

HASIL CEK_A Literature Study on Science Learning Media in Elementary School

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A Literature Study on Science Learning Media in Elementary School

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ABSTRACT

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This study aims to discover the development of research on elementary science learning media in 2017-2021 and find future research opportunities in elementary science learning media. The type of research used is descriptive quantitative using bibliometric analysis assisted by VOSviewer and Mendeley software. This research data is in the form of 111 research journal articles on elementary science learning media conducted in Indonesia and sourced from several SINTA 1-6 journals in the 2017-2021 timeframe. From the study results, the development of research on elementary science learning media was the highest in 2018. Opportunities for learning media research topics can still be done by selecting keywords rarely used by previous researchers, namely training, science abstract, learning independence, science process skills, cartoons, flashcards, index card matches, puzzles, mastery of concepts, and monopoly games. You can also choose topics with the latest discussion trends using articulate storyline keywords, media development, STEM-based science learning, 21st century, Canva, application of learning media, wonder share, software, mobile learning, monopoly games, mastery of concepts, en-alter source, animation, online, discovery learning, interest and learning outcomes, animated videos, and development models.

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Introduction

Natural science is a subject that contains a variety of life materials. Science learning in elementary schools is essential because it can be one of the means to adjust the progress of science and technology. Natural science or science learning in Indonesia has been given to students from elementary, junior, and high school. Learners at the primary school level must understand the basic concepts of science correctly. Students are expected not only to memorize but are required to be able to think critically and creatively, sensitive to the environment, and be able to master modern technology. According to Ref. [1], some schools still need efforts to improve the quality of science learning to produce good outputs.

Improving elementary science learning quality requires learning innovations, including selecting methods, models, or learning media. Learning media is the most critical component that the teacher must prepare. Teachers as facilitators play a role in innovating media development that supports the learning process so that the learning process is not tedious, especially in science subjects [2]. Using appropriate learning media will undoubtedly affect the achievement of learning objectives.

The results of interviews conducted by Ref. [3] with MI YAPPI teachers, MIM Karanganyar and MI Maarif Patalan, stated that there are students who are less interested in participating in science learning because not all teachers use learning media. So that many students ignore the teacher when explaining the material. In addition, problems in the field arise because teachers have not used various learning media. It results in students being easily bored and not understanding the material presented by the teacher. At the elementary school level, science learning materials must be attractively packaged. A literature review is needed to increase the information obtained about science learning media in elementary schools to gain additional knowledge about elementary science learning media. It can be used for human purposes. Journals are essential to be used as a means of scientific interaction to exchange researchers' information.

Through journals, teachers can add information and knowledge about various learning media that can support the teaching and learning process. This bibliometric literature study is essential to understand the extent to which research on elementary science learning media has developed as a reference or reference for subsequent teachers and researchers. Research articles are limited to the last five years (2017-2021) because researchers want to get data that is still relevant and up-to-date.

The bibliometric analysis intends to analyze the extent of the development of n themes regarding elementary science learning media. Besides that, researchers also describe each keyword in this study so that it can see opportunities for future research. A literature study, or what is known as a literature study, is one of the research activities carried out by collecting

information and data using various types of materials contained in libraries, such as reference books, relevant research results, articles, notes, and appropriate journals [4].

Natural Science is a subject designed to help students formulate systematic knowledge, ideas, and concepts about the surrounding nature and believe that God created nature on this earth [5]. Elementary science learning aims to make students master the concept of science and its interrelationships and develop scientific attitudes to solve the problems they face so that they are more aware of the greatness and power of His Creator.

The use of learning media in science learning needs to be considered. Media comes from the word *medius*, which means middle, intermediate, or introductory. The definition of media in Arabic is the intermediary or delivery of messages from the sender to the recipient. Learning media is a means of transferring information that is made or used under learning theory. It can be used to channel messages and stimulate students' thoughts, feelings and desires to motivate the occurrence of a deliberate, purposeful, and controlled learning process.

Method

This research is a type of research in the form of quantitative descriptive. The type of descriptive research carried out is in the form of scientific articles on the topic of elementary science learning media in Indonesia, which are published in journals in Indonesia from 2017-2021. This study used bibliometric analysis and was processed using Mendeley software and VOSviewer. Bibliometric network analysis often uses mapping and grouping techniques in a combined manner. Bibliometric analysis can be used to determine the mapping of research being carried out and research opportunities in the future [6].

