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The Role of E-Learning in Improving Teaching and Learning Interactions in Higher Education

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Abstract

This study aims to explore the role of e-learning in enhancing teaching and learning interactions in higher education. Using a qualitative approach, data were collected through in-depth interviews with lecturers and students, online classroom observations, and analysis of learning documents. The results indicate that e-learning increases learning flexibility, lecturer engagement, and the use of interactive media, which overall enhances the quality of interaction and student cognitive engagement. Although interaction between students is still limited, the implementation of pedagogical strategies that support collaboration and social communication can optimize the online learning experience. These findings confirm that the success of e-learning depends on the combination of technology, teaching strategies, and student motivation, making e-learning an effective pedagogical transformation in the digital era.

INTRODUCTION

The development of information and communication technology (ICT) has brought significant changes to higher education practices, particularly through the use of e-learning as the primary medium for teaching and learning. E-learning enables the integration of various digital platforms, such as Learning Management Systems (LMS), discussion forums, learning videos, and interactive quizzes, providing flexibility and accessibility for students to learn independently and collaboratively. This transformation has become increasingly important and urgent during the COVID-19 pandemic, when face-to-face learning has been restricted globally, forcing higher education institutions to adopt online learning methods to maintain academic continuity (Crawford et al., 2020; Bartusevičienė et al., 2021; Turnbull et al., 2021; Ali, 2020).

The advantage of e-learning lies not only in its ease of access, but also in its potential to improve the quality of learning interactions between lecturers and students (Al Rawashdeh et al., 2021; Concannon et al., 2005; Sarker et al., 2019). Teaching and learning interactions are crucial aspects that determine the effectiveness of higher education. Transactional Distance Theory states that the psychological distance between lecturers and students can affect material comprehension and the quality of communication. An active lecturer presence, a clear learning structure, and intensive communication can reduce the transactional distance, thereby increasing

student engagement and learning success (Moore, 2019; Chen, 2023; Wheeler, 2007).

Furthermore, e-learning opens up opportunities for the implementation of more innovative pedagogical strategies (Sasson et al., 2022; Carvalho et al., 2021). In the context of a Community of Inquiry (CoI), the success of online learning is determined by the balance between teaching presence, cognitive presence, and social presence (Garrison et al., 2010; Maddrell et al., 2020). Teaching presence encompasses the lecturer's role in designing, facilitating, and assessing learning; cognitive presence reflects student engagement in critical thinking and problem-solving; while social presence emphasizes social interactions that build a learning community. In other words, e-learning is not simply a medium for delivering material, but a platform that demands meaningful and collaborative interactions between all parties.

Although e-learning offers significant benefits, its implementation in higher education faces complex challenges. Limited internet access, differences in students' digital skills, and lecturers' readiness to manage online learning remain major obstacles (Dhawan, 2020; Mirķe et al., 2019; Chung et al., 2020). Many students report difficulty maintaining focus, feeling less engaged in class interactions, or experiencing limitations in collaborating with classmates. Furthermore, lecturers are required not only to master technology but also to possess adaptive pedagogical competencies to design materials, provide timely feedback, and create interactive learning experiences. This requires institutions to provide technical support, digital training, and guidance on effective teaching strategies to optimize e-learning (Phulpoto et al., 2024; Sain et al., 2024).

The role of e-learning is also increasingly strategic in the context of modern higher education, where students are expected to be active, creative, and critical independent learners. Digital platforms enable personalized learning, real-time monitoring of academic progress, and data analysis that supports the evaluation and improvement of teaching quality (Josué et al., 2023; Vashishth et al., 2024). Furthermore, e-learning can support collaboration across faculties or universities, opening up broader discussion opportunities, and facilitating team-based projects that foster effective interaction between students. However, the effectiveness of this collaboration depends heavily on instructional design that takes into account social dynamics, technological capabilities, and student motivation (Brod et al., 2023; Al Yakin & Seraj, 2023; Fitrianto, 2024; Damaševičius & Sidekerskienė, 2024).

