

Development of E-Supplement Teaching Materials Physics Based On Flipbook in Balogo Traditional Games

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ABSTRACT

Indonesia is a country with high cultural diversity that is spread in every region, one of which is traditional games. The existence of traditional game begins to be eroded and forgotten by the children. Along with the development of the era, educators have to follow the development of recent technology without leaving the cultural values. The existence of traditional games can be maintained by introducing and integrating them into learning through the teaching materials. Therefore, this research is focused on the development of e-supplement teaching materials physics based on *flipbook* in balogo traditional games. This research aimed to determine the validity and feasibility of e-supplement teaching materials physics based on *flipbook* in balogo traditional games. This research used the research and development method of 3D models (define, design and develop) modified Thiagarajan 4D models. The results of research showed that e-supplement teaching materials physics based on *flipbook* in balogo traditional games was very good with validity 91.36%. The conclusion is the e-supplement teaching materials physics based on *flipbook* in balogo traditional games is valid and very feasible for use in learning.

Keywords: Example: Feasibility, Suplemen Teaching Materials, Traditional Game, Validity



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INTRODUCTION

Indonesia is a country with high cultural diversity, ethnicity, and customs. One of the cultural diversity heritages in Indonesia is traditional games. The existence of traditional games from time to time starts to erode and be forgotten. Traditional games are fading away due to the development of the digital technology era and the influence of globalization (Suryawan, 2020). Balogo is a popular traditional game in Banjar tribal area especially in South Kalimantan. Balogo games have a process of inculcating cultural values, namely honesty, cooperation, hard work and deliberation (Azahari, 2018). Based on an interview with Dra. Hj. Siti Nursiah Se.Ak., the tradition of local wisdom in the balogo game was eroded and revived by holding a socialization of balogo to reintroduce it to the younger generation.

The attempt to preserve local culture to keep it intact and awake are by introducing and implementing the balogo game in the education field. The integration of local culture in learning can motivate students to develop knowledge, build understanding and perceive the relevance of the material taught by educators during the learning process (Kristin, 2015). Educators still have not integrated the culture in learning so that educational goals are lacking in achieving educational goal (Shufa, 2018). Learning that does not collaborate scientific literacy into real environmental knowledge may cause lower students scientific

knowledge and tend to be rote. Learning by integrating indigenous science processes (culture) into scientific science can create meaningful learning atmosphere (meaningful learning) and students become more active in analyzing and exploring problems in the local area. Culture-based learning is more meaningful because it relates learning materials to everyday life (Sumalong et al., 2021). Local culture-based learning can be implemented on science concepts, namely physics. Physics is a science that is closely related to human life and natural phenomena (Harefa, 2019).

Quality learning can be realized by packaging physics teaching materials that integrate culture. The efforts to incorporate cultural values into education are designing, creating, and developing teaching materials (Ferdianto & Setiyani, 2018). Teaching materials are media to achieve learning objectives so students can understand the material presented by educators. The teaching material developed in this research is an electronic supplement book or usually called e-supplement. Supplementary books are learning support books that contain facts, information, and various things with the purpose to help the main textbooks according to the material and needs of educators (Pranata et al., 2021). Along with the era development, educators must keep up with technological advance by using online teaching materials. Flipbook-based teaching materials can be an alternative in supporting student learning in the 4.0 industrial revolution era following the increase of rapid technological developments. The use of flipbook-based teaching materials can improve understanding of student achievement (Kodi et al., 2019). Flipbook-based physics teaching material of e-supplements do not only provide the text readings but also animations, videos, illustrations, audio with the tools that allow users to interact so that the learning atmosphere becomes more interesting and not boring. E-Supplements for flipbook-based teaching materials are designed to overcome boredom and make it easier for students to understand the material taught by educators so that learning can run effectively (Adrian & Laila Agustina, 2020).

