

PHYSICS E-BOOK DESIGN FOR HIGH SCHOOL STUDENTS USING FLIP PDF PROFESSIONAL BASED ON EDUPARK HOT WATERBOOM SOLOK SELATAN

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ABSTRACT

In facing the era of the industrial revolution 4.0, education is needed that can form a creative, innovative, and competitive generation. This can be achieved by optimizing the use of technology as a tool in education. In terms of education, the government made improvements to the learning system, namely curriculum development. The 2013 curriculum regulates learning resources, namely books, print, and electronic media. But in reality, the student books used in school only contain physics material and have not been fully integrated with the dimensions of attitude, spirituality, and local context. The existing teaching materials have not included the implementation of the 2013 curriculum and are not sufficient for students to learn independently. One solution to this problem is the physics e-book based on Edupark. This study aims to produce a physics e-book based on the Edupark Hot Waterboom in South Solok using a professional flip pdf for valid high school / MA students. The type of research used is development research using the Plomp development model. The plomp model is a research design suitable for developing research-based solutions in education. The plomp model is used to develop or validate theories about the learning process. The results of the validation test are used to test the advantages of the product that has been made and as a guide in making revisions to the e-book. The average value of each assessment component in the physics e-book based on the South Solok Water Boom Edupark can be determined from the average of the four assessment components including 1) content feasibility component 2) learning design component 3) display component and 4) software utilization component. From the percentage of the four components, the results of the e-book validation instrument were obtained by three validator experts with an average percentage of 85.11% with a very valid category.

Keywords : e-book, flip pdf, edupark



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I. INTRODUCTION

Today the world has entered the era of revolution 4.0 which can be seen from the increasing number of interactions, availability in the development of intelligent systems that artificial, virtual and digital. This era has affected many aspects of life both in the fields of economics, politics, culture, art, and even up to the field of education. Education 4.0 can change the utilization of information in an easy and global-based way. To be ready to face and able to compete on a global scale the change of this revolution is in desperate need of human resources (HR).

Improving the quality of human resources can start from elementary school education, secondary school to college. This is the key to being able to face the development of revolution 4.0. The success of a Country in the face of industrial revolution 4.0 can be seen from the quality of a teacher or an educator. This global challenge requires teachers to be able to master and be able to adapt to new technologies. In this case, new orientation and literacy must be required by the educational institution.

Learning in high school, especially physics learning has a purpose so that learners can develop attitudes, knowledge, and skills through mastery of concepts and principles of physics so that physics can be applied by

learners in everyday life. Various topics of information appear to dominate the public space so that the term trending topic for social media users can be utilized in education [1]. Categorically there are several areas of the topic that are more important in the conversation than some other topics, one of which is quite trending topics, namely Geopark.

Geopark is a new concept carried by the United Nations Educational, Scientific and Cultural Organization (UNESCO) and is now a global trend. Geopark stands for Geological Park if translated into Indonesian means Geological park or earth park. West Sumatra Province is one of the provinces in Indonesia that carries its area to become a national Geopark and UNESCO Global Geopark and expects this Mining Domain Geopark to become a national and global Geopark in 2019-2020 under the name "Ranah Minang UNESCO Global Geopark"[2].

Based on these circumstances, the development of learning in geopark utilizing has been done and produced a textbook dark fluid physics-based on Sianok Canyon Geopark. The development of edupark physics textbook based on Sianok Canyon Geopark can be seen in Government Regulation No. 19 of 2005 on National Standards of Education, namely article 17 paragraph 1 which explains that the curriculum level of elementary to high school education units / MA is developed by the education unit, regional potential, socio-cultural, and learners. The purpose of the idea of education based on local wisdom is so that students can take experience and knowledge from any source that can be obtained. But it has to be able to adapt to the potential and value that it has in place.

The utilization of nature or tourist attractions in the form of natural and artificial parks that allow learning in it to occur is the main concept of Edupark[3]. The concept of edupark facilitates the idea of education based on local wisdom, namely containing learning materials based on potential and local wisdom that is used as a source of learning. The attractions in Sianok Canyon Geopark have many concepts of physics scattered and potentially as a source of learning physics[4].

With the diverse potential in each region so that special attention is needed by the government so that each region can master its potential and can develop the potential by global demands. Revolution 4.0 which demands multi-learning resources is in line with the challenges of globalization by utilizing the potential of the area where the area can be used as a learning park for students, namely on tourism hot water boom South Solok. The edupark activities so that it can make students more interested in learning.