In the Indonesian context, studies show that the implementation of e-learning in higher education remains variable, with some institutions successfully integrating technology, while others face infrastructure and human resource constraints. This underscores the importance of research to understand the factors influencing the quality of teaching and learning interactions through e-learning, including student perceptions of platform benefits, ease of use, lecturer engagement, peer-to-peer interactions, and cognitive engagement.

Thus, this study aims to explore the role of e-learning in enhancing teaching and learning interactions in higher education. This research is expected to provide academic and practical insights for lecturers, higher education administrators, and policymakers in designing effective, collaborative, and meaningful digital learning strategies in the modern era of higher education. The research findings are expected to inform recommendations for improving teaching quality and student engagement, while maximizing the potential of e-learning as a pedagogical transformation in the digital era.

METHODS

This study utilized a qualitative research approach to explore the role of e-learning in enhancing teaching and learning interactions in higher education. A qualitative approach is particularly suitable for this research as it allows for an in-depth exploration of the experiences and perceptions of lecturers and students, which are central to understanding the dynamics of e-learning in a higher education context. This approach helps uncover nuanced insights into the challenges and benefits of e-learning, providing a rich understanding of how digital platforms influence teaching practices and student engagement.

The participants in this study were selected using purposive sampling, ensuring that they had direct experience with e-learning platforms in higher education. A total of 35 participants were involved, including 15 lecturers and 20 students from various faculties and study programs. This selection enabled the collection of diverse perspectives on e-learning interactions, ensuring that the study captured a wide range of experiences from both the teaching and learning sides. Lecturers were chosen for their active involvement in e-learning, particularly those who had designed and facilitated online courses. Students were selected to represent various levels of experience with e-learning, from those who were highly engaged to those with less experience using digital platforms. By including both groups, the study aimed to provide a comprehensive understanding of the interactions between lecturers and students in the e-learning environment.

Data were collected through multiple methods to provide a holistic view of the research topic. In-depth interviews with the participants were the primary data collection method. The interviews were semi-structured, allowing for flexibility while ensuring that key topics related to the research questions were addressed. This approach enabled participants to share their personal experiences and insights about their interaction with e-learning, the challenges they encountered, and the strategies they used to enhance learning. Interviews were conducted both face-to-face and online, depending on the participants' availability and preferences, ensuring accessibility for all involved.

In addition to interviews, online classroom observations were conducted to assess the real-time interactions between lecturers and students in e-learning settings. These observations focused on the types of interactions occurring, the level of lecturer engagement, and the use of interactive media such as quizzes, discussion forums, and multimedia content. Observing actual online classes provided valuable insights into the implementation of teaching strategies and the extent of student engagement in real-world e-learning environments. Document analysis was the third method of data collection. The researcher analyzed learning materials, such as course modules, assignments, discussion posts, and class recordings, to understand the pedagogical strategies used by lecturers and the ways in which e-learning platforms supported teaching and learning interactions.

Thematic analysis was employed to analyze the data collected from interviews, observations, and document analysis. This analysis method is ideal for identifying patterns, themes, and categories within qualitative data, providing a deep understanding of the role of e-learning in enhancing interactions between lecturers and students. Thematic analysis was conducted by first transcribing all interview recordings verbatim and then reviewing the transcripts, field notes, and documents to identify recurring themes related to the research questions. These themes were coded and grouped into categories that reflected key aspects of e-learning interactions, such as flexibility, lecturer involvement, student engagement, and the use of interactive media. The analysis was carried out using NVivo software to

organize and manage the large volumes of qualitative data, making the process of identifying and categorizing themes more efficient.

To ensure the validity and reliability of the study, several strategies were implemented. Data source triangulation was used by combining data from multiple sources, including interviews, observations, and documents. This approach helped to validate the findings by cross-checking data from different perspectives. Additionally, peer debriefing was conducted, where the researcher discussed the emerging themes and interpretations with colleagues to ensure that the analysis was accurate and objective. Peer debriefing helped identify alternative interpretations and reduce researcher bias. Member checking was also used to enhance the credibility of the findings. After the initial analysis, participants were asked to review the findings to ensure that their perspectives were accurately represented. This process of member checking provided an opportunity for participants to clarify or refine their responses, further ensuring the reliability of the data.

