Strategy for Implementing Artificial Based Learning Models in Improving Learning Quality

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Keywords

Abstract

This research seeks to develop and design solutions for artificial intelligence-based learning models to improve learning quality in higher education. The qualitative technique was used in this study, which was completed in three steps: data collection, analysis, and conclusion. To establish the best approach, this study employs validity testing and a SWOT analysis. this research resulting 10 strategies in the implementation of an Artificial intelligent based learning model, namely: Develop a curriculum in accordance with technological developments in Industry 4.0; Establish or establish a special technology development Lab in the field of artificial intelligence and other fields; Creating and using learning media based on bolted intelligence; Conduct regular evaluations by universities/faculties regarding the use or development of artificial intelligence technology; Conducting outreach regarding the importance of data privacy; Provide training for both students and lecturers on artificial intelligence; Provide socialization about entrepreneurship, especially in the field of artificial intelligence; Designing university regulations related to infrastructure to be able to support the development of artificial intelligence; Provide career and talent consulting assistance for students; provide socialization on professional ethics to students and lecturers.

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INTRODUCTION

Japan developed the concept of Society 5.0, a human-centered and technology-based society. This notion arose as a result of the fourth industrial revolution, which is seen to have the potential to degrade human roles. The application of artificial intelligence is one of the key aspects of civilization 5.0. Artificial intelligence (AI) will translate vast data acquired through the internet in all sectors of life (the Internet of Things) into a new knowledge committed to boosting human capacities and opening up new opportunities (Makridakis, 2017; Nguyen et al., 2022; Zhang & Tao, (2020).

Artificial Intelligence, which is the foundation for the development of machines that can assist humans in solving a variety of problems (artificial) and investigates the human cognitive side, memory systems, and character in problem-solving (intelligent), has given birth to a discovery with implications for the educational process (Flogie & Aberšek, 2022; Wang et al., 2021.). Artificial intelligence may be utilized to deliver learning materials, run tests, and offer learning feedback. The following are some instances of how artificial intelligence may be used to aid learning. It is referred to as the learning model during the learning process. The learning model is a type of learning that is displayed from beginning to end and is explicitly provided by a lecturer. In other words, the learning model serves as a container or framework for the implementation of an approach, method, strategy, or learning methodology (Zainuri et al., 2021).

The existence of learning models indicates that the field of instructional technology has progressed from research that attempts to "prove" that media and technology are effective teaching tools to research formulations that examine and test approaches to the application of processes and technology in order to improve learning (Munir et al., 2022a). In the new educational paradigm, the goal of learning is not only to modify student behavior, but also to form the character and mental attitude of global-minded professionals.

The emphasis of learning is on 'learning how to learn,' rather than merely studying the subject matter (Rollnick & Mavhunga, 2016). Meanwhile, the approach, strategy, and learning method all connect to the constructivist notion, which fosters and values students' learning efforts through the inquiry and discovery learning process. Smart education is about delivering a learning system that can be accessed anywhere and at any time. To make this a reality, a software system for determining artificial intelligence-based learning styles must be developed (Bajaj & Sharma, 2018; Göçen & Aydemir, 2020).

The existence of the digitalization era, in conjunction with the availability of artificial intelligence technologies, has revolutionized the learning model in the field of education. In the field of education, artificial intelligence technology encourages student interest in studying in order to enhance the number of talents created (Cantú-Ortiz et al., 2020; Zainuri et al., 2021). According to Alam (2021); Alam (2022); Toumi (2018), artificial intelligence can boost learning and aid in the development of the best advantages for students and lecturers in the education industry.

This is because smart gadgets and computers are accessible to all stakeholders. Students, as objects and subjects in the realm of education, are the most important components in the success of education. Students, as an essential aspect in the world of education, have diversity that must be acknowledged and treated in ways that are appropriate for each student's circumstances. Inappropriate methods of mentoring students might make them hesitant to develop themselves (Mohamed et al., 2021).

The use of artificial intelligence technologies in the classroom can assist lecturers in learning more quickly and easily about their students' preferences and learning preferences. Additionally, the utilization of artificial intelligence technology can be utilized to advise lecturers on effective teaching techniques for the purposes of using the learning mate-

rials already present in the learning management system (LMS) to accommodate more students with various learning preferences. This is a result of the industrial phenomena known as Industry 4.0, which has increased future demand for student talent. The creation of components in the form of learning infrastructure, such as device infrastructure and learning aids, which are produced cooperatively and integrated by many parties from universities, government, and industry, in tertiary institutions.

