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Needs Analysis of Learning Material Development with Mind Map Model in Android Based on Brain Based Learning (BBL) in Physics Learning of High School

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ABSTRACT

Teaching material is one of important part in the learning process, as an educators need to increase creativity in preparing teaching material that wan to conveyed. Teaching materials which used by students need to follow the desires in accordance with the workings of each brain or bbl (brain based learning), so learning can be more enjoyable and students become easier to understand. One of the alternative teaching materials that works with the way of brain works is to use a mind map model developed through an application. in accordance with the industrial revolution 4.0, teaching materials can be through electronic devices such as smartphones that are easily carried to anywhere, so students can repeat the material wherever and whenever. This research is aims to analyze the need for teaching materials based on brain based learning with mind map model in Android on physics learning. This type of research method is a qualitative descriptive study. The sampling technique uses a random sampling technique. The research data were obtained by observation, interview, and questionnaire distribution. Based on the results of the data obtained shows that students do not play an active role when the teacher only explains the material and gives examples of questions because the teaching materials used by students are only textbooks, then students and teachers need bbl based mind map teaching materials on Android.

Keywords: Brain based learning, physics learning, mind map android

INTRODUCTION

As well known today has been entered the 21st century or called the 4.0 era. In this era technology is developing more rapidly and has been widely applied in various fields including industry, health, education and many others. The impact of the technology is very helpful for humans in carrying out various activities in certain fields. Especially in education world, technology can be used as an intermediary media that makes it easy for students to learn. The technology in education field can be specialized in 3 important ways namely creating, using, and managing. All of these three things will become the most important part in the function of educational technology, as learning facilities to improve the ability of students, it also with the ability of teacher. Furthermore, technology in the field of education affects learning patterns that will more demanding students to be more active and creative[1]. Therefore, with the increasingly sophisticated technology, conventional learning is rare to do. So that the public is more expect for technology to help students solve any difficulties in learning. One of the lessons that seems difficult for students is science, which is called physics.

Physics is a science that discusses the process of the occurrence of the universe phenomena. Physics known as a very difficult subject, because of the abstract discussion. Because it's learning related to the physics phenomenon is quite difficult to present in the class directly on the object. So not a few students who just memorize only the formula. These obstacles can come from various aspects, one of which is teaching materials used by students. Teaching materials that used by students is in the form of textbooks from the education department and must be in accordance with the curriculum. Teaching material have an important role in learning process. Monotonous learning resources and teaching materials will reduce student interest.

In this regard, interesting teaching materials can help students understand the material more easily. So the learning process is also can be more fun. One way that can be used to support this is to use teaching materials with a mind mapping model. [2] said mind map is a system that uses the principle of brain management to unlock the full potential and brain capacity thats still hidden. While according to [3] mind map can be define as a visual information management tool used by students in remembering,

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The 2nd International Conference of Education on Science, Technology, Engineering, and Mathematics (ICE-STEM 2020) organizing, exchanging ideas, and learning information in a special way. So it can be said that mind map is a method that aims to more easily remember and understand the material in the learning process.

The concept of mind map has been known for a long time and has been widely used in the learning process, because it is believed to have a strong memory increase and maximize the potential function of the brain to be better [3]. Thus the use of mind maps in learning can be more effective.

Mind map is chosen as teaching material in the delivery of messages because it can organize and store a lot of information desired by students [4]. Moreover, mind map is easy to develop because it does not require complicated skills so that teachers and students can easily in developing it [5]. In understanding the material in the textbook has been provided, the ability is required to be able to record what is obtained into a writing or memory. Physics textbooks that used by students is generally contain writing, pictures, simple concept maps that only mention the parts of the material in each chapter. Based on the observations of researcher during the implementation of the 3rd internship at SMA Muhammadiyah 1 Jakarta showed that most students did not bring physics textbooks, they only carry notebooks and student worksheets because are considered small and lightweight to carry. Thus, it has been seen that students need teaching materials that are easy to carry and easy to understand. Media learning with technology through applications has been made by many experts. Adjusted to the needs and creativity of each developer. The application is even widely used on various smartphone platforms.

Based on data sourced from eMarketer 2015 states that Android smartphone owners in Indonesia are increasing every year from 2016 to 2019. Android smartphone users this year are around 90 million Indonesian people from various backgrounds ranging from elementary school children to parents. In the 4.0 era, young people were more fond of playing smartphones than other activities.

One of the most digital technology that used among people today is an android based smartphone. The function of this Android-based smartphone is wider than previous communication tools that are limited to phone and send message. Android comes with an internet that can reach a wide range of information to look for. Most of people especially Indonesia is more often use smartphones to surf the virtual world through social media. Likewise with young children who are more often playing social media, till forget the time. Whereas the usability of Android smartphones is more than just that. With its easy to carry form, this Android can also become a media student to learn individually wherever and whenever.

