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DEVELOPING A NATURAL SCIENCE LEARNING VIDEO OF HUMAN RESPIRATORY SYSTEM FOR THE FIFTH GRADERS AT SDN 1 TELAGA USING SIMPLE MATERIALS

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Abstract : This research aims to develop a natural science learning video of the human respiratory system using simple materials. We used Borg and Gall's model yet in a limited manner as we only used the five initial stages the model required, i.e., (1) finding the potentials and problems, (2) collecting information and literature studies, (3) designing the product, (4) validating the design, and (5) revising the design. Research data were collected using observation and interview methods. Findings indicate that the mean of the validity score of visual media and materials included in learning media was 93.33% and 94.54%, respectively.

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INTRODUCTION

Teaching-learning activities are important in the education process in schools. In other words, the well-achieved goals of education are built upon how good a learning process student have is. Usman (2000), in Hasan (2015), argues:

> "*A teaching-learning process was a process carried out in an educative atmosphere to achieve a specific goal. Objects engaged in the process were teachers, students, and the material being taught."*

Learning processes conducted in schools are not necessarily facile. In practice, diverse issues must appear, from either teachers or students. This is an obvious marker, that learning processes are dynamic, demanding teachers to perform a consistent observation of any changes in students and innovate the strategies and methods they use when teaching.

Before researching, we made a preliminary observation in the field. We figured out that, the science teacher who taught fifth graders in SDN 1 Telaga did not use learning media well, especially for the material of the human respiratory system. The learning method used was the lecturing method, in which the teacher explained the material and students listen to him and accept the material. This made students bored and consequently could not focus on the material. Additionally, students apparently did not find any difficulty during the learning process and we had identified no learning motivation in them, giving them poor learning achievements. As such, we should renew the learning method used by the teacher, i.e., by using proper technology in the learning process. Using learning media in a teaching-learning process is deemed

effective to prompt students to engage in the process more actively.

Natural science constitutes a subject which studies natural phenomenon (Samatowa, 2010). An ideal science learning process should use learning media which will ask for a more active engagement from students. In making learning media, teachers can use simple affordable materials which correspond to the materials being taught or discussed in the science subject for primary school students.

Referring to the explanation, we were strongly motivated to conduct research on "**Developing a Natural Science Learning Video of the Human Respiratory System for Fifth Graders in SDN 1 Telaga Using Simple Materials**". This research aimed to develop a science learning video, in which we used simple materials, of the human respiratory system for fifth graders. Also, we wanted to analyze the reliability of the video for learning.

RESEARCH METHODS

We used a research and development method and Borg and Gall's development model (in Sugiyono, 2011:408). The product we developed as learning media was in the form of a science learning video of the human respiratory system for fifth graders using simple materials.

Borg and Gall, in their development model, designated ten stages, namely (1) potentials and problems, (2) information collection and literature studies, (3) product design, (4) design validation, (5) design revision, (6) product trial, (7) product revision, (8) application trial, (9) product revision, and (10) massive production. However, we only used five of the ten stages because we intended to apply this research on a small scale. The development stages in this research are depicted in Figure 1.

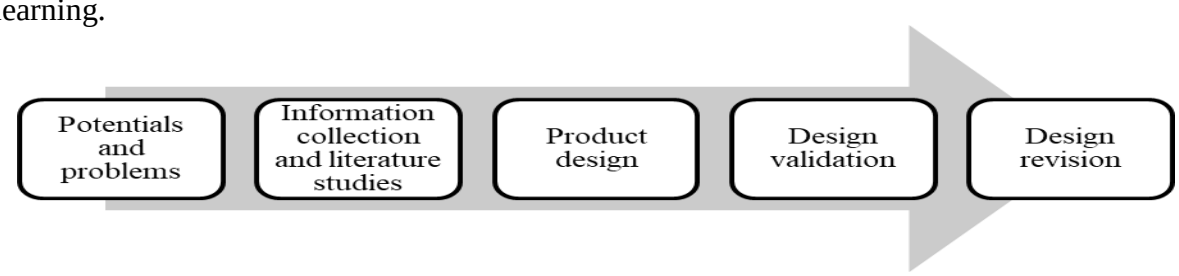

Figure 1. Stages Implemented to Develop a Natural Science Learning Video

Data collection was performed by interview, observation, and documentation. The design was assessed for validity using a media validation sheet and material validation sheet, adjusted to the validation sheet issued by the Directorate of Secondary Education of the Ministry of Education and Culture of the Republic of Indonesia in 2015, under a stipulation of choosing certain parts which corresponded to research needs. The data of the validation result were then analysed by finding the reliability percentage and interpret it in accordance with Table 1 (Arikunto, 2006).

$$P = \frac{Total\ score\ of\ collection\ result}{Total\ criteria\ score} \times 100\%$$

Description
P = reliability percentage

Table 1. Reliability Criteria of Natural Science Learning Video Using Simple Materials

Percentage Score (%)	Interpretation
P > 80%	Highly reliable
61% < P ≤ 80%	Reliable
41% < P ≤ 60%	Fairly reliable
20% < P ≤ 40%	Inadequately reliable
P ≤ 20%	Highly inadequately reliable

RESULT AND DISCUSSION

Result

Media Expert's Validation

$$Mean = \frac{Score\ of\ collection\ result}{Criteria\ score} \times 100$$

$$= \frac{42}{45} \times 100$$

$$= 93.33$$

Based on the media expert's validation, the natural science learning video of the human respiratory system using simple materials developed acquired a mean of the validity score of 93.33 with a **highly reliable** criterion. Nevertheless, the natural science learning video developed should be revised following the validator's suggestions before tried out in the field.

