



Development of Physics Learning Media Using Kvisoft Flipbook: Bilingual Digital Books

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ABSTRACT

Purpose of the study: The purpose of this study was to develop learning media in the form of bilingual digital books on Physics learning materials on the subject of Newton's laws that meet the good criteria.

Methodology: This research is a development research using mixed research methods with sequential exploratory design where the data obtained in this study are qualitative data supported by quantitative data. Sources of research data include material experts (content feasibility, language and images, presentation, and graphics), high school physics teachers as reviewers, and students who study making learning media as peer reviewers. Data analysis techniques used in this study are qualitative and quantitative analysis.

Main Findings: Physics learning media in the form of digital books arranged according to the rules of writing modules on Newton's Law material and its application to State High Schools that have been developed, from all aspects meeting the very good criteria as many as 27 students out of 30 students. Then on good criteria as many as 3 students out of 30 students based on a questionnaire compiled according to the characteristics of the module according to the Ministry of National Education in 2008.

Novelty/Originality of this study: The novelty of this research is that learning media have been developed in the form of digital books which are arranged according to the rules of writing modules on Newton's Law material and its application for class X high school with the manufacturing procedure using CorelDRAW X4 software in its manufacture.

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1. INTRODUCTION

Physics is the study of the inorganic, physical world, as opposed to the organic world such as biology, physiology and others accompanied by the derivation of formulas to calculate physical events in nature. [1]–[4]. Since then until now, students understand Physics only from its formulas, without knowing the basic concepts implied in Physics itself. This causes the frightening mindset of physics from the minds of the students to become something that is not easy to get rid of [5]–[8]. In this case, the Physics teacher plays an important role

in reducing the scary mindset about Physics that is already attached to the students' minds. So, to the horror of the children, teachers still stick to formulas, not theories and concepts. Truly Physics should be fun.

Learning media is needed as a means of supporting the learning process [9]–[11]. Learning media can be defined as a tool in the form of physical or non-physical that is used as an intermediary between teachers and students in understanding learning material so that it is more effective and efficient to improve the quality of learning [12]–[14]. This aims to make learning material more quickly accepted by students as a whole and attract students' interest in further learning.

Learning media must be able to help facilitate students and teachers in the learning process, so that students do not feel bored and interested in learning the material when all students' senses are activated [15]–[17]. In addition, instructional media are expected to be able to provide more real experiences (abstract becomes concrete) and can evoke the world of theory with reality so that learning Physics which is an applied science can be studied by students in real terms. On the other hand, there is a need for awareness to teach languages other than the mother tongue which was done several decades ago. Someone who can speak two languages has a more powerful brain and will avoid reduced brain function.

Learning media that is still the main need of students is textbooks. Textbooks are teaching materials that contain knowledge from the results of an analysis of the curriculum presented in two-dimensional writing and pictures. Instilling concepts through writing has not been able to motivate students to study the material more deeply, so that existing textbooks or digital books are only read when students really experience difficulties when working on them. Along with the development of technology, textbooks began to be developed into digital books, namely electronic versions. from books and in the form of softfiles that students can easily study anywhere and anytime without having to carry heavy books. Existing digital book formats are presented in the form of plain text, PDF, JPEG, LIT, HTML, and the Open Electronic Book Package Format.

The development of digital books as learning media needs to be streamlined by presenting more interesting material. Presentation of material that is equipped with pictures is able to visualize the concept to be conveyed to students, especially if it is capable of displaying moving images (.gif). In addition to pictures, learning videos guide students to understand the material through interactive visualization and evaluation as well as increase students' understanding of the material. Media that is able to combine two or more elements consisting of text, graphics, images, photos, audio, video and animation in an integrated manner can create interesting learning.

2. RESEARCH METHOD

The model used in this research is research and development (R&D). What was developed in this study was a bilingual digital book (bilingual digital book). Research and development (research and development/R&D), is a research method used to develop or validate products used in education and learning. So the research model used for the basis for the development of bilingual digital books (bilingual digital books) refers to the model developed by Borg and Gall.

The development research procedure from Borg and Gall consisted of 10 stages but in this study it was only taken up to the 6th stage, so the last stage of the research was the main field trial which was conducted on 3-5 schools, with 30-80 subjects. Tests or assessments of student achievement are carried out before and after the learning process. In the research that has been done, researchers took 30 students from 3 high schools (high schools) with details of 10 students in each school. The subjects of this study consisted of the validator and 36 students of class X junior high school from 3 high schools, namely Senior High School 1, Senior High School 2, and Senior High School 3.

