

The Role of Lecturers in Developing Digital-Based Adaptive Learning for Students

Pietra Dorand^{1✉}, Marlina², Abi Sofyan³, Bernardus Agus Rukiyanto⁴, Melvianus Selan⁵

¹ Telkom University Jakarta, Indonesia

² Institut Agama Islam Negeri Takengon, Indonesia

³ Akademi Maritim Pembangunan Jakarta, Indonesia

⁴ Universitas Sanata Dharma, Indonesia

⁵ Universitas Kristen Arthawacana Kupang, Indonesia

Correspondence Email: pietra@telkomuniversity.ac.id✉

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Abstract

The rapid development of information and communication technology in recent decades has brought significant changes to various aspects of life, including higher education. This study aims to analyze the role of lecturers in developing digital-based adaptive learning for students in the era of technological transformation. The approach used in this study is qualitative with a descriptive research type. Data were collected through in-depth interviews, observations, and documentation of lecturers and students involved in the digital-based learning process. Data analysis techniques were carried out using an interactive model that includes data reduction, data presentation, and drawing conclusions, and its validity was tested through triangulation of sources and methods. The results of the study indicate that lecturers have a very important role as facilitators, motivators, and innovators in creating digital-based adaptive learning. Lecturers who are able to optimally utilize digital technology tend to be more successful in increasing student participation, motivation, and learning outcomes. However, this study also found various obstacles, such as limited digital competence, infrastructure, and lecturer readiness in managing adaptive learning. Therefore, institutional support is needed through training and the provision of adequate facilities. This research is expected to contribute to the development of more effective digital-based adaptive learning strategies in higher education.

Keywords

Adaptive Learning, Digital Technology, Higher Education, Role of Lecturers.



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INTRODUCTION

The rapid development of information and communication technology in recent decades has brought significant changes to various aspects of life, including higher education. The

digital era has not only transformed the way people communicate and work but also influenced the way they learn and teach. Students, as digital natives, have distinct characteristics compared to previous generations, particularly in terms of information access, learning styles, and the use of technology in their daily lives. This situation demands a transformation in the learning system in higher education to remain relevant and able to meet the needs of the times (Hartono, 2025).

In this context, digital-based adaptive learning is considered an effective approach to improving the quality of the teaching and learning process. Adaptive learning is a method designed to adapt material, strategies, and learning pace to the needs, abilities, and characteristics of each student. By utilizing digital technology, adaptive learning can be implemented in a more flexible, personalized, and interactive manner. Digital platforms such as Learning Management Systems (LMS), learning applications, and artificial intelligence-based technologies enable lecturers to monitor student progress in real time and provide appropriate interventions (Sugiarto et al., 2024).

However, the implementation of digital-based adaptive learning cannot run optimally without the active role of lecturers. Lecturers, as the main actors in the learning process, have the responsibility not only to deliver material but also as facilitators, motivators, and innovators in creating an effective learning environment. The paradigm shift from teacher-centered learning to student-centered learning requires lecturers to possess pedagogical, professional, social, and personal competencies integrated with digital literacy skills (Purwantoro et al., 2025).

The role of lecturers in developing digital-based adaptive learning is becoming increasingly important, especially in facing the challenges of globalization and the industrial revolution 4.0. Lecturers are required to design learning that focuses not only on knowledge transfer but also on developing 21st-century skills, such as critical thinking, creativity, collaboration, and communication. In this regard, the use of digital technology is not merely a tool but an integral part of innovative and adaptive learning strategies (Kasman et al., 2024).

Furthermore, the global pandemic that has occurred in recent years has accelerated the adoption of technology in education. Online learning has become the primary solution for maintaining the continuity of the educational process. This experience provides a valuable lesson that utilizing digital technology in learning is no longer an option, but a necessity. However, the transition to digital learning has also revealed various challenges, such as gaps in technology access, limited digital competency among lecturers, and a lack of preparedness in designing effective online learning (Setyaningsih & Putri, 2025).

