

# Development of Android-Based Interactive Learning Media Using Smart Apps Creator Software for Senior High Schools on the Subject of Optical Tools

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## ABSTRACT

High school students face various learning challenges when it comes to optical instruments. One of them is that the media is less varied, necessitating interactive media practical for independent learning, mainly when practicing problems independently. As a result, using the Smart Apps Creator software, a study was carried out to create Android-based learning media in Indonesian. The ADDIE development model was used for this study, which includes the following steps: analysis, design, development, implementation, and evaluation. Student user trials were conducted to determine the media's viability. The user-provided media has a feasibility level of 86.73 percent. As a result, it is concluded that the developed media is very suitable for use.

**Keywords :** - Android, interactive learning media, optical tools, smart apps creator

## 1. INTRODUCTION

In essence, teaching and learning are communication processes. Because of verbalism, unpreparedness, and a lack of student interest in learning, the communication process does not always run smoothly, and misunderstandings occur. With such communication issues, solutions must be found so that the teaching and learning process can continue to run smoothly. One of the methods used by teachers for this solution is media.

Interactive learning media is a medium that allows educators to deliver messages to students using technology in the form of application programs. Learning can be done anywhere and at any time using interactive learning media. Learning media can be stimulated so that students can conduct learning activities anywhere and at any time without relying on an educator [1]. This type of learning is known as mobile learning or m-learning [2].

According to Hamzah's research [3], m-learning plays an essential role in education. The availability of m-learning and wireless devices has become a requirement. The ability of students to learn and seek information makes m-learning more appealing. Because of its sophisticated features, low prices, and variety of applications, the number of Android smartphone users increases rapidly from time to time. Android is a smartphone and tablet operating system based on Linux [4].

Ainiyah's research [5] identified high school students learning difficulties with optical devices, including students' challenges in experimenting with optical instruments, challenges in learning optical instruments in class and outside of the classroom, and problems in understanding the application of material tools. Students' challenges in making diagrams of the path of rays on the reflection and refraction of light and their challenges in solving mathematical problems are all related to optics in everyday life. Whereas the causes of this learning difficulty differ, the less diverse media is one of them.

One solution to this problem is to use interactive learning media based on Android. Learning media could be published in HTML and run on an Android device by converting it into a file using the Smart Apps Creator software, one of the tools used for application development .apk with the Website to Apk Builder software.

Researchers created interactive learning media based on Android for high school students using the Smart Apps Creator software based on knowledge. This interactive learning media is expected to help students learn about abstract optical tools and can be studied independently anywhere and at any time. The goal of this study was to determine the level of feasibility of the media being developed.

## 2. RESEARCH METHOD

The ADDIE development model was used in this study, with the stages being analysis, design, development, implementation, and evaluation [6], [7]. Smart Apps Creator, one of the application development tools, can be published in HTML and run on an Android device by converting it to a .apk file with the Website to Apk Builder software. Furthermore, OBS software and Adobe Photoshop are used to create learning videos, icons, and images. A laptop and an Android smartphone with at least version 5.0 are used as the hardware.

The suitability of the material, pictures, video, and evaluation are all examined during the development stage to help students understand the material. The appearance and theme of the learning media should be adjusted to make it more appealing. The media created and revised were then tested out on users in the form of 20 students during the implementation stage. The final stage of research is the evaluation stage. The success of research objectives is measured and known through data analysis, so the feasibility of the developed interactive learning media is known.

A questionnaire with a Likert scale was used in the development of this learning media [8] [9], with four levels of assessment: Very Good = 4, Good = 3, Less = 2, Very Less = 1, and then compiled into a list of statements followed by four responses with levels of Strongly Agree (SS), Agree (S), Disagree (TS), and Strongly Disagree (STS). The equation calculates the media's feasibility level, P.

$$P = \frac{\text{the score of the assessment results}}{\text{Maximum score}} \times 100\% \quad (1)$$

The obtained percentage is then converted into a qualitative sentence. Table 1 shows how qualitative criteria (very feasible, feasible, less viable, and not viable) are classified [10]. Media is categorized as suitable for use if the questionnaire results are in the range of 76 percent - 100 percent or 51 percent - 75 percent, or if the criteria of "very feasible" or "feasible" are met [11].

**Table-1** Interval values and media feasibility level classification

No.	Value Intervals, P	Eligibility Level
1.	76 – 100 %	Very feasible
2.	51 – 75 %	Well feasible
3.	26 – 50 %	Less feasible
4.	0 – 25 %	Not feasible

## 3. RESULT AND ANALYSIS

This research resulted in creating an interactive learning media based on Android for high school students on the subject of visual tools after several stages of design and development. This learning media consists of several views, including the initial display, menu display, and material content display, as shown in Figures 1 (a), (b), and (c).



