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Systematic Literature Review: The Utilization of Interactive Learning Media in Algebra Material for Junior High School Students

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Abstract: Along with the rapid development of technology in the world of education, the use of learning media is increasingly urgent in the teaching and learning process. This study specifically aims to reveal the extent to which interactive learning media can contribute to improving junior high school student's understanding of algebra concepts. Through a systematic literature review approach, researchers analyzed 15 related articles over the past 10 years. The results of the study indicate that the application of interactive learning media has a significant effect on improving understanding of algebra concepts. From various studies, it is clear that interactive learning media can make students more enthusiastic about learning, like learning more, and their exam scores also improve. Some examples of interactive learning media that are commonly used to learn algebra include E-Books, LKPD, Android, Educational Games, Geogebra, etc. In addition, researchers also identified various models for developing interactive learning media that can be adjusted to the abilities and learning methods of students and learning materials.

INTRODUCTION

Rapid advancements in technology have significantly impacted on various aspects of life, including education, enabling more innovative and effective learning. A significant change is the use of technology in education, such as the utilization of interactive media as an innovative learning medium to support students' learning activities (Laila, 2024) especially in mathematics subjects. Interactive learning media is a form of learning media that integrates various multimedia elements such as audio, video, text, graphics, and animations. The implemented learning media encourages students to actively participate in the learning process by responding to the presented material (Azmi et al, 2022).

According to (Alifah et al., 2023) the use of digital media in learning activities is an adaptation to the changing times. Digital tools can facilitate the teaching and learning process by creating innovative and interactive learning materials (Fahri and Qusyairi, 2019). Teachers play a crucial role in the learning process as guide the learning journey and are key to achieving learning objectives (Larasati et al, 2019). Teachers have a vital role in the learning process, especially in understanding the diverse characteristics of learners and striving to meet all their learning needs. This fulfillment demonstrates the learners' needs, characteristics, and abilities, thereby directing them toward optimal learning outcomes. This role aims to facilitate the teacher's teaching practices by enabling them to select the most appropriate learning media to be implemented using available technology (Ambarwati and Darmawan, 2024).

Given the crucial role of technology in mathematics education, the role of teachers as facilitators in algebra learning is highly necessary to assist students in grasping abstract mathematical concepts that often pose difficulties. By utilizing digital media, teachers can present algebraic material more engagingly and interactively, thus motivating students to learn. The interaction between teachers as facilitators and students in digital-based learning can facilitate the teaching-learning process and assist students in overcoming their difficulties. Therefore, the utilization of digital media can be an effective solution to enhance students' understanding of algebra and prepare them for the challenges of mathematics education in the future.

Algebra is a branch of mathematics characterized by its abstract nature and extensive use of symbols and operations. Algebra has a wide range of applications in real-life situations, such as problem-solving through the analysis of complex phenomena in various fields of study (Maulida, 2024). The use of abstract symbols in algebra poses a significant challenge for students in mastering mathematical concepts. However, a deep understanding of algebraic concepts will pave the way for students to grasp more complex mathematical topics in the future. Therefore, students need to master algebraic concepts from an early age (Ekawati dan Saragih, 2018).

Junior high school students have a high level of dependence on their teachers when it comes to understanding algebraic concepts (Harianti, 2018), Therefore, the use of interactive learning media in supporting the learning process is highly relevant for further research. Therefore, research on the utilization of interactive learning media for algebra material in junior high school students can provide effective solutions to address the problems students face in understanding algebraic concepts.

The researcher explained that the purpose of this study was to find out: 1) What are the various interactive media employed in the teaching of algebra to middle school learners?, 2) What are the advantages of employing interactive media in the instruction of algebra for middle school learners?, 3) What is the appropriate development model for creating interactive learning media for algebra instruction. Furthermore, this study aims to identify the trends and challenges in the utilization of interactive learning media in teaching algebra to junior high school students. The novelty of this research lies in the use of Systematic Literature Review (SLR) as a more in-depth and systematic approach to literature analysis. By employing this method, the researcher can provide a clear and comprehensive explanation of the use of interactive learning media in enhancing students' understanding of algebraic concepts.

METHOD

The method employed in this research is a Systematic Literature Review (SLR), which incorporates the concept of a literature review to structure this article. A Systematic Literature Review (SLR) is a systematic approach to identifying, critically evaluating, and integrating relevant empirical evidence related to a specific research question, to provide a comprehensive and accurate answer (Nursalam dkk, 2020). This study was carried out systematically in several stages, as follows: (1) Crafting a specific research question, (2) Performing an exhaustive literature search, (3) Selecting relevant articles, (4) Undertaking a rigorous analysis and synthesis of qualitative data, (5) Evaluating the quality of previous research, (6) Writing a research report following the guidelines of scientific writing (Siswanto, 2010).