The data obtained from development research are quantitative and qualitative data. Quantitative data were obtained from the average value of the questionnaire in the evaluation test from the feasibility aspects of content, language and images, presentation, and graphics. As for qualitative data, suggestions and comments were obtained as considerations in revising digital books. The data that is also expected to be collected is student responses about the readability of digital books from the aspects of content, language and images, presentation, and graphics.

In this study, the instrument used was a product evaluation questionnaire. Product evaluation questionnaire instruments are addressed to expert lecturers according to their fields, namely material evaluation questionnaires to material experts and media evaluation questionnaires to media experts while evaluation questionnaires are for reviewers, peer reviewers and students. language and pictures, presentation, and graphics (modification from BSNP). The description of these aspects is consulted first with the supervisor before being used in research.

The data analysis technique used in this evaluation research is qualitative and quantitative analysis, namely by describing and interpreting the data from each of the variables evaluated, both quantitative and qualitative data. Before being analyzed, the process of quantifying the data from the questionnaire was carried out and then the data was analyzed using descriptive statistics. Descriptive statistics are methods related to

collecting/presenting data to provide useful information [18]–[20]. Data in the form of suggestions and comments were analyzed by qualitative analysis. In conducting data analysis, there are three activities carried out simultaneously, namely data reduction, data presentation, and drawing conclusions. These three activities were carried out during and after the data collection process.

3. RESULTS AND DISCUSSION

This development research aims to produce learning media for Bilingual Digital Books that meet the good criteria. The six stages of the research were: (1) the research and information seeking stage, (2) the planning stage, (3) the product draft research stage, (4) the revision stage, (5) the initial field trial revision stage, and (6) main field trial stage. The final product of this research is a Bilingual Digital Book on Newton's Laws and its application for class X high school. The development research carried out refers to Borg & Gall. The data obtained consisted of product evaluation results by the validator and test results data on students in terms of validating the feasibility of content, language and images, presentation and graphics. In the following, we will present in general the results of the evaluation of the Digital Book on Newton's Law material taken from experts, reviewers and peer reviewers. Data from the trial results will also be presented in general, taken from 6 students from two classes in the initial trial phase and 30 students from 3 schools in the main trial phase.

The results of the first development or evaluative data analysis were carried out by experts, namely material experts and media experts. The results of the evaluation of material experts get a total score of 87 which is included in the good criteria, while the media expert's total score gets a score of 73 which is also included in the good criteria. These results indicate that the Digital Book is ready for the trial phase with suggestions and comments as revisions.

The results of the development or evaluative data analysis show that the total score for each validator (reviewer and peer reviewer) is as follows: reviewer I gave the highest score, namely 141 and reviewer II gave a score of 126, while peer reviewer I and peer reviewer II were 120 and 133. Different assessments were obtained from several validators for the Digital Book. Based on a questionnaire from the validator (reviewer and peer reviewer) it shows that the Newton's Law Digital Book developed is categorized as good. As many as 25% of the validators (reviewer I) considered it very good, while 75% of the other validators (reviewer II, peer reviewer I, and peer reviewer II) rated it well. This shows that more than 50% of the validators agree that this Digital Book is ready for the trial phase with suggested comments being revised. The histogram of validation data from reviewer I, reviewer II, peer reviewer I, and peer reviewer II is presented in Figure 1.

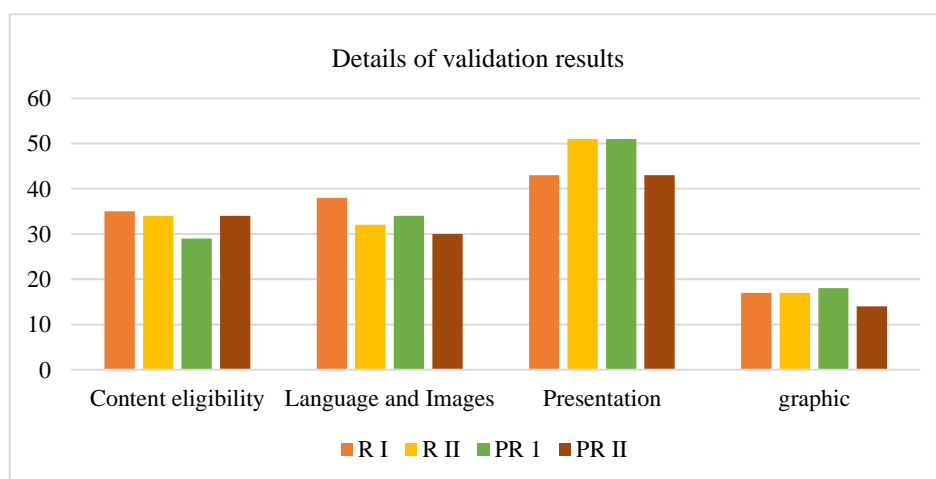


Figure 1. Histogram of data details of validation results by reviewer I, reviewer II, peer reviewer I, and peer reviewer II

