

# **Investigating Influential Factors on Student Engagement and Success in Lifelong Learning Online Courses for Practical-based Subjects: A Case Study Approach**

**Mohd Hafiez Ahmad<sup>1</sup>, Sharifah Nadiyah Razali<sup>2\*</sup>, Nur Alin Azhari<sup>2</sup>**

<sup>1</sup>Politeknik Merlimau Melaka,  
77300 Merlimau, Melaka, Malaysia.

<sup>2</sup>Kolej Komuniti Selandar,  
77500 Selandar, Melaka, Malaysia.

\*Corresponding Author's Email: [sharifah.nadiyah@kkselandar.edu.my](mailto:sharifah.nadiyah@kkselandar.edu.my)

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## **Abstract**

Kolej Komuniti, recognized as a leading provider of lifelong learning, traditionally offers face-to-face courses to enhance community skills and knowledge. The COVID-19 pandemic precipitated a seismic shift, compelling a rapid transition to online platforms. This shift expanded engagement beyond the targeted areas but posed significant challenges, particularly for delivering practical-based subjects online. This study investigates factors influencing student engagement and success in online lifelong learning courses focused on technical subjects. Utilizing a case study methodology, data were collected from participants enrolled in an Internet of Things course via a prominent online learning platform. The findings identify three key factors: Instructor Presence, Engagement with Instructor, and Digital Competence. These elements are crucial for enhancing student engagement and success in online technical courses. The study offers valuable insights for educators and course designers to improve the quality and effectiveness of online lifelong learning experiences in technical domains.

**Keywords:** Lifelong Learning; Online Platform; Practical-based Subject; Student Engagement.

## **1.0 Introduction**

Lifelong learning has come to be recognised as essential to ongoing professional and personal development in today's rapidly changing educational landscape. Kolej Komuniti, recognized as a leading provider of lifelong learning, traditionally offers face-to-face courses to enhance community skills and knowledge. However, the COVID-19 pandemic precipitated a seismic shift, compelling a rapid transition to online platforms. The emergence of online courses has fundamentally transformed the accessibility of education, enabling individuals from different backgrounds to actively participate in a wide range of disciplines at their own speed. Although theoretical courses have successfully transitioned to online formats, practical subjects pose distinct obstacles requiring specialized techniques to assure student success and engagement (Mesuwini & Mokoena, 2024).

Online courses in lifelong learning that focus on practical subjects, such as engineering, healthcare, and the arts, demand a sophisticated integration of theoretical knowledge and hands-on practice (Bangert et al., 2022). These courses inherently involve hands-on activities, interactive learning, and real-

time feedback, which are vital for replicating the experiential learning process. A significant issue in lifelong learning online courses is maintaining student engagement. Student engagement is crucial as it directly impacts motivation, retention, and overall success (Bowden et al., 2021). Therefore, it is crucial to explore and understand the factors that influence student engagement and success in these settings, enabling educators and instructional designers to develop effective and impactful learning experiences.

This study aims to evaluate the key factors influencing student engagement and performance in lifelong learning online courses, focusing on the six-hour IoT Basic short course. The course helps participants design and create a functional IoT device, integrating hardware and software to address a specific use case. By systematically identifying and analyzing these factors, the study aims to provide valuable insights that can enhance the effectiveness of online learning in practical contexts. The findings will help shape more effective online learning approaches, ensuring that practical subjects are taught with the same quality as traditional in-person training. Ultimately, the research seeks to improve the quality and accessibility of lifelong learning opportunities, empowering students to achieve their academic and career goals in an increasingly digital world.

## **2.0 Literature Review**

### **2.1 Definition of students' engagement**

Student engagement in online learning is about how much attention, curiosity, interest, optimism, and passion students show when they are learning or being taught in an online environment (McKeithan et al., 2021). This engagement appears in three dimensions: behavioral, emotional, and cognitive. Behavioral engagement includes students participating in academic, social, or extracurricular activities. Emotional engagement involves how students feel in the classroom, like whether they are interested, bored, or anxious. Cognitive engagement is about how much effort students put into learning, including their willingness to tackle complex ideas and master challenging skills.

### **2.2 Importance of student engagement towards student success**

As the universities shifted from onsite learning to online learning, student engagement became the emerging concern among teachers (Baloran et al., 2021). Engaging students in online learning is crucial for several reasons. Firstly, it is closely linked to academic success. Engaged students are more likely to get higher grades and retain information better than those who are not engaged (Dunn & Kennedy, 2019). Students who are actively engaged in their learning tend to achieve higher grades and perform better on assessments. This is because engagement involves a deep investment in learning activities, leading to better comprehension and retention of information.

