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Analysis of Prospective Teachers' Abilities to Designing Artificial Intelligence-Based Learning Media

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Abstract: This research evaluates the capability of prospective teachers to design learning media that effectively incorporates Artificial Intelligence (AI). Conducted within the Mathematics Education Study Program at Malikussaleh University, the study highlights the significant role of AI in education during the Society 5.0 era, particularly in enhancing the quality of learning. Using a descriptive quantitative research method, data was collected through a questionnaire distributed to 60 students in the Mathematics Education Study Program. The findings clearly indicate that 33,33% of respondents fall into the medium ability category, while 53.33% are classified as high and 13.33% as very high in their ability to design AI-based learning media. These findings suggest that while a majority of prospective teachers demonstrate strong competencies in designing AI-based learning media, a notable 33,33% remain in the medium category and may require additional support. It is crucial to enhance skills in creating AI-based learning media to ensure that prospective teachers are well-prepared to address the challenges of education in the digital age. This research provides valuable insights into the abilities of prospective teachers and is expected to serve as a key reference for developing more effective training programs in the future.

Keywords: Ability, Prospective Teachers, Learning Media, Artificial Intelligence.

1. Introduction

The current technological advancements in the era of Society 5.0 are progressing at an unprecedented pace, particularly in the field of education. These developments have significantly impacted various aspects of education, aiming to enhance its quality. A notable trend in this technological landscape is artificial intelligence (AI). In the educational sphere, AI is frequently utilized to support teachers in the implementation of learning processes. AI, a branch of computer science, focuses on creating systems capable of performing tasks that typically require human intelligence [1].

The integration of AI in education can significantly enhance the ability of teachers to develop learning tools, particularly interactive learning media. By utilizing AI in the educational process, teachers can implement adaptive and engaging learning experiences [2]. Additionally, AI enables educators to create diverse learning resources that reflect current trends, preventing the learning experience from becoming monotonous. It is widely recognized that effective learning media is essential for a successful educational process..

The use of learning media is essential in the teaching and learning process. It serves as a bridge for educators to convey the material, fostering greater enthusiasm among students

during learning activities. Learning media plays a crucial role in enhancing both the effectiveness and efficiency of achieving educational objectives [3]. Previous research conducted by Mukarromah & Andriana [4] stated that learning media can quickly and easily increase students' understanding of the material being studied. Furthermore, learning media can increase students' motivation to learn and master the material independently [5]. This shows that learning media is really needed in the teaching and learning process. So in terms of creating AI-based learning media it can be used as a solution for teachers to increase enjoyable learning.

Based on the explanation provided, it is evident that AI-based learning media plays a crucial role in facilitating practical, effective, and efficient learning. However, in practice, challenges remain in the development of such AI-driven resources. Many teachers still rely on conventional teaching methods and struggle to incorporate technology into their learning media creation [6]. In addition to that, there are numerous issues associated with selecting learning media that align with students' needs. These challenges should be addressed, as they can impede learning and lead to a decline in academic performance, ultimately making it difficult to enhance the quality of education.

To mitigate these issues related to the development of learning media, particularly those based on AI, researchers will undertake a study to analyze the capabilities of prospective teachers in designing AI-driven educational resources. This initiative aims to prepare qualified and competent educators.

2. Materials and Methods

This research employs a descriptive quantitative method, grounded in positivist philosophy, to examine research samples and populations [7]. The descriptive quantitative approach is utilized to present data in numerical form, reflecting the findings of the study. In this context, the researchers aim to quantitatively assess the abilities of prospective teachers in designing artificial intelligence-based learning media.

The study's population consists of prospective mathematics teacher students from Malikussaleh University. The sample includes 60 students from the mathematics education program, specifically those in their fifth and seventh semesters. These students were selected because they have completed coursework related to the fundamentals of learning media, the use of technology, basic pedagogy, and both basic and advanced mathematics..

Data collection techniques refer to the methods researchers employ to gather information pertinent to their studies. In this research, data was collected through a questionnaire utilizing a Likert scale, which offers five response options: Always (SL), Often (SR), Sometimes (KD), Ever (P), and Never (TP). Consequently, the percentage of responses can be calculated by dividing the frequency of each answer by the total population surveyed using this scale.

The researcher opted for a Likert scale to assess the varying degrees of responses, ranging from very positive to very negative. This questionnaire was administered to prospective teachers to evaluate their abilities in designing AI-based learning media. Below is a scoring guideline table for assessing the prospective teacher's proficiency in developing AI-driven educational resources..

