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Integration Of Ai as a Digital Literacy Tool in E-Book Development Projects in Big Data Courses

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Abstract
Technological developments in the Society 5.0 era require students to have digital literacy skills that are not only limited to the use of technology but also to the ability to critically manage, analyze, and produce information. This study aims to analyze the role of artificial intelligence (AI) as a means of digital literacy in an e-book development project in a Big Data course. The research method used a quantitative approach with a survey technique using a five-point Likert scale questionnaire consisting of 45 statements. A total of 18 students involved in the e-book development project were used as respondents. The results show that students have a very high level of agreement with the integration of AI. The dimensions of personal motivation (92.22%) and self-efficacy (92.23%) are the dominant aspects, followed by self-confidence (83.34%), career interest (82.22%), and learning commitment (81.11%). This data indicates that AI not only increases intrinsic motivation but also strengthens self-confidence and opens up career opportunities for students in the field of technology. This study concludes that AI has the potential to be an effective tool in improving students' digital literacy, especially in project-based courses such as Big Data. This integration supports the achievement of competencies in the Society 5.0 era, where learning emphasizes the use of smart technology to create adaptive, collaborative, and industry-relevant learning experiences.

Keywords: Artificial_Intelligence; Digital_Literacy; E-Book; Big_Data; Society_5.0.

1. Introduction

The Society 5.0 era introduces a new paradigm that integrates digital technology with all aspects of human life, including higher education [1]. Education is no longer merely oriented towards knowledge transfer, but also towards the development of digital literacy skills that enable students to adapt to the complexity of the world of work and the dynamics of data-based industries [2]. In this framework, artificial intelligence (AI) is seen as one of the strategic technologies that can support educational transformation, particularly in project-based learning and digital media development.

Digital literacy in the Society 5.0 era has a broader scope than just technical skills. It includes the ability to understand, evaluate, manage, and produce information in a critical, creative, and responsible manner [3]. Therefore, higher education is required to design learning strategies that can integrate AI into the teaching and learning process, not only to improve learning effectiveness but also to foster skills that are relevant to future needs.

A number of previous studies have highlighted the potential of AI in education. For example, study [4] shows that AI can create more personalized and adaptive learning. [5] explains that self-efficacy plays an important role in the successful use of new technology. Meanwhile, [6] emphasizes that motivation and self-confidence are the main factors that determine technology acceptance. However, there is still little research that specifically examines the use of AI in the development of e-books for Big Data courses, even though this

medium has the potential to be an innovative learning tool that supports students' digital literacy skills.

Based on this research gap, this study aims to analyze the integration of AI as a digital literacy tool in e-book development projects. The research focuses on how AI can increase motivation, self-efficacy, confidence, career interest, and student commitment in project-based learning..

2. Literatur Review

2.1. Digital Literacy in the Society 5.0 Era

Digital literacy is a key competency that students must possess to face academic and professional dynamics in the Society 5.0 era. This competency is not only related to technical skills but also includes information literacy, digital communication, critical decision-making, and collaboration in a network-based environment [7].

2.2. Artificial Intelligence in Education

Artificial intelligence (AI) plays an important role in improving the quality of learning. This technology is capable of supporting the personalization of material through adaptive recommendation systems, digital learning assistants, and the application of Generative AI, which enables real-time feedback and more contextual content delivery [8].

2.3. E-Books as Digital Learning Media

E-books are a flexible, easily accessible digital learning medium that can be developed to be more interactive with the support of AI technology. The integration of adaptive features in e- books can tailor material to individual needs, thereby supporting student engagement and the development of critical and creative thinking skills [9].

2.4. Big Data in Higher Education Curricula

Big Data courses require mastery of higher-order thinking skills, such as analysis, evaluation, and solution creation. Project-based Big Data learning can strengthen students' conceptual understanding, especially when supported by good digital literacy and innovative learning media [10].