Additionally, engagement improves student satisfaction with their learning experience, which reduces dropout rates (Lu, 2020). This is particularly important in online learning environments, where students may feel isolated and disconnected. Engagement helps mitigate these feelings by fostering a

sense of belonging and commitment to the learning process. Moreover, engagement helps build a sense of community and connectedness in online courses, which is essential for students' overall well-being and motivation (Phirangee & Malec, 2017). This is especially important in online courses, where the lack of physical interaction can lead to feelings of isolation. Engaged students participate in collaborative activities, interact with peers, and build supportive relationships, which enhance their overall learning experience and success.

### **2.3 Factors influence student engagement**

Several factors influence student engagement in online learning environments. Instructional Design and Technology plays a critical role, as the quality and usability of the online platform, along with effective instructional design, greatly impact engagement. Interactive elements, multimedia resources, and user-friendly interfaces enhance the learning experience by making it more enjoyable and accessible (Pandita & Kiran, 2023). Equally important is Teacher Presence and Interaction, where the perceived presence and active participation of instructors significantly affect engagement. Regular feedback, personalized communication, and involvement in discussions help students feel supported and valued (Stone & Springer, 2019).

Furthermore, Social Presence and Community Building contribute to a sense of belonging within the learning community. Activities like group projects and discussion forums foster peer interaction, creating a supportive environment that enhances engagement (Peacock et al., 2020). Lastly, Self-Regulation and Motivation are crucial. Students' ability to manage their learning through goal setting, time management, and self-assessment, coupled with intrinsic motivation, sustains engagement in online learning settings (Mendoza et al., 2023). By understanding and addressing these factors, educators and institutions can create more effective and engaging online learning experiences that promote student success.

### **3.0 Methodology**

This case study aims to investigate the factors that influence students' success and engagement in online courses for lifelong learning for practical disciplines. A qualitative method will be employed, involving a study of previous research documentation and focus group interviews. Document review is an effective strategy for gathering secondary data from current studies, papers, and publications, providing a comprehensive perspective on factors already reported in the literature (Morgan, 2022). Meanwhile, focus group interviews have proven to be an effective qualitative research method for gathering detailed information about participants' perspectives, opinions, beliefs, and attitudes toward specific phenomena (Morrison et al., 2020).

This approach allows for an in-depth understanding of the factors influencing student engagement and success in lifelong learning online courses for practical-based subjects. Finally, both data will be triangulate to enhance the reliability and validity of the findings by cross-verifying information from multiple sources, thus providing a comprehensive understanding of the

factors that contribute to student engagement and success in these courses. Combining data from the document review and focus group interviews will enable triangulation, which enhancing the reliability and validity of the findings (Bans-Akutey & Tiimub, 2021).

The first phase involves a document review to identify key factors influencing student engagement and success in online learning. A matrix table will be used to organize and analyse the factors, facilitating the identification of recurring themes. The second phase will focus on developing semi-structured interview questions based on the document review findings. These questions will undergo expert review to ensure their clarity, relevance, and comprehensiveness. In the third phase, focus group interviews will be conducted with nine participants from three different IoT Basic short courses. The interviews will be recorded for transcription and analysis, exploring factors influencing student engagement and success.

In the fourth phase, thematic analysis will be used to analyse the interview transcripts, with steps involving coding, categorizing, and reviewing the data to identify significant themes. To ensure a comprehensive understanding, triangulation will be employed by combining insights from both the document review and the interviews. Ethical considerations will be prioritized throughout the study, including obtaining informed consent, maintaining confidentiality, and ensuring data security by restricting access to the research team only.

## **4.0 Result and Discussion**

### **4.1 Result from document review**

The document review involved an analysis of five key studies to identify factors influencing student engagement and success in online practical-based subjects. The matrix table (Table 1) summarizes the findings, highlighting the presence of various factors across the studies. Instructor Presence was identified in four out of the five studies. Student-Instructor Interaction was highlighted in three studies. Peer Interaction was noted in all five studies, while Course Design was mentioned in two studies. Digital Competence appeared in three studies, and Self-Motivation was included in one study.

Table 1: Matrix Table

	Instructor Presence	Student - Instructor Interaction	Peer Interaction	Course Design	Digital Competence	Self-Motivation
(Farrell & Brunton, 2020)	x		x		x	
(Ong & Quek, 2023)		x	x		x	
(Khlaif et al., 2021)	x	x	x	x	x	
(Salta et al., 2022)	x	x	x			

(Abou-Khalil et al., 2021)	x		x	x		x
TOTAL	4/5	3/5	5/5	2/5	3/5	1/5

The review emphasizes the importance of several factors in enhancing student engagement and success in online practical-based subjects. However, only Instructor Presence, Student-Instructor Interaction, and Digital Competence were selected for inclusion in the semi-structured interviews.

