

DEVELOPING ANIMATED VIDEO FOR WATER CYCLE TOPIC IN FIFTH GRADE OF ELEMENTARY SCHOOL

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Received 13 January 2024; Received in revised form 12 March 2024; Accepted 9 April 2024

Abstract

The low level of student motivation in studying the water cycle has resulted in reduced instructional effectiveness. This factor is attributed to the limited utilization of technology by teachers to enhance the appeal of the learning process, with teachers predominantly relying on textbooks as the primary instructional resource. The research aims to evaluate the validity and practicality of animated video media as a supplementary tool for understanding the subject matter and fostering learning motivation, specifically concerning the water cycle topic for 5th-grade elementary school students. Data were obtained through the ADDIE model phases (Analysis, Design, Development, Implementation, Evaluation). The research findings indicated that the material presented in the instructional videos exhibits a remarkably high level of suitability for delivery to students, with an average validation percentage of 100% by subject matter expert and 95,14% by media expert. Additionally, an evaluation of the practicality of this media revealed an average percentage of 89% from student feedback and 100% from teacher assessment. Consequently, it can be inferred that this animated video product is both valid and practical for utilization within the realm of educational instruction.

Keywords: learning media, animated video, water cycle.

Abstrak

Tingkat motivasi yang rendah pada siswa dalam mempelajari siklus air telah mengakibatkan kurangnya efektivitas pembelajaran. Faktor ini disebabkan oleh kurangnya pemanfaatan teknologi oleh guru dalam meningkatkan daya tarik pembelajaran. Guru lebih cenderung menggunakan buku sebagai sumber utama pembelajaran. Penelitian ini bertujuan untuk mengevaluasi validitas dan efektivitas media video animasi sebagai alat bantu dalam pemahaman materi serta peningkatan motivasi belajar, khususnya pada topik siklus air untuk siswa kelas V SD. Data diperoleh melalui proses pengembangan model ADDIE (Analysis, Design, Development, Implementation, Evaluation). Hasil penelitian menunjukkan bahwa materi yang disajikan dalam video pembelajaran ini memiliki tingkat kelayakan yang sangat tinggi untuk disampaikan kepada peserta didik, dengan rata-rata persentase validasi oleh ahli materi mencapai 100% dan rata-rata persentase validasi oleh ahli media mencapai 95,14%. Evaluasi terhadap kepraktisan media ini juga menunjukkan rata-rata persentase sebesar 89% dari tanggapan peserta didik dan 100% dari penilaian guru. Dengan demikian, dapat disimpulkan bahwa produk berupa video animasi ini layak dan efektif untuk digunakan dalam konteks pembelajaran.

Keywords: media pembelajaran, video animasi, siklus air.

INTRODUCTION

The current technological advancements provide educators with inspiration to create innovative methods that facilitate more effective learning. Despite the rapid evolution of technology, educators need to maintain adaptability to these technological advancements (Zubaidah, 2019). In the context of science education, technology plays a crucial and intimate role. This is due to science, or STEM (Science, Technology, Engineering, and Mathematics), being a dynamic field that involves the exploration and examination of objects in relation to scientific theories or natural phenomena, ultimately contributing to the development of technology aimed at enhancing or simplifying daily life (Agustin, et al., 2021).

However, science education at the elementary school level often encounters several challenges, such as the complexity and abstraction of concepts, as well as limitations in resources and time for classroom learning (Wahyu et al., 2020). Hence, the use of instructional media, particularly within the context of science subjects, becomes crucial in supporting the success of the learning process. Instructional media is believed to enhance students' learning achievements by engaging them creatively in the learning process, thereby developing students' thinking abilities and contributing to the improvement of their learning outcomes (Wahyuningtyas & Sulasmono, 2020).

Taking into account the previous arguments, a science teacher should consistently engage in updating and adjusting all elements that support the success of the learning process, including the utilization of instructional media within the classroom (Syahid, et al., 2022). In striving for this success, one approach that can be adopted is the integration of instructional media to render the learning process more meaningful and engaging. Therefore, educators should employ innovative approaches to enhance the learning experience and effectively utilize technology as an aid in the teaching process (Sari, 2021).

Technology serves as a meaningful instructional tool. Educators are expected to respond to the use of media effectively to harness the latest technological advancements in supporting the learning process. The use of instructional media is deemed essential for teachers as it aids in content delivery and facilitates student comprehension during the teaching and learning process (Febrita & Ulfah, 2019). The selection and application of instructional media should also consider and comprehend the characteristics of students. In the context of science learning, particularly at the elementary level, the alignment between the teacher's and students' experiences significantly influences the meaning of science learning, where real activities become crucial in determining the relevance of learning as elementary school students might not grasp the reasoning behind hypotheses (Susiyanti, 2017). Supporting this argument, Wahid (2018) emphasizes the pivotal role of media usage in concretizing a concept for easier student comprehension of the subject matter. Therefore, instructional media should remain innovative.

