Educational Management Innovation by Utilizing Artificial Intelligence in Higher Education

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ABSTRACT

Innovation in higher education is essential to align teaching with technological developments. The use of artificial intelligence (AI) offers great potential to improve education management in higher education through optimizing the teaching and learning process. This research aims to explore how the integration of artificial intelligence in education management can improve the efficiency, effectiveness, and quality of students' learning experience in higher education. The research method includes a comparative analysis between conventional education management systems and systems that utilize artificial intelligence, as well as the implementation of AI technology in the decision-making process in higher education. The results show that the application of artificial intelligence can improve the ability of prediction, data analysis, adaptation, and personalization in curriculum management, student performance evaluation, and the provision of learning resources tailored to individual needs. Artificial intelligence in education management in higher education has opened up various opportunities. Artificial intelligence enables personalization of learning. In addition, the use of artificial intelligence in administration has also improved the efficiency of resource management and administrative processes. The conclusion of this study states that the utilization of artificial intelligence in educational management in higher education can bring about positive changes. By effectively utilizing artificial intelligence technology, universities can improve students' learning experience and optimize administrative efficiency, better preparing students for future challenges. It can also manage education in higher education to create a more adaptive, responsive, and innovative learning environment, which in turn can improve the overall quality of higher education.

Keywords: Education Management Innovation, Artificial Intelligence, Higher Education

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INTRODUCTION

Education is an important foundation in shaping a competent generation that is ready to face the changing times (Abdulkadyrov et al., 2019). One of the crucial aspects in improving the quality of education is innovation in education management (Armenia et al., 2019). Higher education is the main milestone in developing this innovation, especially with the utilization of artificial intelligence (Aditya Nirwana et al., 2023). With the rapid development of technology, artificial intelligence has become an important catalyst in designing an education system that is more efficient, adaptive and responsive to individual needs (Allam & Dhunny, 2019). In higher education, the use of artificial intelligence in education management promises a more reliable transformation (Charias et al., 2019). By leveraging artificial intelligence, universities can optimize the learning process with curriculum personalization (Mohamed, 2023), development of recommendation systems for learning materials, and predictive analysis to improve the efficiency and effectiveness of the teaching-learning process (Brew & Boud, 1995).

There are several ways technology is used in education management. The first is learning management system (LMS) (Alsubaie, 2022). LMS such as Moodle, Canvas, or Blackboard provide a digital platform to deliver materials, assignments, and tests to students. They also enable interaction between students and lecturers, and provide access to educational resources online. Both data analysis and predictive. Technology enables extensive data collection and analysis (Bai et al., 2019). By using data analysis and machine learning techniques, universities can predict trends, needs, and behavior patterns of students, helping in designing more effective educational programs. Third, adaptive learning technology (Adeyeye et al., 2022). There are learning systems that can customize teaching content and methods based on students' individual responses and abilities (Nurani et al., 2023). This enables more personalized and efficient learning. Fourth, Cloud Computing and Online Collaboration. Cloud computing allows easy access and collaboration between students and lecturers from various locations. It also facilitates efficient storage and sharing of learning materials. Fifth, mobile applications (Aceto et al., 2019). Mobile applications expand access to education by allowing students to learn anywhere and anytime (Ardiansyah & Nana, 2020). They can access reading materials, assignments, and communication with lecturers through their mobile devices. Sixth technology in administration. Technology is used in administration to manage student data, enrollment, finance, and other operational processes, improving administrative efficiency (Bernacki et al., 2020). The use of technology in education management enables more interactive learning experiences, wider access to educational resources, and more administratively efficient management.
REVIEW OF LITERATURE

