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Development of Physics Learning Media Based on *Mobile Learning* Assisted by *Smart Apps Creator* on Students ' Ability to Understand Concepts in Dynamic Fluid Material Class XI

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ABSTRACT

Smart Apps Creator or commonly abbreviated as SAC is an application used to create learning media or similar based on Android or iOS without using programming code. This SAC can save applications in HTML5 and EXE formats which can be used on various devices such as laptops, computers and gadgets. SAC can be used as an alternative method for online learning because it does not require an internet quota for online learning. The research subjects were class XI high school students with 12 students from different schools. This research aims to test the effectiveness of mobile learning-based physics learning media with the help of Smart Apps Creator in increasing students' understanding of dynamic fluid material. The instruments used are questionnaires and tests. This research uses a type of research and development known as Research and Development (R&D) with the ADDIE development model which consists of 5 (five) stages, namely Analysis, Design, Development, Implementation and Evaluation. The results of material assessment by material experts obtained an average result of 80%, material assessment by media experts obtained an average result of 80%. The average percentage result of the posttest carried out by students was 94.7% so it can be concluded that students understand the concept of dynamic fluid material using the Smart App Creator.

Keywords: *Fluid a ; Mobile Learning; Smart Apps Creator*

INTRODUCTION

Along with the development of increasingly modern times, many sectors are increasingly making changes or transitions, especially by utilizing technology. For example, in the field of education, there is media that is used as a learning forum. Advances in information technology mean that humans can communicate with each other without being limited by distance and time. Whenever and wherever, humans with these technological devices can establish relationships, obtain information, and disseminate information to other people. [1]

The industrial era 5.0 has encouraged the world of education to follow current developments by using information technology to support all activities, especially in teaching and learning activities. In other words, technology really helps and supports the quality of education and educators in delivering more interesting material so that students avoid feeling bored while attending lessons.

At the end of 2019, an outbreak of disease emerged in China, specifically in the city of Wuhan. This outbreak is called the Covid-19 virus (CORONA). This outbreak spread rapidly to all parts of the world, including Indonesia in March 2020. The Covid-19 pandemic has caused significant shifts, including in the education sector. It is as if all levels of education are required to mutate to adapt significantly to carrying out distance learning from home online. This is certainly not an easy thing, because teaching staff are not yet

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fully ready to carry out online learning and there are still many teaching staff who do not understand learning technology. [2]

Distance Learning or also called distance education (PJJ) is learning using a medium that allows interaction between teachers and learners. The interactions that occur between teachers and students are carried out online or not face to face. In fact, it can be done in different places or long distances. [3]

Media is one of the references in the teaching and learning process of channeling messages from the sender to the recipient so that it can stimulate students' thoughts, feelings, attention and interest so that it occurs. Whether the learning process is achieved or not is largely determined by the media used. Media is a platform that can be used in learning sequences. [4] Android applications combined with animation, audio, video with text and images can increase students' understanding, insight, interest and attention to the material being taught. [5]

Mobile learning is a learning media that involves mobile devices so that students can access learning materials, learning instructions and learning applications without being limited by space and time, wherever and whenever the user is. [6] The main point that is the initial consideration for developing mobile-based teaching media is the freedom to access information anytime and anywhere. [7]

Covid-19 has had an impact on the learning media revolution which previously involved more interaction with students in the classroom. However, with the Covid-19 pandemic which causes rapid transmission through direct contact with sufferers, there is a ban on holding gatherings. So the world of education is also affected, so learning is carried out online. Online learning media can be interpreted as media that is equipped with a controller that can be operated by the user, so that the user can control and access what the user needs. [8]

Based on the description above, by experiencing the Covid-19 situation, educators must be more careful in choosing the learning media that must be used in the ongoing learning process so as not to miss out on material. Therefore, educators are required to master many learning media. [9]

One of the learning media is *Smart Apps Creator* . *Smart Apps Creator* or commonly abbreviated as SAC is a platform used to produce Android or iOS based learning media without using programming code. This SAC can save applications in HTML5 and EXE formats which can be used on various hardware devices such as computers, laptops, tablets and smartphones. [10]