An assessment of digital books obtained from a material expert, namely Idongesit N. Udosen, is an assessment of the material presented in digital books. Assessment by experts using a questionnaire in accordance with their expertise. Suggestions from material experts regarding material for Digital Books, which was originally material on Newton's Laws, are better coupled with applications that often occur in everyday life so that Digital Books are more complete so that the title of Digital Books becomes Newton's Laws and Applications. The title change was followed by the addition of material regarding force in learning activity 1 as an initial understanding in understanding the added material, namely learning activity 3 regarding the Application of Newton's Laws. For the perfection of digital books, material experts suggest adding a glossary at the end.

The assessment of digital books obtained from media experts, namely by Mohamed Ramadan, is an assessment of digital book learning media. Assessment by experts using a questionnaire in accordance with their expertise. Comments and suggestions by media experts were the first regarding the background image on the front cover of the module which was originally an image of water flowing on river rocks. According to media experts, the image on the cover is not related to the material contained therein, namely Newton's Laws and its Application, so the image on the cover is replaced with an image of an apple falling from a tree and hitting the person underneath. A good cover should be able to outline what is contained in the book.

Other comments and suggestions on the visual aspect are the design for learning objectives which are considered to lack contrast between the color of the writing and the background which results in writing that cannot be read clearly. Regarding the color of the writing suggestions, it is also intended for evaluation questions, namely writing in purplish blue is still difficult to read when the writing has been given a transparent white background, it is better if the transparent background is changed to solid white so that the writing is clearly legible. Suggestions for improving this digital book regarding writing formulas on media to make it more interesting and creative to make it easier for students to remember without changing the meaning of the formula.

The first stage of revision which was carried out based on suggestions and comments from material experts was by adding an application to the title from Newton's Laws to Newton's Laws and their Applications. This title change is accompanied by the addition of material on force and Newton's Law Applications in everyday life. In addition, a glossary was added at the end of the digital book which was also a suggestion from reviewer II.

Based on expert advice and comments the media changed the cover image from a picture of water flowing on river rocks with a picture of an apple falling from a tree and hitting the person below it. the transparent white color on the interactive evaluation questions is changed to solid white. In addition, improvements were made in writing the formula for Newton's 2nd law and the application of Newton's law to moving elevators. Fragmentation of sentences is corrected in almost all material pages, but not in the cover, introduction, and bibliography of formula writing. Furthermore, the font type curlz MT and Impact were replaced with Comic Sans Ms. The balloon release video is added to the description at the beginning before the balloon release experiment is carried out. Videos about daily life were added at the start of the styling introduction. Apart from that, the addition of image proportions and animations to the application of Newton's Laws.

The main field trials were carried out on 30 students from 3 schools with details of 10 students in each school. The schools that became the research sites were Senior High School 1, Senior High School 2, and Senior High School 3. This main field test was carried out on 10 students as respondents on June 18 2013 at Senior High School 1, 10 students as respondents on June 15 2013 at Senior High School 2, and 10 students as respondents on June 5 2013 at Senior High School 3.

The results of the main field trials can be known from the questionnaire distributed to 30 students from 3 schools with details of 10 students in each school. The schools that became the research sites were Senior High School 1, Senior High School 2, and Senior High School 3. Ten students from Senior High School 1 as students 1st to 10th students, ten students from Senior High School 2 as students 11th to 20th students, and ten students from Senior High School ` as students 21st to students 30th.

