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Development of Learning Media "Case Elasticity" Using H5p Program on Material Mechanical Properties of Materials

Devni Gusliza Sari[1], Muhammad Nasir[2*]
[1]*University of Riau, Physic Education Master Department, Bengkalis, Riau, Indonesia*
[2]*University of Riau, Physic Education Master Department, Panam, Riau, Indonesia*

Abstract: Current learning tends to achieve curriculum material targets, more concerned with memorizing concepts rather than understanding. Students sometimes feel saturated and bored with the current learning patterns. With interactive learning media, it can make it easier for teachers and students in the learning process. The purpose of this study is to develop a learning medium "Case Elasticity" using the H5P program on material mechanical properties of materials for students of class X SMK which is valid and very practical to use in physics learning. The type of research used is Research and Development (R&D) with the ADDIE development method. The learning strategy used for the development of this media is case-based learning. The data analysis technique is to calculate the validation assessment using the validity index of the formula V Aiken of 0.93. In addition, learning media is also stated to be very practical with an average practicality value index of 86.25%.
Keywords: learning media, H5P, Elasticity

I. Introduction

Education is a conscious and planned effort to create a learning atmosphere and learning process so that students actively develop their potential to have religious spiritual power, self-control, personality, intelligence, noble character, as well as the necessary skills of themselves, society, nation and state (Law no. 20 of 2003 concerning the National Education System article 1 paragraph 1). Educational objectives are a set of educational outcomes achieved by students after the holding of educational activities. Efforts to improve the quality of education in schools must be through learning. Various new concepts and insights about the teaching and learning process in schools have emerged and developed along with the rapid development of science and technology (Suryosubroto, 2002)[7]. The renewal of learning aims to continue to improve the quality of learning. Learning itself is a combination that is composed of humane elements, materials, facilities, equipment and procedures that influence each other to achieve learning objectives (Ngubadillah & Kartadie, 2018)[3].

The application of e-learning technology is needed at this time. The use of information technology as a learning medium has also begun to be developed with a more creative and innovative learning model. One of them is by using learning media by utilizing the H5P program. H5P is an HTML 5-based web framework that provides access to a variety of interactive content, such as presentations, interactive videos, memory games, quizzes, multiple choice, drag and drop and others.

In the research of Charles Luis (2022)[2] the existence of E-learning can make it easier for teachers and students in the learning process presented in the form of interactive content (H5P). Interactive content (H5P) allows the material presented to be more interesting and students participate in responding to the material directly.

II. Methodology

The development model used in this research is a type of research and development or Research and Development (R&D) with the ADDIE development method. The term ADDIE stands for *Analyze, Design, Develop, Implement and Evaluation.* Based on the educational philosophy foundation, the application of ADDIE must be student center, innovative, authentic and insprirative (Robert M B, 2009)[6]

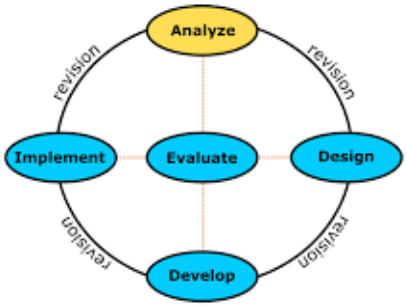


Figure 1. ADDIE Model Design Steps

The instruments used in this development research are validation sheets and practicality assessments on a small scale. The validation assessment sheet includes aspects of design feasibility, aspects of pedagogical feasibility, aspects of content feasibility and aspects of technical feasibility. Validation was carried out by 3 validators, namely a lecturer of Master of Physics Education Riau University and two Bachelor of Physics Education. After validation, a trial of the practicality of learning media was carried out on a small scale. The trial was conducted at SMK Negeri 1 Bantan, Bengkalis district, Riau, Indonesia with a sample of 25 class X students using a likert scale as shown in Table 1.

Table 1 Validity Sheet Assessment Categories

No	Category	Score
1	Agree	5
2	Agree	4
3	Disagree	3
4	Disagree	2
5	Strongly disagree	1

(Rita C Richey, 2014)[5]

Furthermore, the validity value is calculated using the formula V Aiken as follows:

$$V = \frac{\sum s}{n(c-1)}$$

Description:
$s = r - L_o$
V = Aiken validity index
L_o = Lowest validity rating number (1)
c = Highest validity assessment number (5)
r = Validator scored
n = Number of validators

The learning medium is declared valid if all validity instrument assessment indicators have a coefficient value of V Aiken > 0.4. The determination of the category of the coefficient V Aiken can be seen in Table 2.