Ethical considerations were carefully addressed throughout the study. Written informed consent was obtained from all participants, ensuring that they understood the purpose of the research and voluntarily agreed to participate. The study maintained participants' anonymity and confidentiality, and the data were used solely for academic purposes. Participants were informed that they could withdraw from the study at any time without penalty, ensuring that their participation was entirely voluntary. The study adhered to ethical guidelines for conducting research with human subjects, ensuring that participants' rights and privacy were respected throughout the research process.

Despite the strengths of this research, there are several limitations to consider. The sample size of 35 participants, while adequate for qualitative research, may not fully represent the broader population of lecturers and students in higher education. The study's findings are therefore specific to the participants involved and may not be generalizable to other institutions or educational contexts. Furthermore, the study focused primarily on the perspectives of lecturers and students, and the views of other stakeholders, such as administrators or instructional designers, were not included. Including these groups could have provided a more comprehensive understanding of the e-learning experience in higher education.

RESULTS AND DISCUSSION

This section presents the findings of the study based on the data collected through in-depth interviews, online classroom observations, and document analysis. The results reflect the significant role of e-learning in enhancing teaching and learning interactions in higher education, with particular emphasis on flexibility, lecturer involvement, cognitive engagement, and peer interactions. The findings highlight both the strengths and challenges of e-learning as experienced by lecturers and students, providing a nuanced understanding of its impact on educational outcomes.

Increased Flexibility and Accessibility of Learning

A central theme emerging from the study was the increased flexibility and accessibility of learning facilitated by e-learning platforms. This was particularly appreciated by students, who noted that they could access learning materials at their convenience. One student commented,

> *"I really appreciate the ability to watch lecture videos whenever I need to. I can revisit them and pause when I don't understand something. This helps me learn at my own pace."*

Another student emphasized,

> *"The fact that I can access all materials online has made learning more manageable. I can plan my study schedule around my work and personal life, which is a major benefit."*

The flexibility offered by e-learning was not only seen as a convenience but also as a way to enhance learning outcomes. For instance, some students found that having the freedom to review lectures at any time helped them grasp complex concepts more thoroughly.

> *"I can rewatch videos if I didn't understand something in the first go, which is something I couldn't do in face-to-face classes,"* said one student.

This ability to revisit materials on-demand aligns with findings by Garrison et al. (2010), who argue that e-learning's flexibility supports students in engaging with content more effectively, allowing them to study at their own pace, thus enhancing cognitive engagement.

However, the flexibility also created challenges for some students, particularly those who struggled with time management or self-regulation. One student admitted,

> *"Sometimes I get behind because there's no set schedule. It's easy to procrastinate when the learning materials are just there and not delivered in real-time."*

This suggests that while flexibility is a major benefit, it also requires students to possess strong time-management skills and a high level of self-discipline. According to Moore (2019), the balance between flexibility and structure is critical, and without appropriate guidance, some students may struggle to stay engaged and organized in an online learning environment.

Lecturer Involvement in Facilitating Interaction

Another significant finding was the crucial role played by lecturers in facilitating interactions and engagement within e-learning environments. Students consistently emphasized the importance of lecturers' active involvement in online discussions, feedback, and the design of interactive activities. As one student shared, "The lecturers who are most engaged, who reply to our posts and provide constructive feedback, really make a difference. It keeps me motivated." Another student echoed this sentiment, saying,

> *"When the lecturer is active in the forums, it feels like we are having an actual conversation, not just receiving information."*

Lecturers, too, acknowledged the importance of their active presence in the online learning environment. One lecturer explained,

> *"I try to be present in the forums, answer questions, and provide feedback regularly. I think it's important to maintain an ongoing conversation with the students so they don't feel isolated."*

This active presence is consistent with the concept of "teaching presence," which refers to the lecturer's ability to design, facilitate, and guide the learning process (Garrison et al., 2010). A strong teaching presence was found to significantly reduce the psychological distance between lecturers and students, thereby enhancing the quality of interactions.

