

## **Development of Android-Based Learning Media (Thunkable) on Work and Energy Materials for Class VIII Junior High School**

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**Abstract.** This research aims to produce android-based (thinkable) physics learning media on work and energy material as a form of utilizing technology to assist educators in delivering learning material. With this android-based (thinkable) learning media, students can learn while at school or while studying at home. The research method used in this research is Research and Development (R&D) using a 4D approach including Define, Design, Develop, and Disseminate, based on validation carried out by 3 media experts and 3 material experts, each of which had an average score of 84.2% (by media experts) and an average score of 81% (by material experts), it can be concluded that android-based learning media (thinkable) is feasible and very practical for users to use. In this android-based (thinkable) learning media product, researchers developed and application that contains objectives, material and examples questions, videos, simulation and also learning evaluations to make it easier for users to understand the material presented.

**Keywords :** *learning media, android, thinkable, work and energy, 4D*

### **I. INTRODUCTION**

According to [1] which states that work and energy are one of the fairly complex topics found in the field of mechanics. Its complexity can be seen from the relationship between concepts. Because, in essence, studying physics cannot be separated from facts, concepts, laws, and theories in solving problems, especially in everyday life.

[2] states that physics is one of the parts of science that is learned through a mathematical approach, so sering it is often feared and tends to be disliked by some learners. Thus, agar concepts in physics lessons, especially on Business and energi material can be conveyed well, a teacher must choose the right learning learning media to help learners understand the material being taught.

[3] mentioned that the factor that supports the achievement tujuaof learning goals is the selection of the right Learning media. The selection of appropriate learning media is intended so that the learning is in accordance with the characteristics of students and learning materials.

According to [4] media learning is a useful intermediary tool to facilitate communication between teachers and learners. The use of media is important because of the position of strategic media for learning success that can generate interest, motivation to learn and improve the understanding of learners and can help the learning process to achieve learning goals. Thus, one of the uses of learning media that can be chosen by educators is the use of android-based smartphones with Thinkable applications as learning media.

According to [5] the existence pembeof learning media by utilizing technology that is developing today so that it raises interest and motivation andmakes learning more effective and efficient. [6] also mentioned that thinkable is an application or tools IDE open source seperti App Inventor. Thinkable is accessible for free to all users who have the desire to create android applications without having to think about programming language skillsand can minimize the time needed to develop applications. With the thungkable application thungkable that is easily accessible and easy to use, it allows an educator to create learning media that are innovative, creative and can also attract the interest and enthusiasm of students learning both at school and at home.

In this android-based learning media product (thinkable), researchers developapplications that contain goals, materials and Sample Questions, videos, simulations and learning evaluations that can help the learning process.

According to Fauzi (2020: 4) in [7] which explains the advantages and disadvantages of the Thinkable application include i:

a) advantages

the advantages of thinkable namely u in making it do not need to understand programming language specifically or be proficient in technology and this application is the only one available in making applications of various types of mobile namely Android and IOS, as well as more features from App Inventor.

a) Disadvantages

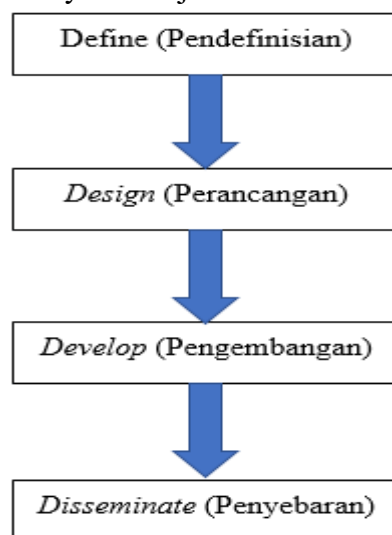
disadvantages of thinkable it has a maximum size limit in the creation of an application that is 100MB, and can not design the application as desired 100% due to the growing number of such projects. Because of the advantages of thinkable, researchers can use the application to develop a mobile learning media.

According to [8] this android-based media player (thinkable) can produce media that can be used by learners while learning at home and make learners not only use smartphones as a place to play games or communication tools, but as a source of learning inside and outside the classroom.