Table 1. Scoring Guidelines for Prospective Media Design Teachers' Ability Scale AI-based learning

	Skor				
Statement Type	SL	SR	KD	P	TP
Positive	5	4	3	2	1
Negative	1	2	3	4	5

Source : [8]

The formula used to calculate the percentage is as follows:

Index Formula (%) =) $= \frac{\textit{total score obtained}}{\textit{maximum score}} \boldsymbol{x100}\%$ (1)

Table 2. Percentage Value Categories

Persentase (%)	Categories
$0 \leq S < 20$	Very Low
$20 \leq S < 40$	Low
$40 \leq S < 60$	Medium
$60 \leq S < 80$	High
$80 \leq S \leq 100$	Very High

Source : [8]

Data collected through a questionnaire on the ability of prospective teachers to design AI-based learning media will be processed statistically using Microsoft Excel and SPSS version 26 software.

3. Results and Discussion

3.1 Results

This research aims to assess the capability of prospective teachers in designing learning media that incorporates Artificial Intelligence. The study was conducted within the Mathematics Education Study Program at the Faculty of Teacher Training and Education, Malikussaleh University. Data collection involved distributing a questionnaire to 60 prospective teachers.

The findings reveal that all 60 respondents completed the questionnaire, which evaluated their ability to design AI-based learning media across five specific aspects. The collected data was subsequently categorized into five criteria: very low, low, medium, high, and very high. Below is the distribution of the categories reflecting the prospective teachers' abilities in designing AI-based learning media.

Table 3. Categories of Prospective Teachers' Ability in Designing Media AI Based Learning

Persentase	Categories	**Number of Respondents**
$0 \leq S < 20$	Very Low	0
$20 \leq S < 40$	Low	0
$40 \leq S < 60$	Medium	20
$60 \leq S < 80$	High	32
$80 \leq S \leq 100$	Very High	8
Amount		60

Based on table 3, the number of respondents was 60 prospective teachers. It is known that 33,33% of prospective teachers have the ability to design AI-based learning media in the medium category with the number of respondents being 20 prospective teachers, 53.33% of prospective teachers have the ability to design AI-based learning media in the high category with the number of respondents being 32 prospective teachers, and 13,33% There are 8 prospective teachers who have the ability to design AI-based learning media in the very high category. This can be seen from the fact that there are still respondents who fall into the medium category, so attention is still needed to improve the ability to design AI-based learning media for prospective teachers.

3.2 Discussion

AI-based learning media plays a pivotal role in enhancing the quality of education, particularly in today's digital age. The capacity of future educators to design learning media that

incorporates AI technology is essential for creating interactive and effective learning experiences. Key aspects of this ability include understanding AI concepts, technological proficiency, readiness for implementation, innovation and creativity, as well as collaboration. These elements are vital for developing media that engages learners and facilitates optimal educational outcomes.

This research was conducted within the Mathematics Education Study Program at FKIP, Malikussaleh University, with 60 prospective teachers participating in the completion of a questionnaire. With this representative sample size, the research aims to accurately portray the capabilities of prospective teachers in designing AI-based learning media. According to Sugiyono[9], systematic data collection is the key to ensuring the validity and reliability of research results, so that the findings can be trusted and used for further development. In addition, it is important for prospective teachers to continue developing skills in dealing with rapid technological change.

Research has indicated that 33,33% of prospective teachers possess the ability to design AI-based learning media at a medium proficiency level, highlighting the need for targeted attention in this area. However, the majority of prospective teachers fall into the high and very high proficiency categories. This finding aligns with Piaget's constructivism theory, which posits that knowledge is developed through experience. Supporting this, research conducted by [10] confirms that incorporating technology into education enhances students' skills and comprehension. According to Yanti et al [11], adapting to new technology is essential in the realm of education to ensure effective teaching and to enrich students' learning experiences. Therefore, having a solid understanding and skill set in designing AI-based learning media is crucial for preparing prospective teachers to meet the challenges of future educational landscapes..

4. Conclusions

Based on the previous discussion, it was concluded that the overall average ability to design AI-based learning media among prospective teachers is 33,33%, placing them in the medium category. This conclusion is drawn from a group of 20 respondents. In contrast, 53,33% of the prospective teachers, comprising 32 individuals, fall into the high category, while 13,33% represent the very high category, accounting for 8 respondents.

It is important to improve the skills of prospective teachers in designing AI-based learning media, considering the increasingly important role of AI in education in this digital era. Increasing these skills will not only prepare prospective teachers to face future educational challenges, but can also enrich students' learning experiences through the use of more interactive, adaptive and interesting learning media. Therefore, it is necessary to develop more effective and sustainable training programs so that prospective teachers can be better prepared to utilize technology, especially AI, to improve the quality of education.

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