DEVELOPMENT OF E-BOOK BASED ON 3D PAGEFLIP PRO ON ECOSYSTEM MATERIALS FOR CLASS VII STUDENTS OF SMPN PONTIANAK

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Abstract: *This study was structured with the aim of knowing the feasibility of student learning media at SMPN 16 Pontianak, SMPN 11 Pontianak, and SMPN 6 Pontianak on ecosystem materials, knowing the process of developing media. e-book based on 3D Pageflip Pro, and knowing the validity and reliability of the developed learning media. The research method used is Research and Development with a model Four-D. In this research, it is reduced to a development model Three-D includes stages define (definition), design (design) and develop (development) to step expert appraisal (expert judgment). The data sources for this study were 60 seventh grade students from SMPN 16 Pontianak, SMPN 11 Pontianak, and SMPN 6 Pontianak, as well as 3 biology science teachers from each of these schools and 2 lecturers of Biology Education FKIP Untan. The result of the validity of the 3D Pageflip Pro-based ebook media is v 0.80 valid category. The results of inter-rater reliability using the ICC get results from 0.5 to 0.851 in good category. 3D Pageflip Pro-based e-book media that has met the good criteria and deserves to be declared for use*

Keywords*: E-book, Four-D model, 3D Pageflip Pro, Instructional media, Research and Development*

Abstrak: Penelitian ini disusun dengan tujuan untuk mengetahui kelayakan media pembelajaran siswa di SMPN 16 Pontianak, SMPN 11 Pontianak, dan SMPN 6 Pontianak pada materi ekosistem. Selain itu, untuk mengetahui proses pengembangan media *e-book* berbasis *3D Pageflip Pro*, serta mendeteksi validitas dan reliabilitas pengembangan media pembelajaran. *Four-D* ditetapkan sebagai model dengan metode penelitian berupa *Research and Development*. Penelitian ini selanjutnya mereduksi model *Four-D* menjadi *Three-D* dengan menjalankan tahapan *define, design*, dan *develop* pada penilaian ahli. Peneliti menetapkan 60 siswa kelas VII dari SMPN 16 Pontianak, SMPN 11 Pontianak, dan SMPN 6 Pontianak, serta 3 guru IPA biologi dari masing-masing sekolah tersebut dan 2 dosen Pendidikan Biologi FKIP Untan sebagai sumber data penelitian. Diperoleh hasil validitas media *e-book* berbasis *3D Pageflip Pro* yaitu v ≥ 0,80 kategori valid. Uji reliabilitas antar rater menggunakan *ICC* menghasilkan nilai 0,5-0,851 kategori baik. Media *e-book* berbasis *3D Pageflip Pro* telah memenuhi kriteria baik dan dinyatakan layak.

Kata kunci: *E-book*, Four-D Model, *3D Pageflip Pro*, Media Pembelajaran*, Research and Development*

INTRODUCTION

Education also develops along with science and information technology which continues to grow to support the quality of human resources through the learning process (Nurindah & Kasman, 2018). These developments require efforts to access knowledge so that all information can be absorbed properly. Martono & Nurhayati (2014) reveal that in education, the use of information and communication technology is always developed in various strategies.

The efficiency of accessibility in the realm of education of which is called through books that have been combined with electronic tools or with e-books and developed as interactive learning media that develops in accordance with the era of globalization (Muslim & Fahri, 2018). Furthermore, Mawarni & Muhtadi (2017) explained that the software used in the e-book is 3D Pageflip Pro as a modern technology development that emphasizes interactivity and multimedia aspects in a concise and easy form so that students will more quickly grasp learning material.

In the early stages of creating an e-book based on 3D, Pageflip Pro is to prepare ecosystem materials that have been compiled in pdf form. Before entering it into the application, first, download the 3D Pageflip Pro software and install it on a computer or laptop device. 3D Pageflip Pro software can be used immediately by entering the prepared material. After the material is displayed in the application, the teacher can open each slide contained in the 3D Pageflip Pro-based e-book. E-book the 3D Pageflip Pro-based e-book is also equipped with an ecosystem material learning video that can be used to help describe the material being taught more clearly. There are videos that can be accessed offline and online. Online videos are sourced from youtube links and must be connected to the internet network. In addition, the 3D Pageflip Pro-based e-book is also equipped with audio that students can listen to clearly. Then each material is equipped with questions that are in accordance with the sub-chapters. So that students can work on it directly and can check the value of the results that are done. When the learning process is complete, you can immediately close the 3D Pageflip Pro-based e-book.

