The Development of Animation Videos Based on Inquiry Learning With The Theme 'My Environment' to Train the Creative Thinking Skills of Grade VII Students

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ABSTRACT

The uniformity of student responses, which tends to indicate convergent thinking or mere knowledge reproduction, warrants attention as it reveals the students' cognitive process.Therefore, learning media that can stimulate students' creative thinking processes more optimally are needed. This study aimed to obtain data and describe the efficiency level of inquiry learning-based animated videos with the theme "My Environment" to train creative thinking skills of 7th-grade students. The method used is Research and Development (R&D) with the Borg and Gall model, modified into 7 steps: problem analysis, data collection, product design, product validation, product revision, product trial, and revision of trial results. The research subjects are material experts, media experts, practitioners, and students. The data types used are expert validation sheets to test validity by material experts, media experts, and practitioners, as well as student response questionnaires to determine the product's efficiency level. The results show that based on material expert validation, the percentage is 88.6% with the category "Very Valid", media expert validation obtains a percentage of 92.4% with the category "Very Valid", and practitioner validation (science teachers) obtains a percentage of 90.3% with the category "Very Valid". The efficiency level of the animated video product obtains a percentage of 86.9% with the category "Very Efficient".

Keywords: *animation video; inquiry learning; creative thinking skills; my environment*.

INTRODUCTION

Currently, the world has entered the era of the 4.0 industrial revolution, marked by increased connectivity, interaction, and development of digital systems, artificial intelligence, and virtualization. It can be seen that this era is becoming more human-centered and technology-driven, which will undoubtedly impact various sectors of life. One of them is the impact on the education sector in Indonesia. To face this era, education that can shape a generation capable of mastering 21st-century competencies is required. Mastering 21st-century competencies has become extremely important. In this era of industrial revolution 4.0, globalization can increase significantly, so everyone must have the ability to create new ideas. To create new ideas, students must be accustomed to training their creative thinking skills, which is one of the 4C competencies that students must possess. Creative thinking is a person's ability to form something new (Anik, 2013). Thus, creative thinking skills are essential for students, given the rapid development of science and technology (Kiki, 2017). To help stimulate students' creative thinking skills, the teacher's role is crucial in creating learning that can help students express their ideas.

Field facts obtained through interviews show that students' creative thinking skills are still relatively low. The current pandemic situation has undoubtedly impacted the learning process in schools. Therefore, the Ministry of Education and Culture issued a policy of limited face-to-face learning with limited time allocation. In principle, through science learning, students can gain direct experience to develop their competencies in studying knowledge naturally. However, due to the current situation, students can only understand the material

thoroughly through online learning. Online learning causes teachers to tend to assign tasks through learning media such as Google Forms, Classroom, e-learning, or WhatsApp.

Science learning is delivered in an integrated manner through lectures by teachers. Additionally, due to the pandemic situation, teachers occasionally only provide worksheets to students without direct guidance. Given the similarity in students' answers, it can be said that students have not been able to provide their thoughts originally. Considering one of the life skills that requires students to create new ideas or thoughts to compete in the current era of development, where providing original thoughts or ideas is one of the indicators of creative thinking ability, namely the ability of students to provide new ideas in answering a question. Following the development of the times, one way to develop learning methods is by developing learning media integrated with learning models. In current technological developments, animation can provide explanations of learning concepts along with text, graphics, and colors, making it a means to attract attention and improve student understanding (Fitriani et al., 2020).Animation refers to a series of images that create the illusion of movement when displayed in sequence. This is evident in animated films, where the images on screen appear to come to life and move (Hanifah,2015). The learning model used must consider the success or achievement in improving students' creative thinking skills in learning. One of the learning models that can be used to improve students' creative thinking skills is the inquiry learning model. This model is a series of teaching and learning activities that involve all students' abilities to search and investigate, so they can formulate their own discoveries (Mashuri, 2016).