This research produces Android-based physics learning media (thinkable) on Business and energy materials as a form of utilizing technology to assist educators in delivering learning materials that are easy to understand and also attract students learning interests.

## II. METHOD

The research method used in this research is Research and Development (R&D) using a 4D. According to [15] consists of four Tahap development. The first stage is *Define* or often referred to as the needs analysis stage, the second stage is *Design*, namely preparing a conceptual framework of models and learning tools, then the third stage is *Develop*, the development stage involves validation tests or assessing the feasibility of the media, and the last is *the Disseminate stage*, namely implementation on the real target, namely the subject of research.



**Figure 1.** 4D development steps

To determine the level of success in this development research, researchers used questionnaires as a testing medium. This learning Media was tested by 3 material experts and 3 media experts. The nature of this study questionnaire used has a scale of 1 to 5 with the highest score of 5 and the lowest

score of 1. For score 5 = very good, score 4 = good, score 3 = good enough, score 2 = less good, and score 1 = not good [9].

**Table 1.** Criteria

for the score questionnaire	Criteria score
1	Very Good
2	Good
3	good enough
4	Bad
5	Not good

Further analysis of practicality, according to [10] learning media products are said to be practical if students can use methem to learn practically and efficiently. The practicality value is given using the following formula :

practicalization value =

$$\frac{\text{Jumlah Skor yang diperoleh}}{\text{Jumlah skor tertinggi}} \times 100\%$$

after the percentage is obtained, the grouping is carried out according to the modified criteria from Purwanto, (2012) in [10] as follows:

**Table 2.** Feasibility level and practicality

Interval	category
86% - 100%	very good
76% - 85%	good
60% - 75%	quite good
≤ 54%	not good

### III. RESULTS AND DISCUSSION

This study uses R&D method with 4D approach consisting of *Define, Disign, Develop, and Disseminate*. This study aims to produce a learning media pembelajaran as a form of utilizing technology to assist educators in delivering learning materials that are easy to understand and also attract students ' learning interests and the results of this research and development are android-Based Learning media (thinkable) on work and energy materials for Class VIII Junior High School.

#### A. Define

In this stage, researchers collect information related to the development of learning media that can help researchers in the process of product development from journals, the internet, and youtube. From the results of data collection and information conducted by researchers that in order to develop technology in the field of Education, an educator is required to be able to create learning media that can attract students ' learning interests and also make it easier for educators themselves to convey learning. Especially in the physics of work and energy in Class VIII SMP / MTs equivalent which has a fairly complex topic in the field of mechanics. And from the information obtained, the

researchers produced a product in the form of Android-Based Learning media (thinkable) to assist users in the learning process.

### **B. Design**

Of the data collection results above and after revision, researchers produce learning media products that have tampilan the following appearance:



**Figure 2.** Home screen

On the home screen there are navigation buttons at the top, and also a log in button to continue the next session. There are opening sentences and pictures that serve to give a little picture of the learning material and also attract users to use this learning media.



**Figure 3.** Attendance

Display the display in attendance contains navigation buttons, home at the top and the start button at the bottom. In this view, users can enter their full name and also the origin of their school as a form of attendance before entering the next view.



**Figure 4.** Main

Menu Display the main menu display contains navigation buttons and the home button at the top. In the middle there is a goal button, material and sample questions, simulations and evaluations which, if clicked, will be directly connected to their respective views. there is also a writing that shows the title of the material to be discussed in the Learning media.



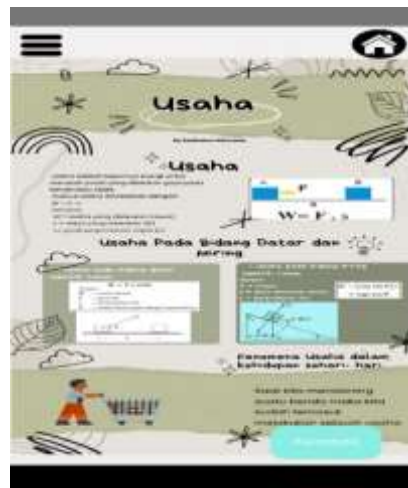
**Figure 5.** Display learning objectives

The display on the learning objectives contains navigation buttons, home at the top and the back button at the bottom. In this view there are goals to be achieved after following the learning.