Table 2 Interpretation of Aiken's Coefficient V

No	Value	Category
1	$0.80 < V \leq 1.00$	Very High
2	$0.60 < V \leq 0.80$	Tall
3	$0.40 < V \leq 0.60$	Enough
4	$0.20 < V \leq 0.40$	Low
5	$0.00 < V \leq 0.10$	Very Low

(Azwar, 2017)[1]

While the practicality analysis is used with percentage values (%) as follows:

$$Practicality\ value = \frac{Total\ score\ obtained}{score\ maximum} x100\%$$

After the percentage of practicality values is obtained, the grouping is carried out according to the criteria contained in Table 3 below:

Table 3 Practicality Assessment Criteria

No	Percentage (%)	Criterion
1	81 – 100	Very Practical
2	61 – 80	Practical
3	41 – 60	Quite Practical
4	21 – 40	Less Practical
5	0 – 20	Practical

(Riduwan, 2010)[10]

III. Results & Discussion

This development research will produce a product in the form of a learning medium "Case Elasticity" Using the H5P Program on Material Mechanical Properties of Materials in class X. ADDIE Model Design has five development steps, namely:

1. Analyze

Analyze is analyzing the need to determine the right problems and solutions and determine student competencies. In this step there are several stages, namely

- validation of performance gaps, where researchers must determine the learning difficulties of learners, the problems encountered and analyze their causes.
- Formulate instructional objectives, formulate learning objectives and indicators of competency achievement.
- Identifying the characteristics of learners, looking at the skills, experiences, motivations, and attitudes of students.
- Identify the resources needed, consider the time needed in learning, suitable content, the right technology for the character of the learner, and determine the supporting facilities to carry out learning.
- Determining the right learning strategy, by analyzing several previous stages, researchers can determine the strategy to be used, namely *case-based learning*.
- Develop a program management plan, by compiling the right RPP.

2. Design

Design is to design the learning media "Case Elasticity" in accordance with the analysis carried out previously. The steps taken at this stage include designing game scenarios, creating historyboards, creating storyboards, and compiling materials that will be included in learning media.

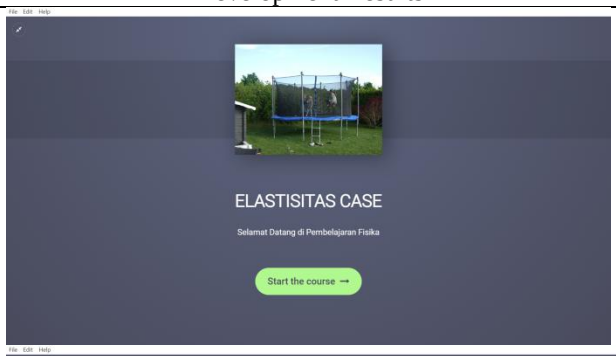
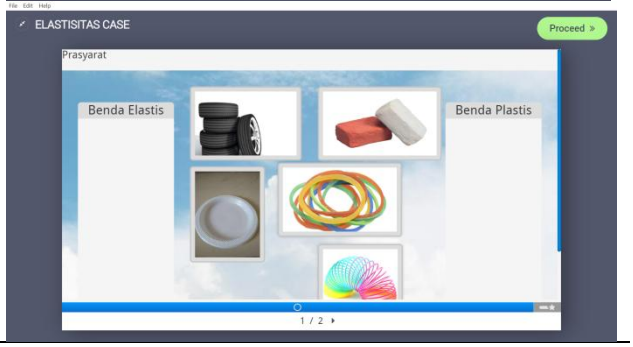
3. Develop

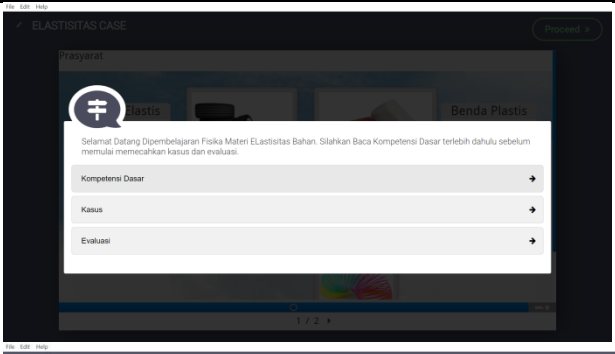
Develop is producing programs and teaching materials that will be used in learning programs. The development is tailored to the needs that have been analyzed and the systems that have been designed. The stages of developing this learning media are:

- Create a learning media content chart using a branching scenario in the H5P program. it is then integrated into the H5P website so that it can be accessed online.
- Fill in the media content into the chart according to the pre-designed storyboard. The content of this content is in the form of images, audio, video, background, materials and evaluation.
- Save and publish the content. This learning media is published through the H5P website.

The results of the development of learning media can be seen in Table 4.

Table 4. Learning Media Development Results

Aspects	Development Results
Home Page	
Prerequisite	

Main Menu	
Case View	
Case Resolution View	

4. Implement

Implement is implementing a learning program by applying the design or specifications of the learning program. The program is carried out by opening a learning media website on the https://h5p.org/node/1320878.