The advantage of the 3D Pageflip Pro-based e-book is that it features back and forth like a book. In addition, each page has animations and other supporting features such as videos to support learning materials. Fitriyani (2017) argues that the combination of conventional and futuristic situations creates a more attractive reading room for users. Syahri et al. (2017) added that in addition to animation and video, 3D Pageflip Pro allows for audio and images or multimedia objects as well as hyperlinks. Based on the results of interviews obtained from three schools, namely SMPN 16 West Pontianak, SMPN 6 Pontianak Selatan, and SMPN 11 Pontianak, science teachers apply the discovery learning model with learning media in the form of powerpoints to deliver ecosystem

material in class VI. Then, students are invited to observe directly real objects, for example, biotic components and abiotic components, according to the sub-material being taught. In addition, the three teachers also said that the availability of media in schools was still lacking, and students were more interested in learning to use interactive media, so teachers needed media in the learning process. In teaching and learning activities, the 3D Pageflip Pro-based e-book has not been used in the three schools. Thus, the 3D Pageflip Pro-based e-book contains materials that are in accordance with basic competencies (KD), which are welcomed by teachers because they can support the learning process to make it easier for students to understand the material.

According to research by Rosida et al. (2017), students can be trained in problem formulation, argument disclosure, application of induction, evaluation preparation, and decision making or carrying out problems encountered through the use of interactive e-books. The results of this study are supported by Magdalena (2018). This is because the material that promotes interactive e-books is equipped with pictures, videos and musical instruments so that students are interested in reading the material. Interactive e-books that allow for learning support, such as multimedia objects in the form of animations, pictures, or videos, can arouse students' interest in absorbing material (Restiyowati & Sanjaya, 2018; Magdalena, 2018). In the science learning process, a 3D Pageflip Pro-based e-book was developed to help grade VII students because ecosystem materials are delivered in an easier and clearer way.

The description of the background and literature review serves as a reference in the formulation of the problem, which consists of what is the need for an e-book based on 3D Pageflip Pro at SMP Negeri Pontianak? What is the process of developing an e-book based on 3D Pageflip Pro at SMP Negeri Pontianak? What is the feasibility of an e-book based on 3D Pageflip Pro at SMP Negeri Pontianak? The purpose of this research is to identify the need for an e-book based on 3D Pageflip Pro at SMP Negeri Pontianak, to describe the process of developing an e-book based on 3D Pageflip Pro at SMP Negeri Pontianak, and to detect the feasibility of an e-book based on 3D Pageflip Pro at SMP Negeri Pontianak.

METHOD

Research and Development (R&D) is a development method applied in the preparation of this research. Pageflip Pro 3D-based e-book with ecosystem material into a product produced in study. The Four-D Model (4D), developed by (Thiagarajan et al., 1974), serves as a reference for development procedures that apply the R&D method. The stages of this model are only up to expert assessment due to time and cost limitations. The stages begin with defining or define. Then, it is followed by the design or design stage, development or development, to expert assessment or expert appraisal. Development process Devided : **Step Define**, This stage aims to determine the basic problems teachers face in carrying out learning through school interviews with biology teachers in

three junior high schools, namely SMPN 11 Pontianak, SMPN 16 Pontianak and SMPN 6 Pontianak. This interview aims to find out and identify problems faced by teachers, especially the use of media in ecosystem materials. **Step Design,** Then this stage is to design learning media that will be developed to obtain a prototype of 3D Pageflip Pro-based e-book media. Researchers select and determine media according to students' abilities and interests.**Step Develop,** The data from the validation results are then used to see how far the developed media meets the valid and reliable criteria**.** The Likert Scale measurement is useful for detecting the validity of learning media by analyzing data obtained from filling out an e-book assessment questionnaire based on 3D Pageflip Pro by the validator. (Azwar, 2016) explains that all items are calculated through Aiken's V. Here's the formula: The Likert Scale measurement is useful for detecting the validity of learning media by analyzing data obtained from filling out an e-book assessment questionnaire based on 3D Pageflip Pro by the validator. (Azwar, 2016) explains that all items are calculated through Aiken's V. Here's the formula:

$$V = \sum s / [n(c-1)]$$

Description:

$s = r - lo$

lo   : The lowest score on the validity assessment (in this case = 1)

c   : The highest score on the validity assessment (in this case = 5)

r   : Numbers given by a validator

     Determination of the minimum value of the validity of the 3D Pageflip Pro-based e-book item through Aiken's V table. The scale used by five validators with a 5% chance of error or p-value higher than 0.05 includes very good (5), good (4), enough (3), less (2), and very less (1) (Aiken in Akhtar, 2017). Through Aiken's V table, the minimum valid value for 3D Pageflip Pro-based e-books in each item is set at 0.80 or V greater than or equal to 0.80. Microsoft Excel 2016 serves as a supporting application for Aiken's V analysis in this study.

     The reliability analysis in this study also relies on the assessment of the validator. Koo & Li (2010) stated that Pearson (1901) projected Intraclass Correlation Coefficients (hereinafter referred to as ICC) or intraclass correlation coefficients, which were useful as an interrater reliability analyzer in this study. The stages that are passed in the analysis are that the data from the validator is reviewed first, then the determination of the model, type and definition of interrater reliability through ICC. Furthermore, the resolution produces the following formula, which functions in calculating interrater reliability through ICC:

$$ICC = \frac{MS_R - MS_E}{MS_{R+}\frac{MS_C - MS_E}{n}}$$

Keterangan:
MSR : Mean square for rows
MSE : Mean square for error

MSC : Mean square for columns
n   : Number of subjects

The application used as a determinant of the interrater reliability assessment through ICC is IBM SPSS Statistic 25. Koo & Li (2016) set four categorization parameters for the evaluation with a 95% confidence interval percentage. First, it is considered very good when the ICC value is greater than 0.9. Second, it is in a good category if the ICC value is higher than 0.75 but lower or equal to 0.9. Third, if the ICC value is greater than or equal to 0.5 but lower or equivalent to 0.75, it is considered moderate. Fourth, it is deemed to be bad when the ICC value is lower than 0.5. These parameters are briefly presented, namely:

ICC > 0,9 : Very Good
0,75 < ICC ≤ 0,9 : Good
0,5 ≤ ICC ≤ 0,75 : currently
ICC < 0,5 : Bad

RESULT

The results of the research are in the form of an e-book media based on 3D Pageflip Pro on ecosystem materials developed through research procedures which will be explained below. ***Define***, At this stage, interviews were conducted with biology teachers in 3 junior high schools, namely SMPN 16 Pontianak, SMPN 11 Pontianak and SMPN 6 Pontianak. Based on the results of interviews, biology science teachers appled discovery learning models with media in the form of powerpoints in the learning processIn addition, to understanding ecosystem material, students are invited to go down to the field to carry out the direct observation process.

Further needs analysis focuses on identifying the characteristics of students in learning. The questionnaire was distributed to three schools,

namely SMPN 16 Pontianak, SMPN 11 Pontianak, and SMPN 16 Pontianak. Then the questionnaire was given to class VII students in each of the three schools totaling 20 people. The following are the results of the learning style questionnaire at SMPN 16 Pontianak, SMPN 11 Pontianak, SMPN 6 Pontianak seen from each aspect, namely visual, auditory and kinesthetic.
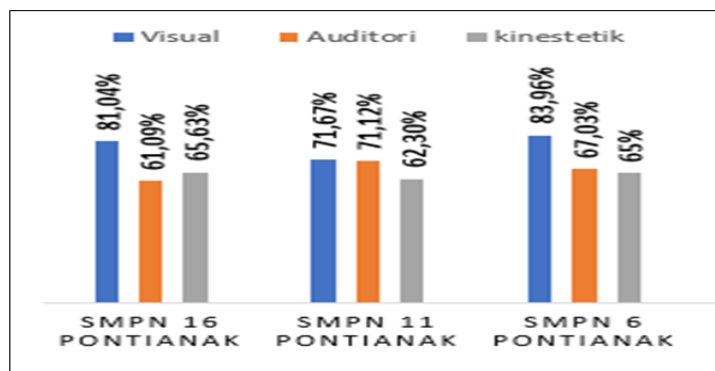

