virtual classrooms. Observation is conducted in digital learning activities, such as LMS forums, synchronous meetings, online discussions, chat interactions, assignment responses, and student participation during class sessions. Documentation includes course syllabi, digital learning materials, assignment instructions, LMS activity records, discussion forums, and institutional policies related to digital learning. Abbas et al. (2022) showed that digital communication tools such as online chat and chatbots may support student engagement, which means that digital traces and communication records can serve as important supporting data.

Data trustworthiness is ensured through source triangulation, method triangulation, member checking, and audit trail. Source triangulation is conducted by comparing information obtained from students, lecturers, and academic or digital learning administrators. Method triangulation is

applied by comparing interview data, observation notes, and digital learning documents. Member checking is carried out by asking participants to review interview summaries or preliminary interpretations to ensure that the researcher's understanding is consistent with participants' intended meanings. An audit trail is maintained by documenting the research process, interview guidelines, analytical memos, transcripts, observation notes, coding decisions, and theme development. Chiu (2023) used a qualitative approach to understand student engagement from the perspective of self-determination theory, demonstrating the importance of interpreting motivational meaning through validated narrative data.

The data are analyzed using thematic analysis through an interactive process of data condensation, data display, and conclusion drawing. At the initial stage, the researcher repeatedly reads interview transcripts, observation notes, and documents to develop familiarity with the data. The researcher then conducts open coding by identifying meaningful statements related to digital engagement, such as academic presence, discussion participation, motivation, digital fatigue, lecturer support, peer collaboration, technological barriers, and adaptation strategies. These codes are grouped into broader categories and themes, such as "engagement as meaningful presence," "limited interaction in digital classrooms," "student strategies for coping with online fatigue," and "the role of learning design in shaping participation." Lasekan et al. (2024) emphasize that thematic analysis is useful for identifying factors that influence engagement in sustainable online education. The final analysis is presented as thematic narratives that connect participants' lived experiences with theoretical concepts of student engagement in digital learning.

3. Results and Discussions

The findings of this study indicate that student engagement in digital learning is a dynamic and multidimensional process. Engagement was not only reflected in students' attendance in online classes or their submission of assignments, but also in how they interpreted their presence, interacted with lecturers and peers, managed learning fatigue, and developed strategies to maintain participation. Based on the thematic analysis of interview data, observation notes, and learning documents, four main themes emerged: meaningful presence in digital classrooms, interaction as the foundation of engagement, digital fatigue and selective participation, and self-regulated strategies for sustaining engagement.

The first theme is meaningful presence in digital classrooms. The data show that students distinguished between merely attending online classes and being meaningfully involved in learning activities. Several participants stated that they were often formally present in synchronous sessions, but not always cognitively or emotionally engaged. This was especially evident when online learning was dominated by one-way lectures, limited interaction, and repetitive activities. One participant stated, "Sometimes I join the Zoom class, but I do not really feel present. I listen, but my mind is somewhere else, especially when the class is only lecture and there is no discussion" (Participant S4). This statement indicates that attendance alone cannot be used as the only indicator of engagement. Observation data also showed that although many students were present in virtual meetings, only a small number actively responded to lecturers' questions or participated in discussion. However, students became more responsive when lecturers used case examples, short questions, polls, or reflective tasks.

The second theme is interaction as the foundation of engagement. Most participants explained that they felt more engaged when lecturers created opportunities for two-way communication, peer discussion, and collaborative learning. Interactive classes were perceived as more meaningful because students felt recognized and involved in the learning process. One participant explained, "I feel more motivated when the lecturer asks our opinion or gives us a problem to solve in groups. It makes me feel that I am part of the class, not just watching a video" (Participant S9). This finding was supported by documentation from online discussion forums, where classes with structured discussion prompts showed more active student responses than classes that only uploaded materials and assignments. Peer interaction also played an important role. Students used

informal communication channels, such as WhatsApp groups, to clarify instructions, share learning resources, remind each other about deadlines, and reduce feelings of isolation.

