Innovation in science learning media using motion graphics

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Article Info	ABSTRACT
	This research has the objective of designing a learning medium in the form of motion graphic videos for fifth-grade students at SDN 1 Kedungjaya. Presently, science learning resources predominantly rely on printed materials, which presents challenges for students in comprehending scientific subjects, particularly the complex topic of the digestive system. Consequently, this research aims to develop motion graphic video learning media as one of the educational resources, with the expectation that the outcomes of this design will facilitate the learning process and enhance students' interest in science subjects.

INTRODUCTION

Technological developments continue to advance in various fields, including multimedia. Education must adapt to these changes. Education is a way for humans to think and gain knowledge. Learning materials are not limited to school textbooks; in today's digital era, learning can also occur through video. According to Ramli, multimedia is considered an engaging learning medium because it stimulates multiple senses, such as sight and hearing. Thus, using video as a learning medium can improve the learning process (Ramli in Haris, 2021). This allows educators to use varied media compared to lectures and textbooks. Instead of relying on memorization, educators can use engaging media like video for complex materials.

Textbooks are still the most commonly used learning media, while video media remains underutilized. However, video use can influence students' interest in the subject being taught. While videos are already used in subjects like Pancasila education, they are not maximized by teachers. According to Saputra, motion graphic-based learning media positively affects student performance (Saputra, 2020). As shown in previous research by Rahmat, Sukarman, and Saleh, designing motion graphic videos can increase children's enthusiasm (Rahmat et al., 2021). Media in teaching and learning can be defined as graphic tools to present and reconstruct verbal or visual information, making it more effective than lectures (Bramantyo & Prasetyo, 2020). Hence, motion graphics are highly effective as learning media for science topics like digestive organs for grade 5 at SDN Kedungjaya 1.

In primary schools, science is still mostly taught using conventional chalkboards and printed textbooks. This shows that teachers have not widely developed digital learning media, although grade 5 materials require visual aids to help students grasp concepts (Ichsan et al., 2018). Based on observations, the problem at SDN 1 Kedungjaya is the lack of suitable learning media to help teachers effectively deliver material and support students in understanding science in an engaging way, especially about digestive organs. Printed materials and conventional teaching methods bore students quickly, prompting the need for varied media, such as motion graphic videos. These videos can be tailored to suit specific topics. Science topics are often complex and require engaging visuals. The motion graphic design in this research covers all digestive organs. Students' interest in video motion graphics is another reason for choosing this medium. Teachers reported that video-based learning media requires time and skills they don't possess. Although they've used general YouTube videos for civic education, this planned content can better align with teaching goals. The ADDIE method (Analysis, Design, Development, Implementation, and Evaluation) is used in this design.

RESEARCH METHOD

The authors use the ADDIE model for media development. Research and Development (R&D) methods are used to produce effective products according to community needs. This method is common in technology development and is also applicable in education (Sugiyono, 2013). The authors use the ADDIE model adapted by Richey and Klein (Nabilah et al., 2020) as a method for developing learning media to improve the teaching and learning process.

RESULT AND DISCUSSION

1. Analysis

Interviews were conducted with the class teacher and several teachers at SDN Kedungjaya 1. Surveys and classroom observations were also done. The analysis resulted in designing learning media for science about the digestive system. Revisions ensured suitability for fifth-grade students. Elements included:

a. Design Concept:

Based on the needs of teachers and students, the main concept introduces digestive organs with explanations and questions in each scene, inspired by *Dora the Explorer*.

b. Visual References

Videos from the *Kurzgesagt – In a Nutshell* YouTube channel were used, known for vibrant motion graphics that can attract children's attention.

Figure 1 Visual References
Source: Youtube/@ Kurzgesagt – In a Nutshell

c. Typography

Sans-serif typefaces like Dinofans and Quicksand were used for clarity and friendliness..

2. Dinofans

Figure 2 Typeface Dinofans
Source: Author Documentation (2024)

3. Quicksand

Figure 3 Typeface Quicksand
Source: Author Documentation (2024)

4. *Design*

The authors created rough storyboard sketches for the video *motion graphic*.
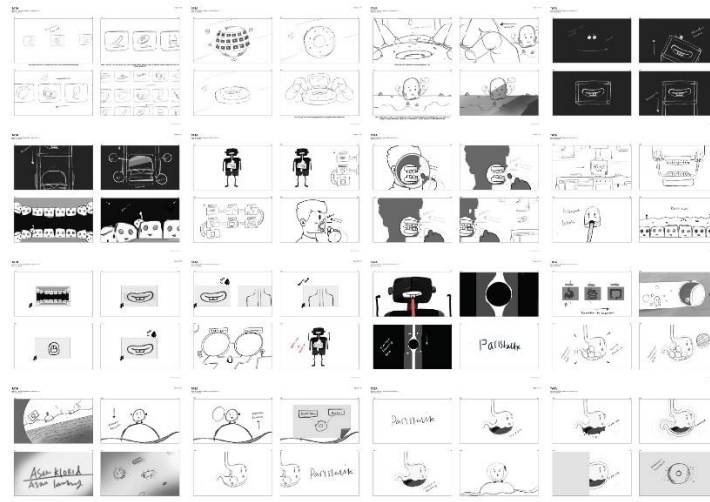