RESEARCH METODH

This research used a research and development model. The design used in this research refers to the Borg and Gall development design, which has been modified into 7 steps from the original 10 steps. The types of data in this research are qualitative and quantitative. Qualitative data is obtained from the analysis of learning media development needs, as well as criticism and suggestions obtained from material validation sheets, product validation sheets, and student response questionnaires. The research instrument for developing this animated video uses validation sheets and student response questionnaires to evaluate the developed animated video using product assessment sheets. These sheets are divided into four components: media expert validation test instruments, material expert validation test instruments, science practitioner validation test, and student response questionnaire instruments.

The data analysis technique used in this research employs assessment criteria in the form of a Likert scale with scores ranging from 1 to 5 to determine the validity of the developed media.

Table 1. Rating Score Scale

Score	**Rating Category**
5	Very Good
4	Good
3	Sufficient
2	Less
1	Very Less

Data obtained is then calculated using the formula:

$$\frac{scoresobtained}{maximumscore} \times 100\%$$

After obtaining numerical results from the calculation, the scores will be converted into qualitative categories based on validity criteria.

Table 2. Validity Percentage Category

Percentage	**Category Validity**	**Qualification**
84% <skor ≤ 100%	Very Valid	Not Revised
68% <skor ≤ 84%	Valid	Not Revised
52% <skor ≤ 68%	Sufficient Valid	Revised
36% <skor ≤ 52%	Less Valid	Revised
20% <skor ≤ 36%	Very Less Valid	Revised

The technique used to determine student responses is in the form of data obtained from the

results of student response sheets with scoring criteria ranging from 1 to 5 using a Likert scale.

Table 3. Rating Score Scale

Score	Rating Category
5	Strongly Agree
4	Agree
3	Less Agree
2	Disagree
1	Strongly Disagree

The data obtained will be calculated for the average score of each assessment criterion aspect using the formula:

$$\%NRS = \frac{\sum_{i=1}^{n}}{NRSMax} \times 100\%$$

Information :
NRS : The desired percentage value
$\sum_{i=1}^{n}$: The score acquired
NRS Max : The maximum score
100% : A fixed amount

RESULT AND DISCUSSION

The development of the product design, which is an animated video, began with the researcher compiling the creation of the animated video based on the analysis of student needs obtained during the interview process and data collection that supports the development of this media.

The chosen theme is "My Environment" with a Connected integration model using KD 3.8 for 7th grade and KD 3.7 and 3.9 for 8th grade. The researcher designed this animated video using Canva and Kinemaster software. This animated video is designed based on inquiry learning.

To determine the validity level of the animated video, the researcher conducted a validation test with 3 expert validators. However, it seems there might be a slight discrepancy in the number of validators mentioned. According to the text, the validation test was conducted by two material expert validators, two media expert validators, and three practitioner validators, who are junior high school science teachers from Serang City. The validation technique used a validation questionnaire sheet as an evaluation and assessment tool, and the researcher also received comments and suggestions from the expert validators. The quantitative data from the calculations of all validators can be seen in Table 4 below:

Table 4. Results of Expert Validation

Validator	Persentase	Kategori
Ahli Materi	88,6%	Sangat Valid
Ahli Media	92,4%	Sangat Valid
Ahli Praktisi	90,3%	Sangat Valid

The results in Table 4 show that the assessment by material experts was 88.6% (Very Valid). The assessment conducted by media experts scored 92.4% (Very Valid). The assessment by practitioner experts obtained 90.3% (Very Valid). Based on the results obtained from the expert validators, it is stated that the animated video based on inquiry learning with the theme "My Environment" to train the creative thinking skills of 7th-grade students meets the predetermined level of validity. The detailed assessment from the expert validators is described below:

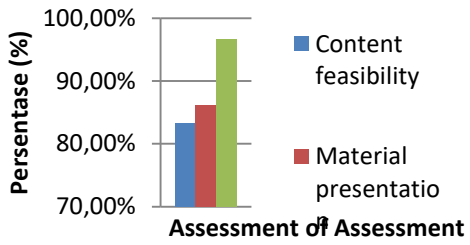

Figure 1. Material Validation

1. Material Validation

Validation of the material on the animated video based on inquiry learning with the theme "My Environment" to train creative thinking skills of 7th-grade students was conducted by 2 lecturers of Biology Education, Faculty of Teacher Training and Education, Sultan Ageng Tirtayasa University. The validation carried out by material experts regarding the aspects of content feasibility, material presentation, and language was done by filling out a questionnaire on a scale of 1-5. The results of the material validation had an average

of 82.2% for all aspects in the "Valid" category. The results of the material expert validation are displayed in Figure 1.