Based on observations and interviews with physics subject teachers and grade XI students at SMAN 3 Solok Selatan that the student books used in school contain only physics materials and have not been fully integrated with the dimensions of attitude, spiritual, local context. And the obstacles encountered during physics learning are that students are less interested in learning physics, and students have difficulty in receiving materials, teaching materials that exist now do not contain the application of the 2013 curriculum and also not enough to make students learn independently. Teaching materials used are one package book and one LKS, teachers still need other teaching materials that are interesting and easy to understand to support the teaching and learning process, namely by using electronic-based teaching materials, because the use of electronic teaching materials can contain images and videos that students believe can improve their understanding. Where the teaching materials designed and compiled by teachers in the form of electronic teaching materials by linking the subject matter to the environment around the learners, the potential of the area/characteristics of the region so that the concept of physics can explain the phenomena that often occur in the life of learners.

Based on the analysis of learners, it appears that the potential of the area needs to be developed as a learning medium, because of the enthusiasm of learners in visiting tourist attractions. This is evidenced-based on interviews conducted with the guide officers hot water boom South Solok said this tourist attraction is visited by many tourists, especially young people who are used to gathering places, playing and taking pictures, especially during holidays many tourists who come mainly are students, so this can be used as a research object based on the results of preliminary analysis. Learning resources from nature are based on learning materials that provide knowledge to the community and students known as Edupark. Edupark is derived from the term Education park which is an educational park abbreviated as edupark.

Technology development is a factor to be able to participate in influencing the behavior of learners in learning. Learners do not realize to have become part of the generation that lives in today's sophisticated age. This can be seen by the development of digital technology so that they can easily get information be it mass learning or other problems. Based on the description and exposure of the above circumstances, the author tries to design an e-book on teaching materials edupark. the e-book is a technological development that can be used in learning. e-books made can be stored in devices such as HP and laptops, so they can be easily carried

everywhere and can be read at any time without feeling the heaviest so it feels more flexible compared to printed books.

The e-book allows more student learning time than usual. Where the demands as now to be able to make students do not have time to read books using printed books, with the presence of e-books so that students can read learning materials anytime and anywhere if there is free time to learn. Besides, the e-book also has the advantage of not only loading text but an e-book has a variety of needs and characteristics of learners to display information in the form of multimedia text, images, videos, and animations that are made in one multimedia-based information technology, its dynamic appearance can integrate sound impressions, graphics, images, animations, and movies so that the information presented is richer than conventional books and used as an alternative in learning.

II. METHOD

The research was conducted in a qualitative descriptive manner. Descriptive research is the description of an event or phenomenon so that it can explain an event as it is. While qualitative research is a research activity and procedure without the use of static analysis or some other quantization method. The research objective descriptively will show an interpretation of data that has been collected objectively and logically. Furthermore, it provides an overview of the relationship of data with other data that has been studied by describing the events/phenomena that occur in a more concrete and detailed manner [8].

These research measures are research and development measures according to Plomp.

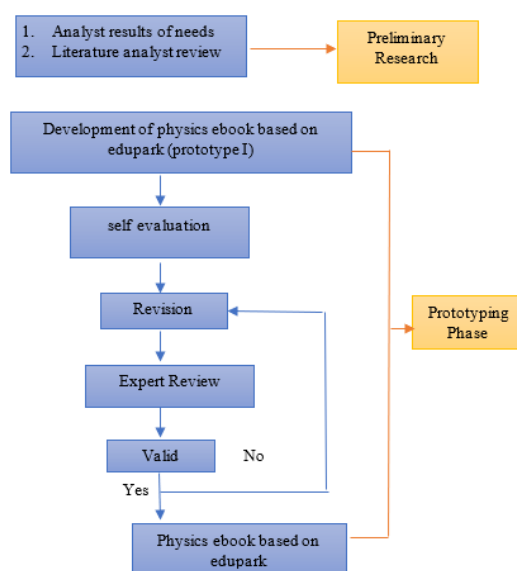


Fig. 1. Plomp Steps

Based on Figure 1, the stages of this research are: 1) Preliminary Research, which consists of needs analysis and literature analysis, 2) Development/Prototype Phase, which consists of Prototype Design and Formative Evaluation and Prototype Revision.