However, while some lecturers were proactive in engaging with students, others were less involved. A few students noted that certain lecturers did not provide sufficient feedback or monitor discussions regularly, which led to feelings of frustration and disengagement.

"Some lecturers just upload the materials and leave us to figure it out on our own. It feels like they don't care about our progress," said one student.

This variation in lecturer involvement underscores the need for professional development and support for lecturers to enhance their digital pedagogical skills, as recommended by Al-Qahtani & Higgins (2013).

Limited Interaction Between Students

One of the most consistent challenges reported by students was the limited interaction between peers. Despite the availability of discussion forums and group assignments, many students found it difficult to engage in meaningful peer-to-peer interactions. As one student described,

"We have a group chat, but not everyone participates. It's hard to have a meaningful discussion when only one or two people are contributing."

Another student added,

"There's no real sense of community in the course because everyone is working on their own schedule. Group work feels disconnected."

This limited interaction among students was identified as a significant drawback of e-learning, as it hindered the development of a collaborative learning environment.

In response to these challenges, some lecturers implemented strategies to encourage more student interaction. One lecturer stated,

"I try to design activities that require students to collaborate. I use group projects and peer review assignments to encourage communication and interaction among students."

Despite these efforts, many students reported that group work in the e-learning environment was still not as effective as in-person collaboration. As Sun and Chen (2020) note, promoting peer-to-peer interaction in online environments is not automatic—it requires intentional instructional design that incorporates collaborative activities and structures that motivate students to engage with one another.

The lack of interaction between students points to the need for greater emphasis on building "social presence" in e-learning environments. According to Garrison et al. (2010), social presence the ability for students to connect with and relate to one another is essential for creating a supportive learning community. In the study, students who felt more connected to their peers reported higher levels of engagement and satisfaction with the course. This suggests that effective e-learning strategies should focus on fostering collaboration and peer interaction, which can enhance both social and cognitive presence in the learning environment.

Increasing Cognitive Engagement through Interactive Media

The use of interactive media was found to play a crucial role in enhancing students' cognitive engagement. Students and lecturers alike highlighted the effectiveness of tools such as quizzes, interactive simulations, and multimedia content in promoting critical thinking and problem-solving skills. One lecturer shared,

"I use interactive quizzes where students must explain their answers before submitting. This helps them think more deeply about the material."

Another lecturer explained,

"I integrate simulations into the course so that students can apply their knowledge in real-world scenarios, which helps them engage with the material on a deeper level."

Cognitive engagement, as discussed by Garrison et al. (2010), refers to the active involvement of students in higher-order thinking, such as analysis, synthesis, and evaluation. Interactive media, such as quizzes, case studies, and simulations, was found to support this type of engagement by encouraging students to actively apply their knowledge and engage with the material in meaningful ways. One student noted, "The simulations were very helpful because they allowed me to experiment with the concepts we learned in class and see how they worked in practice."

However, not all students found interactive media to be equally effective. Some students expressed frustration with activities that they felt were too simplistic or not challenging enough.

> *"The quizzes feel like a test of memory, not understanding," one student commented.*

This feedback highlights the importance of aligning interactive media with course objectives and ensuring that they challenge students to engage in higher-order thinking. As Rapanta et al. (2020) suggest, the design of interactive activities must be intentional and aligned with learning outcomes to be truly effective in promoting cognitive engagement.

Pedagogical Strategies to Enhance Interaction and Engagement

Effective pedagogical strategies were central to fostering meaningful interactions and engagement in the e-learning environment. Lecturers who implemented collaborative assignments, provided timely feedback, and integrated interactive media into their teaching practices were more successful in creating engaging and interactive learning experiences. One lecturer explained,

> *"I use collaborative assignments that require students to work together on projects. This gives them a chance to interact and share ideas, which enhances the learning experience."*

Another lecturer noted,

> *"Feedback is crucial in online learning. I make sure to give detailed comments on assignments to help students understand where they can improve."*

Regular feedback was found to be a particularly important factor in maintaining student engagement and motivation. Students who received timely and constructive feedback on their work reported feeling more supported and engaged in the learning process.