In line with the definition of mind map in the opinion above, than the writer conclude the mind map is a model that can maximize the function of potential brain, Then to develop it to be better by approach with brain based learning can be contained it in. Nowadays, it is definitely a potential brain that has given much learning from child. But it does not close the possibilities, the brain is not optimal in carrying out its functions due to lack of grinding.

Brain Based Learning has a sense of learning based on brain empowerment. According to[6] brain based learning model is learning models that are adapted to the workings of the brain and are instinctively designed to learn and prioritize students enjoyment in learning. The advantage of this learning model is can develop the brain when the learning process becomes an environment with new conditions and new challenges.

Based on the explanation above it can be concluded that there is an opportunity to develop teaching materials with the mind map model. This teaching material can be used as a source of learning physics that can be used at anywhere and any time. Moreover the benefits of this teaching material, students can more easily remember and understand the material in the learning process because it is based on a brain based learning approach. For this reason, before it we need the research that aimed to analyzing students needs for teaching materials with a mind map model on Android based on brain based learning in physics learning of high school.

RESEARCH METHOD

The method used in this research is qualitative methods which focuses on analyzing the need for mind map model teaching materials on Android in high school physics learning. Time of research was conducted on February – March 2020. The subject of this research was taken from four schools are SMA Muhammadiyah 1 Jakarta, SMAN 75, SMA Muhammadiyah 4 Jakarta dan SMAN 92.

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Research data were collected by observation, interview, and questionnaire distribution. Interviews instrument for teachers are used to obtain the information about teaching materials and methods that used in learning process.

RESULT AND DISCUSSION

The results of this preliminary study were obtained through literature study and field study results. Literature study is obtained from several references such as books, journals and others. While field studies are obtained from observations, interviews and needs analysis at school. Based on the results of the interview it was concluded that the teacher uses teaching materials in textbook as a learning reference. So it can be said that the teacher only provides material based on writing from textbooks owned by students without developing the desires of the brains working of each student in learning. The observations result is also obtained that students were not actively involved in learning because the methods and teaching materials used by the teacher were monotonous, thus making students more likely to feel bored. Furthermore, the following will be shown the results of needs analysis obtained from 4 schools:

On picture 1 the question is “Whether the teacher learning methods used in the learning process make learners active in class ?”



Figure 1 Diagram of teacher learning methods

Based on data result in figure 1, the highest percentage shows that students will be active in learning if the teacher uses the question and answer method with a percentage of 35.7%. Then as many as 20.9% of students were not actively involved because the teacher only explained the material and gave examples of questions. These results can be seen in diagram of figure 1.

On figure 2 the question is “Have you ever implemented the desired learning process following the way of your brain works?”

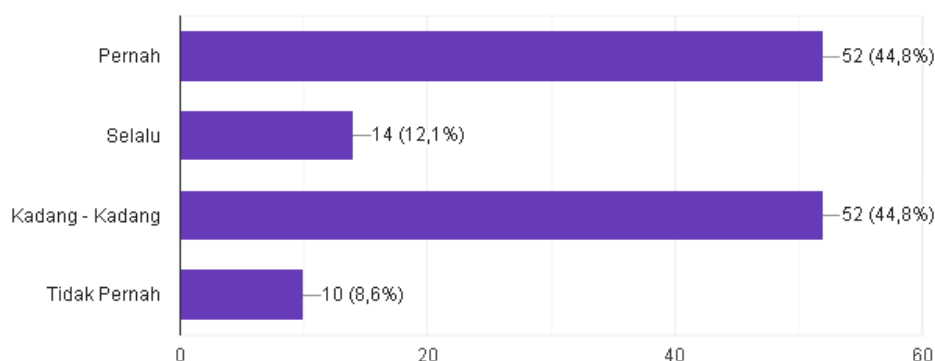


Figure 2 Diagram of learning process with the way of brain works

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Based on the obtained result, the highest percentage has shown that students have experienced learning process by following their brain work with a total of 44.8%. That result can be seen on diagram of figure 2.

On figure 3, the question is “Does the teacher ever use teaching materials with mind map models in learning of physics ?”