Education management innovation

Education management innovation is a concept that includes the application of new ideas, technologies, methods and strategies in the management of educational institutions (Tan, 2023). The aim is to improve the efficiency, quality and suitability of education to today's needs. Education management innovation includes several things: first, learning support technology. The use of technology in teaching and learning, such as e-learning, online learning applications or the use of digital platforms to facilitate collaboration and interaction between students and teachers. Secondly, personalization of education (Ellah & Achor, 2023). Implementing strategies that take into account the individual needs of students, such as adaptive learning that tailors teaching materials and methods to each student's learning style (Arantes, 2023). Third, the use of education data. Utilize data analysis to identify trends, evaluate student performance, measure teaching effectiveness and make decisions based on empirical evidence. Fourth, collaboration and networking (Šašinka et al., 2018). Building partnerships between educational institutions, education stakeholders and communities to improve access to resources, exchange ideas and design more effective strategies (Figueiredo & García-Peñalvo, 2018). Fifth, educational leadership development. Establishing leadership that is innovative, visionary and responsive to change and promoting a school culture that supports innovation. Sixth, community engagement. Integrating the role and expectations of the community in education management, ensuring that educational programs are in line with local and global needs (Alonso De Castro & García-Peñalvo, 2020). Educational management innovation is also often closely linked to responses to social, technological and economic change (Y. Li et al., 2020). The aim is for educational institutions to respond to the demands of the times by adapting and adopting sustainable best practices.

Artificial intelligence

Artificial intelligence (AI) has great potential to change the higher education landscape in significant ways. In higher education, AI has already begun to be utilized in a variety of contexts, ranging from learning processes to administrative management (Bali et al., 2022). A few things about artificial intelligence in higher education (Barredo Arrieta et al., 2020). First, there is adaptive learning. AI enables learning approaches that are tailored to individual needs. With in-depth data analysis on learning styles and student progress, adaptive learning systems can be structured to provide a more effective and efficient learning experience. Secondly, AI can analyze historical data to predict student behavior, such as academic performance, attendance, or even potential academic difficulties. This allows institutions to take preventive measures or early intervention to help students in need (L. Li et al., 2020). Third, administrative management. In terms of administration, AI can be used to automate many processes, such as timetable management, lecture hall scheduling, resource management, and staff performance evaluation. This can reduce administrative burden and improve efficiency (Dwivedi et al., 2021). Fourth, research and innovation. AI is becoming an important
tool in higher education research, assisting in complex data analysis, simulation models, or even in identifying new patterns in certain disciplines. Fifth as ethics and privacy. Discussions on ethics in the utilization of AI in higher education are very important (Buinytska et al., 2021). The need for data security and privacy, fairness in technology access, and the development of a transparent and accountable system are things that must be carefully considered (Boranbayev et al., 2021). Finally, staff engagement and education. Equipping academic and administrative staff with the necessary skills to understand, manage, and utilize AI effectively is critical. Continuous training and education is required to enable them to integrate this technology properly in the educational environment.

Universities

Universities are institutions of higher learning that offer academic programs after secondary education, such as high school or its equivalent (Turugare & Rudhumbu, 2020). These institutions provide opportunities for individuals to explore specific disciplines in greater depth, whether through undergraduate (S1), master’s (S2), doctoral (S3), or other advanced education programs (Peacock, 2001). Colleges can have a variety of focuses and specializations, such as universities that offer a wide range of disciplines, institutes of technology that focus on science and technology, art schools that explore art and design, and community colleges that offer educational programs that are more practical or directly related to local needs. Universities are not only places to acquire academic knowledge, but also centers of research and innovation. They encourage the development of knowledge through scientific research, produce new breakthroughs in various fields, and develop critical and analytical skills in students. In addition to academic education, universities are also places where students can engage in various activities outside the curriculum, such as extracurricular activities, student organizations, and community projects. This helps in personal development, leadership skills, and rich experiences during college. Universities play an important role in shaping individuals to be ready for the world of work or society. They also serve as agents of social and economic change, play a role in community development, and are a critical intellectual resource for progress and innovation.