This research will illustrate the mapping of trends in future research topics. The data used are articles from national and international journals whose research is carried out in Indonesia. A selected journal article is a journal article on SINTA (Indonesian Index) one to six from 2017 to 2021. The data was collected by searching the Google Scholar database using elementary science learning media keywords. After searching, researchers found 78,400 articles. Through the sorting process, research data was found in the form of 111 selected journal articles. Data processing and analysis are carried out with the help of Mendeley software, Microsoft Excel, and VOSviewer. The first step is converting the selected journal certificate into RIS data through Mendeley software by adding files, exporting, specifying the storage location, selecting the RIS format, and saving it.

Furthermore, RIS data is processed using VOSviewer software using the Co-occurrence type of analysis and the Full counting method and keywords as the unit of analysis. The selection of the minimum number of occurrences of a keyword is one resulting in 221

keywords appearing. The final result of processing the VOSviewer software is in the form of a network map image of 221 keywords found.

Result and Discussion

After searching the data, researchers found 111 journal articles to be processed and analyzed. These journal articles are international journals whose research is carried out in Indonesia and national journals that have been indexed by SINTA one, two, three, four, five, and six. Descriptively, the data from journal articles are presented in Table 1.

Table 1. Articles of National and International Journals

Year	International	National
2017	0	23
2018	1	24
2019	1	21
2020	0	23
2021	0	18

Data processing and analysis are carried out using VOSviewer, Mendeley, and Microsoft Excel software. The following is shown data analysis using several applications. This section will outline the results of keyword visualization generated from VOSviewer software. The initial stage is to select journal articles that match the research criteria and are presented in a Microsoft Excel table. The next step is to include the journal chosen in the Mendeley software. To find out the overview and development of trends in research topics about elementary school science learning media using keyword mapping processed in VOSviewer software.

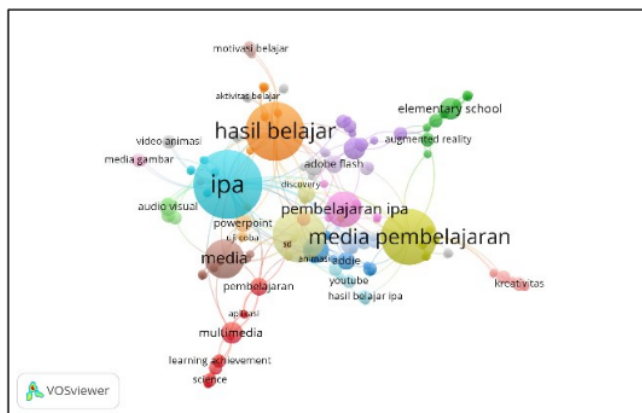


Fig. 1. VOSviewer Network Visualization Map

Fig. 1 is a mapping of research keywords on elementary science learning media indexed by SINTA from 2017 to 2021. Figure 1 contains all keywords in 111 journals about selected

elementary science learning media. The picture shows that the keywords that often appear are science [7], learning media [8], learning outcomes [9], and development [10]. Many researchers have used topics with these keywords. Based on the results of this interpretation in figure 1, it forms 25 clusters. Keyword mapping was carried out as an initial stage to find out the general visualization and research trends that are widely researched [11].

The red indicates the first cluster: application keywords, audio visual media, CTL, style, learning achievement, mobile, motivation, multimedia, learning, basic physics problem, PowerPoint, science, elementary school or SD, and visual media. The fifteen keywords that appear most often are multimedia and learning keywords. The second cluster is designated by the green colour consisting of the keywords abstract reasoning, augmented reality, comic book, comics, elementary school, research and development, science education, science learning, science technology society, science textbook, student's understanding, student's performance, and teaching and learning. The primary school and science learning keywords are the thirteen most frequently mentioned keywords.

The third cluster is indicated by a dark blue colour consisting of the keywords ADDIE, animation, online, en-alter sources, student engagement, contextual, environmental pollution, Powtoon, project-based learning activities, media technology, and video. Of the eleven keywords in cluster three, the dominant keywords are video and ADDIE. The fourth cluster is indicated by a yellowish-green colour consisting of the keywords cartoon, ecosystem, science abstracts, learning independence, science process skills, environment, learning media, monopoly, training, and monopoly games. Of the ten keywords in cluster four that are the dominant keywords are learning media.