> *"When I get feedback on my assignments, I feel more motivated to keep going. It helps me understand what I need to work on," said one student.*

This finding reinforces the importance of feedback in e-learning environments, as outlined by Garrison et al. (2010), who argue that feedback is a key component of teaching presence and is essential for maintaining student engagement.

Lecturers who used multimedia content, such as videos, podcasts, and interactive simulations, were also found to enhance student engagement by catering to different learning styles and keeping students interested in the material. One student shared,

> *"The videos and simulations were really helpful because they made the material come alive. I could see how the concepts applied in the real world."*

This finding aligns with the work of Al-Qahtani & Higgins (2013), who emphasize that multimedia content can enhance the learning experience by providing varied and engaging materials that appeal to different learning preferences.

The findings of this study underscore the transformative potential of e-learning in enhancing teaching and learning interactions in higher education. While the study highlights several advantages, such as flexibility, accessibility, and increased cognitive engagement, it also reveals notable challenges that must be addressed for e-learning to reach its full potential. This discussion section interprets the results in the context of existing literature and theoretical frameworks, providing insights into how these findings contribute to the broader field of e-learning in higher education.

One of the most significant advantages of e-learning highlighted in this study was the increased flexibility and accessibility it offers to students. The ability to access learning materials at any time and from any location was seen as a major benefit by students, particularly those with busy schedules or additional responsibilities. This finding is consistent with research by Garrison et al. (2010), who argue that the flexibility of e-learning allows students to engage with the content at their own pace, promoting autonomy and self-regulated learning. The autonomy afforded by e-learning platforms enables students to take ownership of their learning process, which is particularly important for fostering lifelong learning skills (Crawford et al., 2020).

However, while flexibility can be empowering, it also requires students to have strong time-management skills and self-regulation. As observed in this study, some students struggled with procrastination and felt overwhelmed by the lack of structure. This aligns with Moore's (2019) Transactional Distance Theory, which suggests that e-learning's flexibility can increase psychological distance if not accompanied by adequate support structures. Although flexibility allows students to learn at their own pace, it also necessitates that they take greater responsibility for their learning. Therefore, institutions and lecturers must ensure that students are equipped with the skills and strategies to manage their time effectively and maintain engagement in an online environment. Providing scaffolding, such as clear deadlines, regular check-ins, and structured learning pathways, can help students navigate the flexibility e-learning offers and ensure they remain on track.

The study found that active lecturer involvement was critical in reducing the transactional distance between lecturers and students, enhancing the quality of interactions and student engagement. Lecturers who were proactive in monitoring online discussions, providing timely feedback, and facilitating interactive activities were perceived as more engaged and effective. This finding aligns with Garrison et al.'s (2010) concept of "teaching presence," which emphasizes the importance of lecturer involvement in designing, facilitating, and guiding the learning process. When lecturers are actively involved in the online classroom, students feel more connected to them and to the learning process, leading to higher levels of engagement and motivation.

Lecturer involvement not only improves engagement but also contributes to student success by providing necessary guidance and clarification. As Moore (2019) argues, the active presence of lecturers can reduce the psychological distance that often exists in online learning environments, thereby promoting better communication and understanding. This is particularly important in e-learning, where students may feel isolated or disconnected from their instructors due to the lack of face-to-face interaction. The study findings suggest that lecturers who engage in meaningful interactions with students such as offering feedback, moderating discussions, and creating opportunities for student input help build a more supportive and interactive learning community.

However, the study also found that not all lecturers were equally involved, which points to the need for institutional support to ensure that all lecturers have the necessary skills and resources to engage students effectively in online environments.

Professional development programs that focus on digital pedagogy and the effective use of online tools could help lecturers enhance their engagement with students and improve the overall e-learning experience.