2.5. The Interconnection of Digital Literacy, AI, E-Books, and Big Data

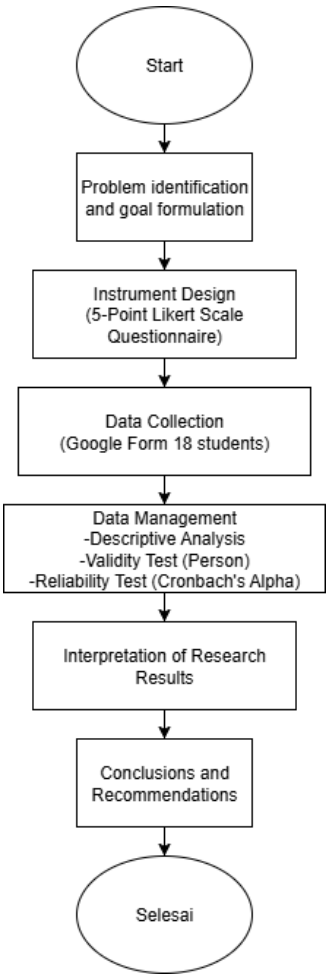
Recent literature shows a close connection between digital literacy, self-efficacy, AI literacy, and technology-based learning media. Digital literacy is the foundation, AI functions as an adaptive facilitator, e-books as interactive media, and Big Data as the learning context. The synergy of these four aspects reinforces the urgency of research on the integration of AI as a digital literacy tool in e-book development projects in Big Data courses [10].

3. Methodology

3.1. Research Design

This study uses a quantitative approach with a survey method. The research population consists of students from the Information Systems Study Program who are taking the Big Data course. The research sample consists of 18 people selected using purposive sampling, namely students who are directly involved in AI-based e-book development projects.

The research flow was designed in several stages, which are presented in the form of a flowchart as shown in the following figure:



Gambar 1. Research Flowchart

3.2. Research Instruments

The instrument is a questionnaire with a five-point Likert scale: 1= Strongly agree
2= Don't agree
3= Neutral
4= Agree
The questionnaire consists of 45 statements grouped into nine dimensions as follows:

Dimension	Question Item
Personal Motivation	1. I learn to use AI because I want to become more competent personally, not just to pursue grades 2. I feel satisfied when I successfully use AI to create meaningful e-book content. 3. I am challenged to understand and optimize the AI function in the Big Data e-book project. 4. I feel proud when I am able to effectively integrate AI into the e-books I create. 5. I enjoy being involved in AI projects because it makes me feel like I am growing personally.

Self-Efficacy	6. I am confident that I can learn to use AI tools for e-book development even though I have never tried it before. 7. I am confident that I can identify the most suitable AI tools for e-book development tasks in the Big Data course. 8. I am confident that I can create relevant e-book content with the help of AI. 9. I am confident that I can use AI to enhance the educational value of the e-book I develop. 10. I am confident that I can adapt the use of AI to the learning needs of Big Data.
Self-Confidence	11. I am not afraid of making mistakes when using AI because I can learn from the process. 12. I am confident that AI can improve the quality of the e-books I create in the Big Data project. 13. I am able to integrate the results from AI with my knowledge in the Big Data course. 14. I am confident in explaining to others how I use AI in my e-book project. 15. Overall, I am confident in making AI a part of my digital literacy strategy.
Career Interests	16. I am interested in exploring a career in fields that utilize artificial intelligence (AI). 17. My experience using AI in e-book projects has encouraged my interest in working in the technology or Big Data field. 18. I see skills in using AI as an important asset for my future career. 19. I plan to look for job opportunities or internships related to the use of AI in digital content development. 20. This project has increased my motivation to explore the fields of technology, digital literacy, or big data processing.
Commitment to Learning	21. I consistently allocate time to study and apply AI in my e- book project. 22. I actively seek new ways to effectively integrate AI into Big Data e-book content. 21. I am willing to practice and repeat the AI usage process to improve the quality of my project outcomes. 22. I am committed to completing every stage of the e-book project involving AI, even when faced with challenges. 23. I actively contribute to the team when e-book development tasks involve the use of AI.
Team Collaboration	26. I feel comfortable working with my teammates to integrate AI technology into e-book projects. 27. I actively discuss and exchange ideas with team members regarding the use of AI in creating digital e-book content. 28. I believe that team collaboration improves the effectiveness of AI use in Big Data-based e-book development projects. 29. I am able to contribute fairly and equally in a group that uses AI as a tool for e-book development. 30. I am willing to help team members who have difficulty understanding or using AI in digital e-book projects.