One form of instructional media utilizing technology in an educational context is the utilization of audio-visual media. Audio-visual media serves as a tool for communicating information, embodying elements of visibility and audibility (Janati et al., 2023). The inherent aspects within audio-visual media are leveraged to depict a concept, explain instructional messages, and offer clearer understanding. Beyond the auditory aspect, the visual elements also aid in enhancing students' comprehension by enabling them to both see and hear the lesson content more comprehensively (Fauziah & Ninawati, 2022). Educators need to

comprehensively understand audio-visual media as it constitutes a pivotal aspect of their pedagogical skill set. These skills are essential in facilitating effective learning implementations and serve as a crucial tool for presenting instructional content (Fakhrudin et al., 2017).

However, the reality in the field often differs from expectations, where there are still issues in teaching science subjects. Previous research findings have highlighted several issues, including limited availability of instructional media resulting in students' lack of focused attention on the material presented by the teacher (Hazmiwati, 2018). This situation affects students' understanding of the learning material, with a perception that textbooks are the sole source, thus leading to a lack of student awareness to learn (Putra & Suniasih, 2021). Another recurring issue is the lack of students' learning motivation caused by the limited instructional media used by teachers. The restricted use of media such as images in textbooks leads to students' boredom during the teaching-learning process. Consequently, students' participation and academic achievements do not align with the intended learning outcomes (Munawwarah et al., 2022).

Those facts are substantiated by interviews with a 5th-grade teacher at one of the public elementary schools in Tasikmalaya Regency, where it was found that in teaching science subjects, particularly the water cycle, teachers did not utilize instructional media but solely relied on government-issued textbooks. Teaching without media has implications for students' comprehension since media serves as a tool aiding students in better understanding the subject matter.

Considering the outlined issues, there is a need for a solution to aid students' comprehension and enhance their learning motivation through the use of concrete or near-concrete instructional media, particularly in the context of science subjects, specifically the water cycle. One proposed solution is the development of instructional media in the form of animated videos that leverage technology. These animated videos utilize moving images accompanied by sound akin to videos or films (Risti et al., 2023). In line with this, this research aims to examine the validity and practicality of an animated video for helping students comprehend the subject matter and enhancing students' learning motivation, particularly in the context of the water cycle in 5th-grade elementary school.

The importance of animated video media in water cycle education is supported by several previous studies (Melinda & Yermiandhoko, 2021; Yuliyanti & Mintohari, 2021; and Novitasari et al., 2023) that investigated the use of animated video media in water cycle education at elementary schools. Their objective was to assess the validity, practicality, and effectiveness of this media in enhancing students' learning outcomes, especially in the context of the water cycle in elementary education. These three studies demonstrated highly practical responses from both students and teachers, with an overall percentage rate exceeding 90%. In terms of validation by various experts, such as media specialists and subject matter experts, the overall percentage rate also exceeded 80%. Furthermore, animated video media has proven to be effective, evidenced by the overall student achievement rate surpassing 75%.

METHODS

Research Design

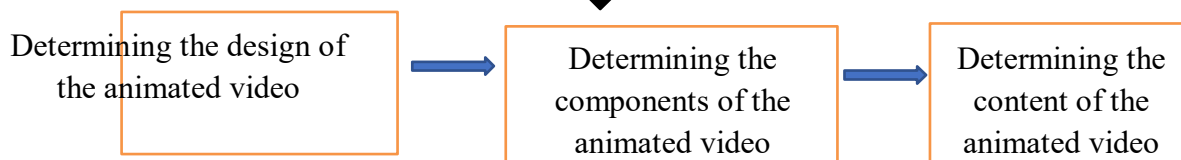
The applied research method is developmental research, aimed at creating new products and evaluating their outcomes (Sugiyono, 2019). This development method utilizes the ADDIE model design. The selection of the ADDIE model in this study is based on its reputation as a systematic and structured instructional design model (Widyastuti & Susiana, 2019). This model is designed to address challenges or problems in learning related to learning resources and to ensure alignment with the needs and specific characteristics of students. The ADDIE development design consists of five stages: Analysis, Design, Development, Implementation, and Evaluation.

The stages of media development utilized by the researchers based on the ADDIE development model are as follows.