Table 2. Media Expert's Validation of Natural Science Learning Video Using Simple Materials

No.	Aspects Assessed	Assessment Indicators	Score				
			1	2	3	4	5
1	Appearance	Precision in choosing the background					√
		Colour harmony					√
		Picture clarity				√	
		Precision in picture size					√
		Precision in type, variation, and font					√
		The appeal of video					√
Subtotal Score = 29							
2	Presentation	Presentation of video which supported student engagement in learning activities				√	
		Interesting picture presentation				√	
Subtotal Score = 8							
3	Voice	The clear voice when presenting					√
Subtotal Score = 5							
Total Score = 42							

(Source: Primary data processed, 2019)

Material Expert's Validation

$$Mean = \frac{\Sigma\ score\ of\ collection\ result}{\Sigma\ criteria\ score} \times 100$$

$$= \frac{52}{55} \times 100$$

$$= 94.54$$

Referring to the material expert's validation, the natural science learning video using simple materials of the human respiratory system developed acquired a mean of the validity score of 94.54 with a **highly reliable** criterion. Nevertheless, the natural science learning video developed should be revised following the validator's suggestions before tried out in the field.

Table 3. Material Expert's of Natural Science Learning Video Using Simple Materials

No.	Aspects Assessed	Assessment Indicators	Score				
			1	2	3	4	5
1	Learning	The correspondence of material to the core competencies (KI) and competence achievement indicators				√	
		The clarity in achievement indicators				√	
		Precision in materials					√
		The clarity in examples provided					√
		Material presentation order					√
		The use of pictures and videos to explain materials					√
Subtotal Score = 28							
2	Language	The correspondence of language to students' thinking levels					√
		Material understandability					√
		Precision in grammar and spelling					√
		Language function				√	
		Curiosity encouragement					√
Subtotal Score = 24							
Total Score = 52							

(Source: Primary data processed, 2019)

Discussion

The product generated by this research and development was a natural science learning video of the human respiratory system using simple materials the R&D development model by Borg and Gall (in Sugiyono, 2011:408). The model consisted of ten stages but as we have a research time constraint, we used only five stages, which were (1) potentials and problems, (2) information collection, (3) product design, (4) design validation, and (5) design revision.

To begin the product design, we performed observation at the school. We later found that facilities to support learning media development had been provided, however, the teacher seemed not to understand how to use, for instance, the LCDs and projectors provided. Furthermore, aggravating that situation, the teacher did not show any intention to learn how to use those instruments. We then inferred that he needed new learning media, visual and audio, which were more appealing and able to accommodate diverse learning styles. A natural science learning video product using simple materials was expected to be the basis to which we can refer when we were developing learning media teachers could use to perform desirable good learning activities.

In the first stage, which was finding the potentials and problems, we conducted advanced observation after we conducted preliminary observation for approximately two months at the same time when we conducted PPL in SDN 1 Telaga. We found some challenges the teacher confronted when having teaching-learning activities (KBM). The challenges were, for example, the fifth-grade teacher's poor ability in technology. He could operate neither LCD, laptop, nor projector, three instruments which were considered effective to support learning processes and motivate students to accept materials given.

To collect information regarding problems the teacher and students faced off during a teaching-learning process, we prepared the instrument needed, format, and guidance sheet to conduct an interview and documentation with the fifth-grade teacher and students at different times.

In designing the product, we planned what steps implemented to make the product were, from the initial to final step, which was video editing. Firstly, we made the script, or the initial design of the product made, including introduction, apperception, material, evaluation, and closing. Secondly, we collected and prepared the materials used, i.e., the laptop in which the video maker application had been installed and the materials needed (a used bottle, small balloon, big balloon, rubber bracelet, plasticine, and hose). After all materials had been prepared, we made a video using those simple affordable materials. We furnished the initial product designed to be an elaborative natural science learning video of the human respiratory system using the application Adobe Premiere Pro CC 2017.

In essential, our natural science learning video of the human respiratory system using simple materials had referred to the lesson plan and the guidebook for teachers but with several strengths and preeminence, namely:

a. This product was in the form of video, allowing students to watch the material more clearly.
b. This product contained the chosen material, which was the human respiratory system.
c. This video rendered alternative substitutes for laboratory instruments using easy-to-get, affordable, and safe materials.
d. Pictures selected had been adjusted with students' learning development and thinking levels, preventing them from boredom when they were learning.
e. This video presented scientific approaches, such as "Let's do that, Let's try that, Let's observe that". As a

result, students would likely be more active when learning science using the video.

The product developed was validated by a media expert and a material expert. Media validation encompassed several aspects, i.e., appearance, presentation, and voice. The mean of media validation score was 93.33, which was categorized as "highly reliable". Meanwhile, material validation included two aspects, namely learning and language, in which we acquired a mean score of 94.54, which was thus categorized as "highly reliable". Based on the two validation results combined, the recapitulated mean score of the natural science learning video of the human respiratory system using simple materials was 93.93, which was "highly reliable" and thus we could proceed to the next stage.

To give a good quality video, we revised our simple science learning video of the human respiratory system one time. The revision was stylized based on the media and material experts' suggestions and comments. We also had a constraint and challenge in this research that the making of this natural science learning video of the human respiratory system using simple materials only reached the revision stage.

CONCLUSION

Developing learning videos as an alternative teaching-learning method in schools was urgently to elevate students' achievements and learning interests in schools. Experts' validation results of the learning video made indicated that the video was **highly reliable** to use, in terms of either visual or material aspects. However, some stuff should be rectified to enable optimal use of the video, among which was teachers' ability to operate instruments which support learning media, i.e., LCD and laptops.

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