Figure 1. Pie Chart

Figure 1 shows the results of student learning styles in the three Pontianak SMPN as a whole based on the assessment of each aspect of visual, auditory, and kinesthetic learning styles. The average percentage of SMPN 16 Pontianak shows that as many as 81.04% are visual, 61.09% auditory, and 65.63% kinesthetic. Students at SMPN 11 Pontianak have an average percentage of visual learning styles as much as 71.67%, followed by auditory with 71.12%, then 62.30% kinesthetic. Meanwhile, the average rate of student learning styles at SMPN 6 Pontianak shows that 83.96% are visual, then 67.03% are auditory, and the remaining 65% are kinesthetic. The purpose at this stage is student analysis to determine the characteristics of students in learning and is one of the considerations that must be considered in making learning media. Furthermore, the analysis of the identification of the main concepts taught, and Develop in detail the relevant concepts. The ecosystem material consists of 4 sub-materials, namely the concept of the environment, interactions in the ecosystem, the relationship between eating and being eaten in the ecosystem, and the influence of human interaction in the ecosystem. The following results from the analysis of the material concept are presented in table 1.

Table 1. Analysis of the concept of an e-book based on 3D Pageflip Pro

Materi	Sub Materi	Concept
Interaction between living things and their environment	Environmental concept	1. Biotic Components 2. Abiotic Components
	Patterns of interaction in the ecosystem	1. Competition 2. Predation 3. symbiosis
	The relationship between eating and being eaten in an ecosystem	1. the food chain 2. food webs 3. population dynamics
	Effects of human and ecosystem interactions	1. The negative influence of human activities on the ecosystem 2. positive influence

Design, It is the design stage in the development of learning media. In this case, it is intended that the 3D Pageflip Pro-based e-book as a medium obtain a prototype in the form of criterion-test, media selection, format selection, and initial design. The first stage is the preparation of the test and the results obtained by the research results with the average grade VII students at SMPN 16 Pontianak, SMPN 11 Pontianak and SMPN 6 Pontianak as follows.

Table 2. Research Results for the preparation of student learning outcomes tests

No	School Name	Average Scor	
		Meeting 1	Meeting 2
1	SMPN 16 Pontianak	77	73,5
2	SMPN 11 Pontianak	80	76,5
3	SMPN 6 Pontianak	80,5	77

Table 1 shows the average value of the results obtained by students in understanding ecosystem materials at meetings 1 and 2 in the threeschools.
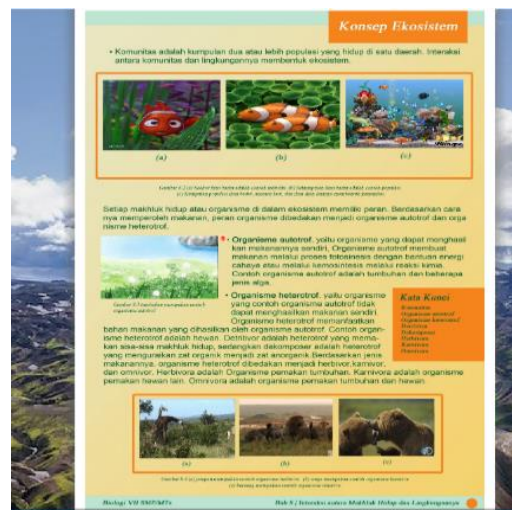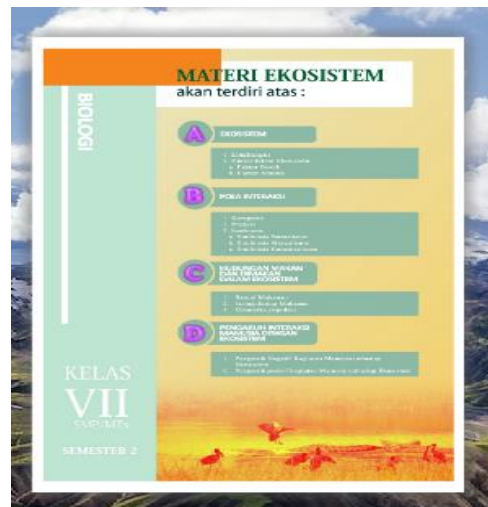
Figure 2. *E-book* Berbasis *3D Pageflip Pro* Materi Ekosistem

Figure 2 shows the selection of media in learning, namely an e-book based on 3D Pageflip Pro tailored to the needs and interests of students. So that in the learning process, ecosystem materials can make it easier for teachers to deliver the material. In the media selection, there are 4 ecosystem sub-materials that are clearly contained, consisting of environmental concepts, interaction patterns in the ecosystem, the relationship between eating and being eaten in the ecosystem, and the influence of human interactions in the ecosystem.