However, there are still certain challenges in putting artificial intelligence-based learning into practice, particularly a dearth of competence in the creation and use of AI technologies. In the future, Indonesia will only serve as a market for AI technologies produced in other nations due to a lack of expertise and skilled developers. The development of AI talent is one area that necessitates specific attention in order to prepare for this potential. The provision of AI technology learning resources, the establishment of an infrastructure that makes it easier to master AI technology, the training of lecturers and teachers in the field of AI, and other measures are just a few of the things that must be included in efforts to develop AI talent quickly (Davy Tsz Kit et al., 2022; Munir et al., 2022b; Najafabadi & Mahrin, 2015). This research aims to identify the learning model's strengths, limitations, opportunities, and dangers in order to design a plan for adopting the Artificial Intelligence-based learning model.

METHODS

This study employs a mix method Mixed methods research is a strategy for examining issues in behavior, society, and health by gathering and analyzing both quantitative and qualitative data precisely in answer to research questions and integrating or "mixing" the two types of data in a specific research design to develop fresh and more thorough understandings than could be obtained from either quantitative or qualitative data alone (Sugiyono, 2015b). This research divided into 3 main stages, data gathering, data analysis, and conclusion.

This study collects data using three methods: interviews, questionnaires, and observation. An interview is a question-and-answer session with someone who is obliged to provide information or thoughts on a certain topic. This is used to gather information about facts, beliefs, feelings, and desires, among other things. The study's resources included the department's chair, deputy head, and numerous academics from Pancasila University and UHAMKA's department of informatics engineering.

The second technique is to distribute the questionnaire that was created as part of the research (Nguyen et al., 2022) . The questionnaire includes critical success factors for e-learning implementation that can also be applied to AI-based learning models. This questionnaire was given to 30 academics (lecturers) from Pancasila University and UHAMKA who majored in Informatics Engineering. The final technique is observation. Observation is a data collection approach that involves systematically monitoring and documenting symptoms of the study topic. In this study, direct observation was used, which means that observations were made directly to the item at the scene or location where the event occurred without the use of intermediaries. In this situation, the observer is present with the thing under investigation.

This study uses 2 methods of analysis, namely statistical analysis with validity test, and SWOT analysis. The validity test in this study aims to find out what factors have not been achieved or fulfilled from the implementation of AI-based learning models at Pancasila and UHAMKA universities (Sugiyono, 2015a). The Aiken's V formula technique was used in this study to examine the validity of the experts' agreement/disagreement on each item in the form of a success factor for the artificial intelligence-based learning model (Sugiyono, 2012). Meanwhile, SWOT analysis is a method of analyzing and planning stra-

tegies that include strengths, opportunities, weaknesses, and threats that form the basis for evaluation (Benzaghta et al., 2021). This analysis will later help in managing the strengths, opportunities, weaknesses to threats in the organized data. This SWOT analysis will also assess several factors, namely internal and external factors, plus the potential that exists in the present and future.

RESULT AND DISCUSSION

As previously stated, the questioner result validity was evaluated by a competent panel using logical analysis or expert judgment to test the feasibility or relevance of the test material. The participation of at least 16 experts is quite beneficial in providing an assessment of the instrument's content. The measure, which included 28 success variables on a Likert scale, was delivered to 16 artificial intelligence learning model specialists at the Faculty of Informatics.

In other words, several experts were asked to agree on whether each success factor (CSF) of the artificial intelligence learning model was in accordance with expert opinion until an agreement was reached. The questionnaire instrument was designed using a Likert scale from 1-5 where 1 (very bad, 2 (not good), 3 (undecided), 4 (good) and 5 (very good). has been distributed by researchers, even in this questionnaire some experts add or propose additional other success factors. However, the added success factors have been accommodated by the existing success factors.

The first stage is to calculate or calculate the content-validity coefficient for each success factor item using Aiken's V formula. Based on the standard of content validity (V), for 16 experts (rater) and 5 categories (likert scale), the minimum content validity coefficient (V) that is considered significant is 0.50 (V > 0.50). All 16 experts (experts) filled out the questionnaire that had been distributed, even in this questionnaire some experts added or suggested additional other success factors. However, the added success factors have been

accommodated by the existing success factors. The first stage is the calculation or calculation of the content-validity coefficient for each success factor item using the Aiken's V formula which is given in Table 1.

