DEVELOPING RADEC LEARNING MODEL-BASED INTERACTIVE E-BOOK ON FORCE USING THE BOOK CREATOR APPLICATION FOR THE FOURTH GRADERS OF ELEMENTARY SCHOOL

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Abstract: Education has transitioned from conventional teaching methods to the digital era. Teachers need to adapt to these changes to use digital teaching materials to make learning more engaging. Teachers can utilize innovative learning models and digital-based teaching materials. The RADEC learning model is a model that can be applied in the current era. This research and development aimed to produce an interactive e-book based on the RADEC learning model using the book creator application for the topic of force in grade IV of elementary school. The Analyze, Design, Develop, Implement, Evaluate (ADDIE) model is combined with this study's research and development (RD) method. Expert content, media, and language validation provide a highly valid research assessment. In addition, teachers and students are very interested in the interactive e-book because it supports an enjoyable learning process. Based on these assessments, it can be concluded that the interactive e-book based on the RADEC learning model meets the criteria for highly suitable use in teaching and learning.

Keywords: teaching materials, interactive e-book, RADEC model, elementary school students.

INTRODUCTION

Education has changed with technological developments that have led to the transformation of education from traditional learning to the digital era (Cahyani & Patrikha, 2019:611). Technological developments must be faced by teachers because teachers must be able to adapt so that learning becomes more interesting. Currently, learners are much happier to connect with technology such as smartphones than with books (Azis & Asih, 2022). So to create interesting learning during this technological development involves teaching materials with technology.

According to Huang et al. (2012:719), technology-based teaching materials such as e-books are more accepted than printed books. E-books, according to Zucker et al. (2009), are teaching materials that can attract student attention. According to Rosita et

al. (2017), interactive e-books can motivate students to engage in self-learning activities or student-centered learning. Interactive e-book users can also interact with each other and communicate with each other (Bozkurt dan Bozkaya, 2015:58). According to Kosasih (2021:252), interactive e-books can involve students to be active and collect information on student activities quickly and practically.

Building active, independent, and responsive learners can use the RADEC learning model. This model is the latest breakthrough in education because it can train competence, character, and literacy in the 21st century (Abidin & Anggoro, 2021). This RADEC learning model has a syntax that matches its name Read, Answer, Discuss, Explain, Create. These systematic steps make it easier for teachers to implement the learning model. This interactive e-book teaching material, according to (Herianto & Lestari, 2021:50), is an integration of the use of technology, which includes a constructivism approach. This approach can support active learning.

In fact, as stated by Fikrah & Sukma (2022:1185), educators still utilize printed teaching materials such as teacher books, student books, and Student Worksheets (LKS). The learning model used is still conventional, so students get bored quickly. Whereas currently, schools are implementing an independent curriculum program that requires innovative teaching materials so that learning is fun (Chamidin & Muhdi Ali, 2022:288).

To prevent students from experiencing misconceptions while learning, especially in natural science lessons, it is necessary to have teaching materials that can change material from abstract to visual, such as digital teaching materials. Utilization of teaching materials can introduce interactive learning so that students get concrete, contextual, interactive learning experiences and can adapt to technological developments (Fikrah & Sukma, 2022:1186). Digital teaching materials can be created with the *book creator* application. An application called *book creator is* used to create interactive digital teaching materials that can be inserted with links, sounds, images, videos, and others (Dewi, 2022:1290).

From some of this information, it appears that teachers do not use interactive e-book teaching materials. The e-books used are only e-books that have been downloaded from the internet and printed, thus eliminating the function of the e-book itself. Learners need varied teaching materials to make the learning environment fun and not dull. With this, it is essential to develop the research title "Development of Interactive *E-books*

Based on the RADEC Learning Model Using the *Book Creator* Application on Elementary School Grade IV Force Material."

Based on the description of the background, the following problems can be formulated; (1) What are the results of the development of RADEC-based interactive *e-book* teaching materials on force material for grade IV elementary school; (2) How is the feasibility of interactive *e-books* based on the RADEC learning model using the *book creator* application on force material for grade IV elementary school and (3) How do teachers and students respond to interactive *e-book* teaching materials based on the RADEC learning model using the *book creator* application on force material for grade IV elementary school.

The purpose of this study was to determine; (1) The results of the development of interactive *e-books* based on the RADEC model using the *book creator* application on force material for grade IV elementary school; (2) The feasibility of interactive e-books based on the RADEC learning model using the *book creator* application on force material for grade IV elementary school according to experts and (3) Teacher and student responses to interactive *e-books* based on the RADEC learning model using the *book creator* application on force material for grade IV elementary school.

