

VALIDITY OF PHYSICS MOBILE LEARNING MEDIA EDUPARK OF BAYANGSANI SOUTH COAST FLUID ON FLUID MATERIAL FOR HIGH SCHOOL STUDENTS USING THE ANDROID STUDIO APPLICATION

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ABSTRACT

This study aims to produce a mobile learning media using an android studio application based on edupark physics waterfall Bayangsani Pesisir Selatan on fluid material for high school students and find out the validity level. This type of research is development research using the Plomp model. The data source of this study was a validator team consisting of three lecturers from the Department of Physics Faculty of Mathematics and Natural Sciences UNP. The research instrument used in this study was an initial observation questionnaire for students and teachers, as well as a validation instrument. The data analysis technique used in this research is descriptive statistical techniques. Based on the results of data analysis that has been done, it can be concluded that the mobile learning media using android studio applications based on edupark physics has a validity value of 82.43 with a very valid category. The validity of the characteristics of this media product is assessed in terms of material substance, learning design, display (visual communication), and software utilization.

Keywords : mobile learning media, edupark, fluid, android studio application.



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I. INTRODUCTION

The era of industrial revolution 4.0 is closely related to the advancement of new technologies that integrate the physical, digital and biological worlds, where there is a fundamental change in the way of life of human life[1]. The era of industrial revolution 4.0 has affected many aspects of life, namely in the fields of economics, politics, culture, art, and even the field of education.

Education and industrial revolution 4.0 has a close relationship, one of the connections is that education is required to follow the development of technology that is growing rapidly. Learning should include information and communication technology as a facility to expedite the learning process. The utilization of information and communication technology is also expected to improve the competence of learners as needed.

The development of technology-based learning media also produces a variety of diverse media. Learning media is a tool to deliver teaching materials that must be prepared by educators and used in the core activities of the implementation of learning. The use of interesting learning media will increase the motivation and interest of learners to learn which will eventually make learners successfully understand the materials provided by the demands of learning according to the 2013 curriculum.

The 2013 curriculum provides quite fundamental changes, especially to the standards of the learning process. The regulation of the minister of education and culture opens the opportunity to develop a learning media that utilizes technology. Learning media that utilizes technology, one of which is mobile learning. Mobile learning (m-learning) is one of the alternatives to the development of learning media. The presence of mobile learning is intended as a complement to learning and provides opportunities for learners to learn less mastered materials wherever and whenever [3].

Learning media plays an important role as one of the components of learning resources. Some important capabilities that must be provided by m-learning learning devices are the ability to connect to other equipment, especially android, the ability to present learning information, and the ability to realize communication. The use of learning media can facilitate the learning process and optimize learning outcomes. Therefore educators must be able to choose and develop the right media so that the learning process can run more effectively and efficiently [5].

The existence of learning media participates in determining the success of learning. With the development of technology today, learning media becomes easy to access anytime and anywhere. Media utilization is carried out on all subjects including physics. Physics lessons are very closely related to daily life, events or events in the environment can be used as a means of learning physics because nature has many concepts of physics. A place that is biased as a learning tool is commonly referred to as an education park (edupark).

Education park is an innovation in the concept of education that presents learning materials based on the location used as a place of learning. One example of edupark that can be used by students as a learning tool is the Taman Taman Terjun Bayangsani. In Bayangsani Waterfall there are several concepts of physics, one of which is fluid. This can make students even more interested in learning physics while playing. Learning innovation in nature is very important as a form of refreshment and variation in learning. Learners can study physics while recreation[7]. Edupark needs to get special attention from the government because each region has a unique diversity of natural environments so that students can take experience and knowledge and develop it.

Real conditions in the field have not been by ideal conditions. Based on the observations made at SMA N 1 Koto XI Tarusan, it can be seen that the physics learning process has not been in line with expectations. This can be seen from the initial studies that have been done by disseminating questionnaires of learners and interview sheets of educators. The results of questionnaire analysis distributed to learners about learning media and edupark can be seen as follows.