The third theme is digital fatigue and selective participation. Students reported that long screen time, unstable internet connection, overlapping assignments, and continuous online notifications reduced their motivation to participate actively. Digital learning was seen as flexible, but it also blurred the boundaries between academic life and personal life. One participant stated, “Online learning is flexible, but sometimes it feels like there is no boundary. Classes, assignments, group meetings, and notifications keep coming. I become tired and only focus on the subjects that I think are most important” (Participant S13). This finding suggests that low participation should not always be interpreted as laziness or lack of responsibility. In many cases, students’ selective participation was a strategy to manage limited energy, technological constraints, and competing responsibilities. Students were more willing to participate when instructions were clear, deadlines were reasonable, and learning activities were varied.

The fourth theme is self-regulated strategies for sustaining engagement. Students developed various strategies to remain involved in digital learning, such as rewatching recorded lectures, making personal schedules, discussing tasks with peers, reading additional materials, and using digital reminders. These strategies were important because digital learning required students to manage their own time, attention, and learning environment. One participant explained, “I usually watch the recording again at night because during the live class my internet is sometimes unstable. I also make notes from the LMS materials so I can understand the topic better” (Participant S7). The data show that engaged students were not always those who spoke frequently during synchronous sessions. Some students demonstrated engagement through silent but consistent learning practices, such as reading materials, reviewing recorded lectures, completing reflective assignments, and participating in peer discussions outside formal class hours.

Overall, the results show that student engagement in digital learning is shaped by pedagogical, technological, social, and emotional factors. Students were more engaged when digital learning provided clear instructions, meaningful interaction, flexible access to learning materials, and supportive communication with lecturers and peers. Conversely, engagement decreased when online learning was dominated by passive lectures, unclear assignments, excessive workload, and limited social connection. These findings highlight that student engagement in digital learning should be understood not only as visible participation, but also as a complex learning experience involving motivation, interaction, self-regulation, and a sense of belonging.

Discussion

The findings of this study confirm that student engagement in digital learning is multidimensional and context-dependent. Engagement cannot be understood only through attendance records, LMS access frequency, or assignment submission. This finding is consistent with Martin and Borup (2022), who explain that online learner engagement includes behavioral, cognitive, emotional, and social dimensions. The distinction between formal presence and meaningful presence found in this study provides a deeper understanding of digital engagement. Students may be present in virtual platforms, but they may still be cognitively and emotionally disconnected from the learning process. Therefore, the evaluation of digital learning should not rely only on quantitative indicators of participation, but also consider the quality of students’ learning experiences.

The finding that interaction is central to student engagement supports previous studies that emphasize the importance of social presence and relational learning in online education. Brown et al. (2022) found that student engagement in online higher education is shaped by course design, interaction, emotional support, and students’ ability to manage learning experiences. In this study, interaction encouraged students to feel recognized, involved, and connected to the class. This finding also supports Tang et al. (2023), who showed that students’ sense of belonging in online learning is influenced by opportunities for academic and social interaction. Thus, digital

engagement is not merely a technical matter of using platforms, but also a social process that depends on the quality of communication between lecturers, students, and peers.

The results also show that digital fatigue affects students' willingness and ability to participate actively. This finding is in line with Farrell and Brunton (2020), who describe online student engagement as a balancing act involving academic demands, personal circumstances, motivation, and learning design. In this study, students' selective participation reflected their effort to manage cognitive load, emotional exhaustion, internet problems, and overlapping responsibilities. This finding offers a critical perspective on student disengagement. Low participation should not immediately be understood as a sign of student apathy. Instead, it may indicate that the structure of digital learning creates pressure, fatigue, or limited opportunities for meaningful involvement.

The emergence of self-regulated learning strategies indicates that digital engagement is closely related to students' ability to organize their own learning. Chiu (2023) emphasizes that motivation is an important prerequisite for engagement in online learning. However, the findings of this study suggest that motivation alone is not sufficient. Students also need clear learning instructions, accessible materials, lecturer feedback, flexible learning resources, and supportive peer networks. In other words, self-regulation is shaped not only by individual discipline, but also by the learning environment. Students are more able to regulate their engagement when digital learning is structured, predictable, and responsive to their needs.