Then the selection of the content format that will be included in the learning media. The development of 3D Pageflip Pro-based e-book media as a support for ecosystem material for class VII semester 2 is oriented to the characteristics and needs of students, as well as school facilities and infrastructure. The media has components in the form of 1) cover, 2) table of contents, 3) Content Competencies (KI) and Basic Competencies (KD), 4) materials, 5) student worksheets, and 6) summaries. The following is an e-book format based on 3D Pageflip Pro ecosystem material.

Figure 3.Cover

Figure 4. Daftar isi

The cover format or the cover of the e-book is shown in Figure 3 and contains the title of chapter 2 ecosystem material in the second semester of class VII. Meanwhile, the table of contents format in Figure 4 aims to make it easier to find certain pages of material based on chapters and subchapters.

Figure 5. Kompetensi Inti dan Kompetensi Dasar

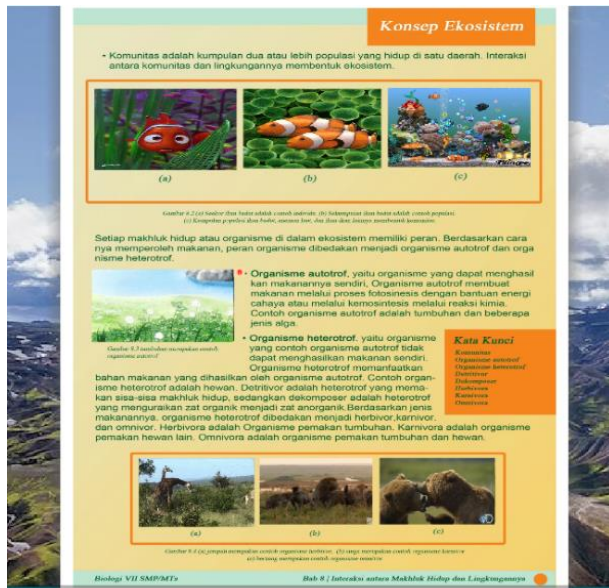
Figure 6. Materi Ekosistem

The KI and KD formats (3.7 and 4.7) are shown in Figure 5. Furthermore, ecosystem materials referring to the syllabus and textbooks on ecosystem materials available at SMPN 16 Pontianak, SMPN 11 Pontianak, and SMPN 6 Pontianak are presented in Figure 6. In each content, the material is also accompanied by pictures that illustrate the explanation of the material.
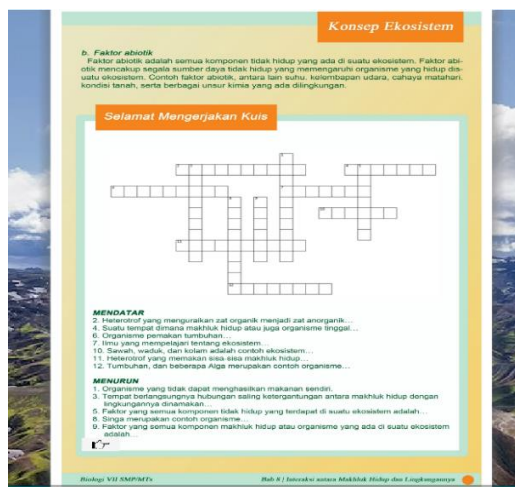
Figure 7. Worksheet

Figure 8. Rangkuman

The format of student worksheets accompanied by exercises and quiz questions as a measure of student competence in understanding the material and helping teachers present material more attractively is shown in Figure 7. Then in Figure 8, the format contains a summary of the 3D Pageflip Pro-based e-book, which aims to help students understand the main points of the learning material. If students want to download the 3D Pageflip Pro-based e-book media for ecosystem materials, they can click on the link provided below.