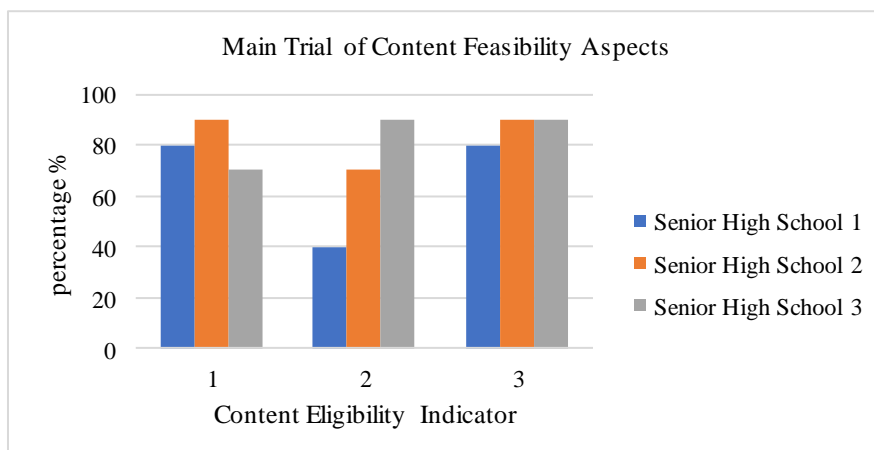


Figure 2. Histogram of data main trial of contenr feasibility aspects

The first indicator is that the material is presented clearly with a score of 80% for Senior High School 1, 90% for Senior High School 2, and 70% for Senior High School 3. While the easy-to-understand material indicator got a poor score for Senior High School 3, namely 40%, which means that only 4 students out of 10

students were able to understand the material, but for Senior High School 1 and Senior High School 2, the percentage was 70%. The final indicator in this aspect is that the material is presented contextually to get a percentage of 90% in Senior High School 2 and Senior High School 3, this shows that 9 out of 10 students rated the material as contextual. Meanwhile, Senior High School 1 got a percentage of 80%.

The second aspect is language and images. The histogram of data from field trials on the main aspects of language and images is shown in Figure 3.

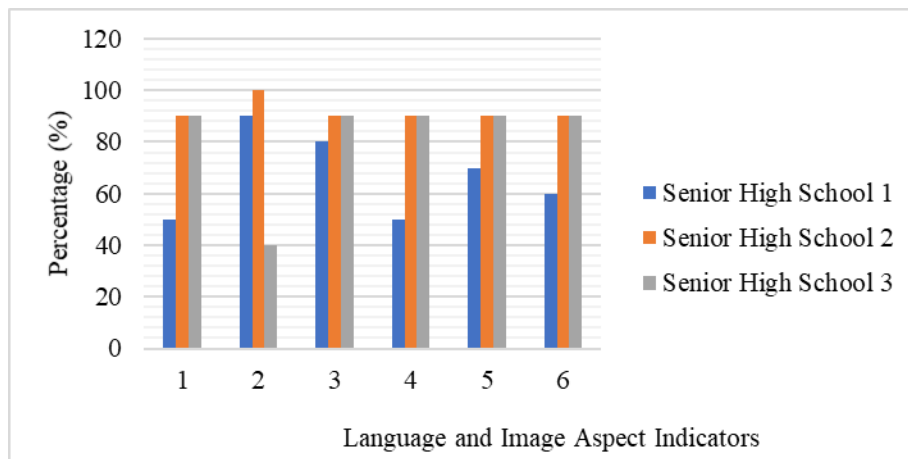


Figure 3. Histogram of data from main field testing results for language and image aspects

In this aspect there are 6 indicators with a distribution of values varying from 50% to 100%. In research at Senior High School 1, the indicator of using language that is not too high gets the lowest percentage, namely 50%, while in the other two public high schools, the percentage is 90%. In contrast to the material indicators presented using sentences that are easy to understand, here it is Senior High School 3 which gives the lowest percentage, namely 40%, while Senior High School 1 gives a percentage of 90% and Senior High School 2 gives a percentage of 100%, which means that all students can easily understand sentences in digital books. The unbalanced assessment at Senior High School 1 and Senior High School 3 occurred because the delivery time in front of the class was too fast. This happened because research time was limited to only one lesson, in contrast to research at Senior High School 2 where students copied learning media on their laptops and filled out questionnaires in non-formal situations.

The presentation aspect which is the third aspect in this questionnaire has the most indicators. This aspect consists of 14 indicators. The histogram of the data from the main field trials of the presentation aspect can be seen in Figure 4.