**Figure 6.** Display menu material and sample questions

Display on the material and sample questions contain navigation buttons, home at the top and the back button at the bottom. On this display also shows the button to the material effort, energy, and video that can be selected by the user himself.



**Figure 7.**Energy menu display

The display on the business material contains navigation buttons, home at the top and the back button at the bottom. In this view contains materi effort that can be learned by the user.



**Figure 8.**Display Energy Matter display

Of energy materials display of energy materials contains navigation buttons, home at the top and back button at the bottom. On this display contains energy material that can be studied by the user.

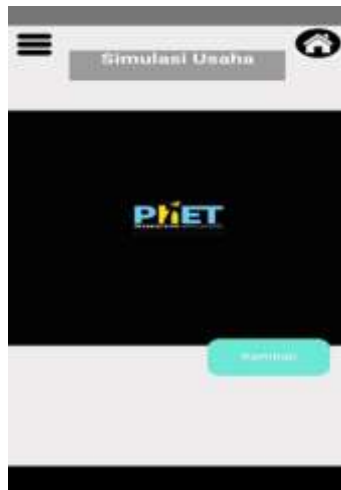


**Figure 9.**Video menu display

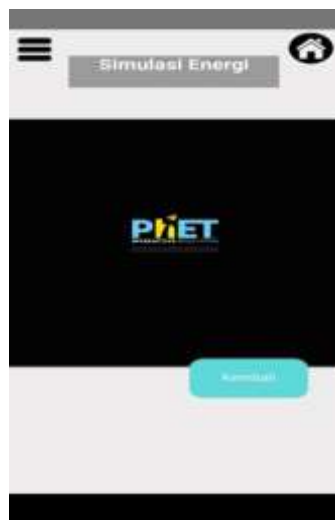
The display on the video contains navigation buttons, home at the top and the back button at the bottom. In this view contains learning videos about business and energy materials that can add to the user's understanding of the material.



**Figure 10.**Display simulation



**Figure 11.**Business simulation display



**Figure 12.** Energy simulation display

Of energy simulation display on the simulation both in the simulation menu, business simulation, energy simulation contains navigation buttons, home at the top and back button at the bottom. In the simulation view contains effort and energy buttons that will connect the user to each option. In the display of business simulation and energy simulation contains learning simulation that can help users to more easily understand the relationship between business and energy.



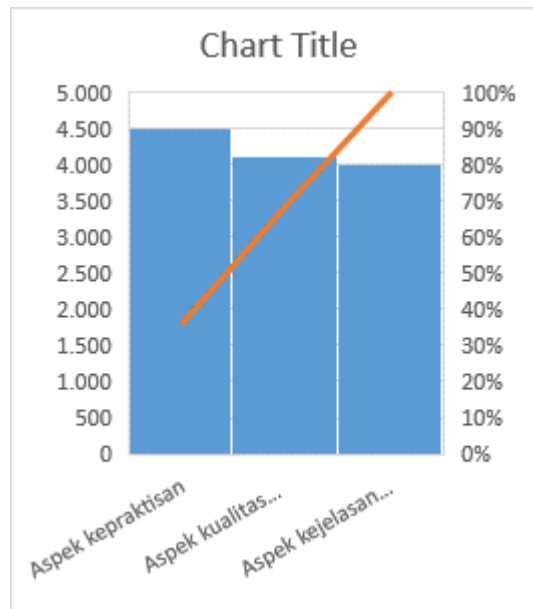
**Figure 13.**Evaluation



Display the display on the evaluationsikan navigation buttons, and home at the top. In this section displays practice questions that can be directly answered by the user. If the answer is chosen correctly will add a value skor.

**C. Develop**

after going through the defien stage, and *design*, the next is the defelop stage *defelop* involving 3 media experts and 3 mteri experts. The results of the questionnaire validation 3 media experts, obtained the average percentage of the questionnaire score is presented in the form of a graph as follows:



**Table 3.** Graph percentase of the average percentage of each

Based on the results of a validation questionnaire by 3 media expertsd, it is known that the average percentage of all media design components is included in the very good criteria with a percentage of 84.2,2% which can be seen from the presentation aspect, content feasibility aspect, evaluation aspect, and linguistic aspect.