Fifth cluster is indicated by the purple colour consisting of the keywords 21st century, Canva, education game, educational game, Natural Sciences, interactive multimedia, interactive multimedia, Luther method, and learning video. Of the nine keywords in cluster five, the dominant keyword is interactive multimedia. Sixth cluster is indicated by a light blue colour consisting of the keywords development of interactive learning media, science, local wisdom, flash animation media, miniature media, interactive models, guided inquiry learning models, and animated videos. Of the nine keywords in sixth cluster, the dominant keyword is IPA (natural science). Seventh cluster seven is indicated by the orange colour consisting of image props, critical thinking, learning outcomes, questioning skills, ICT media, and quantum. Of the nine keywords in seventh cluster, the dominant keyword is learning outcomes.

Eighth cluster is indicated by the brownish-red colour: baduy, big book, local wisdom, media, pokari pokabu, pop-up, scrapbook, solar system, and utilization. Of the nine keywords in eighth cluster, the dominant keyword is media. Ninth cluster is indicated by a light purple

colour consisting of keywords mastery of concepts, KIT media, children's songs, windowed book media, natural, science learning, environmental learning, scientific, and multimedia technology. Of the ninth keywords in cluster nine, the dominant keyword is science learning. Tenth cluster is indicated by pink colour consisting of the keywords science props, storyline articulate, creativity, STEM-based science learning, media development, perception, pop-up book, and project-based learning. Of the eight keywords in tenth cluster, the dominant keywords are creativity and project-based learning.

Eleventh cluster is indicated by a light green colour consisting of audio-visual keywords, children's learning in science, guided inquiry, knowledge competence, quality of education, concrete media, inquiry learning models, and talking sticks. Of the eight keywords in eleventh cluster, the dominant keyword is audio-visual. The twelfth cluster indicated by the blue colour consists of the keywords animal life cycle, effectiveness, science learning, multimedia use, concept mastery, snakes and ladders games, puzzles, and validity. Of the eight keywords on the twelfth cluster, the dominant keywords are effectiveness, snakes and ladders game, puzzles, and fact. Thirteenth cluster is indicated by a light yellowish-green colour consisting of keywords discovery, elementary school science, comics, power point-based learning media, learning video media, and development. Of the seven keywords on this cluster, the dominant keywords are development and comics. Fourteenth cluster is indicated by a light purple colour consisting of the keywords adobe flash, science subjects, motivation, interactive learning, application of learning media, circulatory system, and wonder share filmora software. Of the seven keywords on the cluster are adobe flash keywords and science subjects.

The fifteenth cluster is indicated by a light blue colour consisting of flashcard keywords, science learning outcomes, index card matches, plant breeding, pop-up books, and youtube. Of the six keywords in the fourteenth cluster, the dominant keywords are pop-up books, youtube, and science learning outcomes. Sixteenth cluster is indicated by a brownish-orange colour consisting of discovery learning, PowerPoint, technology, trial, and validation. The dominant keyword in PowerPoint is among the fifteen keywords on the sixteen clusters. Seventeenth cluster is indicated by the red colour of the heart consisting of keywords cognitive learning outcomes, audio-visual media, video media, and learning motivation. Of the four keywords in the seventeen clusters, the dominant keyword is learning motivation.

The eighteenth cluster is indicated by the pink colour consisting of the keywords of image media, learning achievement, card short strategy, and word square. Of the four keywords on the eighteen clusters, the dominant keyword is image media. The nineteenth cluster is indicated by the grey colour consisting of the keywords android, mobile learning, and science learning in elementary school. Of the three keywords on the nineteenth cluster, the dominant keyword is android. The twentieth cluster is indicated by a light grey colour

consisting of the keywords learning activities, science education comic media, and STAD-type cooperative learning. None of the three keywords on the twentieth cluster is the dominant keywords.

The twenty-first cluster is indicated by the cement grey colour consisting of the keywords innovative wheel media, cooperative model, and numbered heads together. Of the three keywords, none of them dominates. The grey colour of the stone indicates the twenty-second cluster, consisting of the keywords 3D media, interest, and virtual reality. Of the three keywords on the twenty-second cluster, there are no keywords that dominate. The twenty-third cluster is indicated by a purplish-grey colour consisting of keywords of interest and learning outcomes, development media, and animated videos. None of the three keywords on the twenty-third cluster is dominant. The twenty-fourth cluster, indicated by the bluish-grey colour, consists of the keywords interactive CD, education and the animal's life cycle. None of the three keywords on the twenty-three cluster is dominant. The twenty-five cluster is indicated by the colour of the old cement ash consisting of the keywords of the appearance of the earth's surface and the pop-up book medium. None of the two keywords on the twenty-fifth cluster is dominant.