The assessment results for the feasibility aspect of the content obtained a percentage of 83.3%, which falls into the "Valid" category. This was based on the average score from one indicator, namely the suitability with core competencies (KI) and basic competencies (KD). The scores obtained from material expert 1 and material expert 2 indicate that the material presented in the animated video based on inquiry learning is in line with the discussion on learning KD 3.8 on environmental pollution regarding water pollution and its impacts, KD 3.7 on the interaction of living things with the environment, and KD 3.9 on global warming. This is in accordance with the opinion of Lilis et al. (2022:327) that KI and KD must be aligned with the material, as it can impact the learning process for students. Therefore, selecting KI and KD that match the theme can be clearly seen.

Looking at problems from different perspectives can help students solve problems with various possible answers. This is in line with what Munandar (2004:37) stated in his book, that providing various possible answers to a problem based on the given information can be considered as thinking creatively. The material used not only discusses one learning topic but various topics, such as environmental pollution, human interaction with the environment, and global warming. The material used is suitable for the students' cognitive level. This is in accordance with Tejo statement (2015) that a media should contain material that can be mastered by students.

To train students' creative thinking skills, the indicator of elaboration or detail is quite important. According to Azhari and Somakim (2015), one of the reasons for students' low creative thinking skills is the lack of ability to elaborate, where students are not yet able to deepen their understanding of a concept and develop it into a solution to solve a problem.

The assessment results for the linguistic aspect obtained a percentage of 96.6% with the category "Very Valid", which was obtained from the average score of 2 indicators, namely the suitability of language with student development and language usage. The animated video can be heard clearly. This is in line with Ratna's statement (2020) that students can more easily understand the material presented if there is support for language effectiveness with clear vocabulary. The language used in this animated video is suitable for the students' development. This is in accordance with Meina statement (2015) that suitability with student development can be applied by using language that is frequently used and easily understood.

2. Media Validation

Media expert validation on the animated video based on inquiry learning with the theme "My Environment" to train creative thinking skills of 7th-grade students was conducted by 2 lecturers of Chemistry Education, Faculty of Teacher Training and Education, Sultan Ageng Tirtayasa University. The media validation aimed to assess the display of the developed media product. The validation carried out by media experts included aspects of presentation, graphics, and sound with a rating scale of 1-5. The results of the media expert validation can be seen in Figure 2.

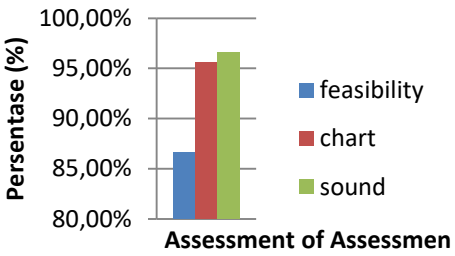

Figure 2. Media Validation

The assessment results for the content feasibility aspect obtained 86.6%, categorized as "Very Valid". The material presentation aspect had a percentage assessment result of 95.6%, categorized as "Very Valid". The language aspect had a percentage assessment result of 95%, categorized as "Very Valid". Thus, the overall average score from the three assessment aspects by material experts was 92.4%, categorized as "Very Valid".

The text in the animated video is clear, but still needs improvement by adding subtitles. Subtitles are the delivery of dialogue in text form in the video and are used to clarify words that are not heard clearly (Zohriyatun et al., 2019). The font size used is suitable (not too big or too

small). The use of suitable and easy-to-read fonts shows that the display is suitable and has a clear focus (Hilda, 2022).

