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Evaluation of the Effectiveness of Artificial Intelligence System in Higher Education Curriculum Management

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ABSTRACT

Background. The development of Artificial Intelligence (AI) technology has created new opportunities in higher education curriculum management. Evaluating the effectiveness of AI implementation in this context is essential to ensure quality improvement in higher education. Artificial intelligence (AI) curriculum management refers to the application of computer technology designed to improve the effectiveness and efficiency of decision-making related to higher education curriculum.

Purpose. This study aims to evaluate

the effectiveness of artificial intelligence systems in higher education curriculum management, with a focus on improving efficiency, adaptability and teaching quality.

Method. The research method used quantitative and qualitative data analysis of AI implementation in curriculum management in several colleges. Surveys, interviews, and observations were used to collect relevant data.

Results. The results show that the implementation of artificial intelligence systems in college curriculum management has successfully improved process efficiency, accommodated dynamic changes in educational needs, and enhanced students' learning experience.

Conclusion. The conclusion of this study explains that a thorough evaluation shows that artificial intelligence systems can significantly improve the effectiveness of college curriculum management. These findings provide a foundation for universities to continue integrating AI technology to improve the quality of higher education and provide a better learning experience for students. Hopefully, the research conducted by the researcher can be a source of reference for other researchers who conduct research related to this field.

KEYWORDS

Artificial Intelligence, Curriculum Management, Higher Education

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INTRODUCTION

Higher education is a crucial aspect in the social and economic development of a nation. In the face of increasingly complex global challenges, universities are faced with the demand to continuously innovate in curriculum management to prepare their students to become highly competitive individuals (Reichstein et al., 2019).

In the digital era, the role of technology is increasingly dominant, and Artificial Intelligence (AI) systems are emerging as a potential solution to improve the effectiveness of curriculum management in higher education (Antonopoulos et al., 2020). Modern universities face unique challenges, such as the rapid development of science and technology, variations in labor market needs, and student diversification. To address these complexities, curriculum management needs to utilize the latest technology (Hooda et al., 2022). The implementation of AI promises to optimize decision-making, improve the quality of education, and align academic programs with industry needs (Acikkar & Akay, 2009). This research aims to evaluate the effectiveness of Artificial Intelligence Systems in higher education curriculum management (Li et al., 2020). The main focus is to identify the positive impact of AI implementation on the efficiency, adaptability, and quality of teaching in the academic environment (Ouyang et al., 2022). With a deeper understanding of AI's contribution, it is hoped that better strategies can be developed in developing a responsive and relevant curriculum.

Literatur of Refiew

1. Effectiveness of artificial intelligence systems

Effectiveness refers to the extent to which an action, policy, or process succeeds in achieving its stated goals or objectives. It reflects the ability of a system or activity to produce desired or expected results, often in the context of efficiency or success in achieving a purpose. Effectiveness involves assessing the extent to which an endeavor has a positive impact or achieves a desired result, without wasting too much resources or time. Essentially, effectiveness involves achieving the desired goal or outcome in the most appropriate and efficient manner. Through the integration of artificial intelligence in the curriculum, universities can better face complex challenges, improve the quality of education, and provide a better learning experience for students. The effectiveness of these artificial intelligence systems creates new opportunities for the transformation of higher education towards a more adaptive and responsive future.

Some of the effectiveness of AI in curriculum management is firstly in-depth data analysis (George & Wooden, 2023). AI systems can analyze academic data, including student performance, learning preferences, and curriculum trends in depth (Ding, 2021). This allows curriculum managers to identify patterns, needs, and opportunities that may be difficult to detect through manual approaches. Deep data analysis also supports more accurate and fact-based decision-making. Secondly, personalization of learning (Agaoglu, 2016). Using AI, curriculum can be personalized to meet the individual needs of students (Adamson et al., 2014). The system can recommend courses, projects, or learning materials based on a better understanding of each student's strengths and weaknesses. This personalization of learning creates a more relevant and effective learning experience (Alamri et al., 2020). Third, predicting the needs of the job market. AI systems can analyze job market trends and predict future skill needs. With this information (Aparicio et al., 2018), colleges can adjust their curriculum to create graduates who are more professionally prepared and in line with industry demands. This increases the relevance of educational programs to the needs of the working world.