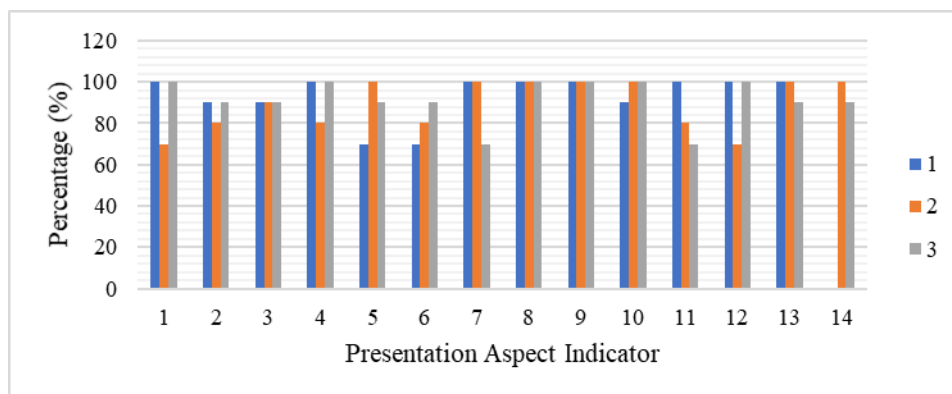


Figure 4. Histogram of the main field test results for presentation aspects

The presentation aspect got the maximum score for almost all indicators, even for the presentation of interesting moving images. The video presentation was able to motivate students to get maximum marks in three schools. This shows that students are interested in learning media that have been developed from the aspect of presentation. The lowest score in this aspect is 70% on the indicator. Presentation of material creates a pleasant atmosphere and presentation of interactive evaluations and assessment feedback by students of Senior High School 2. In addition, presentation can also guide students' skills in solving problems and presentation can guide students' skills in making decisions by students of Senior High School 1. Two other indicators that get a

percentage of 70% are the presentation of scientific work guiding students' creativity by State High School students.

The last aspect is the graphical aspect. The graphic aspect has 6 indicators with percentages from 20% to 83%. The histogram of data from the initial field trials of graphical aspects is presented in Figure 5.

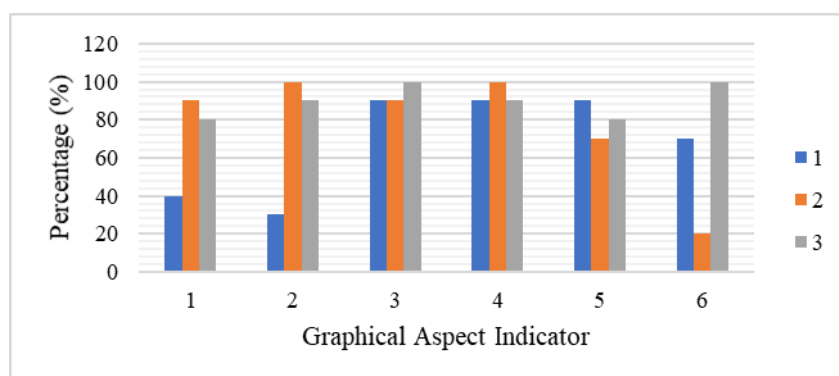


Figure 5. Graphical aspect main field test graph

In the graphical aspect, there is an indicator with a very striking value of 20%. This percentage was obtained from students of Senior High School 2. Cover made for digi book tal itself is almost the same as book covers in general, here are the limitations of the developers themselves. In addition, the attractiveness of the cover is relatively different for each person because the other two schools obtained a percentage of 70% Senior High School 1 and 100% Senior High School 3. Senior High School 1 this percentage is in accordance with the suggestions and comments of students who stated that the size of the picture was not appropriate and not big enough.

The data description shows the distribution of Digital Book ratings in the main trial. There are 29 items in the description of the indicators in the trial. Overall the distribution for value 1 is 86%, while the distribution for value 0 is only 14%. The details regarding the total distribution vary. Two indicators that get a 100% distribution for a value of 1 are the moving image presentation indicator and the video presentation indicator.

The description of the indicators that get a 97% distribution for value 1 is owned by four indicators, namely items 16, 19, 22, and 23. The 93% distribution consists of three indicators, namely items 13, 26, and 27. As for the distribution 90% is owned by three indicators, namely items 10, 12, and 21. There is also an 87% distribution for the value 1 of the five indicators, namely items 3, 6, 11, 14, and 25. An 83% distribution for value 1 belongs to the indicator 8th and 20th regarding the display of images that are not boring and the presentation of scientific work.

An 80% distribution for value 1 is in item indicators 1, 9, 15, and 28. The 77% distribution for value 1 is owned by four indicators, namely indicators 4, 5, 7, and 24. The cover attractiveness indicator gets a percentage of 63 % for value 1 and a percentage of 60% for value 1 is the lowest score on the easy-to-understand material indicator. So the distribution of 1 values in most of the indicator descriptions is very dominant compared to the distribution of 0 values. Therefore, the assessment of the main trial can be said to be successful.

Characteristics of the Digital Book on Newton's Laws and its application, the results of this development have several advantages. These advantages include that Digital Books are compiled according to the rules for writing modules. These are prepared using the principles of writing learning modules in general, in which there is an introduction consisting of descriptions of learning, prerequisites for studying the module, instructions for using the module, final goals, competency maps, concept maps, and pre-test so that it can train students to learn independently and can make it easier for students to understand the contents of the module material.