Research instrument or as a tool used to collect data in this research consists of two stages, namely: 1) Data Collection at the Preliminary Research Stage, this stage aims to obtain data. At this stage, the instruments used are observation questionnaires of students, teacher observation questionnaires, and teacher interview sheets. Data collection at the development stage, product assessment conducted in this research is by conducting product validation test by experts that consists of validation questionnaire sheet. The validation questionnaire used aims to determine the accuracy of the constituent components of the product.

Data analysis is used to test validity, Data analysis techniques in this study there is five descriptive statistical analysis that explains the validity of physics e-book based on edupark hot water boom Solok Selatan using professional flip pdf for high school students. Analysis of this data is done after experts or validators fill out a validation sheet that has been adjusted to the indicators needed in the creation of an e-book. Aspects of the

assessment contained in the validation instrument include the principle of material substance, learning design, e-book display, software utilization, and indicators related to edupark physics.

The validity of teaching materials that have been made from questionnaires filled by lecturers of Physical FMIPA UNP. Validation values are determined based on the criteria for interpretation of the score obtained. The following criteria are used to determine the validity of teaching materials edupark physics Hot water boom South Solok:

Table 1. Product Validity Criteria

Interval	Category
1 - 20	Invalid
21 - 40	Less Valid
41 - 60	Quite Valid
61 - 80	Valid
81 - 100	Very Valid

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

III. RESULTS AND DISCUSSION

A. Result

This research was carried out with plomp design research development model consisting of three stages, namely: preliminary research, prototyping phase (design stage), and assessment phase. The preliminary research obtained the results of needs analysis and literature. While in the research stage of development obtained the results of product validation. The full details of the research results are as follows.

1. Preliminary Research

a. Analyst results of needs

At this stage of needs analysis, preliminary studies of students and teachers have been conducted. The preliminary study of teachers and students in the form of questionnaires aims to find out the teaching materials applied in physics learning that is associated with the surrounding environment in the school. Furthermore, by conducting interviews with physics teachers who aim to find out the application of the 2013 curriculum and the use of teaching materials, especially electronic teaching materials and related to daily life.

b. Literature analyst review

This stage is done after knowing the problems in the field. Based on the problem at the analysis stage of the need that the learning resources used are still limited to teaching materials in the form of prints and bahan teachings used have not integrated the surrounding environment. The solution provided is a physics e-book design based on edupark hot water boom Solok Selatan using professional flip pdf for high school / MA students.

2. Prototyping Phase

a. Prototype Design

e-book physics made based on edupark or playground, where edupark used is hot water boom located in South Solok. Where e-book physics created using professional pdf flip application to be published in the epub file extension. To read this e-book can be through a computer and android with the help of an application called spreader or through google chrome that uses the radium application.

b. Formative evaluation and revision of prototypes

1) Results of self evaluation

Self-evaluation is done before being validated by a team of experts, the prototype will be re-examined by the researchers themselves (self-evaluation). At this stage, researchers read and examine, repair, and add

completeness to each prototype that is perceived to be lacking. In the interactive multimedia created, the e-book structure is under Permendikbud No.8 the Year 2016 that is by the constituent components of the e-book [8].

2) Validation test results (Expert Review)

The validation results of the physics e-book based on edupark hot water boom Solok Selatan obtained from validation instruments that have been filled by three experts consisting of three lecturers of Physics FMIPA UNP. The validation test results were used to test the advantages of the product that has been created and as a guideline in revising the physics e-book based on edupark hot water boom Solok Selatan and to determine the validity level of the physics e-book based on edupark hot water boom Solok Selatan. The physics e-book validation assessment instrument based on edupark hot water boom Solok Selatan consists of four components of assessment, namely content feasibility, learning design, display (communication, visual), and application utilization.

Based on the validation instruments that have been used, validity results can be analyzed for the four components of physics e-book assessment based on edupark hot water boom South Solok. First, in the feasibility component of the plot result, the value of the physics material substance indicator can be seen in Figure 2.