The fourth is efficient study plan management. AI can assist students and academic advisors in planning efficient studies (Zawacki-Richter et al., 2019). By considering students' schedules, prerequisites, and preferences, the system can generate an optimal study plan. This not only helps students complete study programs more efficiently but also supports smarter management of college resources. Fifth, adaptability to dynamic changes. AI systems can quickly respond to changes in educational needs and changes in the social or technological environment (Ahmad et al., 2022).

This allows colleges to more quickly adapt their curriculum to the latest trends and innovations in various disciplines. Finally, adaptive decision-making. With machine learning capabilities, AI systems can optimize the curriculum-related decision-making process. The system can update itself based on past experiences, allowing for increasingly better decision-making over time.

The effectiveness of artificial intelligence in curriculum management is significant. Firstly, AI enables the automation of various administrative tasks and data analysis that can be time-consuming. As such, the efficiency of the curriculum management process increases, allowing for greater focus on strategic decision-making and curriculum development. By understanding student needs and preferences, AI can craft personalized learning experiences (Faculty of Education, University of Osijek, Cara Hadrijana 10, 31 000 Osijek, Croatia & Đurđević Babić, 2017). This helps maximize each student's potential by presenting material that suits their individual level of understanding and learning style. Second, responsiveness to change. The world of education and the job market are constantly changing. AI allows educational institutions to more quickly respond to changing industry trends and needs, ensuring curricula remain relevant and up-to-date (Dosilovic et al., 2018). Third, data-driven decision-making. In-depth data analysis by AI systems helps curriculum managers make decisions based on facts and accurate information. This can improve the quality of curriculum policies and optimize the use of resources (Lukita et al., 2020). Fourth, artificial intelligence can predict future skill needs based on trend analysis and labor market developments (Somasundaram et al., 2020). Colleges can adjust their curriculum to ensure that graduates have the skills required by the industry. Fifth, AI can support the development and implementation of innovative teaching methods. By utilizing advanced technology, institutions

2. Curriculum management

Curriculum is a learning plan or design that includes a series of formal and structured arrangements regarding materials, methods, assessments, and learning resources used in an educational institution (Baker, 2016). The curriculum not only covers aspects of teaching and learning, but also reflects the values, goals and vision of the educational institution. In other words, the curriculum is a guide or framework that provides structure and direction for the educational process (Guerin, 2009). Curriculum management in higher education involves a series of activities designed to design, develop, implement, and evaluate the curriculum of a study program or department (Zinser, 2012). A curriculum is a set of learning and teaching plans that include subjects, activities, and assessments that are organized to achieve specific educational goals. Effective curriculum management in higher education requires collaboration between lecturers, academic administration and industry. By following these principles, colleges can ensure that their curriculum is relevant, responsive and provides meaningful learning experiences for students.

Curriculum management in the context of higher education has various objectives that include aspects of development, implementation, evaluation and adjustment. Some of the main objectives of curriculum management are firstly competency development (Lau & Al-Hawamdeh, 2002). Developing a curriculum in order to achieve competency development goals in accordance with the vision and mission of the college. Second, providing a flexible curriculum to meet the needs and interests of students and considering individual development. Third, ensuring that the curriculum is always relevant to the development of science, technology, and the demands of the job market (Mohamed, 2023). Fourth, integrate practical and theoretical aspects in the curriculum to prepare students with the skills needed in the real world. Fifth, establish an evaluation system to monitor and evaluate the achievement of learning objectives. Sixth set and maintain quality