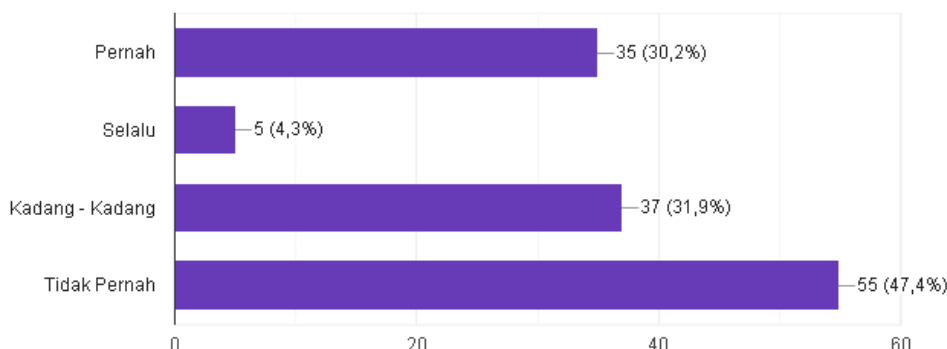


Figure 3 Indication diagram of using teaching material with wind map model

Based on the data obtained, the highest percentage shows that teachers never use mind map model teaching materials in physics learning. That data can be seen in diagram on figure 3.

The question is further described “If ever, what kind of tools that teacher uses the mind map model teaching materials in the learning?”

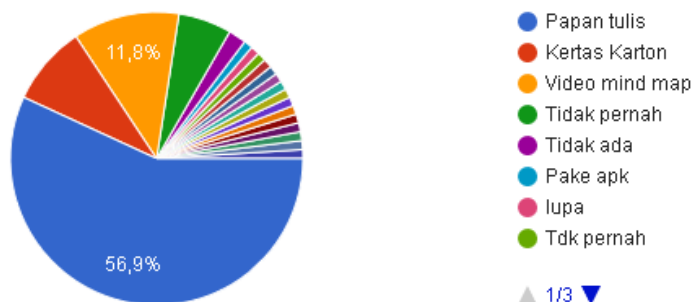


Figure 4 Diagram of tool that use by teacher to deliver mind map model teaching material

Based on the data obtained the results indicate that in using the material teaching model mind map, teachers use the whiteboard as a tool of delivery with a percentage of 56.9%.

Then if the teacher never used the material teaching with mind map model, then the question is “If not, do you ever make the task of summarizing material with the mind map model ?”

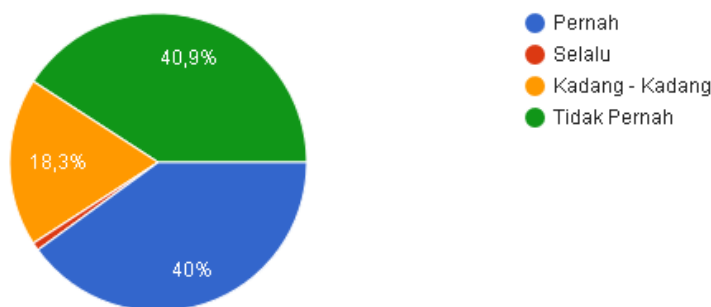


Figure 5 Diagram of frequency of student task with mind map model

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The next is the description of the results stating that students who never summarized the material with mind map model as much as 40.9%. But there are also students who have summarized the material with a mind map model of 40%.

On figure 6, the question is about “does the teaching material that delivered by teacher was interested enough from all parts including appearance, content or other supporters so that it is more easy to understand ?”

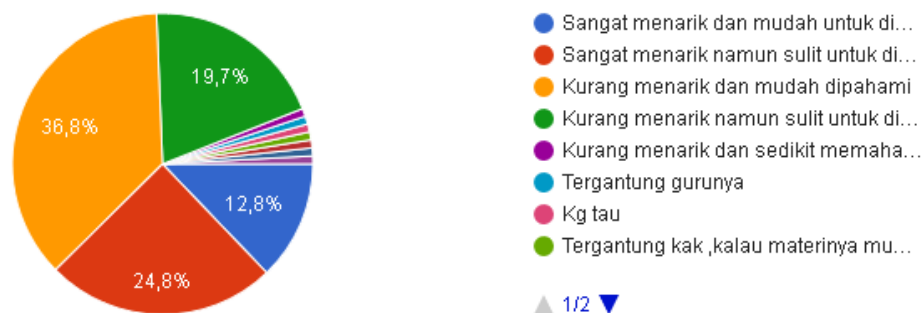


Figure 6 Diagram of teaching material that used by teacher today

In accordance with the diagram shown in Figure 6, the student response with a percentage of 36.8% states that the teaching material used by the teacher is less interesting but easy to understand. Other than that, 24.8% stated that teaching materials were very interesting but difficult to understand.

Here are the results of the need analysis about “Does it require the development of the teaching materials you use today ?”