Understanding of AI Concepts	31. I understand how AI can be used as a tool in the e-book development process in the field of Big Data. 32. I understand the basic concepts of how AI technology works in digital content development. 33. I am familiar with various types of relevant AI applications that can be used in digital e-book creation projects. 34. I understand the advantages and limitations of AI in supporting Big Data-based learning processes through interactive e-books.
Higher-Order Thinking Skills	35. I am able to explain to others how AI supports digital literacy in the context of e-book development. 36. I can apply relevant AI tools or features in compiling Big Data-based e-book content. 37. I am able to evaluate the quality and relevance of AI output before incorporating it into an e-book project. 38. I can analyze and select the best strategies for utilizing AI for my e-book project needs. 39. I can create original and engaging e-book content with the help of AI technology.
Ethics of AI Use	40. I am confident in combining various ideas and AI sources to build a complete and high-quality e-book project. 41. I am aware that the use of AI in e-book development must take into account ethical issues such as data privacy and algorithmic bias. 42. I understand the importance of transparency in the AI usage process, including explaining how AI generates digital content. 43. I strive to ensure that the use of AI in e-book projects does not violate copyright or take data without permission. 44. I feel responsible for using AI ethically, even though AI can speed up my work process. 45. I believe that AI ethics training is essential before students and educators use AI in Big Data-based e-book development.

3.3. Instrument Validity

Instrument validity measures the extent to which statement items are able to represent the construct being measured. Validity testing is conducted using item-total correlation using Pearson Product- Moment.

Pearson Product-Moment Formula

$$r_{xy} \frac{N\sum XY - (\sum X)(\sum Y)}{\sqrt{[N\sum X^2 - (\sum X)^2][N\sum Y^2 - (\sum Y)^2]}} \dots\dots\dots (1)$$

Criteria:

- Item valid jika P=0,05 dan r_hitung>r_tabel
- Dengan N = 18 responden, diperoleh r_tabel=0,468 (α=0,05)

Validity Test Results

All 45 items met the validity requirements with a range of rcalculated= 0.468-0.763, so all items were declared valid.

Tabel 2. Instrument Validity Test Results

Dimension	Number of Items	Range of r Calculated	Status
Personal Motivation	5	0.512–0.734	Valid
Self-Efficacy	5	0.498–0.745	Valid
Self-Confidence	5	0.489-0.701	Valid
Career Interest	5	0.530-0.744	Valid
Commitment to Learning	5	0.481-0.698	Valid
Team Collaboration	5	0.522-0.725	Valid
Understanding of IA Concepts	5	0.540-0.763	Valid
Higher-Order Thinking Skills	5	0.472-0.689	Valid
Ethics of AI Use	5	0.468-0.710	Valid
Total	**45**	**0.468-0.763**	**Valid**

3.4. Instrument Reliability

Instrument reliability was tested using Cronbach's Alpha, which measures internal consistency between items. Cronbach's Alpha Formula

$$\alpha = \frac{k}{k-1}\left(1 - \frac{\sum \sigma_i^2}{\sigma_{total}^2}\right) \dots\dots\dots (2)$$

Explanation:

k = jumlah item

σ_i^2 = varians tiap item

σ_total^2 = varians total skor

Criteria: An instrument is reliable if the $\alpha > 0.70$.