standards to ensure high-quality learning (Aspegren, 1999). Prepare the curriculum to meet accreditation requirements and educational standards. Seventh, a curriculum that enables student empowerment in facing global challenges and social change (Bond, 2020). Eight develop curriculum so that graduates can compete in the job market by having relevant skills and knowledge. Nine encourage the development of character and ethics through the curriculum to create graduates who are responsible and have integrity (Yin et al., 2014). Finally, receive regular feedback from students and lecturers to continuously improve the learning experience. The objectives of curriculum management may differ between universities and may evolve over time according to changes in the educational environment and the needs of society (Yin et al., 2014). Good curriculum management can help create an academic environment that is dynamic, relevant and responsive to the demands of the times.

There are several previous research opinions. The first research is according to Alicia & Rani, (2022), with the research title Contribution of Cyber-Based Learning Management System Applications to the Complexity of Class Action Management. The results of his research stated that the results of the literature study and interviews were discussed in a focus group discussion (FGD) forum conducted by 4 lecturers at ITB Ahmad Dahlan Jakarta, in order to carry out a needs assessment and equalize the perceptions (intersubjectivity) of academics, students and good education staff. In this way, comprehensive conclusions and recommendations are obtained for optimizing the implementation of 21st Century Education. The second research according to Yustiasari Liriwati, (2023), with the research title Curriculum Transformation; Artificial Intelligence to Build Relevant Education for the Future. The results of his research stated that in the digital era, learning data produced by students is very abundant. Artificial intelligence can analyze this big data to identify patterns and trends that can help improve the curriculum. The third research is according to Maesaroh et al., (2022), with the research title Effectiveness of Implementing Business Intelligence Management in Industry 4.0. The research results state that knowledge contributes to the current state and positive consequences of Industry 4.0, and high development in technology when implemented in organizations and harmonization between production and intelligent digital technologies.

Research conducted by previous researchers is different from the research that researchers do. Meanwhile, the research that the researchers conducted was entitled Evaluation of the Effectiveness of Artificial Intelligence Systems in Higher Education Curriculum Management. The results showed that the implementation of artificial intelligence systems in managing the college curriculum has succeeded in improving process efficiency, accommodating dynamic changes in educational needs, and improving student learning experiences.

RESEARCH METHODOLOGY

In this study, the research method used quantitative and qualitative data analysis of the implementation of AI in curriculum management in several universities (Ertefaie et al., 2018). Surveys, interviews, and observations were used to collect relevant data. Qualitative research method is a research approach that focuses on an in-depth and interpretive understanding of the phenomenon under study (Hamilton & Finley, 2019). Qualitative research is descriptive in nature and aims to explore the meaning, views, and context surrounding a phenomenon (Rofiah & Bungin, 2021). Evaluating the effectiveness of artificial intelligence (AI) systems in higher education curriculum management is an important step to ensure that this technology makes a positive contribution to higher education. A good evaluation method should include both qualitative and quantitative aspects to provide a holistic understanding of the impact and

performance of the system. The following are qualitative and quantitative methods that can be used in such evaluation.

The steps of the qualitative method in this research can be done in several ways, namely first interviews with stakeholders. Conduct in-depth interviews with various relevant parties, such as lecturers, students, and curriculum administrators, to get their views on the use of artificial intelligence systems. Questions can include their perceptions of effectiveness, challenges faced, and suggestions for improvement. Second, direct observation. Directly observe the use of the system in a real context. Observations can be made in the classroom, curriculum meetings, or other related activities. This can provide an understanding of how the system interacts with users and its impact on the curriculum management process. Third, document analysis. Analyze related documents, such as usage reports, meeting notes, and feedback from users. These documents can provide an overview of the changes that have occurred since the implementation of the artificial intelligence system.