RESEARCH METHODS

This research is Research & Development (RnD). Sugiyono (2020: 395) recommends this research method is a method for developing and validating products. Developing this product using the ADDIE model because it is very suitable for use in developing teaching materials Cahyadi (2019: 40). According to Branch (2009: 23), the ADDIE model has five steps, namely Analyze is done to identify the possible causes of the needs gap. Design is to determine the design, learning materials, and language. Develop is the realization of the product by making interactive e-books and validating teaching materials by media expert validators, material expert validators, and language expert validators. Implement is applying products that have been validated and have been declared eligible for testing. Evaluate is getting feedback from implementation activities in the form of suggestions and input.

Data collection in this study used a research instrument in the form of a questionnaire. Students who have tried the product are given a questionnaire, and teachers

are also given a questionnaire to find out the practicality of the product. In addition to teachers and students, validators were also given a questionnaire to determine the feasibility of the product developed.

This research assessment uses a Likert Scale for expert validation, with a score of 1 to 5, with score one the lowest score and score five being the highest score. According to Sugiyono (2020: 146), this Likert Scale is used to measure the design of the product developed. The following questionnaire is presented using five alternative Likert Scale answers with the following classification:

1) Very Valid= 5
2) Valid = 4
3) Simply = 3
4) Less Valid = 2
5) Invalid = 1

According to Riduwan (2013:102), the formula that can be used to calculate data from the validation results of media experts, materials, and linguists is as follows:

$$X = \frac{\sum \quad xi}{n}$$

Description:

X = Average answer value

$\sum \quad xi$ = Total number of grades

n = Amount of data

Calculating the results of the learner response questionnaire using the Guttman scale. The Guttman scale requires a firm answer, namely yes and no, for the highest answer is given a score of 1, and the lowest answer is given a score of 0. The student response questionnaire, according to (Syuhada, 2014), uses the formula:

$$i = \frac{x}{n} \times 100\%$$

Description:

i= Percentage of student response answer

x= Total score of student responses

n= Maximum number of scores

Based on the values that have been obtained, they are then interpreted using a percentage interpretation to determine the following criteria:

Table 1. Student Response Questionnaire Criteria

Peresentage	**Criteria**
80,1%- 100%	Very Interesting
60,1% - 80%	Interesting
40,1% – 60%	Simply
20,1% - 40%	Less Attractive
0% - 20%	Not Interesting

Arikunto in Jannah et al.,(2017:189)

Data analysis techniques to determine the results of teacher responses using a Likert scale. This Likert scale has a scale of 1 to 5, scoring one as the lowest value and score five as the highest value. The results of the teacher's response were then processed using the same percentage formula as calculating student responses as described above.

RESULTS AND DISCUSSION

The research results in the form of RADEC-based interactive e-book teaching materials using the book creator application on grade IV elementary school style material. This development research refers to the ADDIE model, which has five stages that need to be done so that the resulting product is of high quality:

1. Analyzes

In this first stage, it analyzes the need for developing teaching materials. The development of teaching materials begins by looking at the problems in the teaching materials used and the previous learning model. The problems that occur from the results of interviews with class IV teachers of SDN 1 Kober teaching materials used are still printed teaching materials and electronic books that are downloaded and then printed, have not involved technology in their learning. Even though students are very active in learning, they get bored quickly and lack focus. It can be concluded that teaching materials are less relevant to student needs, student skills, technology, and teachers. This is in line with the development of interactive e-books based on the RADEC model on class IV force material.

2. Design

After analyzing the problems and needs of students, the next stage is design by designing conceptual teaching materials in order to become the basis for the teaching

material development process. The teaching materials developed are interactive e-books based on the RADEC learning model with an attractive appearance. The e-book was developed in accordance with the stages of the RADEC model, namely there are stages of Read, Answer, Discuss, Expland, Create. This interactive e-book contains material from book references issued by the Ministry of Education and Culture using the independent curriculum.

3. Develop

This stage develops teaching material devices that are ready to be implemented. The making of teaching materials is based on the design that has been made, which contains a cover, preface, table of contents, instructions for use, general learning outcomes, gluing learning outcomes, Pancasila student profiles, flow of learning objectives, book content according to RADEC steps, bibliography, and developer bios. The following are the results of interactive e-book development:

Picture 1. Interactive e-book based on RADEC Learning Model

(https://bit.ly/E-book_Interaktif_RADEC_Gaya_Kelas4)

After making the teaching materials, the assessment was carried out by the three validators, namely the material expert validator, media expert validator, and language expert validator, presented in Table 2.

Table 2. Results of Material Expert Validation Assesment

Indicator	**Score Validator I**	**Score Validator II**
Content	27	27
Presentation of Material	19	18
Average	**4,6**	**4,5**

Percentage	**92%**	**90%**
Criteria	**Very Valid**	**Very Valid**

Judging from Table 2, the final results of both material expert validations show that the interactive e-book that has been made is very valid. Thus, the teaching materials can be used to assist the educational experience with suggestions and criticisms from the validators. Apart from the approval of the material expert validation, there is validation by the media expert introduced in Table 3.