This selection was based on several key considerations. Instructor Presence was identified as a critical factor in online learning environments in four out of five studies. Instructors play a vital role not only in facilitating learning but also in providing essential guidance, support, and feedback, all of which are particularly important in practical-based subjects where hands-on learning is essential. Student-Instructor Interaction was highlighted as significant in three studies, underscoring its role in creating a collaborative and engaging learning environment. Interaction between students and instructors helps establish a sense of community, fosters direct support and discussion, and contributes to overall student engagement and retention. Additionally, Digital Competence was emphasized in three studies for its importance in online learning. As students navigate digital platforms and tools, their ability to use these technologies effectively significantly influences their learning experience. Ensuring students possess the necessary digital skills is crucial for reducing frustration and improving engagement with course materials.

The study excluded Peer Interaction, Course Design, and Self-Motivation for the following reasons: Peer interaction was not feasible due to time constraints in the 6-hour course, making collaborative exercises impractical. Course design was focused on essential, task-oriented activities, limiting the scope for incorporating engaging design elements. Finally, Self-Motivation was not considered a differentiating factor, as participants exhibited uniformly high motivation due to the financial investment and clear, goal-driven purposes for enrolment. By concentrating on instructor presence, student interaction, and digital competence, the semi-structured interviews aim to delve deeply into the most influential factors, providing actionable insights for enhancing student engagement and success in lifelong learning online courses for practical-based subjects. These findings can help inform future instructional practices and interventions to enhance student engagement and learning outcomes.

## **4.2 Semi-Structured Interview Questions**

The results of the document analysis indicate that three key factors emerged as significant influencers of student engagement and success in the online course: instructor presence, student-instructor interaction, and digital competence. These factors play crucial roles in shaping the learning experience and outcomes for participants. To explore deeper into these factors and their impacts, a semi-structured interview protocol has been designed.

The interview protocol comprises three key sections designed to guide the flow of the discussion. The Introduction Section aims to establish rapport with the interviewee and provide a brief overview of the interview's purpose and structure. This helps set a comfortable and focused tone for the conversation. The Body Section forms the core of the interview, where detailed responses are sought regarding the influence of instructor presence, student-instructor interaction, and digital competence on student engagement and success in the online course. Finally, the Closing Section concludes the interview, offering the interviewee an opportunity to share any final thoughts, reflections, or additional insights. This section also includes an expression of gratitude for their participation.

These structured interview questions are intended to gather rich qualitative data that will complement the findings obtained through document analysis, thereby enhancing the depth and comprehensiveness of the study's findings.

### **4.3 Focus Group Interviews**

The semi-structured interview data revealed the substantial influence of instructor presence, engagement with the instructor, and digital competence factors.

#### **4.3.1 Instructor Presence Factor**

The analysis of the semi-structured interview responses reveals a comprehensive understanding of the critical role instructors play in fostering student engagement and success in online practical-based courses. The responses from participants across three groups highlight the multifaceted nature of the instructor's role and its significant impact on the learning experience.

Group 1 participants emphasized the dynamic and engaging nature of the course due to the instructor's active participation in discussions and prompt feedback on assignments. Participant A specifically noted these aspects as key factors in making the course feel lively and interactive. Additionally, Participant S described the instructor as a facilitator who not only delivered content but also fostered discussions and provided ongoing support, thereby creating a sense of accountability among students. Participant C echoed this sentiment, emphasizing the importance of the instructor's clear explanations and responsiveness to queries in maintaining student engagement and enhancing the overall learning experience.

In Group 2, the instructor's role was described as multifaceted by Participant E, who highlighted their involvement in delivering lectures, facilitating discussions, and providing personalized feedback. This approach gave the course a structured and directed feel. Participant M viewed the instructor as a mentor who guided students through the learning process, emphasizing the importance of approachability and responsiveness in fostering a supportive learning environment. Participant L further noted that the instructor acted as a bridge between the course content and students' understanding, with their active engagement and responsiveness fostering a sense of camaraderie among participants.

Group 3 participants highlighted the instructor's expertise and guidance as essential for understanding complex concepts. Participant J noted that the instructor provided a solid foundation for comprehending difficult material. Participant I saw the instructor as a mentor who nurtured critical thinking skills and fostered intellectual curiosity through active involvement in discussions. Participant H described the instructor as a catalyst for learning, emphasizing their approachability and willingness to address challenges, which created a supportive environment conducive to growth.

