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Presentation-based Macromedia Flash Design on Static Electricity Material for Junior High School Students

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Abstract

The study aimed to design a presentation-based macromedia flash on static electricity for junior high school students. This study uses the type of research and development. The ADDIE model was chosen in this study, which includes: analysis, design, development, implementation, and evaluation. However, the design stage is carried out in 3 stages: analysis, design, and development. The research data were obtained by reviewing the curriculum, interviews, and validation questionnaires. There were 9 students in class IX who were subject to a limited trial in this study. Data was analysed by reviewing the curriculum contents, descriptive interview results, and quantitative analysis for validation results. The results showed that the presentation-based macromedia flash design results on static electricity material for junior high school students were declared valid and could be used by junior high school students. It was concluded that the results of the presentation-based macromedia flash design as a learning medium for static electricity material were accurate and could be utilized by junior high school students.

Keywords: Learning Media; Macromedia Flash; Presentation; Static Electricity

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INTRODUCTION

The education sector is one of many that have benefited from the technology's quick growth. The benefit of online learning is that it more equally distributes the educational system across different geographic areas. In addition, many technology-based media and learning resources have been created for self-learning.

Based on interviews with science teachers at junior high schools, they have prepared various science learning media. The media is in the form of practicum

tools, videos, and power points as the media most used by teachers. However, based on interviews with students, they still have trouble understanding the science content. They explain why all of the media has not been included in a single application. As a result, they find it challenging to review teachings outside of the classroom. Students need media that can cover science topics and is equipped with animations that can help students comprehend the material in greater detail.

Science learning in junior high school combines physics, biology, and chemistry materials. However, among these materials, physics is still considered the most difficult subject for students (Hau & Nuri, 2019). This is evident from students' less-than-ideal attitudes toward studying physics compared to chemistry and biology. Only 31 students out of 134 have a favorable and extremely favorable attitude toward the physics material (Hartono et al., 2021). The students interviewed noted that a lot of physics material is abstract. Dielectric materials, static electricity, dynamic electricity, Ampere's law, Faraday induction, direct current and voltage, and Bernoulli's law are all examples of abstract physics materials (Suseno, 2014).

According to Marwati (2022) abstract and difficult material can be easily understood through the presentation method. Presentation is a learning method that triggers students to be active in learning (Rusminie, 2021). Teachers can use images, videos, or animations to assist their teaching process. The learning process can completely contain thoughts and ideas (Nuraini, 2016). Through presentations, students and teachers can carry out maximum learning interactions with the students asking questions and the teacher explaining repeated material (Noor, 2021).

Learning media as a means of delivering material. The video media used in conveying learning material has drawbacks, including not all students can follow the material presented because when the video is played, the images and sound will still continue (Hasanah, 2020; Nurfadhillah et al., 2021). In addition to having drawbacks, PowerPoint is another type of media that teachers frequently use. For example, not all content can be displayed in it (Hasanah, 2020). In order to show content and animation or video simultaneously, physics learning media such as macromedia flash are required (Ikawati & Kurniawati, 2016). Through illustrations that are given to resemble real-world events closely, this media is used to help students comprehend the subject matter (Handayani et al., 2018).

A presentation-based macromedia flash design was created on static electricity material for junior high school or *Sekolah Menengah Pertama* (SMP) and *Madrasah Tsanawiah* (MTs) students based on the description of the issue. It would be simpler for teachers to carry out instruction with Macromedia Flash because it is conceptualized with presentation material presented in sequential order from competence standards and basic competencies, materials, and practice questions.

METHOD

This study combined development and investigation. The ADDIE model was selected during the planning phase (Branch, 2009). Figure 1 displays the growth chart for the ADDIE model.

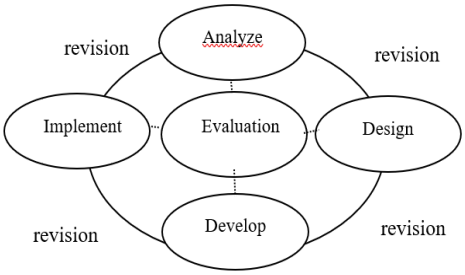

Figure 1 ADDIE Model Development

However, at the planning stage, the research phase included: the analysis,

design, and development stages. These three stages were carried out because this research produced a product in the form of valid and practical macromedia flash. While product testing and evaluation at the implementation and evaluation stages had not been carried out due to limited research time. Figure 2 showed the design study chart.