5. Evaluate

An important concept of the evaluation stages of the ADDIE model is how an instructional designer is able to perform an overall evaluation of the model, from the initial stage to the end. Important steps in the evaluation of the ADDIE model are how to determine the evaluation criteria, select the tools for evaluation, and conduct the evaluation itself. Based on the evaluation results, researchers can revise the product so that it produces the desired learning media.

Then the learning media application is ready to be tested for validity by validators. This "Case Elasticity" learning media is tested for feasibility in several aspects, namely design aspects, pedagogic aspects, content aspects and engineering aspects. The validation results on the design aspect can be seen in Table 5.

Table 5 Results of Learning Media Validation in Design Aspects

No	Assessment Items	Value	Category
1	Attractive or appropriate learning media screen design	0,75	T
2	Letters used are appropriate or easy to read	0,83	ST
3	Illustrations in the media according to the content	1	ST
4	Illustrations used help students' comprehension	0,92	ST
5	Illustrations used to aid learning	1	ST
6	The colors used are correct and unobtrusive	0,75	T
7	The button or sign used is easy to recognize	1	ST

8	Consistent text, image or sign notability	0,75	T
9	Complete with directions or user manual	0,83	ST
	Average number of validity indexes	0,87	ST

The data in Table 5 shows that all indicators are valid with validity indexes ranging from 0.75 to 1 and have an average Aiken validity index of 0.87with the suggestion that it is necessary to consistently use Indonesian and background slides are more aligned. An assessment of the feasibility aspects ofpedagogical aspects is presented in Table 6.

Table 6 Results of Learning Media Validation in Pedagogic Aspects

No	Assessment Items	Value	Category
1	Clearly written teaching competencies	1	ST
2	Learning media helps achieve competencies	0,83	ST
3	Basic competencies become guidelines for media users	1	ST
4	Topics according to competence	1	ST
5	Delivery of the topic attracts the attention of students	0,83	ST
6	The information conveyed is easy to understand	0,83	ST
7	Media encourages students to improve their process skills	0,83	ST
8	Regular and easy-to-follow material delivery	0,92	ST
9	The questions given are in accordance with the material	0,92	ST
10	Topics suitable for Elasticity Case learning media	1	ST
	Average number of validity indexes	0,92	ST

The data in Table 6 shows that all indicators are valid with validity indices ranging from 0.83 to 1 and have an average Aiken validity index of 0.92. An assessment of the feasibility aspects of the contentaspects is presented in Table 7.

Table 7 Results of Learning Media Validation on Content Aspects

No	Assessment Items	Value	Category
1	Lesson materials in accordance with the 2013 curriculum	1	ST
2	Subject matter in accordance with competence	0,92	ST
3	Lesson materials in accordance with the formulation of basic competencies	1	ST
4	Lesson materials according to the basic abilities of students	1	ST
5	The subject matter contains educational values	0,92	ST
6	Lesson material accompanied by exercises	0,92	ST
7	Exercises according to the topic of the lesson	1	ST
8	Learning media accompanied by evaluation questions	1	ST
9	Evaluation questions according to the subject matter	1	ST
	Average number of validity indexes	0,97	ST

The data in Table 7shows that all indicators are valid with validity indices ranging from 0.92 to 1 and have an average Aiken validity index of 0.97. An assessment of the feasibility aspects of the engineering aspects is presented in Table 8.

Table 8 Results of Learning Media Validation on Technical Aspects

No	Assessment Items	Value	Category
1	Users can be helped in controlling the learning process	0,92	ST
2	Media has many branches to other parts	1	ST
3	Users are not stuck when using media	0,92	ST
4	The use of media in delivering material is easy to follow	0,92	ST
5	There is more than one piece of information obtained	1	ST
6	Users easily search for the necessary information	1	ST
7	Users can easily exit the media	1	ST
8	Easy-to-use (operated) media	1	ST
	Average number of validity indexes	0,97	ST

The data in Table 8 shows that all indicators are valid with validity indices ranging from 0.92 to 1 and have an average Aiken validity index of 0.97.

On the practicality value of the learning media "Elasticity Case" was tested on a small scale on class X students at SMK Negeri 1 Bantan, Bengkalis Regency as many as 25 people. The results of the practicality value in each aspect are shown in Table 9.

Table 9 The Results of the Value of Practicality of Learning Media in Every Aspect

Not	**Assessment Aspects**	**Practicality Value (%)**	Practicality Criteria
1	Comfort and design aspects	86	Very Practical
2	Satisfaction aspect	88	Very Practical
3	Efficiency Aspects	85	Very Practical
The average number of practicality indices		86,25	Very Practical

Based on data from Table 9, it was found that the average practicality value was 86.25 with very practical criteria. This suggests the learning medium of "case elasticity" is very practical to use by learners.

IV. Conclusions & Recommendations

The results of this study concluded that the learning media "Elasticity Case" is valid in accordance with valid validation results and is very practical to be used by students in accordance with the results of the practicality test conducted at SMK Negeri 1 Bantan. It is hoped that this learning media can motivate students in receiving the material provided by the teacher.

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