The first step a researcher takes is to formulate a clear and specific research question, to focus on finding an answer to the research. The researcher attempts to obtain accurate results by formulating the problem as follows: 1) What are the various interactive media employed in the teaching of algebra to middle school learners?, 2) What are the advantages of employing interactive media in the instruction of algebra for middle school learners?, 3) What is the appropriate development model for creating interactive learning media for algebra instruction?

The second step is performing an exhaustive literature search. In this study, the researcher sought literature sources using the Google Scholar and Open Alex databases through the *Publish or Perish* (PoP) application. The researcher used the keywords "Interactive Learning Media and Algebra Material for Junior High School Students" with a period of 2014 to 2024. The search yielded 40 articles from Google Scholar and 670 articles in Open Alex. Then the third step is for the researcher to re-filter the references that have been found through the selection stage with exclusion and inclusion criteria with the following criteria description:

Table 1. Exclusive Criteria

Criteria	Information
Duplicate	This article has duplicates
Theses, Dissertations, Papers and Books	This file is not an article but rather a thesis, dissertation, paper or book.
Previous article	Does not match search year
Not on topic (does not match keywords)	Does not match the keywords interactive learning media and algebra material
Not on topic (abstract does not match)	The abstract does not discuss algebra material for junior high school students.

Table 2. Inclusion Criteria

Criteria	Information
Title and abstract on the topic	The article discusses interactive learning media and algebra materials for junior high school students.
Discussion results according to the topic	The article answers the researcher's questions

Based on the filtering process using the aforementioned criteria, the researcher found 15 articles that met the specified criteria. The fourth stage involves a detailed analysis of the data to uncover patterns and themes that fit the established criteria. Through this analysis, the researcher can address the research question by conducting a thorough examination, review, and analysis of the data aligned with the research topic.

The fifth step is to evaluate previous research, Before conducting the research, the researcher needs to review previous related studies. Consequently, the researcher can learn from the merits and shortcomings of their study. The final step is to write up all of the research findings in a report. The report should conform to established scientific writing conventions to facilitate understanding by other researchers. The following is a flowchart illustrating the screening process conducted by the researcher in the literature review using the Preferred

Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) framework on Google Scholar and OpenAlex databases.