There are several opinions of previous research on educational management innovation. The first research is according to Manongga et al., (2022), with the research title The Impact of Artificial Intelligence on Education. The results of his research state that Intelligent Web-based education takes into account various factors such as learner knowledge and skills, learning, compatibility capabilities and develops platforms to improve education and learning experiences. The second research according to Aryo Kusuma Yaniaja et al., (2021), with the research title Introduction of Gamification Model into E-Learning in Higher Education. The results of his research state that with the right combination of gamification into the e-learning field in higher education, positive effects on the learning process can be achieved, such as, higher enjoyment, greater student motivation and activeness in the learning process. The importance of gamification goals, rules, techniques and mechanisms that show the effects of student
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dynamics. The third research according to Wahyudi & Sunarsi, (2021), with the research title Benefits of Implementing Knowledge Management for Lecturer Performance during the Covid-19 Pandemic. The results of his research state that the general picture or more or less knowledge management helps the management of higher education institutions in adapting to pandemic conditions, especially in maintaining the performance of lecturers in carrying out education. This is evident, knowledge management encourages the birth of a technology-based online education delivery system, so that the performance of lecturers in the field of education does not decrease.

The research conducted by the previous researcher was different from the research that the researcher conducted. Meanwhile, the research that the researchers conducted was entitled Educational Management Innovation by Utilizing Artificial Intelligence in Higher Education. The results of the research show that the application of artificial intelligence can improve prediction, data analysis, adaptation, and personalization in curriculum management, student performance evaluation, and the provision of learning resources tailored to individual needs. Artificial intelligence in education management in higher education has opened up various opportunities. Artificial intelligence enables personalization of learning. In addition, the use of artificial intelligence in administration has also improved the efficiency of resource management and administrative processes.

**RESEARCH METHODOLOGY**

The research method on education management innovation by utilizing artificial intelligence in higher education begins with identifying the main problems in education management and opportunities for artificial intelligence integration (Bauer & Scheim, 2019). A literature study was then conducted to understand the latest developments in the field of artificial intelligence and its application in education management. In addition, interviews with education and technology experts can provide valuable insights into the challenges and benefits of applying artificial intelligence in the context of higher education. The next step is to design a conceptual framework by identifying the key variables to be researched, such as the existing education management model, relevant artificial intelligence technologies, and factors inhibiting or supporting the implementation of these innovations. Designing the conceptual framework also involves selecting an appropriate research method, such as a case study, survey, or experiment, depending on the research objectives and the type of data to be collected (Martínez-García et al., 2019). In carrying out these research methods, it is important to pay attention to the sustainability and generalizability aspects of the research results. This allows the resulting innovations not only to be situational, but also to be adopted and applied in various higher education contexts by taking into account the diversity of characteristics and needs of educational institutions. Thus, this research method is expected to contribute significantly to advancing education management through the use of artificial intelligence in higher education.
The next stage is data collection, which includes the observation process, mapping of available artificial intelligence technologies, and analyzing the needs and expectations of stakeholders in higher education. In addition, the development of simulation models or prototypes of artificial intelligence systems that will be tested in the context of education management can also be done to obtain valid and reliable data. After the data is collected, data analysis is carried out to identify patterns or relationships between the variables studied. This analysis may use quantitative methods, such as regression or multivariate analysis, and/or qualitative methods, such as thematic analysis or comparative case studies (Bordeleau et al., 2021). The results of this analysis will assist in drawing conclusions regarding the effectiveness and potential of artificial intelligence in educational management innovation in higher education. Furthermore, the implementation of research results in a real context is an important step in this methodology. This step involves working with universities or other educational institutions to test the models or innovative solutions generated from the research. Evaluation of this implementation is also needed to evaluate its impact on efficiency, effectiveness and the learning experience in the educational environment. Finally, this research can also end with the development of recommendations and practical guidelines for universities or other stakeholders to adopt and develop educational management innovations by utilizing artificial intelligence. These recommendations can be in the form of implementation guidelines, selection criteria for appropriate artificial intelligence technologies, or even decision support systems for education managers to integrate artificial intelligence in their daily activities.