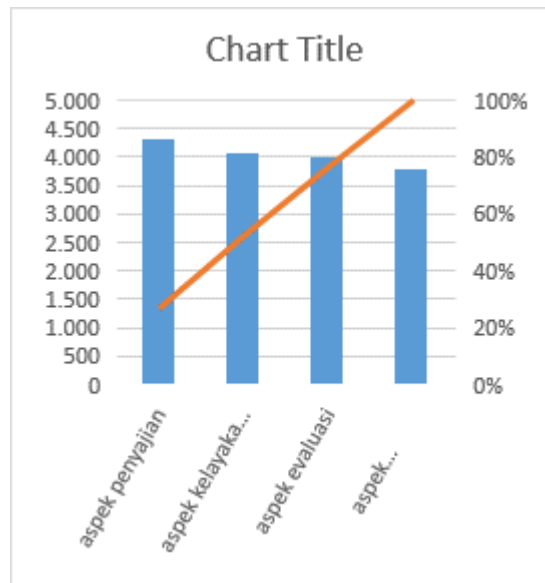
At the time of the validation process by 3 media experts there are several parts that must be improved contained in the following table:

No	things that need to be revised
1	addition of images and background adjustments to pdf learning materials
2	addition of the Home menu
3	reduction of the back button and consistent Left
4	addition of the navigation menu on each page

Based on android can be used well by users in accordance with the assessment dilakukan by media experts.

With the holding of assessment or validation by experts both media experts and material experts we can find out whether the product or learning media developed is in accordance with the needs of users and know the shortcomings and advantages of Learning media developed

the results of the validation questionnaire 3 material experts, obtained the average percentage of the questionnaire score presented in :



**Table 4.**Graph percentaseof the average percentage of each component

Based on the results of a validation questionnaire by 3 material expertsd, it is known that the average percentage of all media design components is included in the very feasible criteria with a percentage of 81% which can be seen from the aspects of practicality, aspects of media quality, and aspects of clarity and attractiveness.

And from the results of validation conducted by media and material experts can be concluded that the Android-Based Learning media (thinkable) on Business and energy materials are in accordance with the needs of teaching and learning of learners and are feasible to be used by users.

Android-Based Learning Media (thinkable) in the manufacturing process is very easy, fast and efficient. Based on the opinion of [11] the use of thinkable software as a tool in the process of developing this android learning media application with various features that have been provided makes the application creation process faster, easier and more efficient.

#### **D. Disseminate**

This Learning Media ditujukaan for students grade VIII SMP / MTs equivalent. Therefore, the last step of the 4D method is to socialize learning media to students of Class VIII SMP/MTs as equals.

In this online era, educators do not need to be confused to find interesting learning media. One ofthem is by usingan android-based smartphone with the thinkable application as a learning medium. Menurut pendapat [12] dnature of the learning process, canhelp teachers in delivering a material with more interesting learning media. One of them is the use of android-based smartphones with Thinkable applications as a learning medium.

According to [11] theuse of thinkable software as a tool in the process of developing this android learning media application with various features that have been provided makes the application creation process faster, easier and more efficient.

According to [13] with students liking Android-based learning media, it will foster interest in learning and indirectly student learning outcomes will also increase. Because it indirectly makes students not saturated in learning. In addition, it can make students learn to be smart, accomplished and knowledgeable through meaningful education.

According to [14] with the Thinkable application, you can provide material that matches the characteristics of students and is able to increase students' learning interests.

## V. CONCLUSION

The purpose of this study is to produce Android-based physics learning media (thinkable) on work and energy materials as a form of utilizing technology to assist educators in delivering learning materials that are easy to understand and also attract students' learning interests.

Based on the results and discussion obtained by the researchers it can be concluded that based on the assessment by 3 media experts and 3 material experts, android-Based Learning media (thinkable) on this business and energy material is in accordance with the needs of teaching and learning of learners and is feasible to be used by users based on the average value of media is 84.2% and the average value of validation from material experts is 81%.

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