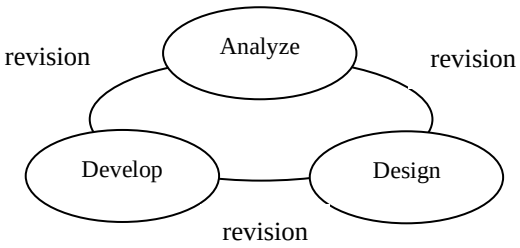

Figure 2 Presentation-based macromedia flash design chart

Data Analysis

The first activity during the analysis stage was identifying problems in the current use of learning media. Then, a needs analysis was conducted regarding the presentation-based macromedia flash design on static electricity material for SMP/MTs students. Three activities were carried out during this analysis stage: a) Problem analysis, b) Needs analysis, and c) Target characteristic analysis.

Design

Designing presentation-based macromedia flash content at this stage is important, as is creating animations, physics materials, and validation tools to evaluate the created media. Presentation-based macromedia flash is a media that supports the implementation of presentations, the presentation of the material is sequential according to the teacher's teaching needs. Starting from explaining competence standards and basic competencies, presentation of material, and practice questions. The results of the design phase are still conceptual.

Development Stage

At this development stage, the conceptual framework is realized into a finished product that is prepared for implementation. The product for SMP/MTs students consists of a presentation-based macromedia flash design on static electricity material. The experts also validated activities at the development stage on the media being developed. Then, the validation results were revised and tested on a small scale on SMP/MTs students to determine their applicability.

This study was conducted at SMP/MTs Bengkulu city. It covered a period of six months, from June to December 2022. The subjects of the small trial consisted of 9 students of grade IX junior high school in Bengkulu city.

Data collection techniques were carried out using documentation, interviews and questionnaires, as shown in Table 1.

Table 1 Data collection instruments

Data type	Instrument
Review curriculum	Documentation
Problem analysis	Interview sheet
Needs analysis	Questionnaire sheet
Target characteristics	Interview sheet and questionnaire
Media validation	Questionnaire sheet
Media practicality	Questionnaire sheet
Media practicality	Questionnaire sheet

Documentation was being done to identify the physics material that will be animated for SMP/MTs in class IX. In order to create a presentation-based macromedia flash, it was necessary to identify issues and student traits through interviews. The questionnaire was used to verify learning materials and media and evaluate their usefulness in small trials. Table 2 explains the questionnaire validation grid for the materials, media, and practicality evaluations.

Table 2 Material questionnaire validation grid, media, and practicality

Component	Aspect/statement
Material	Content eligibility
	Presentation eligibility
	Language eligibility
Media	Media cover design
	Media content design
Practicality	Ease of use
	Animation details on presentation-based macromedia are lacking
	Presentation-based macromedia helps understand the subject matter
	Macromedia-based presentations are already interesting

Data analysis was carried out by reviewing the contents of the curriculum and descriptive interview results, whereas the formula used to calculate the results of the questionnaire from the validator is as follows:

$$P = \frac{\sum X}{\sum X_i} \times 100 \quad (1)$$

Notes:
P = Percentage wanted
∑X = The number of validator answer values
$\sum X_i$ = Maximum number of values

Meanwhile, the basis for decision making is in Table 3.

Tabel 3 Criteria for the level of validity

Percentage	Validation Criteria
76-100	Valid
56-75	Valid Enough
40-55	Less Valid
0-39	Invalid

(Suharsimi, 2006)

RESULT AND DISCUSSION

At this analysis stage, three activities were carried out: 1) Problem analysis, 2) Needs analysis, and 3) Target characteristic analysis. Problem analysis was obtained through interviews with science teachers at SMP/MTs, they had prepared learning media. However, the media only contains science material. The specificity of presenting science material which is abstract has not been considered, so that the media has not been equipped with animation to sharpen students' conceptual understanding.

While the results of the needs analysis, Students' interest in learning is still missing when learning to use the media that teachers typically use, which were based on the results of interviews with students. This is due to the media's limited content, which makes it challenging for students to acquire science concepts in abstract material. Students need science learning media, especially in abstract physics material. They declared that media with concept animation is engaging and simple to comprehend.

Furthermore, based on the analysis of the target/student characteristics, it was stated that all students had smartphones. Most students preferred studying on their smartphones with learning media that included materials and animations. (Sriyanto & Sukarelawan, 2021).

At the design stage, determining the components of media content, physics material, designing animation, and designing validation instruments to assess the media to be developed were done.

Media Content Components

The menus home (title page), competence standards and basic competencies, materials, exercises, and profiles are some of the presentation-based media content components developed.

A curriculum review results in the determination of competency standards, basic competencies, and course materials. Static electricity was selected as the subject matter for this media based

on an evaluation of the curriculum. This information can be found in basic competency 4.4. Present the findings of observations regarding the symptoms of static electricity in grade IX students' everyday lives.