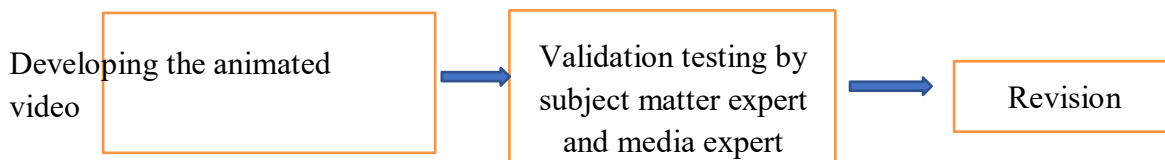
Analysis



Design



Development



Proven Valid Animated Video on Water Cycle Topic

Implementation

Conducting limited trial

Evaluation

Conducting Evaluation and Obtaining the Final Version of the Animated Video

Figure 1. Stages of Developing Animated Video Media using the ADDIE Model

Participants, Location, and Research Duration

Subjects in this study were classified into 2 categories. The first category involved expert validation, consisting of media expert and subject matter expert. Meanwhile, the second category involved field trial subjects. The research was conducted in one of the public elementary schools in Tasikmalaya Regency, West Java, over a period of 3 months, starting from October to December 2023.

Data Collection Techniques

Data were collected using research instruments in the form of subject matter expert validation sheet, media expert validation sheet, and user response questionnaires.

Data Analysis Techniques

Data analysis was conducted qualitatively and quantitatively. Qualitative data consisted of suggestions and comments from validators, namely subject matter expert, media expert, and users. Meanwhile, quantitative data comprised scores obtained from expert validations and user responses.

Scores from expert validations and teacher response were assessed using a Likert scale with a score range of 1-4. On the other hand, student responses were evaluated using a Guttman scale, with available responses being 'yes' or 'no'. Likert scale scores were calculated based on the average statement values, while student responses were measured using the Guttman scale as follows:

Table 1. Guttman Scale-Based Evaluation

Response	Positive Statement	Negative Statement
Yes	1	0
No	0	1

Source: (Ridwan, 2015)

To calculate the average of validation results, teacher response, and student responses, the formula is as follows:

$$\frac{\sum_{i=1}^n x_i}{n} = \frac{\dots}{\dots} \times 100\%$$

Next, the criteria for the feasibility of video animation media based on the validation test results from content experts and media experts are as follows:

Table 2. Criteria for Animation Video Validity

Percentage	Criteria
81% - 100%	Highly Valid
61% - 80%	Valid
41% - 60%	Moderately Valid
21% - 40%	Less Valid
0% - 20%	Invalid

Source: (Bintiningtiyas & Luthfi, 2016)

Meanwhile, the criteria for the practicality of animation video based on the responses of teachers and students are as follows:

Table 3. Criteria for Animation Video Practicality

Percentage	Criteria
81% - 100%	Very Practical
61% - 80%	Practical
41% - 60%	Moderately Practical
21% - 40%	Less Practical
0% - 20%	Not Practical

Source: (Bintiningtiyas & Luthfi, 2016)

RESULTS AND DISCUSSION

1. *Analysis Phase*

This study followed the ADDIE development research stages. The initial phase undertaken was Analysis. This phase aimed to comprehend the issues and needs associated with the water cycle topic in a fifth grade at one of the Elementary Schools in Tasikmalaya Regency. This analysis involved interviews with a fifth-grade homeroom teacher and observational activities. The interview outcomes indicated that teaching the water cycle topic was considered challenging, with students facing difficulties in grasping the stages of the water cycle. Analyses of needs, curriculum, media, and student characteristics were conducted. The needs analysis highlighted the requirement for instructional media to support teachers in teaching the water cycle. Curriculum analysis encompassed core competencies, learning objectives, competency indicators, and instructional goals. The results showed that students felt less engaged when instruction lacked captivating media. Observations revealed that the school possessed technological facilities such as projectors, speakers, and laptops.