1)https://drive.google.com/file/d/1Gl61BYoRjUwgqdkJbZKRM3GA1gD3Qy7y/view?usp=sharing)2)https://drive.google.com/file/d/17g2DdDbVwgD5M7gHH4hk0H1WprVA0j2f/view?usp=sharing

Develop, become the validation stage of learning media. Researchers set 60 students of SMPN 16 Pontianak, SMPN 11 Pontianak, and SMPN 6 Pontianak as research subjects. Two lecturers of Biology Education FKIP Tanjungpura University and 3 Biology Science teachers in each of the selected schools were designated as validators.

Student needs, as one of the problems in this study, were analyzed by adapting the learning style questionnaire instrument (Peng, 2002). The questionnaire is divided into 3 indicators, the form of Visual, Auditory and Kinesthetic, whose role is to detect student characteristics. Meanwhile, the researcher applies a 3D Pageflip Pro-based e-book questionnaire as a closed questionnaire that contains elements of assessment, review, and input to detect the validity and reliability of the media. The following table 2 represents the results obtained.

Table 3. Validation Results of E-books based on 3D Pageflip Pro Ecosystem Materials

No	Assessment Aspect	Aiken's V Value Range	Category
1.	Contents	0,85-0,9	Valid
2.	Presentation	0,9	Valid
3	Language	0,85-0,9	Valid
4.	Graphics	0,85-0,9	Valid

The range of Aiken's V scores in all aspects is shown in Table 2. The assessment is calculated through a Likert scale measurement by collecting answers in a distributed questionnaire. In addition, (Aiken 1985: Akhtar, 2017) also becomes a reference in determining the value that is reviewed through the categorization of the number of raters or validators using a scale by looking at Aiken's Table V. The validity of each 3D Pageflip Pro-based e-book item is limited to a minimum value of 0.80 (V 0.80), so that the application of the media is declared feasible The average agreement between raters on the 3D Pageflip Pro-based e-book based on the results of reliability analysis through ICC is 0.851. This figure is categorized as good because the ICC value is above the minimum standardization of 0.75 and does not exceed 0.9 (0.75 < ICC 0.9). That is, fellow validators show an agreement that is categorized as high in stating the feasibility of the media.

DISCUSSION

The following describes the steps taken in developing an e-book based on 3D Pageflip Pro based on data findings in the field. *Define*, is the initial stage carried out by interviewing the teacher? This process is a step in determining the basic problems in biology learning for junior high school students. Thus, various issues faced by teachers in the learning process, specifically on ecosystem materials, can be identified. Agree with Annisa & Ardi (2021) that interactive learning helps students learn independently and improve their learning outcomes. Analysis of students aims to measure the characteristics and mastery of the attitudes of each student before undergoing the learning process in class. These components are considered in the preparation of a media. Meriyati (2015) explains several aspects or qualities of students that can be considered, including motivation, attitudes, learning styles, talents and interests, cognitive, and skills. Learning style questionnaires were distributed to

three schools as research subjects, namely SMPN 16 Pontianak, SMPN 11 Pontianak and SMPN 6 Pontianak. The tendency learning styles found in the three schools is visual and auditory. (Fajar, 2016) defines visual learning style as a model of absorption of material or information by focusing on observation, thus requiring the involvement of visible media efficiency. Furthermore, Deporter et al. (2014) revealed that auditory is a type of learning style that prioritizes hearing in the process of understanding material. Meanwhile, Arliyen et al. (2014) define kinesthetic as a learning style that involves action, movement, activity, or touch. The results of the student need data in the form of a learning style questionnaire are the basis for making 3D Pageflip Pro-based e-book media. This opinion is supported by Ananda (2017), who revealed that learning media consisted of print, audio, and visual media. So teachers are expected to be able to identify and adjust the press with learning objectives.

Design, is the stage of preparing a test which consists of evaluating the learning outcomes of ecosystem materials with 20 optional questions. All students have worked on these questions and obtained a completeness score above the average, which is 70. This means that the material can be input into the preparation of the 3D Pageflip Pro-based e-book media. Next, the layout design is carried out on the selection of media with predetermined materials. Making the layout aims to make the display more attractive and in harmony with the material. Microsoft Word 2016 was chosen as the application used to write or type material manuscripts with Times New Roman font size 11, line spacing of 1.5 cm, A4 paper (21 cm x 29.7 cm), making it easier to read the text contained on the page. Pageflip Pro 3D based e-book.