Based on the results of the calculation of the success factors of the artificial intelligence-based learning model in Table 1, for the dimension of lecturer features, it shows that the ability of lecturers to flexibly manage teaching activities at UHAMKA University is 39%, while Pancasila University is 43%. The dimension of learning content factors shows that UHAMKA lecturers in providing artificial intelligence-based learning materials are less available and up to date by 58% due to a lack of artificial intelligence-based curriculum innovation, while Pancasila University lecturers are very good at 43%.

On the technological factor dimension, it shows that UHAMKA lecturers lack technical support in teaching showing a score of 51%, while Pancasila lecturers, institutions support technically in artificial intelligence-based teaching with a value of 43%. On the quality factor dimension, it shows that UHAMKA lecturers are good at adapting to artificially based learning needs and are able to make student progress report profiles by 46%, while Pancasila lecturers are very good at 41%. On the dimensions of organizational features, it shows that the institution holding training with Industry for UHAMKA lecturers does not support artificial intelligence-based learning models, showing a value of 22%, while Pancasila lecturers are very good at 51%.

For the dimension of lecturer features, it shows that the ability of lecturers to flexibly manage teaching activities is the most important factor with an average value of 0.9145. In the dimension of learning content factors, it shows that learning materials are available and up to date with an average value of 0.857. On the technological factor dimension, it shows that there is technical support in teaching showing an average value of 0.727. On the quality factor dimension, the artificial intelligence-based learning model is able to adapt to

Table 1. Results of Content-Validity Success Factors in the Application of Artificial Intelligence-Based Learning Models for Lecturers of UHAMKA and Pancasila University 2022

Dimension	Critical Success Factor (CSF)	V Coefficient UHAMKA	V Coefficient Pancasila Univ
Lecturer Factor	Self-Efficacy	0.435	0.872
	Passion for teaching	0.757	0.805
	Focus on interaction	0.761	0.833
	Timely feedback	0.009	0.876
	Flexible teaching organization	0.896	0.933
	Fair interaction and assessment	0.047	0.859
	Mastering AI-based learning models	0.675	0.886
Learning Content Factor	Content quality	0.463	0.835
	Course flexibility	0.274	0.718
	Materials according to the curriculum	-0.062	0.916
	Learning materials are available and up to date	0.757	0.957
Technological Factor	Internet quality	0.619	0.733
	Reliable technical infrastructure	-0.062	0.750
	Available online communication tools	0.119	0.879
	Technical support in teaching	0.727	0.717
Quality Factors of artificial intelligence-based learning models	Ease of use	0.649	0.869
	System functionality	0.854	0.936
	System interactivity	0.615	0.890
	Language support	0.745	0.904
	System response	0.659	0.904
	Simplification of learning	0.765	0.691
	Student learning evaluation	0.830	0.515
	Calculation of teaching results	0.636	0.782
	Automatic reporting	0.820	0.824
	Evaluation of learning content	0.734	0.878
Organization	Training with Industry	0.820	0.776
	University leadership support	0.867	0.475
	University Policy	0.850	0.312

Source: Processed data (2022)

learning needs showing an average value of 0.895, besides that the artificial intelligence-based learning model is able to profile student progress reports showing an average value of 0.822. In the dimension of organizational features, it shows that the institution holds training with Industry in supporting artificial intelligence-based learning models, showing an average value of 0.79.

Based on the results of interviews of researchers with lecturers, there are obstacles in supporting the success of the artificial intelligence learning model, namely: online education that is currently being carried out is still very minimal. Student attitudes towards e-learning in willingness to participate in online learning 54%. In terms of technology and quality of artificial intelligence-based learning, the learning process is still the same as the conventional learning process, where the lecturer still acts as a knowledge keeper and knowledge arranger. The only difference lies in shifting face-to-face meetings to indirect face-to-face meetings using gadgets and the internet.

Another obstacle that are limited internet quota and appropriate technology facilities to carry out online learning. Ability to adapt to artificial intelligence-based learning technology using the online LMS application. The difficulty in exploring student desires and motivating students when using artificial intelligence-based learning is due to an unsupportive infrastructure as a learning medium.

Difficulties in facilitating practicums due to the lack of virtual laboratories in artificial intelligence learning. Difficulty in providing study guides for the courses they teach. Difficulty in internalizing attitudes, building ethics and student character through the online learning process.

SWOT Analysis and Strategic Design

SWOT analysis in knowing the development of artificial intelligence models in universities based on SWOT analysis (Strength, Weakness, Opportunity, and Threats).