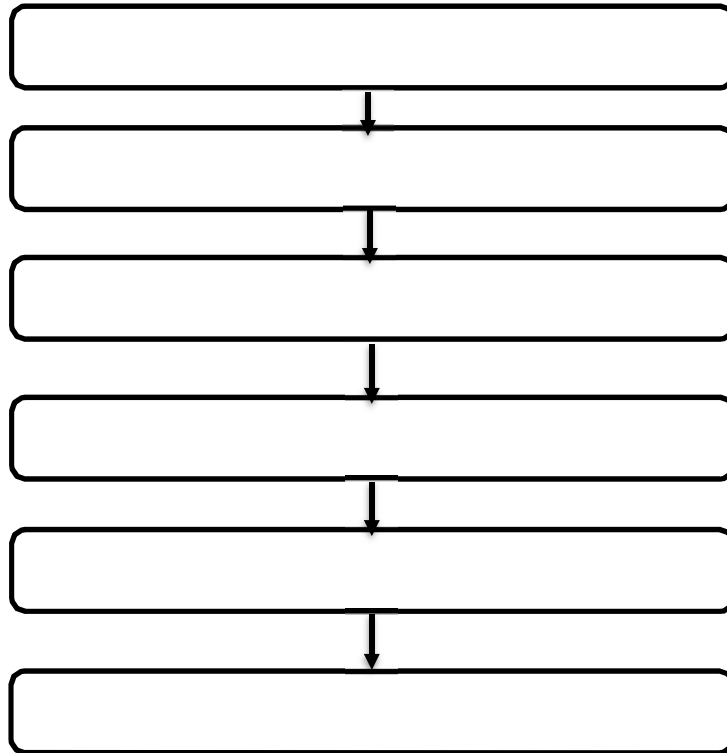
Based on the issues, needs, and technological advancements, the decision was made to develop an animated learning video on the water cycle aligned with the established competencies. This aligns with research indicating that audio-visual media can illustrate concepts, convey instructional messages, and provide better understanding to students (Fauziah & Ninawati, 2022). Video media enhances student comprehension by allowing them not only to listen but also to visually observe the broader coverage of the lesson content being delivered (Fauziah & Ninawati, 2022).

2. *Design Phase*

After determining the solution to address the existing issues, the subsequent step involved designing an animated video for the water cycle content. This phase commenced with the selection of software to be used for creating the animation video. The software employed comprised Inshot and Doratoon. Inshot was utilized for animation creation, while Doratoon was used to add audio to the already created animation video. Additionally, relevant images for the fifth-grade water cycle content were gathered and collected. In this stage, the design of the animated video for the fifth-grade water cycle content was implemented. The conceptual design layout produced is as follows.

1. Creating a title, objectives, and content
2. Creating a flowchart

3. Developing a storyboard
4. Collecting materials (graphics, audio)
5. Integration of graphics, content, and audio



6. Finalization (validation and testing) Figure 2. Conceptual Design Layout

3. Development Phase

Furthermore, the completed animated media underwent evaluation and received assessments and feedback from subject matter expert and media expert to measure its validity. The animation video that has been developed can be seen in Figure 3.



Figure 3. Animated Video for Water Cycle Topic in Fifth Grade of Elementary School

The evaluation results from the subject matter and media experts are presented in table 4 and table 5.

Table 4. Subject Matter Expert Validation Result

Evaluation Aspect	Validity Test Percentage (%)	Category
Relevance of content	100%	Highly Valid
Absence of conceptual errors	100%	Highly Valid
Up-to-dateness of content	100%	Highly Valid
Use of relevant references	100%	Highly Valid
Average	100%	Highly Valid

Source: Chaeruman (2015)

Based on the result from Table 4 in the evaluation by subject matter expert, it is evident that aspects of relevance of content, absence of conceptual errors, up-to-dateness of content, and use of relevant references all achieved an average percentage of 100% with the highly valid category. From the comprehensive evaluation results, it can be concluded that the developed animated video media holds highly valid content quality. As highlighted by Eliwatis & Sabarullah (2021), effective content presentation facilitates learners' understanding of learning materials and stimulates creativity in discussions.

Table 5. Media Expert Validation Result

Evaluation Aspect	Validity Test Percentage (%)	Category
Video quality	91.67 %	Highly Valid
Video accuracy	93.75%	Highly Valid
Video attractiveness	100%	Highly Valid
Average	95,14%	Highly Valid

Source: Chaeruman (2015)

Based on the result from Table 5 in the evaluation by the media expert, it can be observed that: 1) the video quality aspect received a rating of 91.67% with the highly valid category; 2) the video accuracy aspect obtained a score of 93.75% with the highly valid category; 3) the video attractiveness aspect achieved a rating of 100% with the highly valid category. The average percentage of these four aspects is 95.14% with the highly valid category. The overall evaluation results affirm that the developed animated video media holds highly valid quality. As Wahidin (2018) mentions, good instructional media supports educators in delivering educational content and aids learners in comprehending the material. Furthermore, Tafonao (2018) also asserts that instructional media plays a crucial role in determining learning success and achieving objectives, making quality instructional media a key factor in the learning process.