Similar studies were carried out by other researchers namely by (Nugroho et al., 2021) that resulted in the development of supplementary teaching materials based on local wisdom that were proven to be very valid, interesting, good and practical so that teaching materials were suitable for use in learning. Furthermore, similar research was conducted by (Marditha et al., 2022) that resulted in the development of supplementary teaching materials based on local wisdom of the Pasti Jaya Village community which proved to be very suitable for use in terms of material, language and graphics. The novelty of this research is that the supplement of physics teaching materials is packaged in electronic form using a flipbook that contains local wisdom of the traditional Balogo game culture. Based on the facts above, researchers need to develop an e-supplement to flipbook-based physics teaching materials in the Balogo traditional game. This research aimed to determine the validity or feasibility of an e-supplement to flipbook-based physics teaching materials in the Balogo traditional game.

METHODS

This research used Research and Development (R&D) method with an ethnographic approach. Ethnography is a systematic description and analysis of the culture of the local community to understand a view of life through the point of view of the culture (Siddiq & Salama, 2019).

Product Development Model

The product development model is a descriptive procedural model. The product development model is an e-supplement to flipbook teaching materials based on the traditional Balogo game that can be accessed online and supported by computer technology

or mobile devices. The e-supplement for flipbook teaching materials was made with the assistance of flip HTML 5 software.

Product Development Method

The method of developing an e-supplement for flipbook teaching materials based on the traditional balogo game used was the Research and Development (R & D) method with a 3D model. This research and development method consisted of define, design and develop a modified Thiagarajan 4D model. The Research and Development (R&D) method is a process used to develop and validate educational products (Sriwahyuni et al., 2019).

Data Analysis Techniques

The data analysis techniques to determine the validity of the e-supplement flipbook teaching materials through 3 stages, namely material experts, media experts and users. Determine the value of expert validation from the average indicator with the equation:

$$V_a = \frac{Ts_e}{Ts_m} \times 100\%$$

Information :

V_a is expert validation (material, media dan users)

Ts_e is the total score obtained from the validator

Ts_m is the maximum expected total score

The combination of the validation results from the assessments of media experts, material experts and users can be determined by the average equation as follows :

$$\bar{V}_a = \frac{V_{a1} + V_{a2} + V_{a3}}{3}$$

Information :

\bar{V}_a is the value of the validation result

V_{a1} is the material expert validation value

V_{a1} is the media expert validation value

V_{a1} is the user validation value

The qualification for the feasibility of flipbook teaching material e-supplements to change the quantitative value from the validation results into qualitative values based on 5 categories of assessments as seen in Table 1.

Table 1. Eligibility qualifications for flipbook e-supplements

Nilai	Score Range	Category
A	$81\% \leq x < 100\%$	Very feasible
B	$61\% \leq x < 80\%$	Feasible
C	$41\% \leq x < 60\%$	Fairly feasible
D	$21\% \leq x < 40\%$	Not feasible
E	$0\% \leq x < 20\%$	Very unfeasible

(Taufiqy et al., 2016)

RESULTS AND DISCUSSION

The resulting research and development product is an e-supplement to flipbook-based physics teaching materials in the traditional Balogo game. The research aimed to produce an e-supplement for flipbook-based teaching materials that were valid and suitable to be used as additional teaching materials in physics learning. The limitation of this research is the third stage of the Borg & Gall research procedure by the validation and revision stages of the experts.

Developed Product Analysis

Field observation about potential problem and student need are needed before designing teaching material products. The observation phase was carried out in one of the public high schools (SMA) in the Jember city. Based on field observations, students were very interested in the development of increasingly sophisticated digital technology because it eases the students to find various information according to their needs. In increasing students interest in learning and creating new situations, educators must prepare teaching materials that are favored by students. Some physics teachers also have never applied flipbook-based physics teaching materials in learning because they are still guided by printed teaching materials in high school and also do not integrate culture (original science) into scientific science.

Flipbook-based physics teaching materials are very effective and practical, they can be carried anywhere without having to burden students with carrying printed books. Effective teaching materials can improve the quality of learning so that it can achieve better student learning outcomes (Reizal et al., 2020). The development of teaching materials must consider the curriculum that applies in learning, the characteristics of students and can guide students in solving problems while keeping abreast of technological developments (Sari et al., 2021). Therefore, in supporting learning with limited digital teaching materials, researchers are interested to develop an e-supplement for flipbook-based physics teaching materials that integrates the Balogo traditional game.