Figure 4 Sketsa *storyboard*
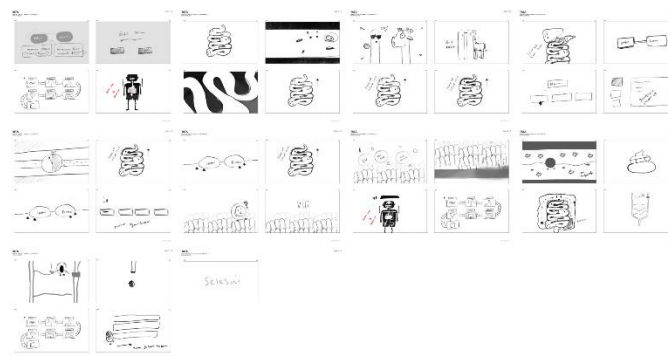Source: Author Documentation (2024)

Figure 5 Sketsa storyboard 2
Source: Author Documentation (2024)

5. *Development*

After sketching, the digital illustration process was done using Adobe Illustrator, then animated in Adobe After Effects.Illustrasi digital

a. Digital Illustration

Transformed sketches into colored digital visuals. At this stage, the rough sketch illustrations of the storyboard will be converted into digital format using Adobe Illustrator, resulting in improved, colored visuals that are ready to be animated using Adobe After Effects.

Figure 6 Illustrasi storyboard
Source: Author dokumentation (2024)

b. Layer Separation

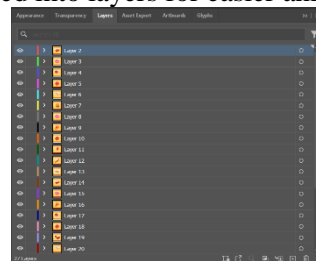   All illustrations were separated into layers for easier animation.

Figure 7 Layer Separation
Source: Author Documentation (2023)

c. Animation

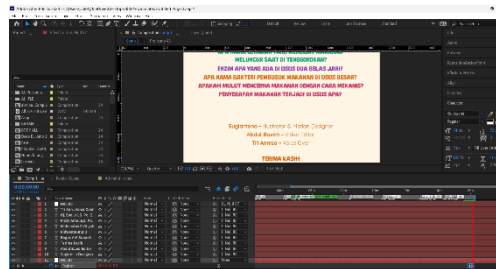   Assets were animated in Adobe After Effects.

Figure 8 The Use Adobe after effect
Source: Author Documentation (2024)

d. *Rendering* video

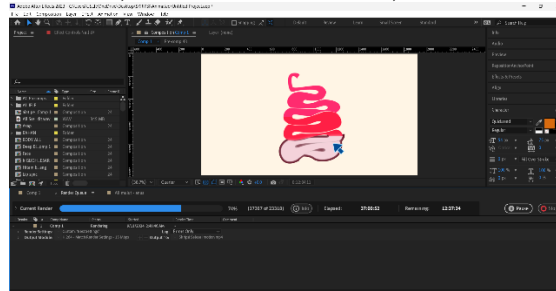   Final video rendered in MP4, 1920x1080 resolution, 15:57 minutes.

Figure 9 Rendering Processing
Source: Author Documentation (2024)

6. Implementation

At this implementation stage, the writer hands over all the learning media that have been created to the respective teacher, which will be implemented in the following month in accordance with the syllabus plan of the 5th grade teacher at SDN Kedungjaya 1

7. Evaluation

Evaluation in the ADDIE model is not always conducted at the final stage; the evaluation process begins from the analysis phase. The following are the evaluations obtained by theauthor during the design process

Table 1 Evaluation Process

Process	Evaluation	Respond
Analysis	The material is suitable for using video media, as it makes it easier for teachers to teach students. However, consideration is needed since some teachers also require books as supporting learning media.	The author created supporting media in the form of an encyclopedia book about the digestion process, and also added a game to the book to encourage interaction between students and the teacher.
Design	Created alternative rough sketches for this design; at this stage, the author made many alternatives for each scene.	The author created several rough sketches for certain scenes, then selected the most suitable sketch for each scene.
Development	Some scenes were found to be unnecessary.	After the illustrations were completed, some scenes were not included in the video, as they were considered unnecessary.
Implementation	A survey was conducted to assess student and teacher satisfaction with the learning media.	The author will conduct a survey to evaluate the satisfaction and suitability of the learning media for 5th grade students.

CONCLUSION

This study successfully designed a motion graphic video for science learning in grade 5 at SDN Kedungjaya 1. The video aims to help teachers deliver material more effectively and engage students in learning science, which is often seen as boring. A supporting book with visually engaging illustrations was also created. The motion graphic video, lasting 15 minutes, serves as the main teaching medium. Design and animation principles played a key role. Tools used include Adobe Illustrator, Adobe Animate, Adobe Audition, Adobe Premiere Pro, and Adobe After Effects. Plug-ins like Duik, Animation Composer, and Recomposition Anchor Point were also utilized. Rough sketches were hand-drawn before being digitized, layered, animated, and finalized with editing and sound effects. It is hoped that this media helps children understand complex digestive system terms and builds their interest in science.

To improve future motion graphic designs, the authors recommend:

1. Conduct More In-Depth Brainstorming and Develop Multiple Storyboard Variations.
2. Prioritize Visual Design While Addressing the Target Audience's Needs

Implement Post-Testing to Evaluate the Motion Graphic's Effectiveness

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