While the steps of quantitative methods in this research can be done in several ways, namely first through performance measurement. Using quantitative indicators to measure system performance, such as data processing speed, prediction accuracy, and user satisfaction levels. This data can provide an understanding of the extent to which the system can meet the goals that have been set. The second is through analyzing usage data. Collecting system usage data, such as frequency of use, time spent, and most frequently used features. This analysis can help determine the extent to which users adopt and integrate the system into their routines. The third is through user satisfaction surveys. Distribute surveys to users, including lecturers and students, to measure their level of satisfaction with the system. Survey questions can include interface clarity, system reliability, and perceived positive impact. Fourth, integrate the methods. It is important to note that the two methods can complement each other. Qualitative data can provide context and deep understanding, while quantitative data provides concrete numbers to measure effectiveness more objectively. Integration of data from these two methods can provide a complete picture of the extent to which artificial intelligence systems are successful in the college's curriculum management. Using this approach, colleges can identify the strengths and weaknesses of their AI systems and take appropriate remedial measures to improve the effectiveness of curriculum management.

RESULT AND DISCUSSION

Evaluation is a systematic process for collecting, analyzing, and assessing the performance, effectiveness, efficiency, or impact of an activity, program, or system. The goal is to provide a better understanding of the extent to which an initiative has achieved its objectives, how effective or efficient its implementation is, as well as its impact on the intended target or population. Meanwhile, artificial intelligence is a branch of computer science that focuses on developing computer systems or programs that can perform tasks that require human intelligence. It includes capabilities such as machine learning, natural language processing, pattern recognition, and decision-making. Curriculum is a set of learning plans and arrangements designed by educational institutions to achieve educational goals and objectives. It includes the structure of study programs, subjects, teaching methods, as well as evaluation of learning outcomes. So Evaluation of artificial intelligence in curriculum management is the process of assessing artificial intelligence systems applied in designing, implementing, and monitoring curriculum in higher education institutions. The purpose of this evaluation is to ensure that artificial intelligence applied in curriculum management makes a positive contribution to the efficiency, effectiveness, and quality of higher education.

The evaluation involved collecting data related to the performance of artificial intelligence in providing customized curriculum recommendations, monitoring student progress, and administrative optimization. By using artificial intelligence in curriculum management, higher education institutions can leverage the technology to improve teaching quality, provide a more personalized learning experience, and respond quickly to dynamic changes in education and student needs. This evaluation provides an in-depth understanding of the contribution of artificial intelligence in achieving educational goals and the effectiveness of curriculum management.Evaluation of artificial intelligence (AI) in curriculum management refers to the process of assessing and analyzing the performance of artificial intelligence systems applied in higher education curriculum management. The main objective is to evaluate the extent to which AI can make a positive contribution to the effectiveness, efficiency and quality of curriculum management in higher education.

Table 1: Evaluation of artificial intelligence in curriculum management

NO	Evaluation Aspect	Indicator	Evaluation Method	Evaluation Results	Explanation
1	Increased Student Retention	Graduation rate	Historical data analysis of student graduation before and after AI implementation	Graduation rates are increasing.	Increased student pass rates are an indicator of successful AI implementation.
2	Learning Quality	Level of understanding, active participation, academic results	Student survey, exam and evaluation test, class observation	Improved quality of learning.	There was an improvement in students' understanding of the material, participation, and academic results.
3	Administrative Efficiency	Class scheduling, resource management, productivity	Administrative data analysis, staff survey, task time measurement	Administration is more efficient.	Administrative processes become more efficient, unlocking potential resource savings.
4	Stakeholder Engagement	Participation level, satisfaction level	Interview, satisfaction survey, student participation analysis	Increased participation and satisfaction.	The importance of involving all relevant parties in AI development and implementation.
5	Expanding Use of AI	AI implementation outreach, co-benefits	Analysis of potential AI development areas, interviews	Diversify the application of AI.	There are opportunities to expand the use of AI to optimize

			with relevant parties		other areas in higher education.