By choosing Android-based learning with *Smart Apps Creator technology* , it is possible to more easily design learning content without any programming process so that users can easily create teaching materials that can be used in offline or online mode which can be further developed according to the developer's needs in order to produce a product that is useful. can be used wherever and whenever. Smart Apps Creator can also be combined with animation to make learning media more interesting. [11] This application does not fully use internet quota to work, file transfers other than via the internet can be via handware such as memory and flash disks. [12]

Smart Apps Creator (SAC) has advantages and disadvantages. The advantages are that it is easy to understand for beginners, creates Android-based applications without programming language, can be saved with results for several devices, and can be run without using an internet connection. The disadvantage is that it is a trial version which can only be used for 1 month for free, the features are limited. [13]

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The utility of *Smart Apps Creator* (SAC) is that it can create an interesting and enjoyable atmosphere, so that students do not feel bored with monotonous and same-old learning media, it is easy to access anywhere, so it is not limited by space, time or situation. helps and makes it easier for today's educators to make changes to learning media with minimal ability to produce interactive learning media. [14]

Physics is an important field of science for students to master. Physics also contributes to improving the quality of human life, especially in the field of technology. Even though physics is important, most students view physics as a difficult and uninteresting subject. Physics material generally covers topics that are difficult for students to understand. [15] Students often find it difficult to understand physics concepts, especially if students previously had different conceptions about the material being studied. [16] Apart from that, students also often experience difficulties in solving physics problems due to their lack of mastery of the physics concepts of the topics they study.

A complex thing that supports the study of physics material, low mastery of concepts will affect students' ability to both answer questions and apply them in everyday life, which is called concept mastery. In reality, students' mastery of basic concepts is still weak or not good. [17] . In the concept of fluid material, not many students experience inaccurate concepts and still experience difficulties in understanding the fluid concept itself. When students already have good basic concepts, the mistakes experienced by students are easy to correct. In physics, the subject of fluids is one of the difficult physics materials due to poor understanding of calculations.

The need to be aware of the difficulties experienced by students in fluid material is to be able to support students in strengthening basic concepts before moving on to the next material. If students experience misconceptions then it is very likely that students will have misconceptions in the continuation of the material. This research aims to test the level of effectiveness of *Mobile Learning -based physics learning media* assisted by *Smart Apps Creator* in increasing students' understanding abilities in fluid material.

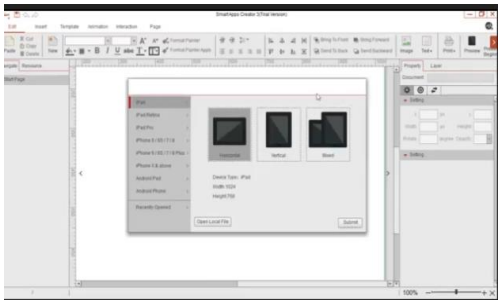
RESEARCH METHODS

This research uses the ADDIE development model, namely a research and development model which consists of five stages, namely *Analysis*, *Design*, *Development*, *Implementation*, and *Evaluation* . [18]

The analysis stage includes media analysis and material analysis. Media analysis is carried out to find out the extent to which media will be used in learning. Material analysis is carried out to ensure whether the content of the material used in learning is appropriate or not.

The second stage is design, which is done at this stage is determining the format, initial framework and determining the instruments. The purpose of the design stage is to produce a product design that has been adapted to the analysis. The design steps are as follows:

- Make sure the SAC application is installed on the laptop, then open the application and it will look like this.



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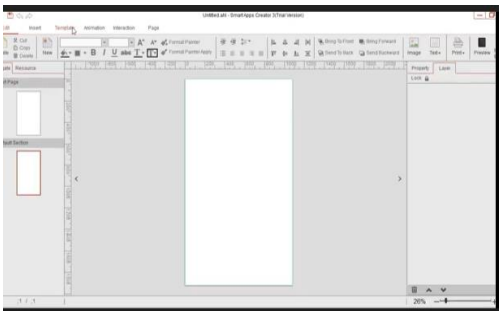
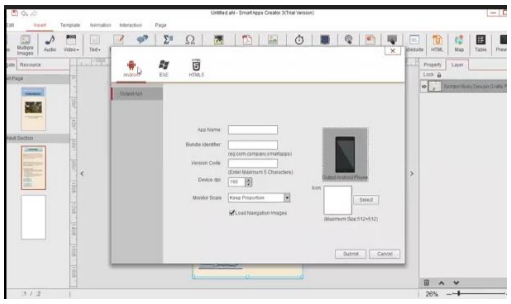
There are various choices, namely Android, iPad and iPhone as well as shapes such as horizontal, vertical and mixed. After that, select the shape and size that the user wants then click submit.