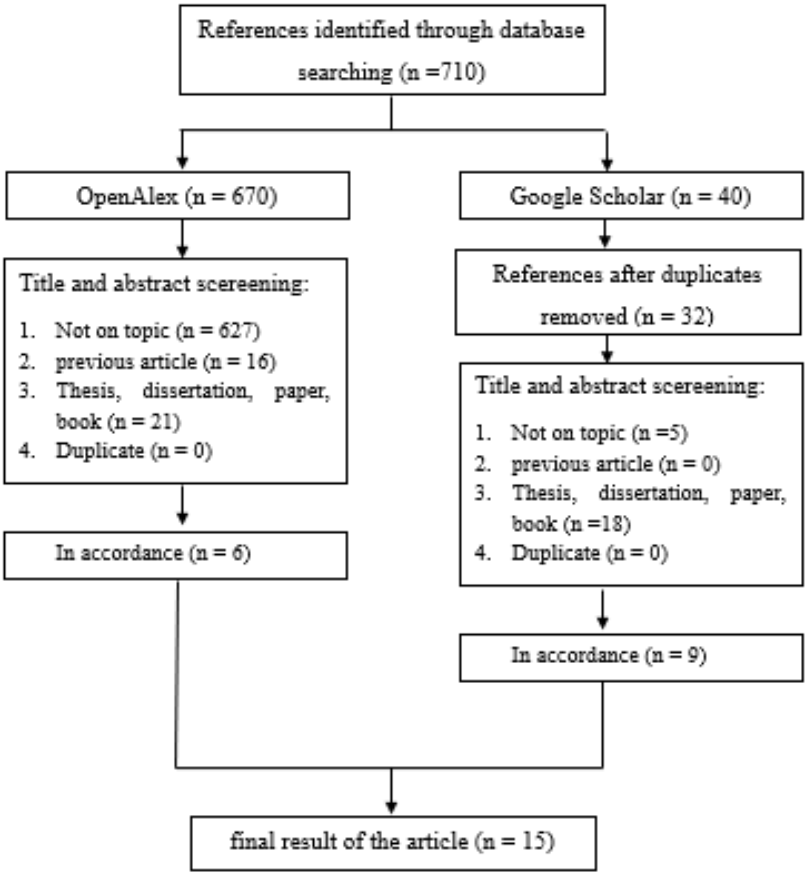

Figure 1. PRISMA Diagram

RESULTS AND DISCUSSION

Based on the researcher's questions, which include: 1) What media are used in learning algebra for junior high school students?, 2) What are the benefits of the use of interactive learning media in Algebra material for junior high school students?, and 3) What are the models for developing interactive learning media for algebra learning?. It can be seen in Table 3 with the details of the answer as follows:

Table 3. Research Results Related to Interactive Learning Media on Algebra Material for Junior High School Students

Researcher Name and Year of Publication	Research Results	Answering Questions
(Fadilah & Effendi, 2023)	The results show that the use of LKPD media is proven to be effective in improving the understanding of Algebra material for junior high school students.	1,2
(Tuljannah & Khabibah, 2021)	The results explain that the development of EBOOK as an interactive media has proven to be effective in increasing student's motivation and interest in learning Algebra material.	1,2,3

(Yulianisa & Sudihartinih, 2017)	From the results of research related to the use of the Scratch application as an interactive media can increase student's interest in learning algebra material.	1,2,3
(Fitrianna et al., 2021)	The results of the research show that the use of learning media with the help of E-Books can train student's reasoning and make student's learning more meaningful.	1,2
(El Hilali et al., 2023)	The results indicate that the development of interactive learning media in the form of PowePoint can increase the level of student's understanding of Algebra material.	1,2,3
(Prayitno et al., 2022)	The results show that the development of Adobe flash-based learning media shows that the use of this media can increase student's motivation in learning algebra.	1,2,3
(Angeline et al., 2024)	The results of the research show that the use of interactive learning media with the help of Wordwall is proven to be effective when used in algebra learning.	1,2
(Noerhasmalina et al., 2024)	Based on the results of the research that has been carried out, it is obtained that the use of PowerPoint-based Almath Game media can spur an increase in student's learning motivation in aljabar material.	1,2
(Anarti, 2022)	Based on the results of the research, it shows that the use of learning media, namely the Geogebra application, can develop student's learning motivation in algebra material.	1,2,3
(Mukhtar et al., 2022)	Based on the results of interviews with students, it is said that this smartphone-based interactive learning media can help students understand algebra material and increase interest and learning outcomes.	1,2,3
(Dewi & Izzati, 2020)	The results of the research obtained information that the development of interactive learning media based on PowerPoint can increase student's learning motivation because of the attractive display of the media.	1,2,3
(Fajriyati & Elniati, 2022)	The results of the research on the development of interactive learning media based on the constructivism approach using smartphones on Algebra material show that the development only reaches 2 stages out of 3 stages used because of Covid 19, with the practicality test showing that the results are very practical.	1,2,3
(Sarji & Mampouw, 2022)	The results of the research show that the development of adventure media gives effective results when used in algebra material.	1,2
(Wahyuni & Ananda, 2022)	Based on tests on students, the use of android-based interactive learning media shows that student's learning outcomes increase in algebra learning.	1,2,3
(Astuti et al., 2021)	The results of the research show that the tests carried out on the use of POKAMATH media show practical results in learning algebra in the classroom	1,2,3

Interactive Learning Media for Algebra Materials

Based on the results of the filtering inclusion that obtained 15 related articles, in this case, the researcher wants to describe what media are used by teachers for student learning in the classroom on algebra material with the following details:

Table 5. Forms of Interactive Learning Media

Author	Interactive Learning Media
(Fadilah & Effendi, 2023)	LKPD (Student Worksheet)
(Tuljannah & Khabibah, 2021)	E-BOOK
(Yulianisa & Sudihartinih, 2017)	Scratch App
(Fitrianna et al., 2021)	E- Book
(El Hilali et al., 2023)	Powerpoint Game
(Prayitno et al., 2022)	Adobe Flash Learning Media
(Angeline et al., 2024)	Wordwall Learning Media
(Noerhasmalina et al., 2024)	Almath Game
(Anarti, 2022)	GeoGebra
(Mukhtar et al., 2022)	Builder App
(Dewi & Izzati, 2020)	PowerPoint Interactive Learning Media
(Fajriyati & Elniati, 2022)	Smartphone-Based Interactive Learning Media
(Sarji & Mampouw, 2022)	Advanture Learning Media
(Wahyuni & Ananda, 2022)	Android-Based Interactive Learning Media
(Astuti et al., 2021)	POKAMATH Learning Media