From the table, several things can be understood, namely the first increase in student retention. The graduation rate of students has increased significantly after the implementation of the artificial intelligence system. With better monitoring of student progress, personalized recommendations, and timely interventions, graduation rates increased. Second, the quality of learning. Evaluations showed an improvement in the quality of learning. Students reported a better level of understanding, active participation in the teaching-learning process, and improved academic grades. AI helps tailor teaching methods to meet students' individualized learning needs. Third, administrative efficiency. Administration becomes more efficient with the help of AI. The class scheduling process becomes more structured, resource management becomes more efficient, and staff productivity increases. This opens up opportunities to better allocate resources. Fourth, stakeholder engagement. Engagement of stakeholders, including students and academic staff, is improved. Student participation in the learning process becomes more active, and student and academic staff satisfaction with the system increases. Fifth, expansion of AI use. The evaluation highlighted the potential for expanding the use of AI in various areas of higher education. AI is not only beneficial in curriculum management, but can also be optimized for financial management, human resources, and other administrative areas. The results of this evaluation provide a comprehensive overview of the positive impact of implementing AI systems in higher education curriculum management. Improved learning quality, administrative efficiency, and engagement of relevant parties provide a strong basis for continuing to develop and expand the application of artificial intelligence in higher education. Invest in the development of AI capabilities to improve data analysis and personalization of curriculum recommendations. In addition to staff and student training. Conduct regular training for staff and students to understand and utilize artificial intelligence systems more effectively.

The evaluation of AI systems in curriculum management in higher education provides a number of benefits covering various aspects from administrative efficiency to the development of student learning experiences. Some of the benefits of AI evaluation in curriculum management are firstly, AI evaluation can help identify weaknesses and strengths in the curriculum. With careful data analysis, colleges can optimize course offerings, update curricula, and adjust study programs according to labor market needs. Secondly, AI systems can provide curriculum recommendations tailored to the individual needs and abilities of students. Evaluation helps ensure that this personalization of learning is effective and has a positive impact on students' academic achievement. Thirdly, AI evaluation includes real-time monitoring of students' academic progress. This enables early identification of students who require additional support, provides opportunities for more effective interventions, and increases retention rates. Fourthly, with good evaluation, universities can measure the administrative efficiency achieved with the implementation of AI systems. This includes resource management, class scheduling, and academic governance, all of which can be improved to save time and money.

The fifth is that the artificial intelligence system can assist students in planning their career development by providing insights into industry trends, skill needs, and job opportunities. Evaluation ensures that the system provides accurate and useful recommendations. Sixthly, evaluation helps colleges to ensure that the educational programs offered remain relevant to the latest developments in the industry and society. It helps in adapting the curriculum to meet real-world demands. Seventh, by identifying student learning patterns through evaluation, artificial intelligence systems can improve the overall learning experience. This includes the provision of customized learning materials, innovative teaching methods, and more targeted feedback. Eight Artificial intelligence system evaluations provide access to in-depth big data analysis. Colleges can

use this data for strategic decision-making, including long-term planning, policy development, and smarter resource allocation. Nine providing a more adaptive and relevant learning experience, AI evaluations can contribute to improved student satisfaction levels. This can have a positive impact on the college's image and student retention. Finally, evaluation assists colleges in maintaining the sustainability and adaptability of AI systems. By continuously monitoring its performance, the college can make adjustments and updates to address changing educational and technological needs. These benefits show that evaluation of AI systems is not just about ensuring that the technology is working properly, but also maximizing its impact on the quality of curriculum management and the overall higher education experience.

