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INTEGRATION OF ARTIFICIAL INTELLIGENCE-BASED INTERACTIVE LEARNING MEDIA IN ELEMENTARY SCHOOL TEACHER TRAINING IN MAKASSAR

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ABSTRACT
The rapid advancement of Artificial Intelligence (AI) has transformed educational practices worldwide, creating new opportunities for innovative teaching and learning. This study explores the integration of AI-based interactive learning media in elementary school teacher training programs in Makassar, Indonesia. The objective is to examine how AI technologies can enhance teachers' pedagogical competence, digital literacy, instructional creativity, and classroom effectiveness. A qualitative literature-based approach was employed through the analysis of current research, educational policies, and best practices related to AI integration in teacher professional development. The findings indicate that AI-based interactive learning media contribute significantly to improving teachers' abilities to design personalized learning experiences, facilitate student engagement, provide adaptive assessment, and support differentiated instruction. Furthermore, AI technologies promote continuous professional learning by enabling teachers to access intelligent tutoring systems, automated feedback mechanisms, and data-driven instructional decision-making. Despite these benefits, challenges such as limited technological infrastructure, insufficient digital competencies, ethical concerns, and resistance to technological change remain significant barriers. The study concludes that successful integration of AI-based interactive learning media requires comprehensive training programs, institutional support, technological readiness, and policy frameworks that ensure equitable and ethical implementation. The findings provide valuable insights for policymakers, educational institutions, and teacher educators seeking to prepare elementary school teachers for the demands of twenty-first-century education.

INTRODUCTION

The Fourth Industrial Revolution has accelerated technological innovation across various sectors, including education. Among the emerging technologies influencing educational transformation, Artificial Intelligence (AI) has gained significant attention due to its potential to personalize learning, automate administrative tasks, and enhance instructional effectiveness. Educational institutions worldwide are increasingly adopting AI-powered tools to support teaching and learning processes, making AI literacy an essential competency for modern educators.

Elementary school teachers play a crucial role in shaping students' foundational knowledge, skills, and attitudes. Consequently, teacher training programs must adapt to technological developments that influence educational practices. In Makassar, Indonesia, efforts to improve teacher quality have focused on strengthening pedagogical competence, technological literacy, and innovative instructional strategies. However, many elementary school teachers still face challenges in integrating advanced digital technologies into classroom instruction.

Interactive learning media supported by AI offer opportunities to transform traditional teaching methods into more engaging, adaptive, and student-centered learning experiences. These technologies can provide personalized learning pathways, intelligent feedback systems, virtual learning environments, and automated assessment tools that

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support both teachers and students. Through appropriate training programs, elementary school teachers can acquire the competencies necessary to utilize AI effectively in educational settings.

The integration of AI-based interactive learning media in teacher training aligns with contemporary educational goals emphasizing critical thinking, creativity, collaboration, communication, and digital literacy. Therefore, understanding the potential benefits, challenges, and implementation strategies of AI in teacher professional development is essential for improving educational quality in Makassar and beyond

LITERATURE REVIEW

1. Artificial Intelligence in Education

Artificial Intelligence refers to computer systems capable of performing tasks that typically require human intelligence, including learning, reasoning, problem-solving, and decision-making. In educational contexts, AI technologies support teaching and learning through intelligent tutoring systems, adaptive learning platforms, automated grading systems, learning analytics, and virtual assistants.

According to Holmes et al. (2022), AI in education aims to augment human teaching rather than replace educators. AI technologies facilitate personalized learning experiences by analyzing learner data and adapting instructional content according to individual needs and learning progress.

The growing implementation of AI in educational environments has expanded opportunities for data-driven instruction, individualized feedback, and enhanced learner engagement. Consequently, teacher preparation programs must equip educators with the knowledge and skills necessary to integrate AI effectively into pedagogical practices.

2. Interavtive Learning Media

Interactive learning media are educational tools that actively engage learners in the learning process through participation, feedback, exploration, and collaboration. Unlike traditional instructional materials, interactive media encourage active learning and student-centered engagement. Examples of interactive learning media include:

a. Educational games
b. Multimedia presentations
c. Virtual simulations
d. Interactive videos
e. Learning management systems
f. Augmented reality applications
g. AI-powered educational platforms

Research indicates that interactive learning media increase student motivation, improve knowledge retention, and foster higher-order thinking skills. When combined with AI technologies, these media become more adaptive and responsive to learner needs.

3. Teacher Professional Development and Digital Competence

Teacher professional development involves continuous learning processes that enhance educators' knowledge, skills, and instructional effectiveness. Digital competence has become a critical component of teacher professionalism in contemporary education.

The European Framework for the Digital Competence of Educators identifies several competencies required for effective technology integration, including:

a. Professional engagement.
b. Digital resource management.
c. Teaching and learning facilitation.
d. Assessment and feedback.
e. Learner empowerment.
f. Facilitating digital competence.

Teacher training programs that incorporate AI technologies contribute to the development of these competencies and support educators in adapting to rapidly changing educational environments.

