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Need Assessment of Augmented Reality-Based Science Learning Media on Solar System Material

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ABSTRACT :
Science learning must be able to explain the abstractness of the concepts and theories in it. Science learning design includes, models, methods and the right media are certainly very influential on the success of science learning in the classroom. Learning media has an important role to convey abstract material content to be easily understood by students. This study aims to analyze the needs of teachers for Augmented Reality-based science learning media on Solar System material. The subjects of this study were madrasah ibtidaiyah class teachers in Brebes district. The research model used is descriptive quantitative with questionnaire data collection methods through google form. Data analysis techniques used quantitative descriptive methods using percentages. The results of this study are that 75% of teachers have difficulty in instilling the concept of Solar System material in students; 70% of teachers have not utilized the available learning media; and 100% of teachers are interested in computer and smartphone-based science learning media. From these data, teachers need augmented reality-based learning media that can be used on computer and smartphone devices.

Key words: *need assesment, learning media, augmented reality.*

INTRODUCTION

Natural science is a scientific discipline that contains the study of a natural phenomenon in the form of theories and concepts that are still abstract[1]. For this reason, learning Natural Sciences (IPA) must be able to explain the abstractness of the concepts and theories in it[2]. The Solar System is a science learning material that contains content related to the characteristics of planets and space objects and their influence on human life. This material began to be given in elementary schools starting from grade VI whose reasoning ability is still in the concrete operational phase that applies logic to physical objects. For this reason, threatment is needed in providing knowledge related to the Solar System which is still abstract so that it can be easily understood by grade VI students.

The success of presenting abstractness in science learning is influenced by many factors, one of which is learning media[3]. Learning media is a means of supporting learning[4], which facilitates

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[1] A. Z. Mahfudz and A. Billah, "The Development of Android-Based Learning Media on Vibrations and Waves Topic for Junior High School Students," *Journal of Physics: Conference Series* 1567, no. 4 (2020), https://doi.org/10.1088/1742-6596/1567/4/042009.

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students to understand the material in learning[5]. Learning media can function as a conveyer of information and a means of communication in learning activities, both in the classroom and outside the classroom[6]. Learning media can be packaged by utilizing information and communication technology with a computer or smartphone base, one of which is Augmented Reality (AR).

Augmented Reality (AR) is the incorporation of 3D objects into the real world so that humans can interact with computers or smartphones more naturally[7]. AR can be utilized in developing learning media so that it can provide real interaction so that it can help provide a concrete understanding of abstract objects of study to students[8]. This is expected to be able to concretize the content of earth and space material to students at the elementary school level.

The description above, led to a research plan that aims to analyze the needs (need assessment) of teachers against Augmented Reality-based science learning media on Solar System material. Analysis of the needs of science learning media is done as an initial effort in developing Augmented Reality-based science learning media on the material of the Solar System.

Methods

The type of research used in this research is quantitative research. Quantitative research method is research based on positivistic (concrete data), research data in the form of numbers that will be measured using statistics as a calculation test tool, related to the problem under study to produce a conclusion[9]. The technique for collecting data used is by providing questionnaires via Google Forms[10].

The subjects of this study were class teachers in Madrasah Ibtidaiyah in Wanasari and Bulakamba sub-districts of Brebes district. There are 20 Madrasah Ibtidaiyah teachers who are willing to fill out a questionnaire as material for researchers. The data from the questionnaire will be analyzed using a quantitative descriptive method using the percentage formula proposed by Sugiyono[11].

$$P = \frac{F}{N} \, x \, 100\%$$

Description:
P: Percentage of student scores
F: frequency of student scores

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[5] A Budi Setiawan, "English Grammar on 2013 Curriculum: The Development of Game Based Learning Multimedia" (EDP Sciences, 2018), https://doi.org/10.1051/matecconf/201820500011.

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N: number of students

Furthermore, the results of the needs analysis are displayed in the form of tables and graphs to make it easier to read the data from the needs analysis.

Result

The needs analysis questionnaire contains indicators of teacher needs for learning media, especially augmented reality-based learning media. This indicator is divided into 3 aspects consisting of 10 statement points related to learning media.

Table 1. Teacher's Need Assessment of Augmented Reality-based learning media

Aspects	Statement	Yes	No
Students' difficulties in Solar System Material	1. Do you have any difficulties in using interactive learning media?	70%	30%
	2. Do you find it difficult to teach science concepts, especially Solar System material?	75%	25%
	3. Are you interested in activating students in science learning?	100%	0%
Availability of facilities and media that support	4. Do you know about augmented reality-based learning media?	50%	50%
	5. Are there complete learning facilities such as laboratories, etc. in Madrasah?	40%	60%
	6. During science learning, do you use madrasah facilities (laboratories, etc.)?	30%	70%
The need for augmented reality-based learning media *augmented reality*	7. Have you used interactive and interesting learning media?	15%	85%
	8. Have you created interactive and engaging learning media?	10%	90%
	9. Have you ever maximized computers and smartphones as science learning media?	25%	75%
	10. Are you interested in using computers and smartphones as science learning media?	100%	0%

Table 1 shows that 75% of teachers have difficulty in instilling the concept of Solar System material in students. One of the factors causing the lack of learning media facilities in madrasah and the limited ability of teachers to develop creativity in utilizing and compiling appropriate learning media. The science learning process that teachers currently do, still rarely use learning media, it can be seen in the table that there are 70% of respondents who have not used existing learning media. Whereas learning media is an important aspect that needs to be considered in the

learning process so that learning objectives are maximally achieved[12]. The use of learning media helps the learning process to be more efficient[13].

Respondents' results on the aspect of learning media needs 100% of teachers are interested in computer and smartphone-based science learning media. Teachers are responsible for being able to visualize materials that are considered abstract or difficult to understand with only verbal communication. Advances in science and technology allow abstract phenomena to be presented to be more real by utilizing computer and smartphone media bases[1415]. Respondents in the science learning process have not maximized the function of computers and smartphones as interactive and interesting learning media for students. This can be seen in the table 85% do not use interactive learning media and 90% of respondents have never made interactive and interesting science learning media.

Based on the research data, augmented reality-based learning media is needed that can be used on computer and smartphone devices. Teachers need learning media that can explain concepts that are still abstract with more real, interactive and interesting for students. Augmented reality is the basis for developing learning media because it is able to combine 3D objects, interactive and interesting[16]. This is supported by several researchers related to augmented reality-based learning media that have a positive impact on learning in the form of; increasing knowledge and insight[17]; increasing student interest and understanding[181920]; increasing student activeness[21]; and improving student learning outcomes[22].

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Conclusion

Judging from the research data, it can be concluded that; (1) teachers have difficulty explaining some concepts that are still abstract to students; (2) teachers have not maximally utilized or developed the basis of computer and smartphone learning media; and (3) teachers need augmented reality-based learning media to help explain abstract concepts so that they are easier for students to understand.

Suggestions for further research on learning media developed should be creative, easy to use (practical), and effective. The results of this study can be used as a study material for further research related to augmented reality-based learning media.

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