These findings underscore the critical importance of instructor presence in online learning environments, particularly in practical-based courses. The instructor's active participation, clear communication, and supportive approach significantly enhance student engagement and learning outcomes. The multifaceted role of the instructor, encompassing facilitation, mentorship, and responsiveness, helps create a dynamic, structured, and supportive learning environment. This not only maintains student interest and motivation but also fosters a sense of community and intellectual curiosity among learners.

The insights gathered from the interviews align with existing literature, such as (Chollet et al., 2022), which emphasizes the significant impact of instructor presence on student engagement and success in online courses. The active involvement of instructors in discussions, coupled with prompt and personalized feedback, is crucial in creating a positive and interactive learning experience. These findings can inform future instructional practices and interventions aimed at improving student engagement and learning outcomes in online practical-based subjects. By recognizing and enhancing the multifaceted role of instructors, educational institutions can better support student success in online learning environments.

#### 4.3.2 Engage with Instructor Factor

The data indicates that participants engage with instructors through multiple channels, including live sessions, WhatsApp, and message boxes. Participants A, E, and J, for example, emphasized the convenience and effectiveness of using WhatsApp for quick questions and clarifications. This suggests that instant messaging platforms can play a crucial role in enhancing student-instructor communication in online courses. Participants S, M, and I highlighted the importance of using live sessions and message boxes for engaging with the instructor. They found these direct interactions helpful for clarifying doubts and discussing course topics in detail. This underscores the need for accessible and responsive communication channels that facilitate immediate feedback and support.

Some participants, like Participant C and Participant H, preferred to rely more on pre-recorded lectures and course materials, engaging minimally with the instructor. This preference for independent learning suggests that while direct interaction is beneficial for many, a subset of students may thrive with less instructor engagement, provided they have access to comprehensive and well-structured resources. Several participants across all groups appreciated the instructor's responsiveness to questions and feedback. Participant L and

Participant I, for instance, valued the timely responses they received, which played a significant role in their learning experience. This highlights the importance of instructor availability and promptness in addressing student queries to foster a supportive learning environment.

Participants S and I highlighted the value of WhatsApp Group, which facilitate peer interaction and allow for ongoing discussions outside of live sessions. WhatsApp Group provide a platform for students to reflect on and articulate their understanding, fostering a learning environment. Participant C relied primarily on pre-recorded lectures and materials, indicating a preference for self-paced learning. However, this reliance may limit opportunities for immediate feedback and clarification, potentially affecting engagement and understanding (Henderson et al., 2019).

Participant H's minimal interaction with the instructor, preferring independent study, suggests that some students may not require frequent instructor engagement to succeed. However, this approach might not be suitable for all students, particularly those who benefit from regular interaction and feedback. The responsiveness of the instructor was a recurring theme among participants who actively engaged with them. Participants L and I specifically noted the positive impact of the instructor's responsiveness on their learning experience. Instructor presence and timely feedback are critical components of effective online teaching, contributing to student satisfaction and perceived learning (Kaban & Kaban, 2021).

The results indicate that students engage with instructors through a variety of methods, including live sessions, WhatsApp Group, and message box. This variety underscores the importance of offering multiple channels of communication to accommodate different preferences and needs. Participants A, E, M, and J found live sessions and message box to be the most effective means of engaging with the instructor. These methods allowed for direct and immediate clarification of doubts, contributing to a deeper understanding of the course material. Live sessions offer real-time interaction, which can enhance engagement and provide immediate feedback (Harris et al., 2021).

#### 4.3.3 Digital Competence Factor

Respondents across all groups consistently reported that their digital competence positively impacted their engagement and success in the course. Participant A and Participant E highlighted that their familiarity with digital tools allowed them to stay engaged and focus more on course content rather than on the technology itself. Participant S and Participant H noted that their digital skills helped them complete assignments efficiently and reduced time spent troubleshooting, enhancing their overall learning experience. Participant C and Participant M emphasized that their digital competence enabled more active participation in discussions and group activities, which was crucial for understanding and engaging with IoT concepts. Participant I mentioned that strong digital skills made the course more accessible and enjoyable, allowing a focus on learning without technical struggles. Participant J and Participant L echoed that digital competence facilitated easier navigation of the online platform and better engagement with course



activities. Overall, digital competence emerged as a critical factor for students' successful and engaged learning experiences in the course, highlighting the importance of digital literacy in online education.