There is consistency in the use of colors in the animated video. The consistent use of colors that match reality will add to students' knowledge related to the environment. In addition, the right color selection will minimize misunderstandings in its use (Ady, 2021). The animation and color combination are attractive, making students more interested in learning (Sofi, 2021).

The layout arrangement at the beginning, content, and end of the video gives a good rhythm impression and pays attention to the overall color display. This shows that the animated video uses the right color selection. According to Ady (2021), the suitability of colors used can minimize misunderstandings in the learning process.

The placement of image layout is consistent, the unity of display between text and illustration, the video is displayed attractively, and the illustration can describe the material being displayed. Attractive illustrations can facilitate students' understanding of learning materials. This is in line with Rachmadiyarti statement (2018) that the presentation of material with illustrations and examples packaged attractively through a combination of images and text makes students more actively involved in learning.

3. Practitioner Validation

The practitioner expert validation on the animated video based on inquiry learning with the theme "My Environment" to train creative thinking skills of 7th-grade students was conducted by 3 experts, including science teachers from SMPN 13 Serang City, SMPN 14 Serang City, and SMPN 2 Serang City. This practitioner expert validation was conducted to obtain assessments and suggestions regarding the aspects of content feasibility, presentation, and language used in the developed animated video. The average percentage result obtained from the three science teachers was 90.3% with the category "Very Valid". The results of the practitioner expert validation can be seen in Figure 3.

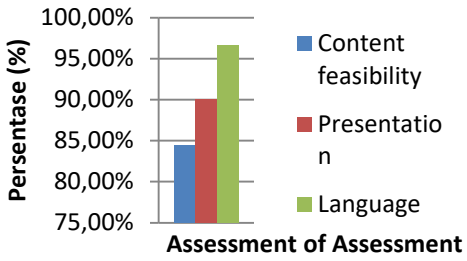

Figure 3. Practitioner Validation

The assessment results from 3 science teachers on three statements, including the suitability of the media with Core Competencies (KI), the suitability of the material with Basic Competencies (KD), and the material's alignment with the connected integration type. This connected model has characteristics in linking one topic to another. The animated video uses water pollution as the main material, which is then connected to supporting materials such as living organism interactions and global warming. The components of the animated video begin with providing orientation, directing students to formulate problems, guiding students to make hypotheses, containing material needed by students to collect information, directing students to conclude the truth of the hypothesis and final conclusions. The inquiry learning model in this animated video is used to help students train their creative thinking skills. This is in line with Ni Ketut (2019), who suggests that creative thinking skills can be trained through inquiry learning models. Similarly, research conducted by Wahyuni (2023) states that developing students' creative thinking skills can be done by applying the inquiry model, as it enables students to think and build upon what they have learned based on experience, leading to new ideas.

The animated video also provides material that suits students' needs, and the breadth of material presented is tailored to students' ability levels. According to Firdha (2019), the breadth of material can be seen based on concepts, definitions, principles, examples, and questions that support the achievement of KI and KD. Furthermore, the video layout is aligned with the material, and the integrated material is presented in a coherent and systematic manner. The sound in the video is clear and understandable, and the material is presented in a

language that is easy to comprehend. According to Lia (2023), an engaging animated video with a combination of colors and supporting text, accompanied by audio, will be more captivating. The use of animated videos in learning can also help students understand abstract material and make it more concrete (Siti, 2021).

The Efficiency Level of Animated Video Product Based on Inquiry Learning with Environmental Theme to Train Creative Thinking Skills of 7th-Grade Students

A limited trial of the animated video based on inquiry learning with the theme "My Environment" was conducted after improvements were made based on suggestions and input from material experts, media experts, and science teacher practitioner experts. This limited trial aimed to collect data and determine the efficiency level of the animated video based on inquiry learning through student responses regarding the content, display, and language, with the goal of training creative thinking skills of 7th-grade students on the theme "My Environment".