4. *Implementation Phase*

The next step was the implementation phase, where the developed animation media was tested in the learning process. This learning process involved 25 fifth-grade elementary school students. The learning process commenced with an introductory session, followed by the core activity, which included playing the instructional video, and concluded with a closing session. After utilizing the animated video, the students were asked to fill out a response questionnaire to gauge their feedback regarding the use of video animation media in science lessons, specifically focusing on the water cycle material. This questionnaire aided in assessing the practicality level of the video animation media. Implementation activities that have been carried out can be seen in Figure 4.



Figure 4. Implementation Animated Video for Water Cycle Topic in Fifth Grade of Elementary School

5. *Evaluation Phase*

The final stage was the evaluation phase. Product evaluation aimed to determine if the developed product, namely the animation video, met quality standards to be effectively used in the learning process. There were two types of evaluations conducted: formative evaluation and summative evaluation. Formative evaluation was periodically performed at each stage within the ADDIE model, while summative evaluation was conducted after the product had been tested, encompassing responses from both students and teachers. The student response scores after using the animation video are presented in Table 6 below.

Table 6. Student Response Results

Evaluation Aspects	Percentage (%)	Category
Attractiveness of the educational video	92%	Highly Practical
Content delivery in the educational video	76%	Practical
Ease of use of the educational video	88%	Highly Practical
Interactivity of the educational video	100%	Highly Practical
Average	89%	Highly Practical

Source: Lukman, Hayati, & Hakim (2019) (modified)

Based on the data presented in Table 6, the student responses indicate that: 1) the attractiveness aspect of the educational video received a rating of 92% in the category of very practical; 2) the content delivery in the educational video received a rating of 76% in the practical category; 3) the ease of use of the educational video received a rating of 88% in the highly practical category; 4) the interactive aspect within the educational video received a rating of 100% in the very practical category. The average rating for these four aspects is 89% with a very practical category. From these results, it is evident that the developed animated video media product proves to be highly practical for student use. Nies & Walker (in Putri and Dewi, 2020) explain that the use of audio-visual learning videos can enhance students' interest

during the learning process, making video learning an instrument for boosting students' motivation to learn. Furthermore, Mu'minah (2021) adds that instructional videos capture students' attention by presenting information through text, sound, and moving images.

In addition to student responses, a questionnaire was also administered to the fifth-grade homeroom teacher to evaluate the practicality of using animated video media. The results of the teacher response are presented in Table 7 below.

Table 7. Teacher Response Results

Evaluation Aspects	Percentage (%)	Category
Ease of use	100%	Highly Practical
Likelihood of student interest and motivation when used in both individual and classroom learning	100%	Highly Practical
Potential for individual student learning and teaching aid for teachers	100%	Highly Practical
Likelihood of promoting students' critical thinking and problem-solving abilities	100%	Highly Practical
Contextual relevance to real-life applications aligned with audience (student) characteristics	100%	Highly Practical
Average	100%	Highly Practical

Source: Chaeruman (2015)

Based on Table 7, the response from the teacher indicate that aspects related to ease of use, likelihood of student interest and motivation when used in both individual and classroom learning, potential for individual student learning and teaching aid for teachers, likelihood of promoting students' critical thinking and problem-solving abilities, contextual relevance to real-life applications aligned with audience (student) characteristics received an average

percentage of 100%, categorizing them as highly practical. Therefore, the overall conclusion is that the developed animated video media product is highly practical for use by teachers in the learning process.

In the context of utilizing educational media, Putri and Fitria (2020) emphasize the significance of appropriate media selection by teachers for presentation to learners. The use of instructional videos can assist educators in delivering course materials due to their ability to captivate learners' attention through moving images (Putri and Fitria, 2020). Furthermore, Febriani (2017) highlights that instructional videos can serve as a tool for educators to convey messages more effectively, given their easily communicable message format.

CONCLUSION

The findings of this research culminate in an animated video product that can be employed by teachers and students in learning the water cycle topic within the Science curriculum for 5th-grade elementary students. The research findings indicate that the content presented in the instructional video was deemed highly valid for students, garnering an average percentage of 100% as evaluated by subject matter expert. Moreover, the animated video media is also considered highly valid for educational purposes, achieving an average percentage of 95.14% based on the media expert evaluation. The outcomes of the media's practicality evaluation revealed an average percentage of 89% from student feedback and 100% from teacher evaluation. This indicates that the animated video product is not only valid but also practical for implementation in the educational process.

Based on the research conclusion, it is suggested that teachers employ animated video media aligned with the lesson content and learning objectives. This could serve as a strategy to enhance student engagement during the learning process.

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