On the map, VOSviewer gives finger colours from dark blue to yellow. The Overlay Map will visualize the latest discussion trends with the network having a yellow colour. Figure 27 shows that the articulate storyline [2], media development [2], STEM-based science learning [2], 21st century [12], canva [12], application of learning media [13], wondershare filmora software [13], mobile learning [14], monopoly games [8], mastery of concepts [15], en-alter source [16], animation [17], online [17], discovery learning [18], interest and learning outcomes [19], animated videos [20], and development models [7] are keywords that emerged in 2021. So that it can be interpreted that there is an opportunity and need for further research on the topic.

Researchers also conducted a content analysis of 111 selected journal articles. Based on the investigation results, multimedia, learning videos, and comics are suitable media to be used in the learning process of elementary school science. The media is appropriate for teachers to use in elementary science materials' teaching and learning process. Because it can make it easier for teachers to deliver the material and improve student learning outcomes, student learning interests, student knowledge, and student learning motivation, learning media will help teachers streamline students' processes and learning outcomes.

The development of journal articles on elementary science learning media research from 2017 to 2021 has increased and decreased. In 2017 a total of 23 journal articles were published. In 2018, it rose to 25 journal articles on elementary science learning media.

However, the following year, reports about elementary school science learning media decreased, namely only 22 journal articles. In 2020, as many as 23 journal articles on elementary science learning media were published. Meanwhile, in 2021 there are only 18 journal articles published.

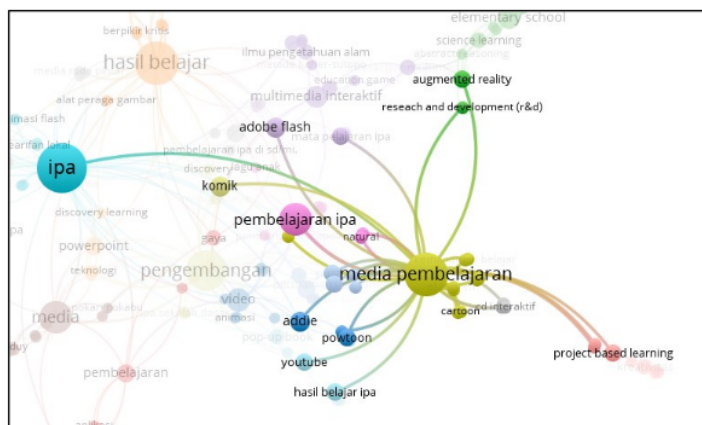


Fig. 2. Learning media keyword mapping image

21 Fig. 2 shows the learning media keyword network. From the network, it can be seen that the keywords of learning media have a relationship with the keywords of learning independence [21], ecosystem, cartoon [22], natural [23], puzzle [24], snakes and ladders game [15], addie [25], Powtoon [26], monopoly game [8], flash card [27], index card match [27], science learning [28], comics [29], adobe flash, science subjects, learning independence [21], IPA (natural science) [30], en-alter sources [16], youtube [10], augmented reality, research and development (R&D) [31], and science learning outcomes [27]. Based on the results of the keyword visualization, there are research opportunities related to training keywords [32], IPA abstract [32], learning independence [21], science process skills [21], cartoon [22], flashcards [27], index card match [27], puzzles [33], mastery of concepts [34], and monopoly games [8].

Most learners at the elementary level prefer fun-packed learning. One of the signs that students are less involved in learning activities is when they are silent when the teacher explains the material. Students are less interested in the learning material because of its complicated and complex nature [35]. If the teacher can choose suitable learning media, it will undoubtedly affect the student's ability to capture the material presented. 18 The results of this study show that multimedia is one of the suitable media used by teachers in explaining science material at the elementary school level. In addition to multimedia, there are other media such as learning videos, comics, pop-up books, powerpoints, and others.

Conclusion

Based on the data analysis and discussion results, the highest development of research journal articles on elementary school science learning media for 2017 to 2021 indexed by SINTA occurred in 2018. From 2017 to 2021, the keywords widely found are science, learning media, learning outcomes, and development. So it shows that the research trend discusses a lot about these keywords. The opportunity to research topic trends in learning media can still be done by selecting keywords that previous researchers rarely used. It included training, abstract science, learning independence, science process skills, cartoons, flashcards, index card matches, puzzles, mastery of concepts, and monopoly games. You can also choose research topics with the latest discussion trends, namely using articulate storyline keywords, media development, STEM-based science learning, 21st century, Canva, application of learning media, wondershare filmora software, mobile learning, monopoly games, mastery of concepts, enalter source, animation, online, discovery learning, interests and learning outcomes, animated videos, and development models.

Conflict of Interest

The authors should declare that there is no conflict of interest.

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