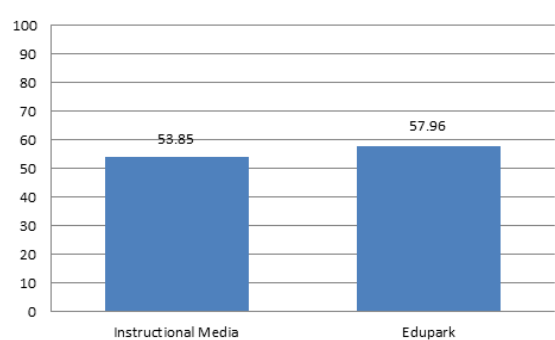


Fig. 1. Results of Student Poll Analysis

Based on the chart above, both aspects of obtaining low values are 53.85 and 57.96. This proves that the use of learning media and edupark in schools is still not optimal. The reality in the field found that learning media is rarely used for reasons of difficulty finding the right media, and the media created by teachers does not vary, there is no video, audio, animation in it so that makes learners bored in following the learning, while the learners prefer learning that contains video, audio, and animation. So it requires electronic-based learning media. Because the use of technology is considered to increase the interest of learners to study physics this is supported also with students who have participated in the development of technology, one of which is gadgets and cyberspace. The development of gadgets, smartphones/android, and other technologies make the generation that lives in this digital age can get information easily through digital media. It would be better if android is used in learning so that students can learn independently through their android.

Based on ideal conditions and real conditions in the field, the solution that researchers want to provide is to make mobile learning media intended for all mobile phones with an android platform. The advantages of mobile learning media are 1) can be accessed anywhere and anytime, 2) help learners in learning, be it at school, at home, or in open spaces such as tourist attractions, 3) mobile learning media is very suitable for learning in nature or educational parks (edupark), 4) mobile learning media by the times, 5) edupark integration in mobile learning can improve the understanding of concepts in learners.

The development of smartphone/android gadgets and other technologies makes the generation that lives in this digital age can get information easily and quickly through digital media. Android is a mobile operating system that adopts Linux operating system but has been modified. Android is an open-source distributed

software stack. Android is open source for developers to create their apps. The Android logo itself is mirrored like a green robot referring to the meaning of the word Android.

The more learners who have and use android, the greater the opportunity to use technology devices in the world of education. This can be a solution for educators and learners in meeting the demands of learning because it is very flexible to use whenever and wherever students have free time.

In physics learning, to facilitate students and educators in the learning process in this digital era, mobile learning is developed. The concept of mobile learning brings the benefits of the availability of teaching materials that can be accessed at any time and visualization of interesting materials.

Mobile learning is learning that utilizes information and communication technology, namely mobile phone technology, often called m-learning. There are three functions of mobile learning in the classroom, namely: as a supplement (supplement) which is optional, complementary, or substitution. Mobile learning is made for devices that have an Android-based mobile operating system. Android is an open-source distributed software stack.

II. METHOD

Research is conducted only through two stages, namely preliminary research and prototype development stage (prototyping stage). This type of research is a stage of development research using plomp model. The plomp model is an appropriate research design to develop research-based solutions in education. The plomp model is used to develop or validate theories about the learning process. The research design includes systematic studies to design, develop, and evaluate educational interventions such as learning processes, learning environments, and teaching materials as solutions to educational problems.

The object of this research is Edupark Mobile Learning Media physics of Bayangsani South Coast Waterfall using an android studio application. Mobile learning media using android studio application is validated by lecturers majoring in physics FMIPA UNP as experts so that this media is worth using.

This plomp development model has three stages, namely preliminary research, prototype development stage (prototyping stage), and assessment phase[11]. This research uses two of the three stages of research on plomp model development and is carried out to overcome the learning process that is still centered on teachers (teacher center). Products made in the form of Media Mobile Learning Edupark Physics Bayangsani Waterfall South Coast to be carried out until the development stage (Prototyping stage) is a validation test only to get a valid product.