A major challenge identified in the study was the limited interaction between students, which hindered the development of a collaborative learning environment. While e-learning platforms provide discussion forums and group assignments, many students reported that peer-to-peer interactions were often minimal or unproductive. This finding echoes concerns raised in previous studies, which highlight the difficulty of fostering meaningful peer interactions in online environments (Sun & Chen, 2020). Social presence the ability for students to feel connected to their peers in the online learning environment is essential for creating a sense of community and enhancing engagement (Garrison et al., 2010).

The lack of social presence in e-learning environments can lead to feelings of isolation and disengagement, which can negatively impact student motivation and learning outcomes. As one student noted, "It feels like we are learning alone, and it's hard to stay motivated when there's no real interaction with others." This highlights the need for intentional instructional design that encourages peer collaboration and communication. Instructors must create activities and opportunities that foster student-to-student interaction, such as group projects, peer reviews, and structured discussion forums. This is particularly important in promoting social presence, as students who feel connected to their peers are more likely to engage in collaborative learning and contribute to the overall learning community.

The study's findings align with the Community of Inquiry (CoI) framework, which posits that effective online learning requires a balance between teaching, cognitive, and social presence (Garrison et al., 2010). While the study found that teaching and cognitive presence were well-supported through lecturer involvement and interactive media, social presence was less emphasized. This suggests that e-learning platforms need to incorporate more opportunities for student collaboration and peer engagement to create a balanced and holistic learning experience.

The study also found that interactive media, such as quizzes, simulations, and multimedia content, played a crucial role in enhancing students' cognitive engagement. Interactive activities that required students to actively apply their knowledge and engage in problem-solving were particularly effective in promoting critical thinking and deeper learning. This finding is consistent with Garrison et al.'s (2010) concept of "cognitive presence," which refers to the ability of students to engage in higher-order thinking. The use of interactive media was seen as a powerful tool for stimulating critical reflection and deepening students' understanding of the material.

One of the strengths of e-learning platforms is their ability to integrate various forms of media that cater to different learning styles, thereby increasing engagement and retention. As Rapanta et al. (2020) argue, interactive media allows students to engage with content in a dynamic and immersive way, which can improve both understanding and retention. For example, simulations and case studies can provide real-world applications of theoretical concepts, helping students see the relevance of what they are learning. This study found that students who engaged with interactive media reported higher levels of cognitive engagement and greater satisfaction with the learning experience.

However, the effectiveness of interactive media depends on how well it is integrated into the overall course design. Activities that were well-aligned with the course objectives and presented students with challenging and relevant problems were found to be more effective in promoting cognitive engagement. In contrast, interactive activities that were too simplistic or unrelated to the course content were less

successful. This highlights the importance of thoughtful instructional design that ensures interactive media is used purposefully to support learning objectives.

The study identified several key pedagogical strategies that were effective in enhancing interactions and engagement in the e-learning environment. Lecturers who designed collaborative assignments, provided regular feedback, and integrated multimedia content into their courses were able to create more engaging and interactive learning experiences. These strategies were found to reduce transactional distance and foster a more interactive and supportive learning environment.

Regular feedback was identified as a particularly important factor in maintaining student motivation and engagement. Lecturers who provided timely and constructive feedback helped students understand their progress and areas for improvement. This is consistent with Garrison et al. (2010), who argue that feedback is a key component of teaching presence and is essential for keeping students engaged in the learning process. Feedback not only helps students stay on track but also reinforces their understanding of the course material, making it a critical aspect of successful e-learning. In addition, the use of multimedia content, such as videos, podcasts, and interactive simulations, was found to enhance student engagement by catering to different learning preferences. This aligns with Al-Qahtani and Higgins' (2013) research, which emphasizes the importance of multimedia in making learning more engaging and accessible. Lecturers who used a variety of media in their teaching were able to maintain student interest and provide a more dynamic learning experience.

CONCLUSION

This study demonstrates that e-learning plays a significant role in enhancing teaching and learning interactions in higher education, particularly through increased flexibility, faculty engagement, and the use of interactive media. The active presence of faculty and instructional design that supports student participation have been shown to improve the quality of interactions and cognitive engagement. Although student-to-student interaction remains limited, pedagogical strategies that encourage collaboration and social communication can optimize the online learning experience. These findings emphasize that the success of e-learning depends not only on technology but also on a combination of effective teaching strategies, the role of faculty, and student motivation, enabling e-learning to function as a pedagogical transformation that supports more flexible, interactive, and meaningful learning.