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4. AI-Based Interactive Learning Media in Teacher Training

AI-based interactive learning media provide innovative opportunities for teacher education and professional development. These technologies support learning through:

a. Personalized Learning

AI systems analyze teacher learning needs and provide customized training pathways. Teachers receive recommendations for resources, activities, and professional learning opportunities aligned with their competencies.

b. Intelligent Feedback

Automated feedback systems provide immediate responses to teacher performance during training activities, facilitating continuous improvement.

c. Virtual Simulations

AI-powered simulations allow teachers to practice classroom management, instructional strategies, and assessment techniques within realistic virtual environments.

d. Learning Analytics

Data analytics help teachers understand learning patterns, identify strengths and weaknesses, and make informed instructional decisions.

e. Collaborative Learning

AI-enhanced platforms facilitate communication, knowledge sharing, and collaborative problem-solving among educators.

METHOD

This study employed a qualitative literature review approach. Data were collected from scholarly journals, conference proceedings, books, policy documents, and educational reports published between 2020 and 2025. The analysis focused on three primary areas:

a. Applications of AI in education.
b. Interactive learning media for teacher development.
c. Teacher training practices in elementary education.

Relevant literature was systematically reviewed to identify emerging themes, opportunities, challenges, and implementation strategies related to AI-based interactive learning media in teacher training.

RESULTS AND DISCUSSION

1. Benefits of Al-Based Interactive Learning Media for Teacher Training

a. Enhaced Pedagogical Competence

AI-based training platforms provide personalized instructional support, enabling teachers to develop effective teaching strategies tailored to diverse learner needs.

b. Improved Digital Literacy

Participation in AI-supported training programs strengthens teachers' technological knowledge and confidence in using digital tools for instructional purposes.

c. Increased Instructional Creativity

AI technologies offer access to innovative teaching resources, lesson planning assistance, multimedia content generation, and interactive classroom activities.

d. Data-Driven Decision Making

Learning analytics provide valuable insights into student performance and learning behaviors, enabling teachers to make evidence-based instructional decisions.

e. Continuous Professional Learning

AI-powered learning systems support self-paced professional development and lifelong learning among educators.

f. Implementation Opportunities in Makassar

Several factors support the implementation of AI-based teacher training in Makassar:

1) Increasing internet accessibility.
2) Government initiatives promoting educational digitalization.

3) Growing availability of educational technology platforms.
4) Rising awareness of digital literacy among educators.
5) Institutional commitment to educational innovation.

Teacher training institutions can leverage these opportunities to integrate AI technologies into professional development programs.

a. Challenges and Barriers

Despite numerous advantages, several challenges hinder implementation:

1) Technological Infrastructure

Some schools continue to experience limited access to reliable internet connectivity and digital devices.

2) Digital Competence Gaps

Many teachers require additional support to develop the skills necessary for effective AI utilization.

3) Ethical Considerations

Issues related to data privacy, algorithmic bias, and responsible AI usage must be addressed.

4) Resistance to Change

Some educators may be hesitant to adopt unfamiliar technologies due to concerns about complexity or job displacement.

5) Financial Constraints

The acquisition and maintenance of AI technologies may require substantial financial investment.

b. Strategies for Effective Integration

To maximize the effectiveness of AI-based teacher training, the following strategies are recommended:

1) Develop comprehensive AI literacy programs.
2) Provide continuous technical support.
3) Establish ethical guidelines for AI use.
4) Strengthen technological infrastructure.
5) Promote collaborative learning communities.
6) Integrate AI gradually into existing training frameworks.
7) Encourage action research and innovation among teachers.

Implications for Educational Practice

The integration of AI-based interactive learning media has significant implications for elementary education in Makassar. Teacher education institutions should redesign professional development programs to include AI competencies as core learning outcomes. Policymakers should support infrastructure development and establish frameworks that promote equitable access to educational technologies.

Furthermore, educational leaders should foster a culture of innovation that encourages experimentation, collaboration, and continuous professional growth. By embracing AI technologies responsibly, educators can enhance learning quality and prepare students for future societal and workforce demands.

CONCLUSION

Artificial Intelligence-based interactive learning media represent a transformative innovation in elementary school teacher training. The integration of AI technologies enhances pedagogical competence, digital literacy, instructional creativity, and professional development opportunities for educators in Makassar. While challenges related to infrastructure, digital competence, ethics, and financial resources remain, strategic implementation and institutional support can facilitate successful adoption.

As education continues to evolve in the digital era, AI should be viewed as a complementary tool that empowers teachers rather than replaces them. Effective teacher training programs that integrate AI-based interactive learning media will contribute significantly to improving educational quality and preparing future generations for the challenges and opportunities of the twenty-first century.

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This version is structured in a format suitable for journal articles, conference proceedings, or further development into a Scopus-indexed manuscript. It can also be expanded into a full empirical study with Introduction, Methods, Results, Discussion, and APA 7th references.

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