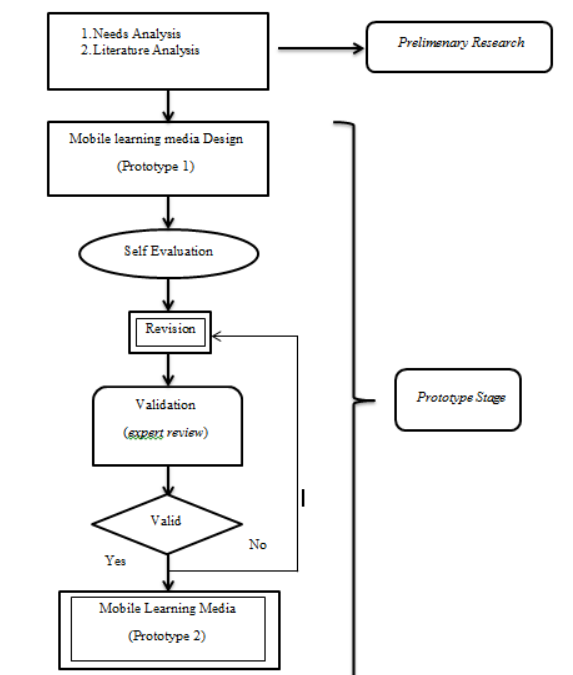


Fig.2. Research Procedure

This research was conducted to overcome the learning process that is still centered on teachers (teacher center) into student center-centered learning. Products made in the form of interactive multimedia will be carried out until the development stage (Prototyping stage) that is a validation test only to get a valid product. The

advantages of plomp model are more flexible, so it can be adjusted to the needs and characteristics of research. Besides, there is an emphasis on preliminary research in the form of research in the early stages of development as a strong basis for formulating problems and determining the right solutions for the next stage [12].

The instruments used in data collection are validity test sheets filled by physics lecturers in the department of physics Universitas Negeri Padang. The validation instrument is a validity sheet compiled based on the validity component according to the Ministry of National Education (2010). The components concern the feasibility of material substance, the feasibility of learning design, the feasibility of display (visual communication), and the feasibility of software utilization, from several components, will be described into several indicators [13].

The first component is the feasibility of the material substance, which consists of four indicators namely; 1) not deviating from the truth of science, 2) conformity to material depth, 3) conformity to the development of science, 4) Using standard and understandable grammar[13].

The second component is Learning Design which consists of eight indicators, namely; 1) conformity of the title to the material, 2) core competencies under the content standards, 3) basic competencies under the content standards, 4) indicators as markers of achievement of student competencies, 5) conformity of materials to basic competency standards and competencies, 6) examples of questions and exercises under achievement indicators, 7) a constituent identity, 8) list of references [13].

The third component is the display (visual communication) consisting of five indicators, namely; 1) Ease of access between slides, 2) Proportionality between the case and slide space, 3) Images, sounds, and videos according to the material presented, 4) Color harmonization, contrast level, 5) Display/layout design[13].

The fourth component is the utilization of software consisting of three indicators, namely; 1) Interactive, 2) Use of supporting software in addition to the main software making, 3) Authenticity of Mobile Learning media work [13].

Data analysis is performed to test validity using descriptive statistical analysis techniques. The resulting product is assessed based on a validation questionnaire. Validation questionnaires that have been filled by experts are then analyzed to find out the validity level. The statistical test performed is a descriptive analysis described through graphs. The weighting was used on a Likert scale[14]. According to Sugiyono (2012), the Likert scale can be used to measure the attitude, perception, and opinion of a person or group of people towards the potential and problems of an object, the design of a product, the process of making products, and products that have been developed. To use the Likert scale, the variables to be measured are re-defined into sub variables and then re-described into measurable indicators in the form of questions that need to be answered by respondents. The answer of each instrument using the Likert scale has a score breakdown as in Table 1.

| Tabel 1. Validation Score Details | |
|--|--------------------|
| Score | Information |
| 4 | Strongly Agree |
| 3 | Agree |
| 2 | Disagree |
| 1 | Totally Disagree |

Validation instruments are filled by experts in the range of 1-4. The response of experts is then processed systematically. Equations can be written as follows.

$$\text{Score} = \frac{\text{Score Obtained}}{\text{Maximum Score}} \times \text{ideal Score (100)} \quad (1)$$

Validity assessment is determined based on the criteria of interpretation of the score obtained from the previous expert [15].

III. RESULTS AND DISCUSSION

A. Result

1. Preliminary Research Result

a. Results of Needs Analysis

The preliminary study was conducted at SMA N 1 Koto XI Tarusan, students were given questionnaires about the use of physics learning media and the relation of materials to the surrounding environment. students are

given questionnaires about the use of physics learning media and the relation of materials to the surrounding environment. The results of the questionnaire sheet that has been shared are then analyzed and obtained results of the analysis as can be seen in Figure 1. The results of the analysis of the initial study in the learners found that some students were not interested in learning physics because of the lack of use of learning media and many learners could not associate the concepts of physics with daily life.

