The application of using video scribe on geometry optics material

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Abstract. On the subject of geometry optics, pictures that can facilitate students in understanding the material are needed. Therefore, learning media that can show animations or pictures that can be understood by students are needed. One of the learning media that can be used is video scribe. Video scribe application can show animations and writings in the form of videos. The stages of this product development are carried out by six stages, such as, concept, design, material collecting, assembly, testing, and distribution. The data collection technique used was product evaluation questionnaire. The product evaluation questionnaire is used to assess development products by material experts and media experts. On average, the result of the validation test by material experts obtained a score of 80,11%, in which it is feasible in terms of material. Whereas, the score by media experts was 84,16%, in which it is also feasible in terms of learning media. Based on the results of the feasibility test conducted, Video scribe-based high school physics learning media on the subject of geometry optics has an average value of 82,14% with a very good interpretation. So that this product can be used in a field trial for users to get a product that viable as an alternative learning media in the classroom.

1. Introduction
Education is a place for practicing, creating, manifesting quality human ideals, beside that, also practicing skills in certain subjects. Changes in the quality of learning is one of the bases in improving entire education. The development of information technology is very important for humans, especially in the advancement of the education system. In accordance with the development of science and technology (IPTEK) that is currently developing, educators are required to be able to determine the right learning methods and media [1]. The development of science and technology can be used as learning media in the school environment, as well as outside the school environment. Learning media can also play a role as a tool in learning activities. Through learning media, it is hoped that students can be independent in learning so that they can increase their intellectual potential and confidence [2].

Learning media in general are all form of teaching tools that are used to assist teachers in delivering subject matter to students in the teaching-learning process, thus, facilitating the achievement of the learning objectives that have been formulated. There are four forms/types of computer-assisted teaching software [3] such as exercise and practice, tutorial, simulation, and teaching with computer instruction (computer managed instruction). Computer regulated teaching refers to software that guarantees the progress of students in a planned instructional sequence. Here, the media functions as an intermediary for teaching and learning to improve the effectiveness and efficiency of achieving instructional goals.
In addition, learning media also functions to provide a basis for concrete experience of thinking in terms of understanding, and enhancing students’ attention.

Physics is not just a theoretical lesson that has no benefits in everyday life [4]. One of branches of physics, study of optics, explains things related to light as waves. This is related to reflection, refraction, and utilization in life. In geometric optics and optical devices, learning media are needed to convey more interesting learning material. On geometric optics subject, there are many pictures contained in textbooks that are difficult for students to understand. This is also agree with [5] which stated that the existing learning media is usually monotonous so that it requires media that can provide students with learning experiences. [6] Stated that the lack of student roles is the result of teacher domination in the learning process. Therefore, learning media are needed can show animations or pictures that can be understood by students is needed. One of the learning media that can be used is Videoscribe. Videoscribe can show animations and writings in the form of videos. The positive impact of the use of interesting learning media is to make the learning process and playing at the same time so that the learning atmosphere becomes more enjoyable [7].

2. Method
Research method used in this research is the research and development method (R&D). The stages of this product development are carried out by six stages, such as, concept, design, material collecting, assembly, testing, and distribution (Sutopo, 2009). The stages of product development can be seen in Figure 1.

![Figure 1. The Stages of Product Development](image)

The data collection technique used was product evaluation questionnaire. The product evaluation questionnaire is used to assess the product development by material and learning experts and media experts. The questionnaire grid that will be given to the material experts consists of 22 statement items divided into 3 dimensions as in table 1 and table 2.

| Table 1. Grid of Evaluation Instruments by Material Experts |
|---------------------------------------------------------|
| Dimension                  | Indicator                      | Quantity |
| Quality of Content and Purpose | Accuracy                      | 3         |
|                            | Actuality                      | 1         |
|                            | Contextuality                  | 1         |
|                            | Depth of Material              | 1         |
|                            | Ease of Material to be Understood | 1       |
|                            | Systematic                    | 1         |
|                            | Consistency of Evaluation with the purpose of learning | 1       |
The data analysis technique used the data interpretation from the material expert and media expert questionnaire. The limits of whether or not a quality of physics learning media on the subject of geometry optics by using VideoScribe using the interpretation of scores calculated by formula 1 and information on interpretation can be seen in table 3.