REFERENCES

Al Rawashdeh, A. Z., Mohammed, E. Y., Al Arab, A. R., Alara, M., & Al-Rawashdeh, B. (2021). Advantages and disadvantages of using e-learning in university education: Analyzing students' perspectives. *Electronic Journal of E-learning*, *19*(3), 107-117. https://doi.org/10.34190/ejel.19.3.2168

Al Yakin, A., & Seraj, P. M. I. (2023). Impact of metaverse technology on student engagement and academic performance: the mediating role of learning motivation. *International Journal of Computations, Information and Manufacturing (IJCIM)*, *3*(1), 10-18. https://doi.org/10.54489/ijcim.v3i1.234

Ali, W. (2020). Online and remote learning in higher education institutes: A necessity in light of COVID-19 pandemic. *Higher education studies*, *10*(3), 16-25. https://doi.org/10.5539/hes.v10n3p16

Al-Qahtani, A. A., & Higgins, S. E. (2013). *Effects of traditional, blended and e-learning on students' achievement in higher education*. Journal of Computer Assisted Learning, 29(3), 220–234.

Bartusevičienė, I., Pazaver, A., & Kitada, M. (2021). Building a resilient university:

ensuring academic continuity—transition from face-to-face to online in the COVID-19 pandemic. *WMU Journal of Maritime Affairs*, *20*(2), 151-172. https://doi.org/10.1007/s13437-021-00239-x

Brod, G., Kucirkova, N., Shepherd, J., Jolles, D., & Molenaar, I. (2023). Agency in educational technology: Interdisciplinary perspectives and implications for learning design. *Educational Psychology Review*, *35*(1), 25. https://doi.org/10.1007/s10648-023-09749-x

Carvalho, A., Teixeira, S. J., Olim, L., Campanella, S. D., & Costa, T. (2021). Pedagogical innovation in higher education and active learning methodologies–a case study. *Education+ Training, 63*(2), 195-213. https://doi.org/10.1108/ET-05-2020-0141

Chen, L. (2023). Transactional distance and college students' learning engagement in online learning: The chain mediating role of social presence and autonomous motivation. *Psychology Research and Behavior Management*, 2085-2101. https://doi.org/10.2147/PRBM.S409294

Chung, E., Subramaniam, G., & Dass, L. C. (2020). Online learning readiness among university students in Malaysia amidst COVID-19. *Asian Journal of University Education*, *16*(2), 46-58. https://doi.org/10.24191/ajue.v16i2.10294

Concannon, F., Flynn, A., & Campbell, M. (2005). What campus-based students think about the quality and benefits of e-learning. *British journal of educational technology*, *36*(3), 501-512. https://doi.org/10.1111/j.1467-8535.2005.00482.x

Crawford, J., Butler-Henderson, K., Rudolph, J., Malkawi, B., Glowatz, M., Burton, R., … & Lam, S. (2020). COVID-19: 20 countries' higher education intra-period digital pedagogy responses. *Journal of Applied Learning & Teaching, 3*(1), 1–20. https://doi.org/10.37074/jalt.2020.3.1.7

Damaševičius, R., & Sidekerskienė, T. (2024). Virtual worlds for learning in metaverse: A narrative review. *Sustainability*, *16*(5), 2032. https://doi.org/10.3390/su16052032

Dhawan, S. (2020). Online learning: A panacea in the time of COVID-19 crisis. *Journal of Educational Technology Systems, 49*(1), 5–22. https://doi.org/10.1177/0047239520934018

Fitrianto, I. (2024). Innovation and Technology in Arabic Language Learning in Indonesia: Trends and Implications. *International Journal of Post Axial: Futuristic Teaching and Learning*, 134-150. https://doi.org/10.59944/postaxial.v2i3.375