In this situation, lecturers are required to continuously improve their competencies, particularly in the field of educational technology. The ability to use various digital platforms, design interactive learning content, and manage virtual classes is crucial. Furthermore, lecturers also need to understand the principles of adaptive learning to accommodate individual student differences. This includes the ability to analyze student learning needs, provide constructive feedback, and create meaningful learning experiences. Furthermore,

students, as learning subjects, also play a crucial role in the successful implementation of digital-based adaptive learning. Students are required to be more independent, active, and responsible for their learning process. Therefore, lecturers need to create a learning environment that encourages active student participation, whether through online discussions, collaborative assignments, or the use of interactive media. This way, the learning process is not only one-way but becomes interactive and dynamic (Ganiadi et al., 2025).

However, the reality on the ground shows that many lecturers are still unable to fully optimize the use of technology in learning. Some of the obstacles frequently encountered include a lack of training, limited infrastructure, and resistance to change. This presents a unique challenge in developing digital-based adaptive learning in higher education. Therefore, appropriate strategies are needed to improve lecturer competency and institutional support in providing supportive facilities and policies. Furthermore, developing digital-based adaptive learning also requires a systematic and sustainable approach. Lecturers need to regularly evaluate the effectiveness of their learning and innovate according to technological developments and student needs. Collaboration between lecturers, as well as between lecturers and other relevant parties, is also a crucial factor in creating an adaptive, digital-based learning ecosystem (Yuliani, 2022).

Thus, the role of lecturers in developing digital-based adaptive learning for students is crucial for improving the quality of higher education. Lecturers are not only required to master the teaching material but also to be able to adapt to technological developments and understand the diverse needs of students. Therefore, research on the role of lecturers in this context is crucial to identify influencing factors and find effective strategies for optimizing digital-based adaptive learning (Rodiyah, 2021).

This research is expected to provide both theoretical and practical contributions to the development of higher education in the digital era. Theoretically, this research can enrich studies on adaptive learning and the role of lecturers in the context of educational digitalization. Practically, the results of this study are expected to serve as a reference for lecturers, educational institutions, and policymakers in designing and implementing more effective, innovative, and modern learning.

METHODS

This study uses a qualitative approach with a descriptive research type, which aims to understand in-depth the role of lecturers in developing digital-based adaptive learning for students. This approach was chosen because it is able to explore phenomena holistically and contextually according to real conditions in the field. The research location was conducted in a university environment, with research subjects consisting of lecturers and students directly involved in the digital-based learning process. The informant selection technique used purposive sampling, namely selecting informants based on certain criteria relevant to the research objectives, such as experience in using learning technology and involvement in adaptive learning.

Data collection techniques were conducted through in-depth interviews, observation, and documentation. Interviews were used to obtain information regarding lecturers' experiences, perceptions, and strategies in developing digital-based adaptive learning. Observations were conducted to directly observe the ongoing learning process, both online and offline, while documentation was used to supplement data in the form of teaching materials, learning media, and digital learning activities. Data analysis was conducted using interactive analysis techniques that include data reduction, data presentation, and drawing conclusions. To ensure data validity, this study utilized source and method triangulation techniques, so that the research results obtained could be scientifically accounted for.

FINDINGS AND DISCUSSION

The results of this study indicate that the role of lecturers in developing digital-based adaptive learning for students is highly complex and encompasses various aspects, from planning and implementation to evaluation. Lecturers function not only as presenters of material but also as facilitators capable of adapting learning methods to student needs and characteristics. In the context of digital learning, lecturers are required to be able to utilize various technology platforms such as Learning Management Systems (LMS), interactive media, and online communication applications to create a more flexible and personalized learning experience (Nugroho et al., 2023).

During the learning planning stage, most lecturers have demonstrated efforts to design adaptive learning using digital technology. This is evident in the development of Semester Learning Plans (RPS), which have begun to integrate the use of digital media, a variety of learning methods, and diverse evaluation strategies. Lecturers also strive to adapt learning materials to students' levels of understanding, for example by providing teaching materials in various formats such as videos, digital modules, and interactive presentations. However, some lecturers have not yet fully optimized their adaptive learning design, particularly in terms of mapping individual student learning needs (Putri et al., 2023).

During the learning implementation phase, research results indicate that lecturers play a crucial role in creating active and dynamic classroom interactions, both online and offline. Lecturers who optimize the use of digital technology tend to be more successful in increasing student participation. The use of online discussion features, interactive quizzes, and project-based assignments are effective strategies for encouraging student engagement. Furthermore, lecturers play a crucial role in motivating and supporting students to remain active in the learning process, particularly in online learning situations that are prone to decreased learning motivation (Rahman et al., 2025).