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\% \text{ Score Interpretation} = \frac{\sum \text{Acquisition Score}}{\sum \text{Maximum Score}} \times 100\%
\]

**Table 2.** Grid of Evaluation Instruments by Media Experts

| Dimension                          | Indicator                                      | Quantity |
|------------------------------------|-----------------------------------------------|----------|
| Quality of Content and Purpose     | Ease of Material to be Understood              | 1        |
|                                    | Consistency of Evaluation with the purpose of learning | 1        |
|                                    | Conformity with Students’ condition            | 1        |
| Instructional Quality              | Providing learning opportunity                  | 1        |
|                                    | Quality of student-teacher interaction         | 1        |
|                                    | Motivating students                            | 1        |
|                                    | Effectiveness in using learning media          | 1        |
|                                    | Bringing impact to the teacher and learning    | 1        |
| Technique Quality                  | Legibility                                     | 1        |
|                                    | Ease of language to be understood              | 2        |
|                                    | Impression quality                             | 2        |
|                                    | Voice quality                                  | 1        |
|                                    | Easy to be used                                | 1        |

Source: Private Document

**Table 3.** Score Interpretation

| Score Percentage | Information |
|------------------|-------------|
|                  |             |
3. Result and Discussions

3.1 Information Collection

This information collection is related to the needs in the field, in this case, a learning process in a school. Therefore, indicators need to be formulated which are the elaboration of main competencies and basic competencies displayed in table 4.

| Table 4. Main Competencies and Basic Competencies |
|--------------------------------------------------|
| **Main Competencies** | **Basic Competencies** |
| 3. understanding, applying, and analyzing factual, conceptual, procedural, and metacognitive knowledge based on the curiosity about science, technology, art, culture, and humanities with a knowledge of humanity, nationality, statehood, and civilization related to the causes of phenomena and events, as well as applying procedural knowledge in the field of study that is specific to the talents and interests to solve the problems.. | 3.11 Analyzing the working of optical devices using reflection and refraction properties of light by mirrors and lenses |
| 4. Processing, reasoning, and presenting in the concrete and abstract realms related to the development of what has been learned in school independently, acting effectively and creatively, and being able to use methods according to scientific rules | 4.11 Making works that apply the principle of reflection and / or refraction to mirror and lenses |

From the main competencies and the basic competencies in table 3, the indicators can be described in learning activity, such as

1. Learners can understand about reflection and refraction of light on the mirror or lens
2. Learners can explain the concept of reflection and refraction in daily life.
3. Learners can understand the law of Snellius about reflection and refraction.
4. Learners can explain the law of Snellius about reflection and refraction.
5. Learners can calculate the focus distance, the distance of the object, or the distance of the shadow on the mirror and lens.
6. Learners can calculate the magnification of shadows on the mirror and lens.
7. Learners can understand the absolute refractive index and the Snellius equation.
8. Learners can calculate the absolute refractive index and Snellius equation.
9. Learners can participate in fast, slow, and wavelength ratios of light with a refractive index.
10. Learners can explain special rays on concave mirrors and convex mirrors.
11. Learners can draw the formation of special rays on concave mirrors and convex mirrors.
12. Learners can explain three special rays on convex lenses and concave lenses.
13. Learners can draw special rays on convex lenses and concave lenses Peserta didik dapat menghitung kuat lensa.
14. Learners can explain concepts in the eye, camera, loop, microscope and binoculars.
From the indicators that have been elaborated from the main competencies and the basic competencies in Table 3, then a mindmapping was made. This mind mapping is used to facilitate the flow of material so that there is a link between one topic of discussion and the topic of another discussion. Mind mapping is related to the subject of geometric optics seen in Figure 2.

![Mindmapping Material]

**Figure 2. Mindmapping Material**

### 3.2 Product Design

After collecting information and carrying out material inventory, then the media was made. Multimedia development is only done until the fifth stage, testing. The five stages are carried out, such as concept, design, material collecting, assembly, testing.