From the results of interviews that have been conducted with educators at SMA N 1 Koto XI Tarusan, it was obtained that educators rarely use learning media because of difficulties in preparing. The use of learning media that associates the concept of physics with the surrounding environment is still not applied because of difficulties in the process of creating learning media based on the latest technology.

b. Literature analysis study

This stage is done after knowing the problems. Based on the problems that exist at the stage of analysis needs, namely the use of learning media, especially technology-based such as mobile phones /android is still rarely used and physics learning that associates matter with the surrounding environment has also not been applied. The solution that can be given is to create a mobile learning media edupark physics Bayangsani Waterfall South Coast using an android studio application, therefore a study of mobile learning media and edupark.

Characteristics of Mobile Learning as a medium have included all elements of multimedia audiovisual and some animations can attract students to be used as a source of reference or learning. The learning process with Mobile Learning media makes students more interested in learning. Android-based Mobile Learning build requires applications on computers whose out-of-date results can be applied/used on Android-based devices[16].

In the process of physics learning in schools educators still rarely associate the physics material studied with the concepts of physics that exist in the environment. The learning process to face the era of industrial revolution 4.0 is to conduct creative learning, innovative, technologically literate, and incorporate the values of local wisdom. So in creating a mobile learning media park physics Bayangsani Waterfall South Coast using android studio application.

2. Results of Research Development Stage (Prototyping Phase)

Based on the validation assessment instruments that have been used, validity results can be analyzed for four components of mobile learning media *assessment*. The first is in the material substance assessment component consisting of two parts, namely physical material developed into 11 indicators *and edupark physics* with 5 indicators as Figure 3.

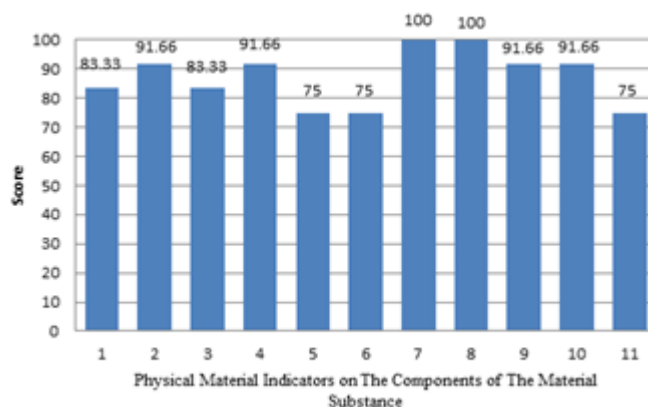


Fig. 3 The value of the indicator of the physical material part of the material substance component

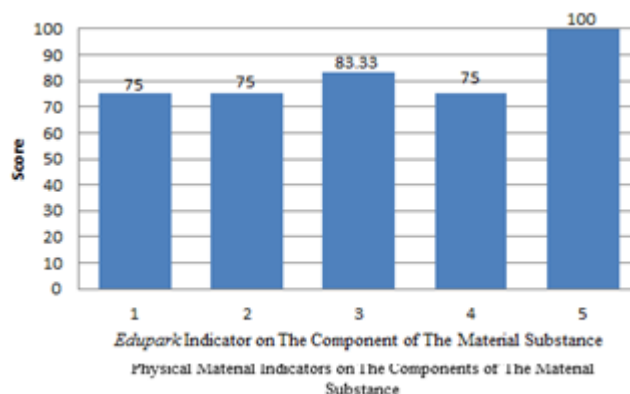


Fig.4. EduPark *physics indicator value* part content feasibility component

Based on figure 3 and figure 4 can be explained the value on each indicator of the material part of physics *and* *edupark* physics on the material substance components ranging from 75 to 100. Of the 16 indicators of material substance there are two categories of validity that are valid and very valid. For values 61 to 80 are in the valid category and values 81 to 100 are in the very valid category. The average value obtained in the physical material part of the material component of the material substance is 87.12 with a very valid category and the average value of the edupark part of the material substance component obtained 81.66 with a valid category.

The second component is a learning design that is developed into 13 indicators as follows.