Benefits of Interactive Learning Media for Algebra Materials

Based on the 15 articles discussed by the researcher, that explained the benefits of interactive learning media for algebra material include an increase in learning interest, learning motivation, and learning outcomes of junior high school students. For more details, see the table below:

Table 4. Benefits of Interactive Learning Media for Algebra Materials

Author	Learning Media	Benefit
(Fadilah & Effendi, 2023)	LKPD	Increase understanding of abstract concepts in algebra
(Tuljannah & Khabibah, 2021) **&** (Fitrianna et al., 2021)	E-BOOK	Increase student's interest and motivation to learn algebra.
(Yulianisa & Sudihartinih, 2017)	Scratch	Increase student's interest in learning algebra.
(Astuti et al., 2021)	POKAMATH	Increase student's motivation to learn algebra.
(Wahyuni & Ananda, 2022)	Android	Improvement of Student Learning Outcomes
(Sarji & Mampouw, 2022)	Advanture Learning Media	Increase learning effectiveness in algebra material.
(Angeline et al., 2024)	Wordwall	Increase learning effectiveness in algebra material.
(Anarti 2022)	GeoGebra	Increase student's motivation to learn algebra.

(Noerhasmalina et al., 2024)	Almath Game	Increase student's motivation to learn algebra.
(Mukhtar et al., 2022)	Smartphone	Increase student's interest and motivation to learn algebra.
(El Hilali et al., 2023) **&** (Dewi & Izzati, 2020)	PowerPoint	Increase student's understanding and student motivation to learn algebra.

Interactive Learning Media Development Model on Algebra Materials

Based on 15 articles selected through predetermined criteria, there are only 10 articles with the 3rd researcher's question related to the learning media development model, with the details of the table below.

Table 6. Learning Media Development Model on Algebra Materials

Author	Development Model
(Tuljannah & Khabibah, 2021)	ADDIE Model
(Yulianisa & Sudihartinih, 2017)	Multimedia Development Life Cycle (MDLC) Model
(El Hilali et al., 2023)	ADDIE Model
(Prayitno et al., 2022)	ADDIE Model
(Mukhtar et al., 2022)	4D Model
(Dewi & Izzati, 2020)	4D Model
(Fajriyati & Elniati, 2022)	Plomps Development Model
(Wahyuni & Ananda, 2022)	ADDIE Model
(Astuti et al., 2021)	ADDIE Model

Based on the description of Table 4., Table 5., and Table 6 can be seen that utilization of interactive learning media, giving many benefits for students in the process of understanding algebra material such as increase learning motivation, learning interest, and student learning outcomes. Based on the development articles, teachers can take advantage of interactive learning media to develop more better. The learning media used in algebra material also varies. The form of media is in the form of LKPD, e-books, android applications, and educational games.

The learning media that has been developed can be accessed with Android platforms and computer. The learning media aims to make it easier for teachers and students to learn algebra material. The development of learning media for algebra material that is most dominant in these studies is the ADDIE model. There 7 of 10 articles that met the research criteria used the ADDIE model. This indicates that the ADDIE model is considered an effective and comprehensive framework in the process of developing learning media, especially in the context of algebra material. In addition to the ADDIE model, other development models such as 4D and Multimedia Development Life Cycle (MDLC) are also used in several studies. The use of these models shows that there are variations in the development of learning media, although the ADDIE model remains the main choice.

CONCLUSION

Interactive learning media as a result of development can motivate students to learn algebra material. The learning media used are LKPD, E-BOOK, POKAMATAT Media, Adobe Flash-based Learning Media, Geogebra, etc. Development models through ADDIE and 4D are options in manufacturing. Students find it easy to learn through the learning media that has been developed. The developed learning media can support teachers and students in the process of learning algebra material in the classroom. Interactive learning media makes it easier for teachers to deliver material and facilitates students in understanding the material being studied. Based on this description, information can be obtained that the use of interactive learning media in algebra learning can be used to increase learning motivation, learning interest, learning outcomes and students' understanding of algebra material.

The results of the study can be used as a reference and comparison when determining which interactive learning media is the most appropriate to be applied in the learning process that is adapted to the subject matter. The researcher suggested to other researchers who want to use the same method can add to the list of other more problem formulations, this will help them to get more results related to the use of interactive learning media.

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