RESULT AND DISCUSSION

Education management innovation is the process of developing and applying new ideas, concepts or technologies that aim to improve the effectiveness, efficiency and relevance of education in educational institutions. It includes the use of new strategies, best practices, technological approaches or other creative concepts to manage aspects of education such as curriculum, teaching, learning and administration. Innovation in education management involves using advanced technologies such as artificial intelligence, data analytics or digital platforms to improve the way educational institutions manage information, teach or provide services to students. However, it can also include new strategies in human resource management, more dynamic curriculum planning, or more holistic evaluation methods. The importance of innovation in education management is to continuously adapt to changing times, meet new demands in education, and prepare students for an evolving future. Innovation helps educational institutions to be more responsive, efficient and relevant in meeting the educational needs of students and society as a whole. Innovation aims to improve administrative efficiency, resource management, and operational processes in higher education. This includes the application of technology for more efficient administration, the use of data for decision-making, and improved management systems.

The existence of innovation in education management in higher education brings
a number of benefits in various aspects of education. These benefits are essentially the improvement of learning quality. Innovation enables a more adaptive and personalized approach to learning. This can improve student understanding and engagement in the learning process. Second, efficiency and productivity. With technology, administration and operational processes can be more efficient, freeing up time and resources to focus on more important aspects, such as improving the quality of teaching. Third, personalization of learning. Through data analysis and adaptive learning technologies, education management innovations enable learning approaches that are tailored to the needs and learning pace of individual students. Fourth, predicting student needs. Using artificial intelligence, universities can predict students' needs and provide timely support to improve their academic success. Fifth, curriculum relevance. Innovation helps universities develop curricula that are more responsive to industry developments and market needs, preparing students with relevant skills. Sixth, learning flexibility. Technology enables access to education remotely, giving students the flexibility to study online, which is particularly important in situations like the pandemic. Seventh, improved career readiness. Students will be better prepared to enter the workforce with the appropriate skills and knowledge gained through innovations in higher education. Lastly, resource saving. The use of technology in administration can save time and costs, allowing colleges to allocate their resources more efficiently.

In an educational environment full of data and information, effective and efficient management is vital to achieving educational goals. On the other hand, the development of artificial intelligence (AI) technology has opened up new opportunities in information processing, data analysis, and the provision of more adaptive and personalized learning experiences for students. There are several benefits of artificial intelligence in higher education management. First, as a personalization of learning. The use of AI allows for personalization in learning. With sophisticated data analysis, AI systems can identify students' individual learning styles, needs, and progress. This allows for a more precisely customized curriculum, increasing the effectiveness of learning. Secondly, prediction of student needs. Through the use of machine learning, AI can predict student needs. From these predictions, colleges can provide timely support, such as academic tutoring or extra help, improving student retention and academic success. Third, administration and operational efficiency. AI can be used in administration, speeding up the process of data management, enrollment, and finance. The use of AI chatbots can also improve customer service and address routine queries, freeing up staff time to focus on more complex tasks. Fourth as curriculum development. With AI data analysis of industry trends and market needs, universities can optimize their curriculum.