- Next, the following display appears at the top, there are many menus such as edit, insert, template, animation, interaction, and page.

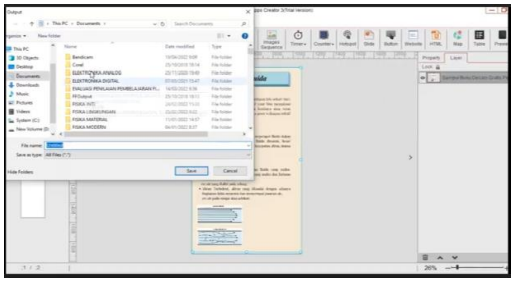


On the start page or home page, you can click on the background by clicking the insert menu then selecting the image then selecting the design that has been created (previously create the design first outside the application, and save it on the PC). Likewise for the background of the next page. Here you can also include various video media, links, audio, images and icons.

- To save the media that has been created, click in the top left corner then select output and then select the media format that we created, whether Android, Excel or HTML 5. Then fill in the available platform points then click submit.



- Select the folder where to save the media. After that the media can be used.



The third stage is development. This stage carries out assessments and evaluations by media experts and material experts to determine whether the media product being created is worthy or not. This stage consists of several steps, including:

a) Develop the design of learning media and instruments used in the previous stage, which will later be evaluated by experts,
b) Assessment of learning media is carried out by experts who are competent in the field of media and materials and are able to provide criticism and suggestions so that the preparation of the media can be better.

The implementation stage is learning media that has been developed and declared appropriate by lecturers with media expertise and material expertise. Next, it will be tested on research subjects on a small scale. This stage carried out a posttest to assess students' ability to understand the material provided. The final stage is evaluation, a final revision of the learning media is made based on criticism and suggestions that have been filled in by the validator in the questionnaire. [19]

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The subjects of this research and development were 12 class XI high school students. The object of this research and development is *mobile learning -based learning media* assisted by *Smart Apps Creator* for physics subjects. The instruments used in this research are: (1) Validation sheet, which is submitted to media expert validators and material experts in the form of a questionnaire to determine the suitability of the media created using a Likert scale. (2) Educator response questionnaire sheet, which is submitted to educators as teaching staff to obtain suggestions and criticism as a starting point for product revision to determine product suitability. (3) Test instrument, in the form of a posttest sheet.

The data obtained from the expert validator results can be analyzed using the selected answer value multiplied by 100%. The results of the feasibility validation can be seen in table 1 below: [20]

Table 1. Assessment Criteria

Eligibility Percentage	Criteria
0 – 20%	Very less
21 – 40%	Not enough
41 – 60%	Enough
61 – 80%	Good
81 – 100%	Very good

To find out the posttest results or ability to understand concepts, they are analyzed using the following formula:

$$Nilai = \frac{Skor\ yang\ diperoleh\ siswa}{Skor\ maksimum} \times 100\%$$

Based on the values obtained, the effectiveness criteria are determined as follows:

Table.2 Effectiveness Criteria

Intervals	Criteria
0-20%	Very Ineffective
21-40%	Ineffective
41-60%	Less effective
61-80%	Effective
81-100%	Very effective

RESULTS AND DISCUSSION

This research uses the ADDIE development model. The first stage is analysis, based on observations and experiences carried out by researchers during online learning, many students prefer to use smartphones or Android-based mobile phones compared to other devices. Because nowadays it is very necessary to develop learning media that are practical or can be accessed anytime and anywhere with a more attractive appearance for carrying out the learning process.

