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Systematic Literature Review: Scope Analysis of Research on Mathematics Learning Media

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ABSTRACT

Good learning media is learning media that is able to provide stimulation to students so as to generate interest in learning. Various types of media, of course students have no difficulty in choosing what media to use, both audio-based, visual-based, and audio-visual-based media. Learning media can be used to generate student learning motivation so that it can improve students' problem-solving abilities. This study aims to conduct a literature review related to effectiveness in learning mathematics at all levels. The research method chosen in this study is SLR (Systematic Literature Review). Data collection was carried out by documenting all articles that had similar research within the last 10 years in this research report. The articles used were 15 national journal articles accredited by Sinta obtained from Google Schoolar. Based on this research, it was found that the use of mathematics learning media can improve students' problem solving abilities, change the mindset and creativity of learning to be more fun. Based on the literature review conducted, learning media can be developed at all levels.

Keywords: learning media, learning mathematic, analysis

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1. INTRODUCTION

Mathematics is one of the sciences that is useful in human life (Tampubolon et al., 2019). Learning mathematics is important because it cannot be separated from its role in the various aspect of life (Doly & Ahmad, 2021). Even mathematicians are often dubbed as the science of its roots because it has a very large role in life (Anwar, 2018). The characteristics of mathematics are abstract so that understanding them requires high concentration and seriousness and even takes a long time because they are full of symbols which are sometimes difficult to understand (Hartinah & Setiawan, 2013). The importance of learning mathematics is emphasized in RI Law no. 20 of 2003 concerning the National Education System article 37 that mathematics is one of the compulsory subjects studied by students at every level of education (Auliya, 2016). Mathematics lessons are not only about numbers, but much deeper than that(Puspaningtyas, 2019). Therefore it is necessary to use learning media as a support for the teaching and learning process.

In the 21st century as it is today there have been significant developments in world technology which of course have had an effect on the education system in Indonesia. The development of this technology can be an alternative for educators in developing and supporting the learning process (Muthy & Pujiastuti, 2020). One development that is clearly visible is in the learning process (Muthy & Pujiastuti, 2020). The most important thing to solve is problem solving, which is the heart of learning mathematics. To be able to help students find innovative solutions to various problems they face, both at school and in everyday life, one of them is using learning media (Azhari & Irfan, 2019)

Learning media is one of the tools needed by teachers in transferring knowledge to students at school (Samura, 2015). Media is a tool for teaching and learning process to convey learning material in order to achieve learning objectives (Karmiani, 2018). A teacher's education must be able to develop an interesting, innovative and fun learning process (Menrisal et al., 2019). In the world of education various kinds of media, learning models and methods have been developed in accordance with the times (Nurbani & Puspitasari,

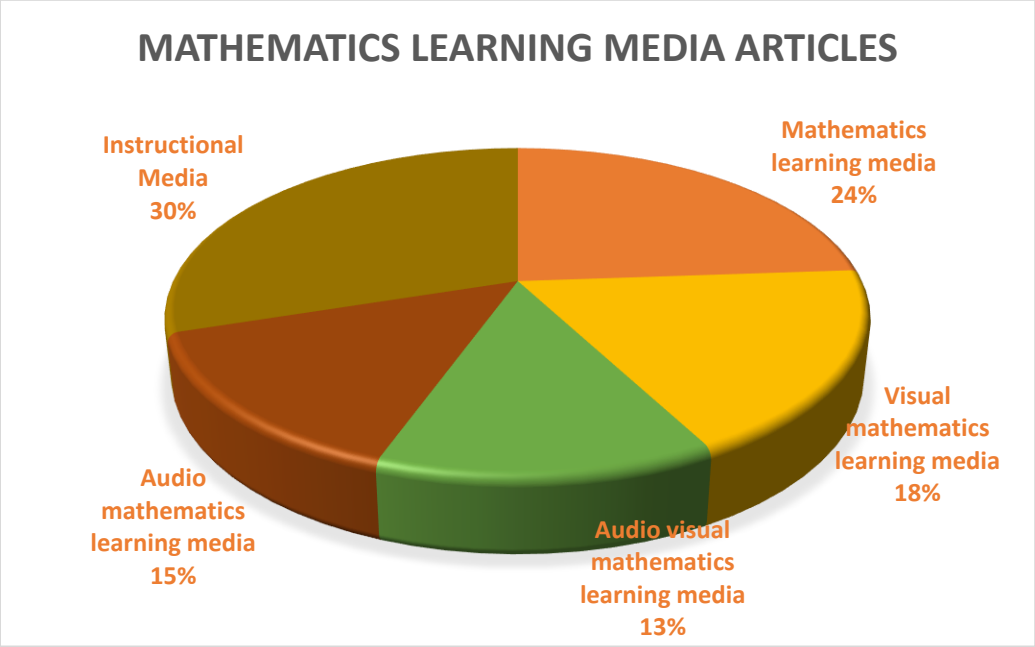
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2022). There are several types of learning media, for example comic media, animation media, visual media, and so on. Comic media is expected to help students understand the contents of a story so that they can convey the contents of the story well (Musfiroh, 2018). Utilizing rapidly developing technology, teachers can create learning media to support face-to-face or face-to-face learning (Sakiah & Effendi, 2021).