E-books based on 3D Pageflip Pro ecosystem materials accompanied by simple pictures that are easy for students to understand (Sunarni & Budiarto, 2014). Video and audio serve to illustrate the appearance of the material, clarify the contents of the ecosystem material and convey the content of the material in the form of words or verbally, namely focusing on the auditory aspect as capturing material. Then in the table of contents consisting of chapters and sub-chapters, the researcher inserts a hyperlink that can be pressed and is directly connected to the explanation slide for each sub-material. E-books based on 3D Pageflip Pro use backgrounds with appropriate colors to beautify the appearance of ecosystem materials, and there are images (animations) that move automatically on each material. In this study, a 3D Pageflip Pro-based e-book was developed so that ecosystem materials can be delivered in an attractive manner, affordability, accessibility, preparation and use is easier, only requires data storage space, and includes multimedia programs as media support. This goal was emphasized by Muhaimin et al. (2017), which state that the software is a display that can be accessed and used via a computer as well as a special flagship program for projecting material through reading that is equipped with various multimedia features.

Develop, is a validity step to test the feasibility of an e-book based on 3D Pageflip Pro in presenting ecosystem materials. Specifically, Dewi (2018) explains that the test aims to observe the truth and accuracy of a product. The validity of Aiken's V value on the content or material in the 3D Pageflip Pro-based e-book proves that the description contained is in accordance with KI and KD, and the accuracy and up-to-date of the content have been tested. In accordance with the opinion of Hidayati et al. (2016), in applying learning media, understanding and adjusting material on KI and KD has an impact when assessing material understanding.

The Aiken's V value obtained through the validity test on the presentation aspect is declared valid because the media tested shows presentation consistency, provides increased learning motivation, appropriateness of source presentation, easy practicum procedures, participation, and suitability to student needs. Agree with Arham & Dwiningsih (2016) that e-books in learning are related to all the five human senses. Supported Atmawarni's research (2015) revealed that the use of images and animations could be used as material reinforcement and effectivee. The validity of the language aspect means that the media being tested is in accordance with the Indonesian Language Rules with the use of terms and symbols. The validity of the graphic aspect proves that the placement, typography, and accuracy of the illustrations applied in the cover and media content are tested. Based on a series of tests on aspects of content, presentation or presentation, language, and graphics, the resulting value is valid or greater than 0.80 (V 0.80). This feasibility is also supported by the validator's response because the development of an e-book based on 3D Pageflip Pro presents material that is in accordance with the curriculum and input questions that stimulate student activity.

The reliability test is an index used to detect the feasibility and consistency shown by a calculation (Rista, 2011). The test was carried out more than twice to prove that the results obtained on the same measuring instrument did not change, so it proved to be reliable and trustworthy. Based on the reliability test, the product in this study in the form of the development of an e-book based on 3D Pageflip Pro can be implemented in teaching and learning activities. The average agreement between raters generated through reliability analysis with the ICC on the media in this study was 0.851, so it was declared good because the value was greater than 0.75 and still below 0.9 (0.75 < ICC 0.9). That is, validators showed high agreement to determine the feasibility of using media in this study. According to Ramdani et al. (2021) that learning media is a component that plays a role in the learning process to be effective and the teacher as a facilitator.

CONCLUSION

Based on the analysis of student needs, it is known that the use of media in schools, especially e-books based on 3D Pageflip Pro at SMPN 16 Pontianak, SMPN 11 Pontianak and SMPN 6 Pontianak, needs to be improved in order to support the transfer of material by teachers so that fabric is delivered in a more attractive and stimulating way for students. In understanding information. Four-D is a model that was coined by (Thiagarajan, Semmel, & Semmel, 1974) and was developed as a reference or media reference in this study. The model stops at the development stage, namely expert assessment, which is the initial phase. In addition, the stages shown in the model do not provide significant difficulties to be applied in this study. The 3D Pageflip Pro-based e-book media can be used in learning because Aiken's V gets a value range of 0.8 - 1, so the application is declared feasible to use. The reliability test between raters on all components of the 3D Pageflip Pro-based e-book media resulted in a score of 0.851, being in the medium to good category. The results of the study are used as suggestions for schools, especially Biology science teachers, should use e-books based on 3D Pageflip Pro in learning in order to train students in the use of electronic media so that they are skilled.

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