Artificial intelligence (AI) evaluation in curriculum management faces several challenges that need to be overcome to ensure successful and sustainable implementation. One of the main challenges is ensuring the accuracy and consistency of the results produced by the AI system. If the model is unable to provide precise or consistent recommendations, this can lead to curriculum decisions that do not match the actual needs. In addition, it is worth noting the issue of algorithm bias, where the model may reflect and even amplify biases present in the training data, which may result in unfairness in curriculum recommendations. Understanding the local context is also a challenge, as each education system is unique, and AI needs to be able to adapt to the unique needs of each educational environment. Transparency in AI decisions is crucial so that curriculum managers can understand the basis of decisions made by the system. Data privacy and security are also serious concerns, especially when handling sensitive student information. Other difficulties involve stakeholder participation, system flexibility and adaptability, and seamless integration with existing curriculum management systems. In the face of these challenges, collaboration between education experts, AI experts, and other stakeholders, along with the implementation of appropriate regulations and policies, are key to the successful evaluation of artificial intelligence in curriculum management.

CONCLUSIONS

Based on the results and discussion above, it can be concluded that the evaluation of artificial intelligence in curriculum management is the process of assessing artificial intelligence systems applied in designing, implementing, and monitoring the curriculum in higher education institutions. The purpose of this evaluation is to ensure that artificial intelligence applied in curriculum management makes a positive contribution to the efficiency, effectiveness, and quality of higher education. The evaluation also has a positive impact on the student experience of learning. The use of artificial intelligence enables improvements in the learning experience through the provision of customized materials, innovative teaching methods, and more targeted feedback. Students are at the center of the learning process, with artificial intelligence helping to identify how best to support their academic development and achievement. With a wide range of benefits in learning personalization, administrative efficiency, curriculum relevance, and student experience, artificial intelligence offers great potential to improve the quality of higher education. A thorough evaluation shows that artificial intelligence systems can significantly improve the effectiveness of higher education curriculum management. These findings provide a foundation for universities to continue integrating AI technology to improve the quality of higher education and provide a better learning experience for students. Hopefully, the research conducted by the researcher can be a source of reference for other researchers who conduct research related to this field.

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AUTHORS' CONTRIBUTION

Author 1: Conceptualization; Project administration; Validation; Writing - review and editing.

Author 2: Conceptualization; Data curation; In-vestigation.

Author 3: Data curation; Investigation.

Author 4: Formal analysis; Methodology; Writing - original draft.

Author 5: Supervision; Validation.

REFERENCES

Acikkar, M., & Akay, M. F. (2009). Support vector machines for predicting the admission decision of a candidate to the School of Physical Education and Sports at Cukurova University. *Expert Systems with Applications*, *36*(3), 7228–7233. https://doi.org/10.1016/j.eswa.2008.09.007

Adamson, D., Dyke, G., Jang, H., & Rosé, C. P. (2014). Towards an Agile Approach to Adapting Dynamic Collaboration Support to Student Needs. *International Journal of Artificial Intelligence in Education*, *24*(1), 92–124. https://doi.org/10.1007/s40593-013-0012-6

Agaoglu, M. (2016). Predicting Instructor Performance Using Data Mining Techniques in Higher Education. *IEEE Access*, *4*, 2379–2387. https://doi.org/10.1109/ACCESS.2016.2568756

Ahmad, S. F., Alam, M. M., Rahmat, Mohd. K., Mubarik, M. S., & Hyder, S. I. (2022). Academic and Administrative Role of Artificial Intelligence in Education. *Sustainability*, *14*(3), 1101. https://doi.org/10.3390/su14031101

Alamri, H., Lowell, V., Watson, W., & Watson, S. L. (2020). Using personalized learning as an instructional approach to motivate learners in online higher education: Learner self-determination and intrinsic motivation. *Journal of Research on Technology in Education*, *52*(3), 322–352. https://doi.org/10.1080/15391523.2020.1728449

Alicia, V., & Rani, I. H. (2022). KONTRIBUSI APLIKASI SISTEM MANAJEMEN PEMBELAJARAN BERBASIS SIBER TERHADAP KOMPLEKSITAS MANAJEMEN TINDAKAN KELAS. *Jurnal Pendidikan*, *23*(1), 24–42. https://doi.org/10.33830/jp.v23i1.2611.2022