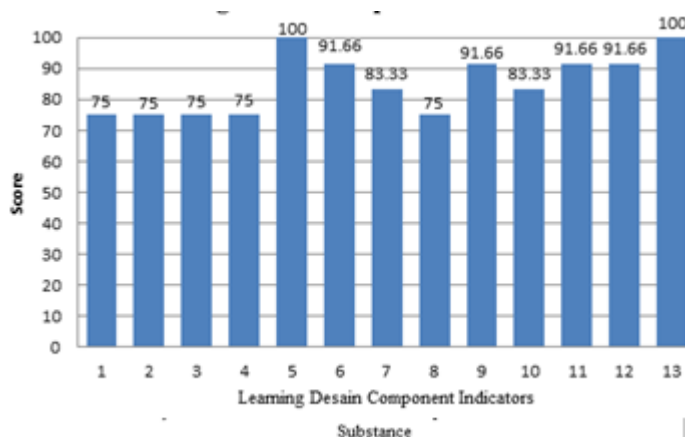


Fig. 5. Indicators of learning design components

Based on figure 5 can be explained the value on each indicator of the learning design component ranging from 75 to 100. The average value obtained in the learning design component is 79.48 belongs to the valid category. The third component is the display (visual communication) which is developed into 14 indicators as follows.

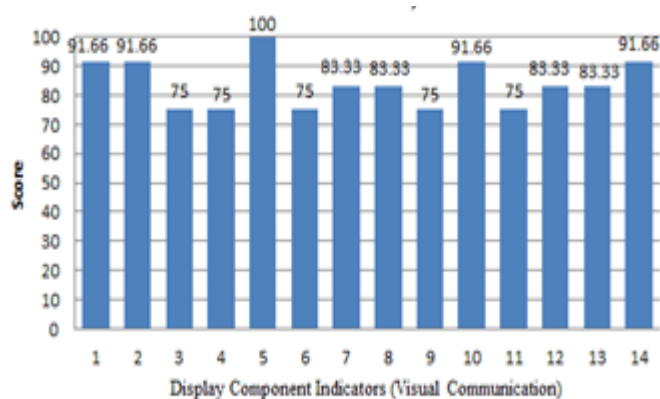


Fig. 6. Display indicator value (visual communication)

From Figure 6 it appears that the value of each indicator of the display component (visual communication) ranges from 75 to 100. So the average value obtained in the display component (visual communication) is 83.92 belongs to the category is very valid.

The fourth component is the *utilization* of software developed into 6 indicators as Figure 7.

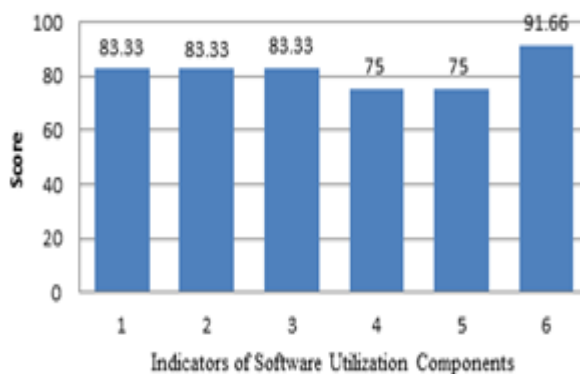


Fig. 7 . Value indicator of software utilization *component*

Based on figure 7 can be seen that the value on each indicator of *the software utilization* component ranges from 75 to 91.66. The average value obtained in the software utilization *component* is 81.94 with a very valid category.

The average value of each assessment component in *the physical edupark mobile learning* media of Bayangsani South Coast Waterfall using android studio *application* can be determined from the average value of the four assessment components namely 1) material substance components, 2) learning design components, 3) display components, and 4) software utilization *components*. The plot result of validity value for each assessment component can be seen in figure 8.

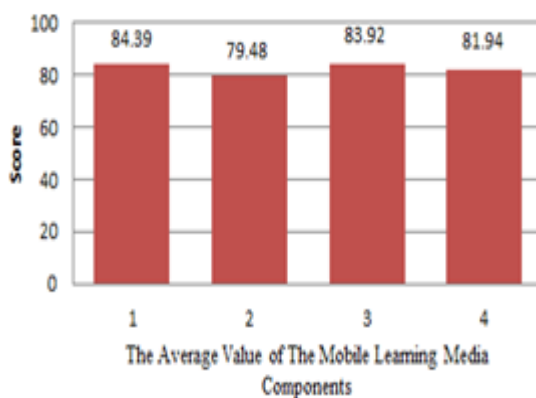


Fig. 8. Average value of all components of *mobile learning* media

Based on figure 8 the average values on each component range from 79.48 to 84.39. With an average value of all components of 82.43. From this value, it can be said that the overall component of mobile learning media is in the category of validity is very valid, so *that mobile learning* media *edupark* physics Bayangsani Waterfall South Coast using *android studio application* is worth using and continued to test practicality and effectiveness.