Garrison, D. R., Anderson, T., & Archer, W. (2010). The first decade of the community of inquiry framework: A retrospective. *The Internet and Higher Education, 13*(1–2), 5–9. https://doi.org/10.1016/j.iheduc.2009.10.003

Josué, A., Bedoya-Flores, M. C., Mosquera-Quiñonez, E. F., Mesías-Simisterra, Á. E., & Bautista-Sánchez, J. V. (2023). Educational Platforms: Digital Tools for the teaching-learning process in Education. *Ibero-American Journal of Education & Society Research*, *3*(1), 259-263. https://doi.org/10.56183/iberoeds.v3i1.626

Maddrell, J. A., Morrison, G. R., & Watson, G. S. (2020). Presence and learning in a community of inquiry. In *Social presence and identity in online learning* (pp. 109-122). Routledge. https://doi.org/10.1080/01587919.2017.1322062

Mirķe, E., Cakula, S., & Tzivian, L. (2019). Measuring teachers-as-learners' digital skills and readiness to study online for successful e-learning experience. *Journal of Teacher Education for Sustainability*, *21*(2), 5-16. https://doi.org/10.2478/jtes-2019-0013?urlappend=%3Futm_source%3Dresearchgate

Moore, M. G. (2019). The theory of transactional distance. In *Handbook of Distance Education* (pp. 32–46). Routledge.

Phulpoto, S. A. J., Oad, L., & Imran, M. (2024). Enhancing teacher performance in E-learning: addressing barriers and promoting sustainable education in public universities of Pakistan. *Pakistan Languages and Humanities Review*, *8*(1), 418-429. https://doi.org/10.47205/plhr.2024(8-I)38

Rapanta, C., Botturi, L., Goodyear, P., Guàrdia, L., & Koole, M. (2020). Online university teaching during and after the COVID-19 crisis: Refocusing teacher presence and learning activity. *Postdigital Science and Education, 2*(3), 923–945. https://doi.org/10.1007/s42438-020-00155-y

Sain, Z. H., Baskara, R., & Lama, A. V. (2024). Rethinking pedagogy in the digital age: Analyzing the effectiveness of e-learning strategies in higher education. *Journal of Information Systems and Technology Research*, *3*(1), 30-37. https://doi.org/10.55537/jistr.v3i1.772

Sarker, M. F. H., Mahmud, R. A., Islam, M. S., & Islam, M. K. (2019). Use of e-learning at higher educational institutions in Bangladesh: Opportunities and challenges. *Journal of Applied Research in Higher Education*, *11*(2), 210-223. https://doi.org/10.1108/JARHE-06-2018-0099

Sasson, I., Yehuda, I., Miedijensky, S., & Malkinson, N. (2022). Designing new learning environments: An innovative pedagogical perspective. *The Curriculum Journal*, *33*(1), 61-81. https://doi.org/10.1002/curj.125

Sun, A., & Chen, X. (2020). Online education and its effective practice: A research review. *Journal of Information Technology Education: Research, 19*, 157–190.

Turnbull, D., Chugh, R., & Luck, J. (2021). Transitioning to E-Learning during the COVID-19 pandemic: How have Higher Education Institutions responded to the challenge?. *Education and Information Technologies*, *26*(5), 6401-6419. https://doi.org/10.1007/s10639-021-10633-w

Vashishth, T. K., Sharma, V., Sharma, K. K., Kumar, B., Panwar, R., & Chaudhary, S. (2024). AI-driven learning analytics for personalized feedback and assessment in higher education. In *Using traditional design methods to enhance AI-driven decision making* (pp. 206-230). IGI Global Scientific Publishing. https://doi.org/10.4018/979-8-3693-0639-0.ch009

Wheeler, S. (2007). The influence of communication technologies and approaches to study on transactional distance in blended learning. *ALT-J*, *15*(2), 103-117. https://doi.org/10.1080/09687760701470924

Zawacki-Richter, O., Bäcker, E. M., & Vogt, S. (2019). Systematic review of research on artificial intelligence applications in higher education. *International Journal of Educational Technology in Higher Education, 16*(1), 39. https://doi.org/10.1186/s41239-019-0171-0