Antonopoulos, I., Robu, V., Couraud, B., Kirli, D., Norbu, S., Kiprakis, A., Flynn, D., Elizondo-Gonzalez, S., & Wattam, S. (2020). Artificial intelligence and machine learning approaches to energy demand-side response: A systematic review. *Renewable and Sustainable Energy Reviews*, *130*, 109899. https://doi.org/10.1016/j.rser.2020.109899

Aparicio, F., Morales-Botello, M. L., Rubio, M., Hernando, A., Muñoz, R., López-Fernández, H., Glez-Peña, D., Fdez-Riverola, F., De La Villa, M., Maña, M., Gachet, D., & Buenaga, M. D. (2018). Perceptions of the use of intelligent information access systems in university level active learning activities among teachers of biomedical subjects. *International Journal of Medical Informatics*, *112*, 21–33. https://doi.org/10.1016/j.ijmedinf.2017.12.016

Aspegren, K. (1999). BEME Guide No. 2: Teaching and learning communication skills in medicine-a review with quality grading of articles. *Medical Teacher*, *21*(6), 563–570. https://doi.org/10.1080/01421599978979

Baker, R. S. (2016). Stupid Tutoring Systems, Intelligent Humans. *International Journal of Artificial Intelligence in Education*, *26*(2), 600–614. https://doi.org/10.1007/s40593-016-0105-0

Bond, M. (2020). Facilitating student engagement through the flipped learning approach in K-12: A systematic review. *Computers & Education*, *151*, 103819. https://doi.org/10.1016/j.compedu.2020.103819

Ding, Y. (2021). Performance analysis of public management teaching practice training based on artificial intelligence technology. *Journal of Intelligent & Fuzzy Systems*, *40*(2), 3787–3800. https://doi.org/10.3233/JIFS-189412

Dosilovic, F. K., Brcic, M., & Hlupic, N. (2018). Explainable artificial intelligence: A survey. *2018 41st International Convention on Information and Communication Technology, Electronics and Microelectronics (MIPRO)*, 0210–0215. https://doi.org/10.23919/MIPRO.2018.8400040

Ertefaie, A., Small, D. S., & Rosenbaum, P. R. (2018). Quantitative Evaluation of the Trade-Off of Strengthened Instruments and Sample Size in Observational Studies. *Journal of the American Statistical Association*, *113*(523), 1122–1134. https://doi.org/10.1080/01621459.2017.1305275

Faculty of Education, University of Osijek, Cara Hadrijana 10, 31 000 Osijek, Croatia, & Đurđević Babić, I. (2017). Machine learning methods in predicting the student academic motivation. *Croatian Operational Research Review*, *8*(2), 443–461. https://doi.org/10.17535/crorr.2017.0028

George, B., & Wooden, O. (2023). Managing the Strategic Transformation of Higher Education through Artificial Intelligence. *Administrative Sciences*, *13*(9), 196. https://doi.org/10.3390/admsci13090196

Guerin, S. H. (2009). Internationalizing the Curriculum: Improving Learning Through International Education: Preparing Students for Success in a Global Society. *Community College Journal of Research and Practice*, *33*(8), 611–614. https://doi.org/10.1080/10668920902928945

Hamilton, A. B., & Finley, E. P. (2019). Qualitative methods in implementation research: An introduction. *Psychiatry Research*, *280*, 112516. https://doi.org/10.1016/j.psychres.2019.112516

Hooda, M., Rana, C., Dahiya, O., Rizwan, A., & Hossain, M. S. (2022). Artificial Intelligence for Assessment and Feedback to Enhance Student Success in Higher Education. *Mathematical Problems in Engineering*, *2022*, 1–19. https://doi.org/10.1155/2022/5215722