In each learning chapter there is a student study plan that can help students to schedule and evaluate the competency achievement of learning outcomes for each sub-chapter by asking the Physics teacher for signature. In addition, in learning material is also presented which is accompanied by lots of pictures, moving images, animations, and videos that are very interesting so that they can make students happy to learn.

The digital book is equipped with practice questions, scientific worksheets, formative tests that are presented interactively, and a final evaluation aimed at providing an assessment in the cognitive, affective and psychomotor aspects. In formative tests that are presented interactively students are able to see first hand the correctness of the answers so that they can train students to study and assess independently. In addition to having advantages, the Digital Book that has been developed also has weaknesses, namely there are several uses of English that are less familiar to students and terms that are foreign to students. Therefore, at the end of the book is equipped with a glossary.

Based on the results of the qualitative analysis of the validators and students, it turns out that there are some suggestions and opinions that can be used as revision references and some that are not. Even though the quantitative and qualitative aspects showed a very good assessment of the modules that had been made, the researchers still made revisions to the suggestions and comments that were considered. The suggestions and opinions that the author pays attention to in carrying out this revision will add to the quality of the Digital Book that is made so that the final product can meet the criteria better. The assessment has increased from each stage of the trial. Comparison of the results of the initial field trial with the results of the main trial can be seen in Figure 6 below:

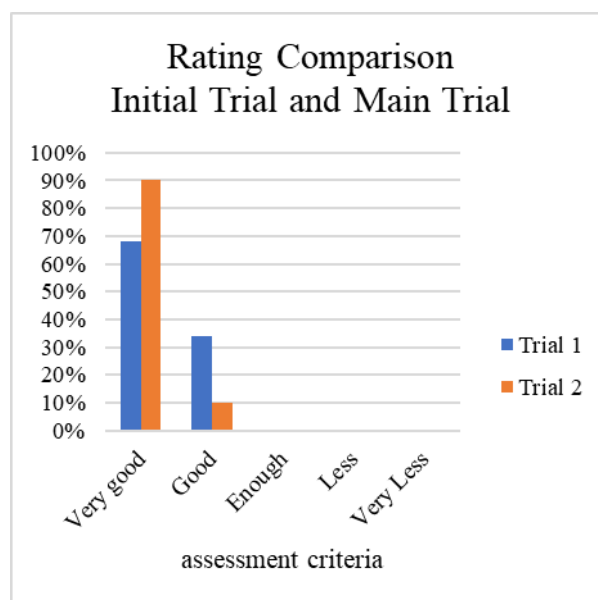


Figure 6. Histogram of data comparison of preliminary trial and main trial

The final product in development research is in the form of a Digital Book consisting of 168 main pages, 7 pages for the start of the module and 1 cover page. The initial cover of this product is in the form of an image of a waterfall flowing on the rocks as a background and is equipped with the module title "PHYSICS" "PHYSICS" along with the material presented in it including Newton's 1st Law, Newton's 2nd Law, Newton's 3rd Law. In addition, the class description and the author's name are located above and below the book title.

The final cover is a picture of a child sitting under an apple tree and the apple falls on the child as a background equipped with the module title "PHYSICS" "PHYSICS" along with the material presented in it including Force, Newton's 1st Law, Law Newton's 2nd, Newton's 3rd Law, Application of Newton's Laws. In addition, the class description and the author's name are located above and below the book title.

This Digital Book prefix consists of a title page, preface, table of contents, and a list of images arranged in sequence. This Digital Book consists of Competency Standards 2. Apply basic concepts and principles of kinematics and dynamics of point bodies and basic competencies 2.3 Apply Newton's Laws as the basic principles of dynamics for straight motion, vertical motion, and uniform circular motion

The display of the Digital Book of Newton's Law material which is packaged in flipbook form consists of the initial section which is chapter 1 as an introduction containing learning descriptions, instructions for using the module, final objectives, competency maps and basic competencies. The first part of the picture can be seen in the Appendix.

In the material content section, namely in chapter 2 of the Digital Physics Book for class X High School with Newton's Law material, it consists of three learning activities which are divided into several sub-chapters, namely Learning Activity I: Style (consisting of sub-chapters: Definition of Style, Types of Forces, Magnitude and direction of Forces, Residual Forces, Forces in everyday life). Learning Activity II: Newton's Laws (consisting of sub-chapters: Newton's 1st Law, Newton's 2nd Law, Newton's 3rd Law). Learning Activity III: Application of Newton's Laws (consisting of sub-chapters: Simple experiments on Newton's Laws, Some examples of applications of Newton's Laws). Each learning activity includes videos, materials, animations, worksheets, scientific worksheets and evaluations. The pictures of the parts of the contents of the material can be seen in the Appendix. This section contains the final evaluation of the lesson along with the answer key. Other pictures can be seen in the Appendix. The last page in the main part of this Digital Book is a bibliography located on pages 167 and 168.