Teaching Material Design

At this stage, the process of compiling teaching materials is carried out by collecting various information about the Balogo traditional game (original cultural science) that is integrated into physics (scientific science) as the main material for e-supplement to flipbook-based teaching materials. E-Supplements for flipbook-based teaching materials that integrate local wisdom of the balogo game provide new information to students in teaching and learning. The design of this teaching material consists of several components including cover, identity of teaching material supplements, introduction, table of contents and pictures, achievement indicators, instructions for using supplementary teaching materials, concept maps, material descriptions, practice questions and bibliography. The development of good teaching materials consists of title components, learning materials, competency standards, basic competencies and indicators, learning objectives, instructions for using teaching materials for students and teachers, supporting information, worksheets and assessments (Febrina et al., 2020).

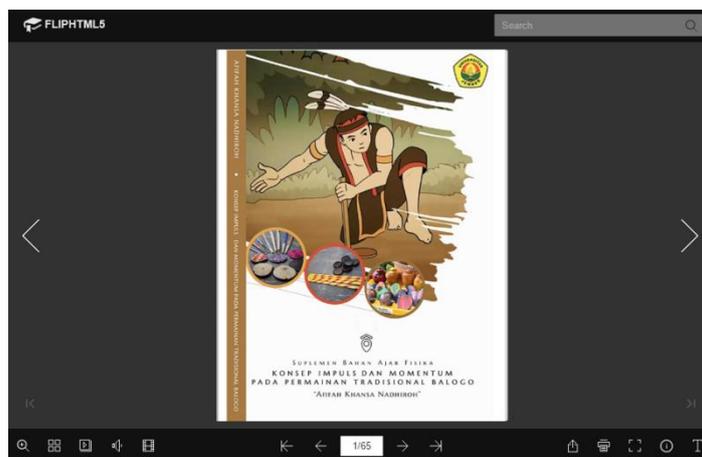


Figure 1. Cover of Flipbook-Based Physics Teaching Material Supplement

The cover section of the teaching material supplement in Figure 1 shows the title of the teaching material supplement with several color combinations. The cover color of this teaching material supplement is designed to give an impression related to the balogo game made from coconut shells. The brown color is very appropriate to be the basic color of the teaching material supplement. The supplementary cover of teaching materials can be more interesting with animated depictions related to the balogo game. One of the criteria for good teaching materials includes learning outcomes that is relevant to competency standards, with the attractiveness and motivation, includes knowledge aspects based on facts, concepts, principles and procedures, is systematic, and practical (Magdalena et al., 2020). The display of the teaching materials can be shown in Figure 2 that is arranged based on the achievement of learning physics according to Content Competencies and Basic Competencies.



Figure 2. Display of Achievement Indicators for Teaching Material Supplements, Instructions for Teaching Materials, Concept Maps and Material Descriptions

Expert Validation

The validation of teaching materials is an assessment with the purpose to measure the truth of the data, validity, and feasibility of teaching material products based on the the material content and the display design of the developed product. The validation of the flipbook-based physics teaching material e-supplement was carried out to determine the level of product feasibility. The validation of teaching materials was carried out by 9 validators consisting of 6 physics education lecturers, FKIP Jember University and 3 user validators, namely high school physics teachers. The assessment was carried out on three aspects, namely the material, media, and user aspects.

Table 2. Results of Material Aspect Validation Test (Source: Research Data)

Validator	Score	Max Score	Strength
Expert 1	50	56	89,29 %
Expert 2	50	56	89,29 %
Expert 3	50	56	89,29%
Averange			89,29 %

Based on table 2, the first stage regarding the material aspect obtained a percentage of validity of 89.29% that showed the very valid criteria. The components of the assessment in the material aspect were the feasibility of the content and the feasibility of presentation. First, the feasibility of the content consisted of 3 indicators, namely 1) the scope of the material, 2) the accuracy of the material, and 3) the latest material. Second, the assessment of the feasibility of the presentation, namely the technique of presenting the material and supporting the presentation of the material. The flipbook-based physics teaching material e-supplement was categorized as very valid with several suggestions for improvement that need to be followed up. One of the suggestions given by the material validator was , “ the writing of physics symbols is more clarified, the presentation of sentences that generate motivation is less, material depth must be detailed”. The completeness and correctness of the content related to the material must be adjusted based on Core Competencies (KI) and Basic Competencies (KD) so that the expected learning objectives can be achieved. Furthermore, the components of the presentation of the material are arranged systematically and the teaching materials contain scientific literacy. The use of language is clear, logical, communicative and adapted to good and correct Indonesian rules (Kapitan et al., 2018). The use of language can provide a stimulus so that the level of readability of teaching materials can be understood by students. Teaching materials designed by adding illustrations, pictures, and animations can be a motivational generator for readers so as to increase the interest and interest of students (Rahmayantis & Nurlailiyah, 2020).