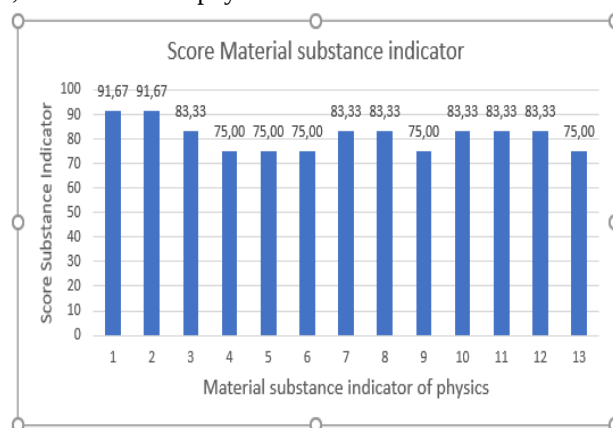


Fig. 2. Material substance indicator of physics

Based on Figure 2, it can be explained that the value of each indicator of the material part of the content feasibility component ranges from 75% to 91.67%. Of the thirteen indicators, there are two categories of validity that are valid and very valid. Invalid categories range from 61-80 while very valid categories range from 81-100. The average value obtained in the feasibility component of the content of the physical material obtained is 81.40% thus the validity level in the physical material part is at a very valid level.

Furthermore, the second part of the content feasibility component is in the Edupark section the plot value of the physical material substance indicator value can be seen in Figure 3.

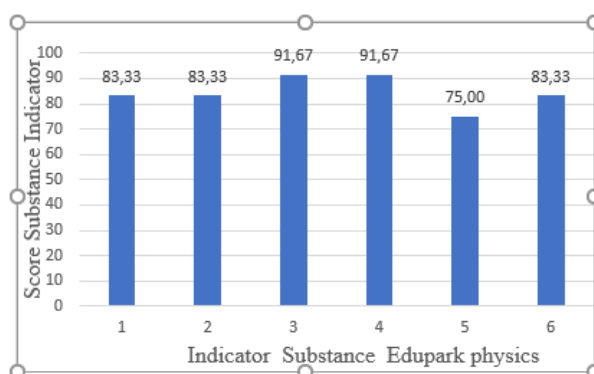


Fig. 3. Indicator Substance Edupark physics

Based on Figure 3, the values in each indicator of the physics edupark section of the content feasibility component range from 75% to 91.67%. Of the six indicators, there are two categories of validity that are valid and very valid. Invalid categories range from 61-80 while very valid categories range from 81-100. The average value obtained in the content feasibility component of the physics edupark section obtained is 84.72% thus the validity level in the edupark section of physics is at a very valid level.

Second, the learning design component consists of thirteen indicators. The plot result of the value of the learning design component can be seen in Figure 4.

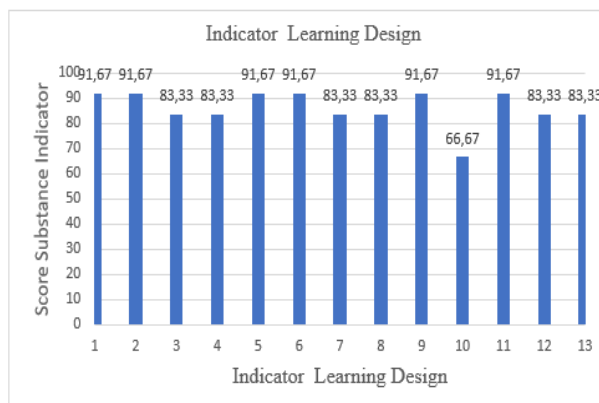


Fig. 4. Indicator Learning Design

Based on Figure 4, it can be explained that the value on each indicator of the learning design component ranges from 66.67% to 91.67%. Of the thirteen indicators, there are two categories of validity that are valid and very valid. Invalid categories range from 61-80 while very valid categories range from 81-100. The average score obtained in the feasibility component of the physical edupark section obtained is 85.89% thus the validity level in the edupark section of physics is at a very valid level.

Third, on the display components (communication, visual). The plot result of the value of the learning design component can be seen in Figure 5.

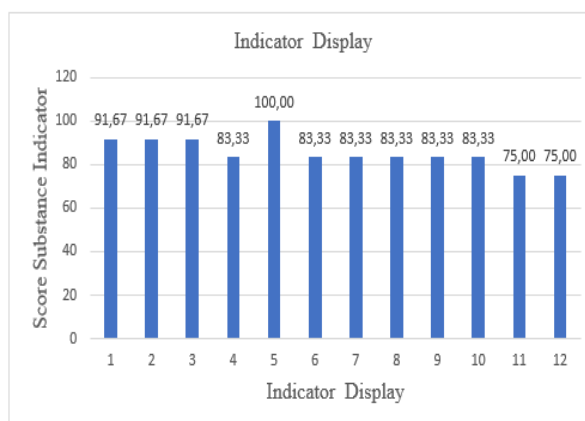


Fig. 5. Indicator Display (Communication, Visual)

Based on Figure 5, it can be explained that the value on each indicator of the display component (communication, visual) ranges from 75% to 100%. Invalid categories range from 61-80 while very valid categories range from 81-100. The average score obtained in the content feasibility component of the physics edupark section obtained is 85.41% thus the validity level in the edupark section of physics is at a very valid level.