Presentation-Based Macromedia Flash Design Results

Macromedia flash is presented with a presentation display that begins with the title of the material, an explanation of competency standards and basic competencies, and material about static electricity, including electric charge, lightning descriptions, and lightning animations. Lightning animation is presented with lightning that occurs in the home environment. It can be seen in Figure 3. Next, the following questions allow for interactive, direct student responses. The number of questions that were correctly and incorrectly answered can be found after the questions by students clicking on the answers to the presented questions. Students can also learn what the exercise's overall purpose was. Lastly, macromedia flash designer profiles are also presented. It is hoped that students will be able to call the number provided on the profile if they have any issues using the program.

Students were very enthusiastic, as evidenced by observations made while they worked on interactive queries. They are competing to complete the issue as soon as possible, hoping to solve it the quickest and receive a prize from the teacher. This is in line with the findings of (Meryansumayeka et al., 2018) about interactive questions making it simple for students to use and answer problems. Additionally, there are no network limitations when students complete assignments using Macromedia Flash because these assignments don't require internet access. The typical student performance on Macromedia Flash-based tests falls into the good category, above 70. This is also in line with the findings of (Yunus, 2014) that there is a significant difference between the pre-test and post-test scores in classes that use Macromedia Flash and those that don't.

Results of the Validation Instrument Design to Assess Media

The media validation instrument was designed with a feasibility assessment by material experts, media experts and practitioners. Material feasibility includes content feasibility, presentation feasibility, and language feasibility. While the eligibility of the media includes: title design and media content design. Practicality includes usability, the absence of detailed animation in presentation-based macromedia, the ease with which the subject matter can be understood, and the already-interesting nature of the latter.

At this development stage, the existing conceptual framework is realized into a product that is ready to be implemented. The product is a presentation-based macromedia flash on static electricity for SMP/MTs students. Figure 3 displays the outcomes of product development.

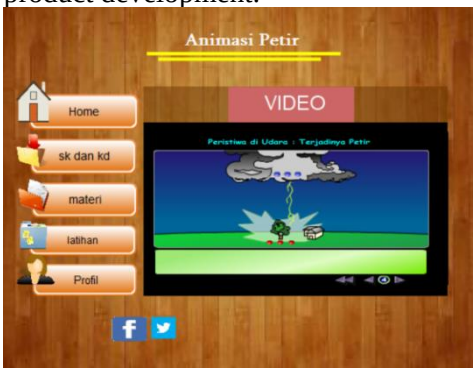

Figure 3 Macromedia flash based presentation on static electricity material for SMP/MTs

The specialists on the designed media are also verified through development stage activities. In order to evaluate the viability of the media, the validation findings were later revised and tested on a

small scale among junior high school students.

The validation results from two material experts, media, and practitioners in assessing material, media, and practicality are presented in Table 4.

Table 4 Product validation results by experts and practitioners

Validation	Validator		Notes
	Expert 1	Expert II	
Material Expert	100	91	Valid
Media Expert	91	90	Valid
	Practitioner 1	Practitioner II	
Practitioner	90	100	Valid

The validation results of Macromedia Flash based on the viability of the content received 100 and 91 out of a possible 100 points from the validator. Based on these results, the eligibility of the media material was declared valid. While the validator gave the media's findings for evaluating their eligibility for the media scores of 91 and 90 out of a possible 100. These findings led to the declaration of the media's eligibility as legitimate. Results of the practitioner evaluation scored 90 and 100 out of a possible 100. The practical worth of the media was determined to be valid based on the practitioner's evaluation.

According to the findings of student interviews, they claimed that the media that experts had deemed feasible made it simpler for them to comprehend the subject matter being studied because the use of the presented material was simple to understand, the media was simple to use, and the content was interesting. This is in line with the findings (Rahmi et al., 2019) that media which have been validated and declared valid are suitable for use.

While the viability of the elements of the content created in Macromedia Flash ensures that there won't be any negative effects, like misunderstandings, from using the presentation-based version of the software. If this occurs, students will carry incorrect conceptual knowledge into adulthood, making it challenging to change them (Kurniawati & Isniwati, 2019; Pratama et al., 2020). As a result, it is common for students to have misconceptions (Sukarelawan et al., 2019).

A small trial was conducted on grade IX junior high school students. This small trial aims to see the practicality test of presentation-based macromedia flash. Small trials were carried out in 2 JP and one meeting. In this small trial, nine students were participated. The nine students were drawn from three different middle schools: SMP 1 Kota Bengkulu, SMP 4 Kota Bengkulu, dan SMP 12 Kota Bengkulu.

CONCLUSION

The findings demonstrated that the presentation-based macromedia flash design outcomes as a learning medium for SMP/MTs static electricity material were accurate and could be utilized by SMP/MTs students. It was suggested that other researchers to be able to create or develop Macromedia Flash with other versions, such as using project-based and other related technologies.

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