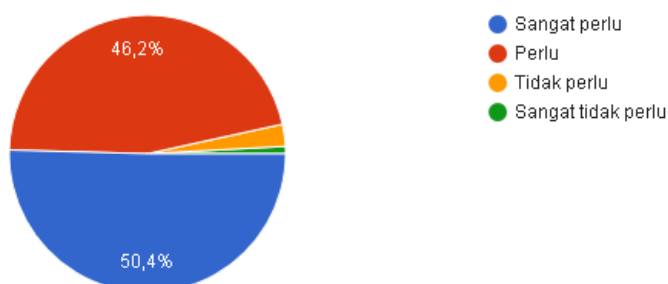


Figure 7 Diagram of the development needs of the current teaching materials

In Figure 7 can be seen that students need the development of teaching materials that are being used with a percentage of 50.4%.

Here are the result of the need analysis about “Do you know about mind map model of teaching material based on android ?”

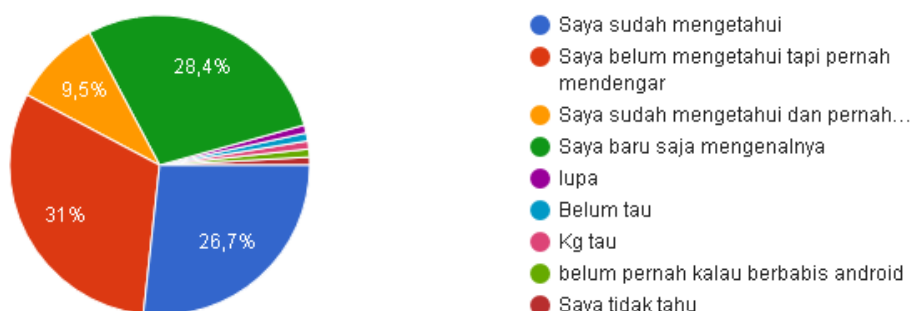


Figure 8 Student knowledge of mind map model teaching material based on android

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Based on figure 8, it can be stated that students do not know the teaching material of mind map model on android, but have heard with a percentage of 31%.

Here are the results of "How if physics learning by using a smartphone?"

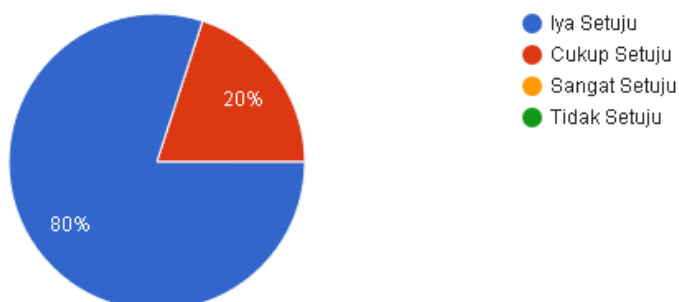


Figure 9 Diagram of smartphone used in physic learning

Based on the results it shows that students agree with the use of smartphones during physical learning with a percentage of 80%.

The description of the next needs analysis is "How do you think about the development of teaching materials with mind map model on Android based on BBL ?"

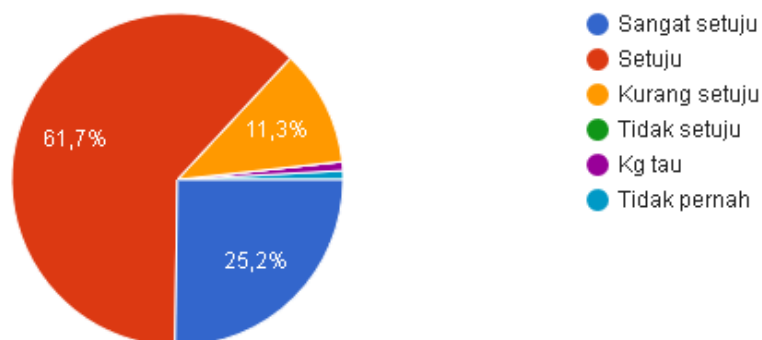


Figure 10 Diagram of students agreement of the development teaching material with mind map model on android based on BBL

Based on the data in figure 10 stated that the students argue agree about the development of teaching material with mind map model on android based on BBL with a percentage of 61.7%.

CONCLUSION

The results of the needs analysis of teaching material development with mind map model on android based on BBL showed that students agreed to the researchers to develop it. Based on the needs analysis that have been described, the teaching materials used by the teacher are only focused on the textbook and students stated that the teaching material is less attractive but understandable. Therefore, it is necessary to develop the interesting teaching materials and it can be understood by utilizing an Android smartphone that students have. The teaching material with mind map model on android based on BBL is contains an interesting material display and easy to understand because BBL mean was Brain Based, so that the delivered material will follow the way of the student brain works

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