This study also contributes to the literature by highlighting the existence of visible and invisible forms of engagement. Many digital learning practices still define engagement through visible indicators such as attendance, camera use, verbal participation, or frequency of LMS access. However, the findings show that some students engage silently through reading materials, reviewing recordings, taking notes, completing assignments, and discussing learning tasks with peers outside the formal class. This finding is relevant to Burke et al. (2022), who argue that not everything that matters in online engagement can be easily measured. Therefore, lecturers should avoid assuming that quiet students are always disengaged. Instead, they should provide multiple channels for participation, including oral discussion, written reflection, asynchronous forums, group work, and individual learning tasks.

Theoretically, this study strengthens the view that student engagement is a relational and situated process. Engagement does not exist only within the student as an individual attribute, but emerges from the interaction between student agency, lecturer pedagogy, peer support, technological infrastructure, and institutional culture. This perspective is consistent with Lasekan et al. (2024), who found that sustainable online engagement is influenced by interaction, learning design, motivation, and digital learning conditions. The present study extends this perspective by showing how students interpret and negotiate engagement in everyday digital learning practices.

Practically, the findings suggest that lecturers need to design digital learning activities that promote active and meaningful participation. Lecturers should reduce long one-way lectures and replace them with interactive strategies such as problem-based discussion, reflective questions, breakout room activities, peer feedback, short quizzes, and collaborative projects. Clear instructions and reasonable workloads are also important to prevent digital fatigue. In addition, lecturers should provide flexible participation options for students who experience internet instability or personal constraints. Recorded lectures, asynchronous discussion forums, and well-organized LMS materials can help students remain engaged even when they cannot fully participate in synchronous sessions.

For higher education institutions, the findings imply that digital learning quality should not be measured only by platform availability or system usage. Institutions need to provide pedagogical training for lecturers, technical assistance for students, and policies that prevent excessive online workload. Universities also need to support students' self-regulated learning by providing academic guidance, digital literacy support, and accessible learning resources. In this sense, digital transformation in higher education should not focus only on technology adoption, but also

on creating a learning culture that supports interaction, inclusion, flexibility, and student well-being.

Future research may explore student engagement in digital learning across different disciplines, academic levels, and institutional contexts. Comparative studies between urban and rural universities may provide deeper understanding of how infrastructure and digital access shape engagement. Further research may also investigate lecturers' perspectives on designing engagement-oriented digital learning. In addition, mixed-method research could combine qualitative interviews with learning analytics to compare students' visible platform activities with their subjective learning experiences. Such studies would enrich understanding of how student engagement is formed, sustained, weakened, or transformed in digital higher education.

Overall, this study shows that student engagement in digital learning is a complex phenomenon involving presence, interaction, fatigue, self-regulation, and belonging. The findings challenge the assumption that engagement can be measured only through attendance or platform activity. Instead, engagement should be understood as a meaningful learning process shaped by pedagogical design, social connection, emotional experience, and students' ability to navigate digital academic environments.

4. Conclusions

This study concludes that student engagement in digital learning in higher education is a multidimensional process involving meaningful presence, interaction, digital fatigue, self-regulation, and a sense of belonging. The findings show that engagement cannot be understood only through formal indicators such as attendance, LMS access, camera use, or assignment submission. Students may be formally present in digital classrooms while remaining cognitively and emotionally disconnected. Conversely, some students demonstrate engagement through less visible practices, such as reviewing recorded lectures, reading digital materials, taking notes, participating in peer discussions, and managing their own learning strategies. Therefore, this study contributes to the literature by emphasizing that student engagement in digital learning should be understood as a situated and relational experience shaped by pedagogical design, lecturer support, peer interaction, technological access, and students' personal learning conditions.

Theoretically, this study strengthens the understanding of student engagement as a complex phenomenon that includes behavioral, cognitive, emotional, and social dimensions. Practically, the findings suggest that lecturers need to design digital learning activities that are interactive, flexible, and meaningful, while institutions should provide pedagogical training, technical support, and policies that prevent excessive digital workload. From a policy perspective, higher education institutions should evaluate digital learning quality not only through platform usage, but also through students' experiences of interaction, clarity, belonging, and academic support. Future research is recommended to examine student engagement across different disciplines, institutional contexts, and levels of digital readiness, as well as to combine qualitative inquiry with learning analytics to better understand the relationship between visible and invisible forms of engagement.

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