The second stage is design, after carrying out analysis, the next stage is designing a product that is made for learning media. This media uses dynamic fluid material. To design the appearance using Canva. When inserting image elements, it is adjusted to the material being created.

The next stage is development, this stage is the development of the previous design. At the end there are questions as evaluation material for the extent to which students understand the concepts of physics material created through SAC media. Next, the product will be validated by media experts and material experts, before being tested on students and educators. This validation was carried out by Physics education lecturers.

The results of the validation data for material experts and media experts obtained from the results of the questionnaire given to media expert lecturers and material experts are as follows:

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Table 3. Material and Media Expert Validation Assessment Results

Validator	Percentage	Criteria
Material expert	80 %	Very good
Media expert	80 %	Very good
Average	80 %	Very good

Based on the results of the material expert's assessment, there are several assessment aspects consisting of appropriateness of content, appropriateness of presentation and language assessment. Material expert validation shows an average score of 80% with "very good" criteria. However, there are several suggestions and input given, namely learning media that have been created very well for further development. The general material has been conveyed, but it seems very compressed and forced on one page or slide, so it does not encourage students to find out more.

The results of the media expert's assessment include several aspects, namely *cover design* , media content design and visual appearance. Material expert validation shows an average score of 80% with "very good" criteria. However, there are several suggestions and input given, namely that the learning media has been created very well but requires more time and thought to perfect the media.

The next stage is implementation, this stage is testing the product against the responses of educators and students. At this stage students are assigned to do a posttest to determine understanding of the material that has been presented in the media created. Here the questions given use the Minimum Competency Assessment (AKM) question type. AKM is a basic competency assessment that is used to assess students' cognitive abilities which are very necessary for students to develop their own abilities. [21] AKM was created to encourage the implementation of innovative learning, not just focused on memorization but oriented towards developing thinking skills. However, there are still many teaching staff who do not know what the AKM concept is which is used in assessing students' cognitive abilities. Based on the average percentage of posttests taken by students of 94.7%, it can be concluded that students understand the concept of dynamic fluid material using *SAC* .

Educator responses are needed to find out whether this media helps educators in providing material to students. The suggestions and input given are that *SAC- based learning media* is very interesting and useful for learning. This media includes material, example questions, learning videos, summaries and practice questions. By using *SAC*- based media , it makes it easier for educators to provide material, and it is hoped that students will find it easier to understand the material provided by the teacher. The suggestion given is that *Smart Apps Creator* -based learning media should be used using each student's cellphone. However, not all students have sophisticated cellphones, so it is possible that some students will not be able to download learning media applications using their cellphones due to the limited memory capacity of the students' cellphones.

The final stage is evaluation, this stage is very important to carry out so that the advantages and disadvantages of the media created can be identified. At this stage the researcher can find out that in planning learning media it must be adjusted based on the student's condition and can build interaction by including various qualities possessed by the teacher. The research results from the evaluation show that using mobile learning-based physics learning media assisted by *SAC* can improve students' ability to understand concepts. This is because in this application we can include video, audio, images and writing which makes the physics

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learning process more fun and less monotonous so that by creating mobile learning-based learning media it becomes an alternative in accommodating students' understanding, interest and attention to the material. .

The advantage of this SAC application is that it can be used as an interesting learning medium because it is equipped with audio, video, images and interesting writing so that the teaching and learning process becomes fun and not monotonous, educators can easily understand the displays contained in the SAC. The disadvantage of this media is that SAC media is a trial version which can only be used for one month for free. When you first make this media using high resolution, it will be difficult to use when changing it to a lower resolution. Below is a link where we can include product development results. ***Smart APPs Creator Product Development Results*** .

CONCLUSION

In research on creating *SAC -based learning media* , it is very good to help educators in dealing with teaching and learning activities and provide interesting learning material to students. Material expert validation shows an average score of 80% with very good criteria, while media expert validation shows an average score of 80% with very good criteria. The average percentage of posttest results completed by students was 94.7%, so it can be concluded that students understand the concept of dynamic fluid material using *SAC.*

It is hoped that the results of this research can be used as a reference for future researchers and that further research can develop this SAC media even more interestingly for other physics materials.

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