The limited trial was conducted at SMPN 13 Serang City, involving 15 students as research subjects. The percentage results obtained showed an efficiency level with the category "Very Efficient". This is presented in Table 5 below:

Table 5. Student Response Questionnaire Results

Aspek	Persentase	Kategori
Isi materi	88,6%	Efisien
Tata bahasa	92,4%	Sangat Efisien
Tampilan media	90,3%	Sangat Efisien

Based on the calculation results in the content aspect, a percentage value of 78.9% was obtained with the category "Efficient". This result was obtained from the average of 2 assessed indicators, namely content and presentation of inquiry-based learning material integrated with creative thinking indicators. According to Nana (2017), inquiry-based learning can improve students' abilities. Inquiry learning strategies emphasize the process of searching and finding (Encep, 2024). Students are guided by teachers with guiding questions so that students can find their own direction and actions to solve problems given by the teacher (Sonia, 2016).

The content indicator obtained a percentage result of 85.3% with the category "Very Efficient", indicating that the animated video is presented in a relevant way to students' daily lives. This also helps students understand the material on the theme "My Environment". According to Astari (2021), student assessments state that the material delivered through this media is feasible for them to use. This learning media has made a significant contribution to improving students' understanding of the material being taught.

To determine students' creative thinking abilities, indicators of creative thinking abilities are observed, including fluency, flexibility, originality, and elaboration indicators. The fluency indicator trained students to provide various alternative answers in responding to a question. To train this ability, a question is presented asking students to mention other factors that can cause river water pollution, except for trash. The answers given by students show several alternative answers, indicating that students can meet the characteristics of fluent thinking, including gathering information and finding various answers. According to Winda et al. (2016), students who can think fluently have the ability to convey concepts clearly, ask several questions, and generally have faster thinking speeds than other students.

The flexibility indicator trained students to see a problem from different perspectives. To support students in having this ability, students are trained with investigative activities through simple experiments, namely simulating water pollution that can be done independently at school or at home. However, although this indicator is categorized as "Efficient", it has a lower percentage than other indicators because some students have not been able to provide answers from different perspectives. According to Rahayu et al. (2019), problem-based learning can train students to provide varied ideas in solving problems, thereby fostering students' ability to think flexibly.

The originality indicator trained students to provide ideas based on their own thoughts. To train this ability, a problem is presented in a coherent manner based on the inquiry learning

syntax. The problem is about river pollution in a news article, and students are asked to observe the condition of the river around them, so that later students can provide their ideas at the end by making a conclusion about the content of the material in the animated video with their own abilities and language. According to Abd (2021), students who can think creatively will be able to convey various interpretations from their own perspective.

The elaboration indicator trained students to expand or develop existing ideas. To train this ability, a question is presented about alternatives that can be done to reduce water pollution in rivers, which can be seen through the answers given by students in a final conclusion. According to Mardhiyana and Wahani (2019), elaborating or developing students' ideas in finding solutions can be done through activities that encourage creativity. This shows that the material presented through the inquiry-based animated video is contextual and able to train students' creative thinking abilities.

The animated video has a language that is easy to understand, and the sound in the video is clear, making it easy to comprehend. According to Dian (2020), ease means that the material can be easily understood, remembered, and accessed technically through the internet. According to Ratna (2020), students will more easily understand the material if there is support for language effectiveness with clear and precise vocabulary.

The material with the theme "My Environment" presented in the form of an animated video is interesting, helping students understand the material, and motivating students to take care of their environment. Environmental care character education needs to be instilled for the sustainability of living beings (Euis, 2024).

CONCLUSION

Based on the research and development conducted, the animated video based on inquiry learning with the theme "My Environment" to train creative thinking skills of 7th-grade students achieved the category of "Very Valid" with a percentage result of 90.4%, obtained from the assessment results of material experts at 88.6% with the category "Very Valid", media experts at 92.4% with the category "Very Valid", and practitioner experts at 90.3% with the category "Very Valid". Therefore, it can be said that this animated video can be used for limited trials.

Future research should aim to conduct large-scale field tests to ensure that the product developed can be utilized effectively and efficiently for widespread implementation.

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