Lau, C. L., & Al-Hawamdeh, S. (2002). Knowledge Management Education and Curriculum Development. *Journal of Information & Knowledge Management*, *01*(02), 99–118. https://doi.org/10.1142/S021964920200042X

Li, L., Qin, L., Xu, Z., Yin, Y., Wang, X., Kong, B., Bai, J., Lu, Y., Fang, Z., Song, Q., Cao, K., Liu, D., Wang, G., Xu, Q., Fang, X., Zhang, S., Xia, J., & Xia, J. (2020). Using Artificial Intelligence to Detect COVID-19 and Community-acquired Pneumonia Based on Pulmonary CT: Evaluation of the Diagnostic Accuracy. *Radiology*, *296*(2), E65–E71. https://doi.org/10.1148/radiol.2020200905

Lukita, C., Suwandi, S., Harahap, E. P., Rahardja, U., & Nas, C. (2020). Curriculum 4.0: Adoption of Industry Era 4.0 as Assessment of Higher Education Quality. *IJCCS (Indonesian Journal of Computing and Cybernetics Systems)*, *14*(3), 297. https://doi.org/10.22146/ijccs.57321

Maesaroh, S., Lubis, R. R., Husna, L. N., Widyaningsih, R., & Susilawati, R. (2022). Efektivitas Implementasi Manajemen Business Intelligence pada Industri 4.0. *ADI Bisnis Digital Interdisiplin Jurnal*, *3*(2), 1–8. https://doi.org/10.34306/abdi.v3i2.764

Mohamed, S. (2023). The development of an Arabic curriculum framework based on a compilation of salient features from CEFR level descriptors. *The Language Learning Journal*, *51*(1), 33–47. https://doi.org/10.1080/09571736.2021.1923781

Ouyang, F., Zheng, L., & Jiao, P. (2022). Artificial intelligence in online higher education: A systematic review of empirical research from 2011 to 2020. *Education and Information Technologies*, *27*(6), 7893–7925. https://doi.org/10.1007/s10639-022-10925-9

Reichstein, M., Camps-Valls, G., Stevens, B., Jung, M., Denzler, J., Carvalhais, N., & Prabhat. (2019). Deep learning and process understanding for data-driven Earth system science. *Nature*, *566*(7743), 195–204. https://doi.org/10.1038/s41586-019-0912-1

Rofiah, C., & Bungin, B. (2021). QUALITATIVE METHODS: SIMPLE RESEARCH WITH TRIANGULATION THEORY DESIGN. *Develop*, *5*(1), 18–28. https://doi.org/10.25139/dev.v5i1.3690

Somasundaram, M., Junaid, K. A. M., & Mangadu, S. (2020). Artificial Intelligence (AI) Enabled Intelligent Quality Management System (IQMS) For Personalized Learning Path. *Procedia Computer Science*, *172*, 438–442. https://doi.org/10.1016/j.procs.2020.05.096

Yin, H., Lee, J. C.-K., & Wang, W. (2014). Dilemmas of leading national curriculum reform in a global era: A Chinese perspective. *Educational Management Administration & Leadership*, *42*(2), 293–311. https://doi.org/10.1177/1741143213499261

Yustiasari Liriwati, F. (2023). Transformasi Kurikulum; Kecerdasan Buatan untuk Membangun Pendidikan yang Relevan di Masa Depan. *Jurnal IHSAN : Jurnal Pendidikan Islam*, *1*(2), 62–71. https://doi.org/10.61104/ihsan.v1i2.61

Zawacki-Richter, O., Marín, V. I., Bond, M., & Gouverneur, F. (2019). Systematic review of research on artificial intelligence applications in higher education – where are the educators? *International Journal of Educational Technology in Higher Education*, *16*(1), 39. https://doi.org/10.1186/s41239-019-0171-0

Zinser, R. (2012). A curriculum model of a foundation for educating the global citizens of the future. *On the Horizon*, *20*(1), 64–73. https://doi.org/10.1108/10748121211202080