In line with previous research that this development is intended to facilitate students in understanding a material. In the previous research, it produced ebook learning media products based on Kvisoft Flipbook Maker

on root, exponential, and logarithmic material where ebook learning media based on Kvisoft Flipbook Maker is feasible and practical to use in learning mathematics [21]. The difference is that in previous studies the material was allocated to learning mathematics, in this study the focus was on the subject matter of physics, namely Newton's law. The implication of this research is for teachers, it can be used as a reference for teachers to enrich learning media models. In addition, teachers can also use ways of learning that are more interesting, creative and effective so that they can increase students' motivation towards physics. For students, obtain learning media that is more interesting, creative and practical. Digital books as an interesting, creative and practical learning solution.

4. CONCLUSION

Learning media in the form of Digital Books have been developed in accordance with the rules for writing modules on Newton's Law material and its application for class X Senior High School with manufacturing procedures using CorelDRAW X4 software in making book designs, image designs, and text. Furthermore, the results from CorelDRAW X4 are combined with videos, moving images, and interactive evaluations in SWF form using KviSoft Flipbook Maker Pro 3.6.6. The total number of Digital Book pages is 168 pages. The Digital Book consists of an introduction, learning activities and closing. The introduction is in the form of learning descriptions, prerequisites for studying the module, instructions for using the module, final objectives, competency maps, concept maps and initial tests. The learning section consists of student study plans and learning activities. Learning activities consisting of materials, formative tests, feedback. The closing section consists of a final evaluation, answer key and glossary. Physics learning media in the form of digital books arranged in accordance with the systematics of writing modules on Newton's Law material and its application for Senior High School class X which has been developed, from all aspects it received very good ratings by 27 students out of 30 students and well by 3 students out of 30 students based on a questionnaire compiled according to the characteristics of the module with good criteria according to the Ministry of National Education in 2008.

