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Literature Review: Artifical Intelegence (AI) Assisted Science E-Module to Improve Students' Environmental Literacy

Tasya Anggyani[1*], Zulfarina[2], Nur Islami[3]

[1,2,3] *Master of Science Education Study Program, Riau University, Pekanbaru, Indonesia*
**Correspondence author email: tasya.anggyani6243@grad.unri.ac.id*

ABSTRACT

The importance of technology in science is crucial for meeting the demands of 21st-century learning, particularly when it comes to using technology as a learning medium to enhance skills. Digital transformation is also needed in education, which is not only a change in the tools or technology used in the learning process but also in how to understand education as a whole. Thus, the development of learning media must still be carried out with innovations that make students more interested in learning. The researcher aims to study in depth the development of AI- Assisted E-Modules to Improve Environmental Literacy. The method used is a literature review. By searching for references to at least six articles in journals that are analyzed inclusively and exclusively so that they are referenced according to the objectives to be achieved, especially with the help of Harzing's Publish or Perrish application based on Google Scholar and Crossef. From the results of the data collection, 1060 articles were filtered and re-selected to produce 4 articles, which are the results of selection according to deeper inclusion and exclusion criteria, including the title, abstract, and discussion content. Thus, it can be concluded that the use of AI-assisted science e-modules that can improve environmental literacy has not yet been found, and there is minimal.

Keywords: *Artificial Intelligence (AI), Environmental Literacy, Science E-Module*

1. Introduction

The rapid development of technology shows how important technology is for human life, one of which is the development of technology in the field of science. With regard to this, the demands of learning in the 21st century, namely related to the use of technology as a learning medium to improve learning skills, have become more important [1]. Therefore, to meet the increasingly stringent global demands, education in this century must undergo changes in teaching materials, learning media, facilities, and learning models. Digital transformation in education is also needed, which is not only a change in the tools or technology used in the learning process, but also in the way of understanding education as a whole [2]. So, the development of learning media must still be carried out with a novelty that makes students more interested and interested in learning.

The application of AI technology is starting to be mobilised to improve the knowledge of teachers and students in facing the industrial era 4.0 [3]. One of them is in the field of education such as learning media with the aim of upgrading themselves to use technology as a learning activity in the digital era. [4]. In the application of AI in educational practice specifically in the perspective of visual communication design, some of the skills that can be influenced are divided into two broad categories, such as cognitive and social-emotional domains. The findings reveal that AI can improve a wide range of cognitive skills [5]. The use of AI in human life, one of which is students, is very large and quite good [6]. AI has the role of being an effective tool in improving student literacy in education [7].

2. Methods

This research is a literature review[8], using the PRISMA method [9]. The procedure applied to generate the percentage of research methods involved the following steps: Firstly, an article review was conducted. Next, the entire article was scanned three times, and finally, the percentage was calculated using excel software. The inclusion and exclusion criteria in this literature are shown in Table 1 below:

Table 1: Inclusion and Exclusion Criteria

Inclusion Criteria	1) Research articles published in 2020 - 2024, 2) Research Topics on Development, E-Modules, Artificial Intelligence (AI), Environmental Literacy 3) Literature from proceedings, theses, and scientific papers
Exclusion Criteria	1) Research articles that cannot be accessed in full 2) Research Topic on Validity 3) Not in the field of education

After establishing these criteria, the next step was to select the articles to be compiled in the literature review. This article selection process can be illustrated in Figure 1:

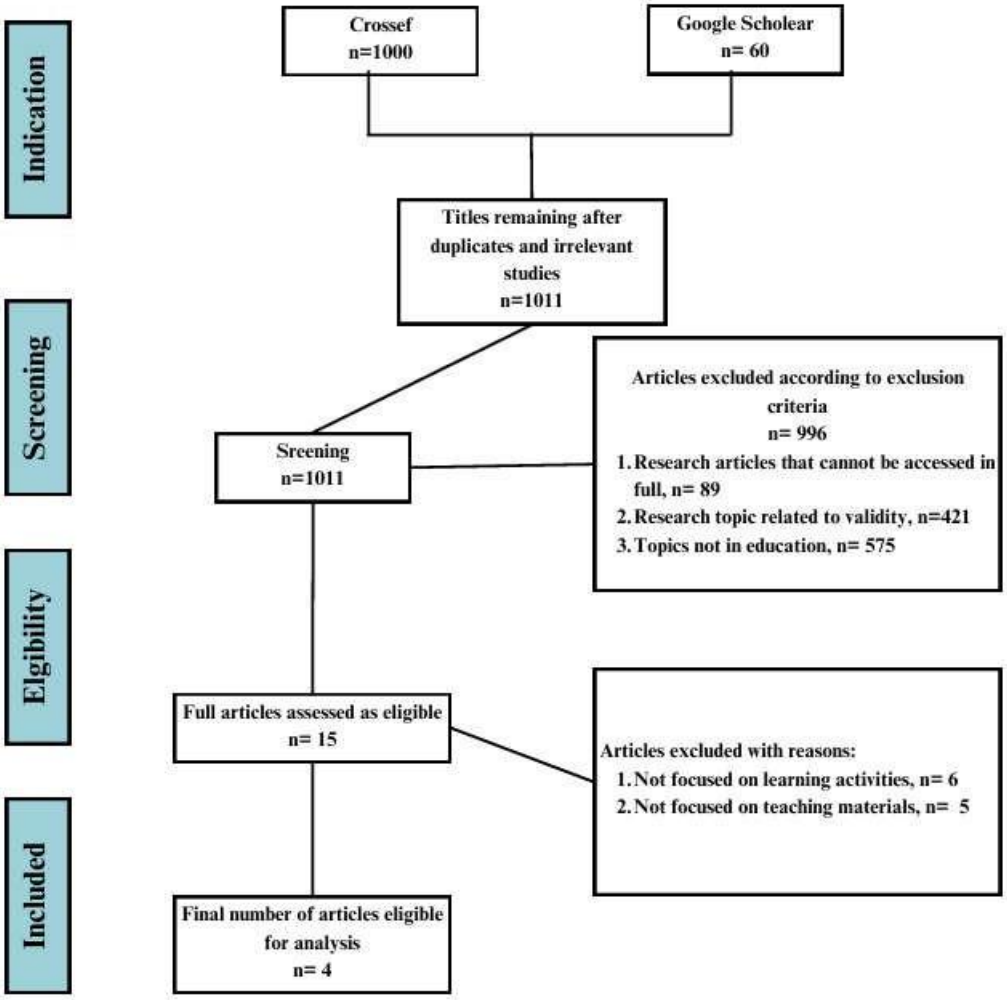

Figure 1: Prisma Diagram

The data analysis method applied is a narrative approach, which aims to provide a description of student learning outcomes based on science process skills by applying a problem-based learning model [10]. Based on the search results, 1060 articles were obtained that were considered in accordance with the research theme raised, then put together and screened whether the studies in the articles were the same or not. After screening, 15 articles were obtained that were in accordance with the study to be conducted by the author. The 15 screening articles will be re- selected based on eligibility in accordance with the inclusion and exclusion criteria and obtained 4 articles which will then be reviewed.

3. Results and Discussion

3.1. Results

From the 4 articles reviewed using the SLR research method, data extraction was then carried out by analysing data based on the author's name, title, and results which are important data in the article. The results of the data extraction can be seen in Table 2.

Table 2: Inclusion and Exclusion Criteria

No	Autors	Year	Title	Research Results
1.	Yusuf	2024	Artificial Intelligence (AI) in Improving Digital Literacy in Islamic Education Institutions	The purpose of this research is to explain how AI can be used to improve literacy in educational institutions. The study revealed that AI has the role of being an effective tool in improving students' literacy in education.
2.	Dwirianto & Linda	2024	Application of Artificial Intelligence Technology to Improve Teacher Competency in Rusqah Foundation Pekanbaru	The purpose of this research is to strengthen the participants' knowledge about Artifical Intelligence (AI) technology and the stages of Artifical Intelligence (AI) application. The results showed that the impact of AI on human life, one of which is the students, is very much and quite good.
3.	Anggun & Siti	2023	E-Module Learning for Artificial Intelligence Specialisation Course, IIB Darmajaya Informatics Engineering Study Programme Based on Android.	The problem in this study is that the modules available in the artificial intelligence specialisation course are still in printed form so that the development of learning media is needed to adapt to technological developments. The results of this study indicate that learning e-modules with android-based artificial intelligence can make it easier for educators to deliver material and can be used as a forum to facilitate the learning process in accessing material, so that it becomes a teaching and learning facility that is more practical and user friendly.
4.	Wu *et al*	2024	Analysis of Attitudes about Artificial Intelligence (AI) and Sustainable Intentions to use AI	The results of this research prove that AI can help make work more effective and efficient. Aiming to provide comprehensive training and education programs on the use and benefits of AI, and gradually integrating AI into various departments.

3.2. Discussion

The data in Table 2 shows that AI-assisted e-modules have not yet been developed. So, what has been analysed further and becomes the basis for initial studies in the development of e-modules that will be made. In addition, junior high school science e- modules related to improving environmental literacy are still minimal or limited. So, that has been analysed further and becomes the basis for initial studies in the development of e-modules that will be made.

Studies in his previous research revealed that AI has the role of being an effective tool in improving student literacy in the field of education. The impact of AI on human life, one of which is students, is very much and quite good. The development of learning e- modules with android-based artificial intelligence can make it easier for educators to deliver material and can be used as a forum to facilitate the learning process in accessing

material, so that it becomes a teaching and learning facility that is more practical, user friendly [11] and can help work more effectively and efficiently [12].

4. Conclusion

Based on the results of the analysis and literature review of the 4 scientific articles, it can be concluded that the use of AI in the development of teaching materials greatly helps students in understanding concepts in science learning and greatly helps teachers in conveying concepts about science learning. The use of learning media such as e- modules can help the independent learning process, especially in terms of material that requires a certain level of understanding. The application of AI in learning media can fulfil the demands of learning in the Merdeka curriculum.

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