Fourth, it is contained in the software utilization component The plotted value of the learning design component can be seen in Figure 6.

Based on Figure 6, it can be explained that the value on each indicator of the software utilization component ranges from 83.33% to 91.66%. Of the five indicators, there are two categories of validity that are valid and very valid. Invalid categories range from 61-80 while very valid categories range from 81-100. The average score obtained in the content feasibility component of the physics edupark section obtained is 86.66% thus the validity level in the edupark section of physics is at a very valid level.

The average value of each assessment component in the physics e-book based on edupark hot water boom Solok Selatan can be determined from the average to the four components of the assessment including 1) content feasibility component 2) learning design component 3) display component and 4) software utilization component. The results of validation assessment values by three validator experts can be seen in Figure 7.

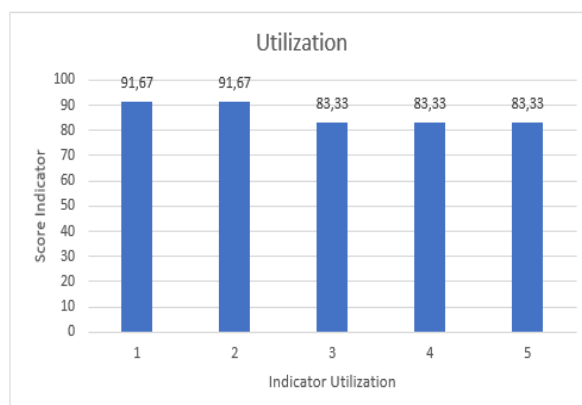


Fig. 6. Indicator Software Utilization

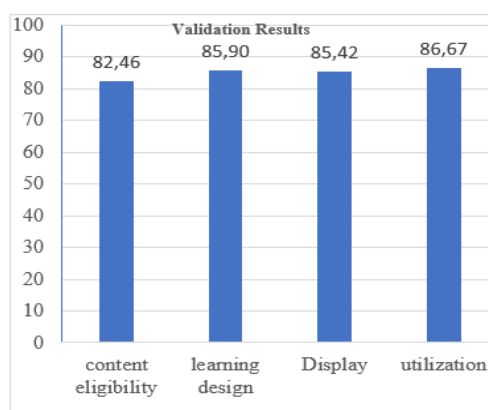


Fig. 7. Validation Instrument Result

Based on Figure 7. The content feasibility component is based on a percentage of 82.46% with a very valid category. The learning design component gets a percentage of 85.90% with a very valid category. The display component gets a percentage of 85.42% with a very valid category. The utilization component obtained a percentage of 82.46% with a very valid category. From the percentage of the four components obtained e-book validation instrument results by three validator experts with the average percentage result obtained is 85.11% with a very valid category.

The validation results of physics e-book based on edupark hot water boom Solok Selatan get suggestions from experts to be revised, advice from experts can be used to improve the feasibility of the e-book made.

B. Discussion

In this discussion, it is explained that the results obtained in researching the form of research results that have been achieved, weaknesses, constraints, and solutions to overcome all weaknesses and obstacles that exist. The results of the study include the validation results of a physics e-book based on edupark hot water boom South Solok by experts, namely three lecturers of physics FMIPA UNP.

In this study, the first result achieved was a physics e-book based on edupark hot water boom South Solok which has a very high validation value. Where data analysis from physics e-book validation instrument based on edupark hot water boom South Solok consists of four components namely content feasibility, learning design, display (communication, visual), and software utilization. Based on the results of the analysis that has been done obtained physics e-book products based on edupark hot water boom South Solok that is valid so it is feasible to be used in the process of physics learning.

e-book physics based on edupark hot water boom South Solok has materials that are under the core competencies and basic competencies of high school physics subjects namely temperature and heat as well as effort and energy. Besides material description, sub-materials and components contained in the e-book is relevant, by the student's intellectual, accurate, coherent and can trigger student involvement in learning

activities. e-book physics based on edupark hot water boom South Solok has been presented by the e-book structure described Permendikbud No.8 the Year 2016.