Human life is currently changing, both changing in terms of positive and negative aspects. Most students are only able to master the material but cannot apply it so this is where the use of learning media is needed so that students can more easily understand and absorb what material is provided by the teacher. Learning to use this developed media does not rule out the possibility of more than one-way communication between the communication components, in this case the teacher, media and students.

2. RESEARCH METHOD

This study uses the SLR (Systematic Literature Review) method. SLR (Systematic Literature Review) is a method that can be used to evaluate, determine and interpret the findings of research problems in answering predetermined questions. Literature Review is a search from various sources either through books or articles on the same topic so that a certain topic is raised (Marzali, 2017). Literature Review helps us in developing a framework of thinking that is in accordance with the 6 theories, findings, and results of previous research in solving the problem formulation in the research that we make. The SLR method is used to identify, review, evaluate, and interpret all available research with interesting topic areas, with specific relevant research questions (Hasanah et al., 2021). With this method, the researcher reviews and identifies journals systematically, which in each process follow predetermined steps(Triandini et al., 2019).

Fig 1. Mathematics learning media articles



The diagram above shows that in terms of learning media articles 30% or 38,700, mathematics learning media articles 24% or 30,800, visual mathematics learning media articles 18% or 23,700, audio mathematics learning media articles 15% or 18,700, mathematics learning media audio-visual by 13% or 17,100.

Based on these steps, the researcher looked for sources of journals with the keywords learning media, learning mathematics, and analysis. The research was conducted by collecting sinta 1 to sinta 4 journal sources on Google Scholar. All sources referred to in this study range from 2013 to 2023. From

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various articles, the researcher chose 15 articles that were closely related to the keywords used. The next step, the researcher grouped articles related to the scope of education in mathematics learning media.

3. RESULTS AND DISCUSSION

In the opinion of Nana Sudjana (2007:17), media is anything that can be used to channel messages from senders to recipients so that they can stimulate thoughts, feelings, concerns, and interests and attention of students in such a way that the learning process occurs. According to Djamarah (2006), media development includes visual-based media, audio-based media, and audio-visual based media. There are lots of various tools, both electric and non-electric, to be used as media for learning mathematics.