B. Discussion

The discussion of researchers made after obtained the results of the study. The discussion explained how the results that have been obtained in conducting research such as constraints, limitations of what is contained during the research, solutions, alternatives, inputs so that the problems faced during the research are resolved. The result of his research is the validation of mobile learning media by experts. Validation of product design is an activation process to assess whether it is appropriate and whether the product design is more effective than the old one or not. The results of the validation of mobile learning media are used to determine the feasibility of mobile learning media and also as a guideline in revising mobile learning media products that have been made.

Validation is done by using a validation instrument sheet. The results of product validation are analyzed by each of its components. After analyzing the existing data, it was obtained that mobile learning media products edupark physics Bayangsani Waterfall South Coast using android studio application has a valid category once and worth using in the process of physics learning.

The first component is the material substance component which in this component consists of two parts, namely physical matter, and edupark. In the physics material section, there are six indicators with high validation values of 91.66 and 100. These indicators are material in mobile learning is logical/rational and adds insight to students' knowledge under the development of science and technology. Mobile learning media is designed to improve the mindset of learners by their development, using applications/application of materials based on real conditions, presenting related materials well, and presenting innovative things. Furthermore, in edupark there is one indicator with a high validation value of 100. The indicator is the presence of photos and videos about edupark making students understand the application of materials in their daily lives. This is because photos and videos are used as tools to deliver materials to mobile learning media.

The second component is the learning design. In this component, there are six indicators with high validation values, namely 91.66 and 100. These indicators are core competencies and basic competencies presented in mobile learning media, indicators and objectives to be achieved are clear, there is an identity of the composer in mobile learning media. , mobile learning media allows students to read the material at any time, the information conveyed in mobile learning media is by the facts, and also includes a list of references on mobile learning media. This is because the main menu section of the mobile learning media is provided with menu navigation that displays core competencies and basic competencies by the material discussed, namely static fluid and dynamic fluid, and also on the media there is menu navigation that displays the identity of the compiler and a list of references that the researcher has. use in making materials. Mobile learning media allows students to read the material at any time because of the ease of accessing material from Android which is always carried by students wherever they go.

The third component is displayed (visual communication). In this component, there are five indicators with high validation values, namely 91.66 and 100. These indicators are menus in the mobile learning media that are easy to understand and are functioning properly, the use of fonts (type and size) of writing is correct, display the mobile learning media is attractive and the language used has also been effective. This is because the mobile learning media is designed by displaying menus that have access to the desired display page so that the media is designed to be attractive and easy to understand with the use of appropriate written fonts and effective language.

The fourth component is the use of the software. In this component, there is one indicator with a high validation value, namely 91.66. This indicator is the originality of the mobile learning media product. This is because researchers themselves design and design ideas on mobile learning media without stealing other people's designs.

Based on the results of the validation, the mean value of validation for all components is 82.43. The results of this validation are in the range 81-100 with the very valid category. Not all of the components of the mobile learning media have reached perfect scores, this is because several indicators on the validity component have not been measured properly according to the validators so that it needs to be revised. Revisions were made based on suggestions from the validator so that the mobile learning media could meet the criteria for each component of validity. After the revision was made, the mobile learning media were found to be better than before. From the results of the validation analysis of the mobile learning media for the physics edupark of Bayangsani Waterfall, Pesisir Selatan using the android studio application, the results are valid with the very valid category. Therefore, mobile learning media is recommended for use by educators and students in physics learning activities.

In this research, it is not easy to get perfect results. Perfection in this research is something that is not easy to realize because of limitations. At the time of the research, there were various constraints and limitations. The limitation that is experienced in the making of mobile learning media for physics education of Bayangsani Waterfall, Pesisir Selatan using android studio application is only done until validity, it still needs to do practicality test and effectiveness test. Also, mobile learning media are still in two basic competencies for class XI material. The follow-up in this research in the future mobile learning media can be made based on all the material contained in class XI both in semester 1 and semester 2 to produce a more complete mobile learning media. Furthermore, the obstacle in this study is the time required to validate the product directly with the validator due to circumstances that are not possible.

IV. CONCLUSION

From the results of the research and discussion that has been done, the conclusions obtained are the results of the validation of the mobile learning media for the physics edupark of Bayangsani Pesisir Selatan Waterfall using the android studio application which has a very valid validity category. The characteristics of the validity of this product are assessed based on aspects of the material substance, learning design, display (communication, visual), and software utilization.

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