The development of artificial intelligence-based learning models will be directed at increasing the talents of competitive higher education students with four objectives, namely: (1) Creating Ethics and Artificial Intelligence Policies, by realizing ethical artificial intelligence in accordance with the values of Pancasila. (2) Development of Artificial Intelligence Talents, preparing Artificial Intelligence Talented Students who are competitive and have character. (3) Improving Artificial Intelligence Infrastructure and Data, realizing data and infrastructure that supports the contribution of artificial intelligence-based learning for universities in collaboration with industry. (4) Increasing Artificial Intelligence Innovation, creating a data and infrastructure ecosystem that supports the contribution of artificial intelligence for the benefit of students and lecturers as well as other education staff.

Table 2. SWOT Analysis and Strategic Design

	POWER (Strength-S)	THREATS (Threats)
	1. Human Resources (Students and Lecturers)	1. Misuse of artificial intelligence technology for users
	2. Technology	2. Talented human resources prefer to work abroad or in foreign companies rather than at home because they get more paid.
	3. Infrastructure	3. Misuse of privacy data that escapes surveillance
	4. Learning Media	4. Provide information

OPPORTUNITY (O)	SO/Aggressive STRATEGY	ST STRATEGY/ diversification
1. Entrepreneurship in the field of artificial intelligence 2. The development of the industry in the field of artificial intelligence 3. Increasing the talents and competencies of students who are familiar with digital technology. 4. Expectations on artificial intelligence technology for more effective and efficient decision making for institutions, lecturers, and students	1. Develop curriculum in accordance with technological developments in Industry 4.0 2. Establish or establish a special technology development Lab in the field of artificial intelligence and other fields. 3. Creating and using learning media based on bolted intelligence	1. Conduct regular evaluations by universities/faculties regarding the use or development of artificial intelligence technology 2. Conducting outreach regarding the importance of data privacy
WEAKNESSES (W)	WO/Stability STRATEGY	WT/Defensive STRATEGY
1. Human resources lack knowledge, education, and skills regarding artificial intelligence 2. The high cost of learning artificial intelligence 3. Availability of learning media is less supportive in the development of artificial intelligence 4. Inadequate regulation in the development of artificial intelligence learning	1. Provide training for both students and lecturers on artificial intelligence 2. Provide socialization about entrepreneurship, especially in the field of artificial intelligence 3. Designing university regulations related to infrastructure to be able to support the development of artificial intelligence	1. Provide career and talent consulting assistance for students 2. provide socialization on professional ethics to students and lecturers

Source: Processed data (2022)

In achieving these goals, this study developed 10 strategies based on the results of the swot analysis, namely: (1) Develop curriculum in accordance with technological developments in Industry 4.0. (2) Establish or establish a special technology development Lab in the field of artificial intelligence and other fields. (3) Creating and using learning media based on bolted intelligence. (4) Conduct regular evaluations by universities/faculties regarding the use or development of artificial intelligence technology. (5) Conducting outreach regarding the importance of data privacy. (6) Provide training for both students and lecturers on artificial intelligence. (7) Provide socialization about entrepreneurship, especially in the field of artificial intelligence. (8) Designing university regulations related to infrastructure to be able to support the development of artificial intelligence. (9) Provide career and talent consulting assistance for students. (10) Provide socialization on professional ethics to students and lecturers.

CONCLUSION

The use of artificial intelligence technology for learning can assist lecturers and other teaching personnel in more readily and rapidly determining students' preferences and

learning styles. Furthermore, artificial intelligence technology may be utilized to make recommendations to lecturers on excellent teaching methods for the demands of learning materials in the learning management system in order to accommodate more students with varied learning styles. From the results of this study, it was found that the implementation of learning at Pancasila University and UHAMKA was quite good, but there were still several factors that could not be fulfilled such as the unavailability of university policies, no ability to evaluate learning content, the provision of materials that were not updated, and tools. cCommunication that is not yet widely available. Therefore, this study develops strategies in the implementation of artificial intelligence which are expected to improve the quality of student learning.

The artificial intelligence - based learning model has a very significant impact on students' mindset and general knowledge, this will require critical and observant thinking, their abilities will also be supported by very advanced interaction and access. However, bad things can also happen like the habit of full duplicates without filtering first. There needs to be security apps that allow students not to commit fraud such as full plagiarism and copyright infringement. The challenge of applying artificial intelligence also lies in values and character, this can be shown by the treatment and control of the management and use of artificial intelligence-based learning models. This research recommends that universities start building and providing infrastructure for the development of artificial intelligence, and also conduct academic-industry research collaborations related to artificial intelligence. besides that, universities and the government can make regulations / policies that accommodate artificial intelligence-based learning.

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