Table 3. Results of Media Aspect Validation Test (Source: Research Data)

Validator	Score	Max Score	Strength
Expert 1	101	108	93,52 %
Expert 2	97	108	89,81 %
Expert 3	97	108	89,81 %
Averange			91,05 %

Based on table 3, the second stage regarding the media aspect obtained a percentage of validity of 91.05% that showed the very valid criteria. The assessment component in the media aspect consists of two components, namely the feasibility of the content and the feasibility of presenting the media for teaching materials. First, the content feasibility component consists of 5 indicators such as : 1) artistic and aesthetic, 2) the ability of informative teaching materials and fosters the curiosity of readers, 3) systematic presentation, coherence, logicalness, and conceptual confusion, 4) supporting material presentation, and 5) linguistic eligibility. Second, the presentation feasibility component is divided into 2 indicators, namely 1) presentation technique, and 2) presentation accuracy and suitability. There are some suggestions for improvement related to the presentation of e-supplement media for flipbook-based teaching materials regarding the alignment of background color with writing, typography improvements, and cover design improvements. The manufacture of teaching materials needs to consider the graphics, the completeness of layout elements, color combinations and the use of proportional fonts (Agustin et al., 2019). The design principles in the design of teaching materials that must be considered include illustrations, colors, typography, shapes, and messages (Badri, 2020). The selection of typography plays an important role in adding the curiosity of the reader so that the presentation of e-supplement teaching materials that does not only contain reading texts.

Table 4. Results of User Validation of Teaching Materials (Source: Research Data)

Validator	Score	Max Score	Strength
Expert 1	62	64	96,88 %
Expert 2	57	64	89,06 %
Expert 3	61	64	95,31 %
Averange			93,75 %

The third stage is regarding the user aspect with several components that are assessed including the accuracy of information based on facts, presentation of the illustrations regarding the material in teaching materials, linkage of teaching material sources with scientific works, components of teaching materials, linkage of materials with actual conditions, updating of teaching materials, presentation of language . Teaching materials must have high innovation and novelty so it attracts students' interest in learning the material being taught. Table 3 shows the results of the assessment based on the user validation aspect that was 95.31% and was categorized as very valid. There are suggestions for improvement from users regarding the e-supplement of flipbook-based teaching materials, namely teaching materials must separate between the teacher's handbook and the student's handbook. Teacher and student handbooks have an important role in supporting the implementation of the 2013 Curriculum (Susilana & Alinawati, 2016). The teacher book includes methods, learning activities and instructions for the use of books aimed at achieving smooth learning competencies. The student book is to ease the students to master each competency (Ilmi et al., 2018). Based on the validation test of material experts, media and users, the total results of the validity and feasibility test of flipbook-based e-supplements can be shown in table 5.

Table 5. Total Results of Teaching Material Validation Test (Source: Research Data)

No	Aspect	Strength	Criteria
1	Material	89,29 %	So worth it
2	Media	91,05 %	So worth it
3	User	93,75 %	So worth it
	Average	91,36 %	So worth it

Table 5 shows the overall test results from the validation of the e-supplement of flipbook-based teaching materials in the Balogo traditional game carried out by several expert validators and practitioners of 91.36% that were declared very valid so that they were suitable for use as teaching materials for physics learning

CONCLUSION

Based on the results of the research and discussion, it is obtained that the validity value of teaching materials from each aspect is material validation of 89.29%, media validation of 91.05%, and users of 93.75%. It can be concluded that the flipbook-based physics teaching material e-supplement in the traditional Balogo game has an average value of 91.36%. Thus, the average value of the validation of flipbook-based physics teaching materials is very valid and feasible to use.

CONFLICT OF INTEREST

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