Table 3. Results of Media Expert Validation Assessment

Indicator	**Score Validator**
Quality of Teaching	8
Graphic	7
Interactive	25
Average	**4**
Percentage	**80%**
Criteria	**Valid**

The interactive e-book based on the RADEC learning model is declared valid and suitable for testing in accordance with the revisions and suggestions of the media expert validator, as shown in Table 3 based on the results of the media expert validation assessment. From the assessment results, it can be assumed that the teaching materials made can be implemented in learning. After conducting validation by media experts, the researchers conducted linguist validation which can be seen in Table 4.

Table 4. Linguist Validation Results

Indicator	**Score Validator**
Straightforward	11
Communicative	22
Use of terms and symbols	9

Average	**4,2**
Precentage	**84%**
Criteria	**Very Valid**

Based on Table 4, the results of linguist validation can show that RADEC-based interactive e-book products have very valid criteria and can be tested with revised suggestions from linguist validators. It can be concluded that this RADEC-based interactive e-book can be implemented in learning.

4. Implement

The purpose of this implementation stage is to conduct product trials. A total of 25 fourth-grade students of SD Negeri 1 Kober participated in the product trial. The product used to conduct the trial is a product that has been validated by validators and is said to be suitable for testing students. Learning using interactive e-books based on the RADEC learning model goes through 5 steps according to the RADEC model syntax. The following are the stages of implementing teaching materials:

Read

Learners read a conversation and read the material that has been presented.

Answer

Students are required to take an online-based quiz available in the Wordwall application at this answering stage. This quiz contains questions about muscle force and motion.

Discussion

Learners discuss what they have watched on the youtube link about frictional force. At this stage, they write the results of their discussion on the learner worksheet provided in the live worksheet.

Explain

The results of the discussion are presented in front of the class by each group. Each group member is asked to stand up and present their group's findings.

Create

Learners create a wind-powered car project. The car is made using used items and balloons. Learners assemble the car with their respective group members.

5. Evaluate

Evaluation is the final stage which includes suggestions and criticisms of the developed product. The scores obtained from the results of student responses to interactive e-books based on the RADEC learning model using the book creator application based on field findings are as follows:

Table 5. Results of Learner Response Analysis

No.	Indicator	Percentage
1.	Ease of use	100%
2.	Clarity of instructions	96%
3.	Clarity of material	100%
4.	Image suitability with material	100%
5.	Easy-to-understand language	92%
6.	Train teamwork	92%
7.	Images and videos are easy to understand	100%
8.	Increase the sense of fun	96%
9.	Increase motivation	100%
10.	Game interest	100%
	Average	**97,6%**
	Criteria	**Very Interesting**

In Table 5, it can be concluded that students are very interested in the RADEC-based interactive e-book. Since this is the first time an interactive e-book is implemented in the classroom, the students are very enthusiastic about this interactive e-book because it is easy to use, has clarity of material, suitability for images, and increases motivation from students. However, not all learners are interested, and there are learners who are less interested, ranging from unclear instructions, language is less understandable, and cannot train cooperation.

Not only the response of students but there is a response from the teacher. The teacher response questionnaire aims to see the teacher's response to the RADEC-based interactive e-book product development using the book creator application when used in learning. The results of the teacher's response concluded that the teacher was very interested in interactive e-book teaching materials, both from the suitability of the material, the quality of teaching materials, and the presentation of teaching materials. This was confirmed by the assessment of the teacher response questionnaire, which received a score of 50 with a level of 100% very interesting category. The RADEC-based interactive e-book received a positive response based on the analysis of the teacher response questionnaire. The teachers' responses are in line with Hariyanto & Jannah (2020), that as a 21st-century teacher, it is time to be able to provide a learning style that is in accordance with technological developments.

CONCLUSIONS

Based on the analysis of the results of the development of RADEC-based interactive e-book teaching materials using force applications in class IV, it is concluded as follows:

1. The development of interactive e-books based on the RADEC learning model using the book creator application on grade IV force material has been carried out in a structured manner according to the ADDIE step according to Branch, which has five stages. Product trials conducted at SD Negeri 1 Kober ran smoothly and received positive responses from teachers and students.
2. Analysis of the results of the validation of interactive e-books based on the RADEC learning model using the book creator application on class IV force material shows material expert validator I with a percentage of 91%, material expert validator II with a percentage of 90%, language expert validator 84%, and media expert validator 80%. From the four validators, the product obtained the criteria "Very Valid or Very Feasible."
3. Analysis of the teacher response questionnaire to the validation of interactive e-books based on the RADEC learning model using the book creator application on class IV force material obtained a percentage of 100% in the "Very Interesting" category.
4. Analysis of the questionnaire response of grade IV students to the validation of interactive e-books based on the RADEC learning model using the book creator

application on grade IV force material obtained a percentage of 97% in the "Very Interesting" category.

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