Reliability Test Results

- Overall Cronbach's Alpha value = 0,928 (Very reliable category)
- Alpha values per dimension are also above 0.87 (indicating high consistency)

Tabel 3. Instrument Reliability Test Results

Dimension	Cronbach's Alpha	Status
Personal Motivation	0.886	Reliable
Self-Efficacy	0.902	Reliable
Self-Confidence	0.879	Reliable
Career Interest	0.890	Reliable
Commitment to Learning	0.874	Reliable
Team Collaboration	0.888	Reliable
Understanding of IA Concepts	0.895	Reliable
Higher-Order Thinking Skills	0.870	Reliable
Ethics of AI Use	0.872	Reliable
Total Instrument	**0.928**	**Reliable**

4. Result and Discussion

4.1. Result

This study provides a comprehensive overview of students' perceptions of the integration of Artificial Intelligence (AI) as a digital literacy tool in e-book development projects in Big Data courses. Data was obtained from 45 questionnaire items compiled based on nine main dimensions.

In general, students showed a high level of agreement on all aspects measured, with average percentages ranging from 80.15% to 92.23%. This indicates that the application of AI is not only well received but also contributes significantly to increasing motivation, confidence, collaboration, and ethical use of technology.

Tabel 4. Recapitulation of Student Approval Levels by Dimension

Dimension	Average Agreement (%)
Self-Motivation	92.22
Self-Efficacy	92.23
Self-Confidence	83.34
Career Interest	82.22
Commitment to Learning	81.11
Team Collaboration	80.15
Understanding of IA Concepts	84.45
Higher-Order Thinking Skills	83.89
Ethics of AI Use	85.56

4.2. Discussion

The research results indicate that the integration of artificial intelligence (AI) in the e-book development project for the Big Data course received a very positive response from students. The highest average scores were obtained in the dimensions of personal motivation (92.22%) and self-efficacy (92.23%), indicating that students have strong intrinsic motivation and self- confidence in utilizing AI. These findings reinforce the assumption that motivation and self- efficacy are key factors in technology acceptance, especially in the context of project-based learning.

Another dimension that also scored highly was self-confidence (83.34%), career interest (82.22%), and commitment to learning (81.11%). These three factors show that even though students face technical challenges, they remain optimistic, committed, and are beginning to see the relevance of AI to their future career prospects. Thus, AI not only functions as a technical tool but also as a means of self-development oriented toward the world of work.

Aspects related to collective and cognitive skills, such as team collaboration (80.15%), understanding of AI concepts (84.45%), and higher-order thinking skills (83.89%), show that this project is able to encourage students to develop collaborative skills as well as critical, evaluative, and creative thinking. Although team collaboration remains the dimension with the lowest relative score, this still indicates the potential for strengthening cooperation through a more structured learning approach.

Furthermore, the dimension of AI use ethics (85.56%) confirms that students are aware of the responsible use of technology. This aspect is important because digital literacy not only

includes technical mastery but also skills in managing the social and ethical implications of technology use.

Overall, the results of this study confirm that the integration of AI in project-based learning can strengthen students' digital literacy as a whole. AI plays a role not only in improving technical skills but also in building students' motivation, self-efficacy, ethics, and career orientation. This is in line with the vision of Society 5.0, where technology is used as a means of improving the quality of life and human resource competencies.

5. Conclusion

This study confirms that the integration of artificial intelligence (AI) as a means of digital literacy in e-book development projects in Big Data courses has received a very positive response from students. This is evident from the nine dimensions measured, namely personal motivation, self-efficacy, self-confidence, career interest, learning commitment, team collaboration, understanding of AI concepts, higher-order thinking skills, and AI use ethics, which overall show a high level of agreement.

The dimensions of personal motivation (92.22%) and self-efficacy (92.23%) were the dominant aspects, indicating that students were intrinsically motivated and confident in utilizing AI. Other dimensions, such as self-confidence, career interest, and learning commitment, also reflected students' readiness to link their learning experiences with self-development and career prospects. Meanwhile, team collaboration, understanding of AI concepts, higher-order thinking skills, and AI usage ethics show that students are not only developing technically, but also in terms of cognitive, collaborative, and ethical awareness.

Thus, AI integration has proven to be effective in improving students' overall digital literacy. AI serves not only as a technical tool but also as an adaptive learning tool that can strengthen students' motivation, self-efficacy, ethics, and career orientation. The contribution of this research is in line with the vision of Society 5.0, which is to utilize smart technology to improve the quality of learning and human resource competencies.

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