**Fig-1** display in developed media: (a) initial display, (b) menu display, and (c) display of material content

**Table-2** The results of the feasibility test for use by users

No	Statement 1	Answer Options			Average		Standard Deviation	
		2	3	4	Score	%	Score	%
1	The initial display design in learning media is attractive		9	11	3.55	88.75%	0.510418	14.38%
2	Content display design in learning media is presented attractively.		8	12	3.6	90.00%	0.502625	13.96%

3	The layout of the title, text and pictures and the equations in the learning media are arranged in an orderly manner	18	11	3.5	87.50%	0.606977	17.34%	
4	The color combination in learning media is interesting.	13	6	3.25	81.25%	0.55012	16.93%	
5	The proportion of the size of the letters in the learning media according to the size of the media.	11	8	3.35	83.75%	0.587143	17.53%	
6	Selection of fonts makes learning media display attractive.	11	6	3.15	78.75%	0.67082	21.30%	
7	Choosing the color of the letters makes the learning media look attractive.	11	8	3.35	83.75%	0.587143	17.53%	
8	The material (theory) in the learning media is in accordance with the learning outcomes	9	11	3.55	88.75%	0.510418	14.38%	
9	The pictures in the learning media can clarify the material presented.	8	12	3.6	90.00%	0.502625	13.96%	
10	Videos that are presented in interesting learning media	9	11	3.55	88.75%	0.510418	14.38%	
11	The videos presented in the learning media are easy to use	9	10	3.45	86.25%	0.604805	17.53%	
12	The material (theory) in learning media can make it easier for students to learn	8	12	3.6	90.00%	0.502625	13.96%	
13	The material (theory) in the learning media is presented in a language that is easy for me to understand.	11	9	3.45	86.25%	0.510418	14.79%	
14	Examples of questions and solutions in learning media are presented in language that I can easily understand.	11	9	3.45	86.25%	0.510418	14.79%	
15	Evaluation in learning media is presented in language that is easy for me to understand.	11	9	3.45	86.25%	0.510418	14.79%	
16	The evaluation questions presented in the learning media are interactive with the user.	3	12	5	3.1	77.50%	0.640723	20.67%

17	The material (theory) in the learning media is presented briefly	1	6	13	3.6	90.00%	0.598243	16.62%
18	Guidelines for using learning media are presented clearly.	2	6	12	3.5	87.50%	0.688247	19.66%
19	Learning media can be presented as a source of independent learning.		10	10	3.5	87.50%	0.512989	14.66%
20	Learning media is easy to operate.	2	6	12	3.5	87.50%	0.688247	19.66%
21	Learning media are portable (easy to carry anywhere).		4	16	3.8	95.00%	0.410391	10.80%

Table 2 shows the results of the feasibility test for user use. The mean and standard deviation for each of the 20 student assessors are shown in Table 2. Because there are many students, namely 20, the size of the distribution is expressed in terms of standard deviation. As shown in Table 1, there is no equal value in every assessment aspect. No standard deviation equals zero; this indicates that the students have a reasonably varied assessment and are independent of one another.

Nonetheless, each aspect's standard deviation of values is quite diverse, ranging from around 10% to 21%. The largest in the sixth aspect is "Choosing a typeface makes the learning media display attractive," which has a standard deviation of around 21.30%. The students give a "very decent" score in all aspects, and the weighted average of all elements provides feasibility with 86.73 percent.

**Table-3** Recapitulation of media feasibility level

No	Validator	feasibility Level (%)	Criteria
1.	User	86,73	Very feasible

Table 3 summarizes the feasibility level of the media developed based on user feedback, which is 86.73 percent. Based on the media's feasibility level classification in Table 1, it can be concluded that the media developed is very suitable for use as a source of independent learning.

The main limitation of this media is that it can only be used on smartphones running at least version 5.0 of the Android operating system. Given that students use smartphones with various operating systems, not just Android, other operating systems can be used for additional research.

#### 4. CONCLUSIONS

The feasibility level of the media given by users is 86.73%, respectively. It can be concluded that the media developed is suitable for use as a source of independent learning. The limitation of this media is that its operation can only be done on smartphones with an Android operating system of at least version 5.0. Physics learning media for smartphones with operating systems other than Android can be developed for further research.

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