A. Visual Based Media

According to Djamarah (2006), media development includes audio-based media, visual-based media, and audio-visual based media. Visual media is the delivery of messages or information technically and creatively which displays pictures, graphics and clear layout and location so that the recipients of messages and ideas can be received by the target. The form of visual media can be in the form of representational images, such as pictures, paintings or photographs that reveal an object; diagrams depicting concept relationships, organization and structure of matter; a map showing the spatial relations between elements in matter; graphics such as tables, graphs, and charts that present figures and figures. Some visual media, including media that are not projected, one of which is reality/real media. Students can look directly at the object. Then there is the model, which is an artificial object in three dimensions which is a representation or substitute for the real object. The use of models to overcome certain obstacles as a substitute for realia, as well as graphic media, are classified as visual media that transmit messages through visual symbols. The function of graphic media is to attract attention, clarify lesson presentations, and illustrate facts or concepts that are easily forgotten. The types of graphic media are pictures/photos, sketches, diagrams/schemes, charts/charts, graphs, cartoons. there is also print media, namely visual media that is made through a printing process. This print material media presents its message through letters and illustrated pictures to further clarify the message or information presented. Types of printed material media include textbooks, namely books about a particular field of study or science which are arranged to make it easier for teachers and students in an effort to achieve learning goals; module, namely a package arranged in the form of a certain unit and designed in such a way for the benefit of student learning; programmed teaching materials, i.e. individual teaching programs, are much the same as modules. The difference with modules, programmed teaching materials are arranged with small topics for each frame/page. Some of the advantages and disadvantages of visual-based media. The advantages of visual media are repeatable, can be read many times, sharper analysis, can make people really understand the content and can make people think more specifically about the content. There are also disadvantages of visual media, namely slow and impractical, no audio, of course you cannot be heard, so the material presented is not detailed enough, limited visuals, in the form of images that represent news content, production costs are quite expensive because the print media have to print and send it to the public.

B. Audio Based Media

Audio media is or listening media is a type of learning media or learning resources that contain messages or subject matter that are presented in an interesting and creative way and are applied using the sense of hearing only, because this media is only in the form of sound. Some examples of audio-based media, namely language laboratories are audio media that function to support the teaching and learning process and its application using the sense of sight. This media is usually used to convey subject matter such as: listening to conversations in foreign languages such as Indonesian, Arabic, and English; Radio is a visual media in the form of objects or tools that can be used to facilitate the teaching and learning process and is applied by using the sense of hearing. The advantages and disadvantages of this media, the advantages of which are that the costs that must be incurred are only a little, the media is easy to carry and move, so it is easy to use, the material can be played back, can stimulate the active listening of students, and can also develop imagination such as writing, drawing and so on. Then the lack of this media is abstract

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because it is only in the form of sound so that in certain cases it also requires visual assistance, this audio media is abstract so that it can only be controlled through words or language, as well as sentence structure, this media will be successful if applied to them who already have the ability to think abstractly, this media cannot be applied by students with special needs, more precisely for those who cannot hear (deaf).

C. Audio-Visual Based Media

Audio-visual media is a type of learning media or learning resources that contain messages or subject matter that are made in an interesting and creative way by using the senses of hearing and sight. This media is in the form of sound and images. Some examples of audio-visual-based media include television, which is an electronic system that displays live and still images accompanied by sound via cable. Television plays an important role for educators, because educators are assisted in conveying things that cannot be brought into the classroom. Students can use the media at home; Video cassette is a tool that can display motion pictures and accompanied by sound. Each has its advantages. Usually educators show learning videos in front of the class via a projector. Video cassette has a function to record data. The data can be deleted and replayed when needed; Sound slide is a combination of slides or pictures with audio or sound tape. Sound slides in the form of PowerPoint, Adobe Flash, Adobe Premiere, and Windows Movie Maker. Sound slides are very effective for the teaching and learning process and make students creative. If the sound slide made is good, it will increase the results. There are advantages and disadvantages to audio-visual-based media, namely time-free usage, very practical and attractive, the price is relatively inexpensive, because it can be used many times, saves time and videos or films can be played back. The drawback is that if you play the film too fast, students cannot follow, television media, cannot be taken anywhere because it tends to be in a certain place, requires special expertise and skills in presenting or making audio-visual learning media, because this media is in the form of sounds and pictures. , both moving and still images. Therefore making this media tends to be more complicated than using visual media and audio media.

4. CONCLUSION

Based on the results and discussion that have been described above, it can be concluded that learning media is divided into three, namely visual-based media, audio-based media, and audio-visual-based media, where the three media both have different advantages and disadvantages but the functions of the three media remain the same, namely to facilitate and facilitate teaching and learning activities so that learning objectives can be achieved, can improve the quality of teaching and learning, can improve students' problem-solving abilities, depending on the characteristics of these students, and change the mindset and creativity of learning to be more fun . It is hoped that in this study students can use learning media well, so that they can increase their understanding of learning mathematics and can improve student achievement.

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