The illustrations used in the e-book can also provoke students' reading interest and make it easier for students to understand the material because it relates to daily life and the student environment, such as edupark which utilizes the concept of a park as a learning resource or edupark park is a park with the theme of education as a place of education[9]. Edupark is a place in the form of a natural garden or artificial garden that can allow the learning process and its utilization to make the learning process fun. In addition to being an educational place edupark also serves as a tourist attraction[10].

e-book validation results in addition to being used to determine the feasibility of the e-book are also a guideline in making revisions to e-book products that have been created. Validate the e-book using a validation instrument sheet, where the first component is the substance of the material. This component consists of two parts, namely physical matter, and edupark physics. In the physics material section, there are eight indicators with high validation of 91.66% and 83.33%. The indicator is materi on physics e-book based on edupark hot water boom South Solok which is designed according to core competencies and basic competencies, logical/rational, based on existing facts. Where it has been explained that teaching materials are a learning material consisting of knowledge, attitudes and skills developed based on the Competent Standards of the Graduate, Competency Standards, and Basic Competencies on content standards that must be studied by students [11].

Furthermore, in edupark there are five indicators with high validation, namely 91.66% and 83.33%. The indicator is an e-book used containing edupark physics that corresponds to the served material, application on edupark physics under the application of materials presented in everyday life, edupark physics that designed more increase motivation in understanding the material presented in the e-book, made possible the occurrence of student interaction with e-books made, with the existence of photos and video about edupark makes students understand the application of materials in everyday life. Descriptive analysis of tourist attractions or theme parks on concepts of physics can be done by data collection through observation and literature studies. Photo documentation and events and phenomena that occurred in the place obtained from observations matched with physics materials[12].

The second component is learning design. In the learning design component, all indicators get high validation, namely 91.66% and 83.33%. The indicator is the suitability of the e-book title with the material, suitability of basic competencies with learning indicators in the e-book. similarities contained in the e-book with the material, concepts contained in the e-book with the material, core competencies and basic competencies presented in the e-book, the objectives and indicators to be achieved are clear, example problems on the e-book by the learning indicators, question exercises on the e-book by the learning indicators, exist identity compiler on e-book, e-book material designed from simple to complex, e-book in design allows students to be encouraged to read the subject matter, Information submitted in the e-book is by the facts, to include reference list on an e-book.

The third component is the display design (communication, visual). In the display component (communication, visual) there are ten indicators with high validation of 100%, 91.66%, and 83.33%. The indicator is e-book has used an easy to move to the next page, e-book made easy to understand, use the font (type and size) of writing, letter writing is appropriate, the e-book has loaded audio and photos, photo, and video in the design on the e-book is by the material, suitability harmonization of colors and the level of contrast on the e-book, view e-book in the design is already interesting, layout and tata location in the e-book is proportional, selection of menu layout or navigation is good, the information presented in the e-book is clear.

The fourth component is the utilization of software. In this software utilization component, all indicators get high validation, namely 91.66% and 83.33%. The indicator is existed feedback from the system to the user (student) e-book, existence direct feedback when answering the question right or wrong, exist interactivity on examples of questions and exercises made on an e-book, e-book using supporting software in addition to the main software, originality of e-book products. This is because the e-book is designed to have feedback from the system to the user (student), so that existence direct feedback when answering the question right or wrong, exist interactivity on the example of questions and exercises made in the e-book, where e-book uses supporting software in addition to the main software that is macro media flash to facilitate students in evaluating the problem so that the occurrence of direct feedback, and products designed originality.

Based on validation results obtained the average validation value obtained by 85.11%. These validations are in the range 81–100 with very valid categories. The e-book view component has not all achieved a perfect value, this is because some indicators on the validity component can not be measured properly according to the validator so it needs to be revised. Revisions are made based on suggestions from validators so that e-books designed can meet the categories of each validity component. After the revision obtained a better e-book than before. Based on the validation results from the physics e-book based on edupark hot water boom South Solok obtained results that the e-book is very valid. Therefore e-books are recommended for use by teachers and students in the learning process.

IV. CONCLUSION

Based on the results of research and discussions that have been done, it is concluded that the validation results of the physics e-book based on edupark hot water boom Solok Selatan has a category of validity. Characteristics of the validity of this product in terms of content feasibility, learning design, display (communication, visual), and software utilization.

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