However, lecturers face several obstacles in implementing digital-based adaptive learning. One major obstacle is the limited digital competency of some lecturers, particularly in the use of more complex technologies such as learning analytics and artificial intelligence-based adaptive systems. Furthermore, infrastructure limitations, such as unstable internet access and limited devices, also hinder the implementation of digital learning. This results in a less than

optimal learning process, particularly for students in areas with limited access to technology (Thalib et al., 2025).

In terms of learning evaluation, research shows that lecturers are beginning to adopt more flexible and diverse assessment methods. Assessments no longer focus solely on written exams but also include project-based assessments, portfolios, and participation in online discussions. This approach allows lecturers to assess students' abilities more comprehensively and in line with the characteristics of adaptive learning. However, challenges remain regarding the objectivity and consistency of assessments, particularly when using qualitative assessment methods (Thoyib, 2025).

Furthermore, research results show that the success of digital-based adaptive learning is greatly influenced by the lecturer's ability to understand student characteristics (Raprap, 2025). Lecturers who are able to identify students' learning styles, ability levels, and needs tend to be more successful in designing effective learning. In this case, the use of digital technology can assist lecturers in collecting and analyzing data related to student learning activities, so that it can be used as a basis for making learning decisions. However, the utilization of this data is still not optimal among lecturers, so the potential of adaptive learning has not been fully maximized (Adhani et al., 2026).

From a student perspective, research results show that digital-based adaptive learning has a positive impact on motivation and learning outcomes. Students feel more flexible in accessing learning materials and have the opportunity to learn at their own pace. Furthermore, the use of interactive digital media also makes the learning process more engaging and less monotonous. However, some students also experience difficulties adjusting to digital learning, particularly in terms of time management and learning independence (Syukur et al., 2024).

Further discussion shows that the role of lecturers as facilitators in digital-based adaptive learning is crucial in creating a conducive learning environment. Lecturers need to be able to guide students to become independent learners, while also providing the necessary support to ensure students do not experience difficulties in the learning process. In this regard, effective communication between lecturers and students is key to successful learning. Lecturers who are responsive and open to questions and input from students tend to be more successful in creating positive learning relationships (Rani et al., 2025).

Furthermore, innovation in technology use is also a crucial factor in developing adaptive learning. Lecturers who are creative in utilizing various digital applications and media can create more varied and engaging learning experiences. For example, the use of instructional videos, simulations, and gamification can increase student engagement in the learning process. However, this innovation requires institutional support, whether in the form of training, provision of facilities, or policies that support the development of digital learning (Mutiarra et al., 2026).

Overall, the results of this study indicate that the role of lecturers in developing digital-based adaptive learning is crucial to the success of the learning process in the digital era. Lecturers are not only required to master the teaching material, but also must possess the ability

to utilize technology and understand the diverse needs of students. Therefore, continuous efforts are needed to improve lecturer competency, both through training, workshops, and collaboration between lecturers. This way, digital-based adaptive learning can be optimally implemented and provide maximum benefits for students (Pecamuya, 2025).

Considering these findings, it can be concluded that developing digital-based adaptive learning is a complex process that requires the involvement of various parties. Lecturers, as the primary actors, play a highly strategic role in determining the direction and quality of learning. Therefore, strengthening the role of lecturers is crucial in efforts to improve the quality of higher education in the ever-evolving digital era.

CONCLUSION

Based on the research findings, it can be concluded that the role of lecturers in developing digital-based adaptive learning for students is crucial and strategic in improving the quality of the learning process in the digital era. Lecturers no longer function solely as transmitters of material, but also as facilitators, motivators, and innovators, capable of adapting learning methods to the diverse needs, characteristics, and abilities of students. Lecturers' ability to utilize digital technology is a key factor in creating flexible, interactive, and student-centered learning.

Furthermore, the successful implementation of digital-based adaptive learning is greatly influenced by the competence of lecturers in designing, implementing, and evaluating learning effectively. Although some lecturers have been able to integrate technology into their learning, various obstacles remain, such as limited digital competency, infrastructure, and readiness to manage adaptive learning. Therefore, support from educational institutions is needed in the form of training, provision of facilities, and policies that support the continuous development of lecturer competence. Thus, digital-based adaptive learning is expected to run optimally and significantly improve the quality and learning outcomes of students.

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