Table 1: Examples of innovations in education management

<table>
<thead>
<tr>
<th>NO</th>
<th>Form of Innovation</th>
<th>Usability</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>AI-based Education Data Management System</td>
<td>Development of an educational information system that uses artificial intelligence to efficiently manage student, lecturer, curriculum, and academic</td>
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</tbody>
</table>
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<table>
<thead>
<tr>
<th>#</th>
<th>Category</th>
<th>Description</th>
</tr>
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<tbody>
<tr>
<td>2</td>
<td>Personalizing Learning</td>
<td>Personalized learning is an AI tutoring system that can provide assistance in learning to students personally, both in terms of material explanation, exercises, and progress measurement.</td>
</tr>
<tr>
<td>3</td>
<td>Decentralized recruitment or selection</td>
<td>The application of artificial intelligence technology in the selection and recruitment process of new students by analyzing data from various sources to improve accuracy in assessing prospective students.</td>
</tr>
<tr>
<td>4</td>
<td>Administrative Management</td>
<td>Administrative processes, such as financial management, receipt and expenditure of funds, and inventory management, utilizing AI-based systems to improve efficiency.</td>
</tr>
<tr>
<td>5</td>
<td>Research Development</td>
<td>The use of artificial intelligence to analyze research trends, help identify potential research areas, and facilitate collaboration between faculty and industry for more effective research.</td>
</tr>
<tr>
<td>6</td>
<td>Smart Campus Management</td>
<td>Implementation of AI technology in facility management and campus security, such as temperature regulation, lighting, smart security systems, and campus transportation management.</td>
</tr>
<tr>
<td>7</td>
<td>Academic guidance</td>
<td>The use of chatbots or artificial intelligence-based virtual assistants to provide academic counseling services to students, helping them in the selection of study programs.</td>
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</table>

Of course, there are also challenges that must be faced, especially for universities that utilize artificial intelligence to create innovations in education management. Especially for universities that utilize artificial intelligence to create innovations in education management. Here are some of the main challenges, namely the first incomplete or unstructured data. Education data is often scattered across multiple systems that are not well connected or structured. Collecting and integrating data from different sources is a challenge that needs to be overcome. Second, privacy and ethics. The use of student or faculty data in artificial intelligence systems raises privacy and ethical concerns. Ensuring data security and complying with privacy-related regulations are important in the use of AI in educational settings. Third, technical skill limitations. The lack of a skilled workforce in the field of artificial intelligence in the education sector can be an obstacle. Training and development of human resources with such technical skills is important. Fourth, user adoption and readiness. Not all stakeholders in the education environment are ready or open to the adoption of new technologies. Encouraging adoption and ensuring that users have the readiness to use these technologies can be challenging. Fifth, algorithm transparency and accountability. Artificial intelligence often uses complex algorithms that are difficult for end users to
understand. Ensuring transparency and accountability of algorithms to avoid bias or unaccountable decisions can be a challenge. Sixth, implementation and infrastructure costs. Implementing artificial intelligence requires significant investment in technology infrastructure. Financial challenges in hardware procurement, software development, and system maintenance also need to be considered. Finally, there is a change in organizational culture: Changing the organizational culture to be open to innovation and technological change requires considerable time and effort. Established universities have habits and structures that can be difficult to change.

Overcoming these challenges requires collaboration between various departments, stakeholders, and continued investment in technology and human resource development. It is also important to build a system that is able to integrate data from various sources efficiently to overcome the problem of scattered data. Conduct a regular data cleaning process to ensure good data quality before being used in decision-making. Establish clear policies regarding data usage, privacy, and ethics in the development and use of artificial intelligence in educational settings. Provide easy-to-understand explanations of how artificial intelligence algorithms make decisions to ensure transparency.

CONCLUSION

Based on the results and discussion above, it can be concluded that innovation in utilizing artificial intelligence (AI) in education management in higher education has a significant impact in improving the efficiency, effectiveness, and relevance of education. Through the integration of AI, universities can optimize various aspects, from personalization of learning to administration. The use of AI enables a more adaptive approach to learning that suits the individual needs of students, maximizing their learning potential. In addition, AI also helps in predicting student needs, allowing colleges to provide more appropriate and timely support in facilitating academic success. Administrative aspects also benefit greatly, with more efficient and automated administrative processes. The use of AI in education management also enables curriculum development that is more responsive to industry developments and market needs. However, it should be noted that the use of AI in education also requires serious ethical considerations, including student data security, transparency in the use of technology, and efforts to minimize bias in AI decisions. Overall, innovations in utilizing AI in higher education management are bringing about major positive changes in the way education is organized, improving the quality of education and student preparedness for future demands. With continued ethical considerations and appropriate adjustments, AI can continue to be a powerful tool to enrich the educational experience in the future.

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