1. **Concept**, the concept stage is to determine goals, including audience identification, type of application (presentation, interactive, etc.), application objectives (information, entertainment, training, etc.) and general specifications. In this stage an inventory of geometric optics material for high school students of X IPA was also conducted.

2. **Design**, the second stage is design there are 3 types of design, namely multimedia-based design, navigation structure design, and object-oriented design. This media uses a navigation structure design. The navigation structure provides an overview of links from page one to another page. The type of navigation structure used is linear design. The model used is the spoke-and-hub-model. Relations are expressed by the main page that has a relationship with each node. Each node can relate back to the main page. In this model there are only two kinds of links, from the main page to certain pages, and from certain pages to the main page. This material is used is geometric optics from reflecting light, curved mirrors, reflection, refraction of light.
3. Material collecting, at the stage of collecting materials, material collection such as picture 3, animation, audio, photos and videos is needed for the next stage. Selection of materials tailored to needs. The required images are made with the help of Microsoft Word and Snipping Tool.

![Figure 3. The making of image with Microsoft Word](image)

4. Microsoft Word is used because it is very easy to use to create images. While the Snipping Tool is used to capture images made in Microsoft Word. While the animation is made with the help of the Adobe Animate application and saved using the extension gift.

![Figure 4. The making of the moving object with Adobe Animate](image)

5. Assembly, assembly or manufacturing stage is the stage of combining all the prepared material so that it becomes a unit in the form of video. At this stage, all multimedia objects are created and combined. Making applications based on storyboards, flowchart views, navigation structures, or object diagrams originating from the design stage. Making this media uses Videoscribe to input and combine text, animation, photos and audio. The final result of Videoscribe media is mp4 video. After all the components have been combined in one script, the video is played at once recorded using the help of Snagit12 media. Videoscribe media can render videos, but it takes a very long time and often fails. Therefore, the author uses Snagit12 media that is easy to use and effective. The maximum duration for making a video is only for 1 minute.

![Figure 5. The process of inserting the image and the explanation to the script](image)
6. Testing, In the testing stage, the finished video will be played on videoscribe applications. Look at how each animation moves and timeliness. If there is a problem with the video, editing is done. Editing is done on each animation or text to run according to the timeliness. Editing is also done if the writing on the video is too small and the image on the video breaks or blur.

![Figure 6. The user interface of videoscribe](image)

### 3.3 Product Design Validity

The next step is to validate or test the feasibility of the product that has been made. Validation of this product is done by giving questionnaires to experts who are divided into two, such as material experts and media experts. Material experts are lecturers who teach basic physics and optics courses at physics education program, Indraprasta PGRI University. The minimum value obtained based on expert questionnaires is 75% with good interpretation, and the maximum value obtained is 100% with very good interpretation. If it is being averaged, the average value obtained is 80.11%, which means that this media according to experts is very feasible to be tested at school.

The next validity test is media testing. Media experts are lecturers who are experienced in making media. Media experts consist of two lecturers, such as teaching lecturers in the visual communication design study program (DKV), Indraprasta PGRI University and instructional media lecturers in the Informatics Engineering study program, Muhamadiyah University of Tangerang. The minimum score obtained is 75% with good interpretation and a maximum score of 100% with very good interpretation. The average score of the validation results by media experts is 84.16% with very good interpretation. Thus, this means that according to media experts it is appropriate to be tested at school.

Thus, after conducting a validation test of material experts and media experts, the feasibility value of the product was developed with an average value of 82.14% with very good interpretation. So that this product can be tested in the field for users to get a product that is feasible to use as an alternative learning media in the classroom.

### 4. Conclusions

On average, the results of the validation test by the material expert obtained a score of 80.11% which means that it is feasible in terms of material. Whereas, by media experts, the score of 84.16% which means that it was feasible in terms of learning media. Based on the results of the feasibility test
conducted, the videoscribe-based high school physics learning media on the subject of geometric optics is feasible to use as a learning media with an average value of 82.14% with very good interpretation. So that this product can be tested in the field for users to get a product that is worthy to be used as an alternative learning media in the classroom.

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