The results clearly demonstrate that digital competence is a critical factor in student engagement and success in online courses, particularly for practical-based subjects like Internet of Things short courses. Participants across all age groups recognized the value of their digital skills in various aspects of their learning experience. Digital competence was reported to enhance engagement and success by enabling participants to comfortably use the required tools and platforms. This comfort reduced the cognitive load associated with learning new technologies and allowed students to focus more on the course content. These findings align with existing research that highlights the importance of digital competency in online education (Martzoukou et al., 2020).

Participants noted that their digital skills facilitated efficient completion of course activities and assignments. This efficiency not only improved their time management but also allowed them to participate more actively in activities. Prior studies have similarly found that digital skills contribute to more effective and engaging learning experiences (Bergdahl et al., 2020). For many participants, particularly those in younger age groups, digital competence reduced the time and effort spent troubleshooting technical issues. This reduction in technical barriers is crucial for maintaining engagement and motivation in an online learning environment.

## **5.0 Conclusion and Recommendation**

### **5.1 Conclusion**

In conclusion, instructor presence, engagement with the instructor, and digital competence stand out as fundamental pillars shaping the landscape of online education. The multifaceted role of instructors goes beyond merely disseminating information; they serve as facilitators, mentors, and guides, crucial for creating a rich, supportive, and dynamic learning environment. Their active engagement fosters a sense of connection and accountability, encouraging students to participate more actively and deeply in the learning process. Moreover, instructors who are responsive and accessible provide timely feedback and support, which is crucial for students' academic growth and success.

Simultaneously, the significance of digital competence cannot be overstated in the context of modern online education. It acts as a gateway enabling students to navigate the digital landscape effectively, access course materials, and engage with online platforms seamlessly. Students equipped with strong digital skills are better positioned to overcome technological hurdles, allowing them to focus more on the substance of the course rather than grappling with technical challenges. Moreover, digital competence empowers students to leverage various digital tools and resources to enhance their learning experience, facilitating collaboration, information retrieval, and knowledge creation.

By intertwining these three factors, educators can create a holistic and inclusive online learning environment. Incorporating strategies to develop digital competence within course design ensures that all students, regardless of their initial proficiency level, can navigate the digital realm confidently. Furthermore, fostering instructor presence through active engagement and responsiveness cultivates a supportive learning community where students feel valued, heard, and supported in their academic journey. These insights are pivotal in understanding how to maintain and enhance student engagement and success in online lifelong learning courses for practical-based subjects, thereby significantly contributing to the existing body of knowledge in this field.

## **5.2 Recommendation**

Based on these findings, several implications and recommendations for practice arise:

### **Recommendations for Lifelong Learning Providers:**

- i. **Enhance Feedback Mechanisms:** Lifelong learning providers should implement diverse feedback methods, including written comments, audio/video feedback, and grades, to cater to different learning styles and preferences. This will ensure that feedback is accessible and effective for all learners.
- ii. **Promote Digital Competence:** Providers should offer digital literacy workshops and technical support to help students improve their digital skills, which are essential for success in online learning. This could include access to tutorials, guides, and resources that enhance students' ability to navigate digital platforms.

### **Recommendations for Instructors:**

- i. **Prioritize Timely and Constructive Feedback:** Instructors should ensure that feedback is timely, detailed, and constructive, providing students with clear insights on their progress and areas for improvement. This supports students' learning and helps them stay on track.
- ii. **Foster Student-Centered Feedback Loops:** Instructors should create transparent channels for communication where students can provide feedback about the course and engage in ongoing dialogue with instructors. This helps enhance engagement and ensures that students' perspectives are considered in course improvements.
- iii. **Adopt Continuous Improvement Practices:** Instructors should engage in regular course evaluations and adapt content, delivery methods, and assessments based on student feedback and emerging trends in digital education. This ensures that the course remains relevant and effective in meeting students' needs.

By prioritizing these factors and implementing targeted strategies, educational stakeholders can create more enriching and effective online learning experiences for students. This study's contributions provide a foundation for further research and practical interventions aimed at improving student engagement and success in online lifelong learning courses for practical-based subjects.

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## Author Contributions

**Mohd Hafiez A.:** Conceptualisation, Data Collection; **Nur Alin A.:** Writing-Reviewing and Editing; **Sharifah Nadiyah R.:** Data Curation, Validation, Supervision.

## Conflicts Of Interest

The manuscript has not been published elsewhere and is not under consideration by other journals. All authors have approved the review, agree with its Submission and declare no conflict of interest in the manuscript.

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