REFERENCES

- [1] F. T. Aldila, M. M. Matondang, and L. Wicaksono, "Identifikasi Minat Belajar Siswa terhadap Mata Pelajaran Fisika di SMAN 1 Muaro Jambi," *J. Sci. Educ. Pract.*, vol. 4, no. 2, pp. 22–31, 2020.
- [2] M. Wulandari, R. P. Wirayuda, F. Aldila, and R. Wulandari, "Description of Students' Integrated Science Process Skills on Friction Material on a Flat Field," *Lensa J. Kependidikan Fis.*, vol. 8, no. 2, pp. 93–103, 2020, doi: 10.33394/j-lkf.v8i2.3206.
- [3] B. C. Putri, F. T. Aldila, and M. M. Matondang, "Hubungan Antara Karakter Motivasi Belajar dengan Hasil Belajar Siswa," *Integr. Sci. Educ. J.*, vol. 3, no. 2, pp. 45–49, 2022.
- [4] I. D. Palittin, W. Wolo, and R. Purwanti, "Hubungan Motivasi Belajar Dengan Hasil Belajar Fisika," *MAGISTRA J. Kegur. dan Ilmu Pendidik.*, vol. 6, no. 2, pp. 101–109, 2019, doi: 10.35724/magistra.v6i2.1801.
- [5] Darmaji, D. A. Kurniawan, Astalini, and N. R. Nasih, "Persepsi Mahasiswa pada Penuntun Praktikum Fisika Dasar II Berbasis Mobile Learning," *J. Pendidik. Teor. Penelitian, dan Pengemb.*, vol. 4, no. 4, pp. 516–523, 2019, doi: <http://dx.doi.org/10.17977/jptpp.v4i4.12345>.
- [6] D. Darmaji, D. A. Kurniawan, and A. Suryani, "Effectiveness of Basic Physics II Practicum Guidelines Based on Science Process Skills," *JIPF (Jurnal Ilmu Pendidik. Fis.)*, vol. 4, no. 1, pp. 1–7, 2019, doi: 10.26737/jipf.v4i1.693.
- [7] E. Triani, Darmaji, and Astalini, "Identifikasi Keterampilan Proses Sains Dan Kemampuan," *J. Pendidik. dan Pembelajaran IPA Indones.*, vol. 13, no. 1, pp. 9–16, 2023.
- [8] S. Ramli, R. Novanda, M. Sobri, and E. Triani, "The Impact of Student Responses and Concepts Understanding on the Environmental Care Character of Elementary School Students," *Int. J. Elem. Educ.*, vol. 6, no. 1, pp. 48–57, 2022.
- [9] S. Susilowati, "Pengembangan Bahan Ajar IPA Terintegrasi Nilai Islam untuk Meningkatkan Hasil Belajar IPA," *J. Inov. Pendidik. IPA*, vol. 3, no. 1, pp. 78–88, 2017, doi: 10.21831/jipi.v3i1.13677.
- [10] S. Rahmadhani and Y. Efronia, "Penggunaan E-Modul Di Sekolah Menengah Kejuruan Pada Mata Pelajaran Simulasi Digital," *Jav. J. Vokasi Inform.*, pp. 5–9, 2021, doi: 10.24036/javit.v1i1.16.
- [11] Darmaji, Astalini, D. A. Kurniawan, and E. Triani, "The effect of science process skills of students argumentation skills," *J. Inov. Pendidik. IPA*, vol. 8, no. 1, pp. 78–88, 2022, doi: <https://doi.org/10.21831/jipi.v8i1.49224>.
- [12] A. C. Fradani and R. P. F. Astuti, "Pengembangan Media Pembelajaran Kewirausahaan Berbasis Komik untuk Siswa di SMK Negeri 1 Bojonegoro," *J. Ekon. Pendidik. dan Kewirausahaan*, vol. 8, no. 2, pp. 111–120, 2020, doi: 10.26740/jepk.v8n2.p111-120.
- [13] S. S. Putri, S. N. Khotimah, M. Rayvan, Y. Oktaviani, I. Agustina, and D. Astuti, "Pelatihan Physics Virtual Experiment Sebagai Solusi Praktikum Fisika Pada Masa Pandemi," *J. PKM Pengabd. Kpd. Masyarakat*, vol. 04, no. 04, pp. 400–405, 2021.
- [14] A. Kesici, "The Effect of Digital Literacy on Creative Thinking Disposition: The Mediating Role of Lifelong Learning Disposition," *J. Learn. Teach. Digit. Age*, vol. 7, no. 2, pp. 260–273, 2022, doi: 10.53850/joltida.1063509.
- [15] T. Tanti, D. Darmaji, A. Astalini, D. A. Kurniawan, and M. Iqbal, "Analysis of User Responses to the Application of Web-Based Assessment on Character Assessment," *J. Educ. Technol.*, vol. 5, no. 3, p. 356, 2021, doi: 10.23887/jet.v5i3.33590.
- [16] W. ISTUNINGSIH, B. BAEDHOWI, and K. Bayu SANGKA, "The Effectiveness of Scientific Approach Using E-

- Module Based on Learning Cycle 7E to Improve Students' Learning Outcome," *Int. J. Educ. Res. Rev.*, vol. 3, no. 3, pp. 75–85, 2018, doi: 10.24331/ijere.449313.
- [17] Y. D. Puspitarini and M. Hanif, "Using Learning Media to Increase Learning Motivation in Elementary School," *Anatol. J. Educ.*, vol. 4, no. 2, pp. 53–60, 2019, doi: 10.29333/aje.2019.426a.
- [18] E. F. S. Rini and F. T. Aldila, "Practicum Activity: Analysis of Science Process Skills and Students' Critical Thinking Skills," *Integr. Sci. Educ. J.*, vol. 4, no. 2, pp. 54–61, 2023, doi: 10.37251/isej.v4i2.322.
- [19] F. T. Aldila, E. F. S. Rini, S. W. Oktavia, N. N. Khaidah, F. P. Sinaga, and N. Sinaga, "The Relationship of Teacher Teaching Skills and Learning Interests of Physics Students of Senior High School," *EduFisika J. Pendidik. Fis.*, vol. 8, no. 1, 2023.
- [20] A. Ramadhanti, K. Kholilah, R. Fitriani, E. F. S. Rini, and M. R. Pratiwi, "Hubungan Motivasi Terhadap Hasil Belajar Fisika Kelas X MIPA di SMAN 1 Kota Jambi," *J. Eval. Educ.*, vol. 3, no. 2, pp. 60–65, 2022.
- [21] A. Fadillah, D. Nopitasari, and W. Bilda, "Development E-Book Learning Media Based on Kvisoft Flipbook Maker," *Kreano, J. Mat. Kreat.*, vol. 12, no. 2, pp. 312–322, 2021, doi: 10.15294/kreano.v12i2.31684.