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Animal Life Cycle Media Using Digital Comics for Fourth-Grade Elementary School Students

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ABSTRAK

Situasi pandemi Covid-19 berdampak pada berbagai aspek kehidupan manusia, salah satunya pendidikan. Pandemi Covid-19 menyebabkan terjadinya perubahan proses penyelenggaraan pembelajaran yang awalnya bertatap muka menjadi pembelajaran daring. Perubahan ini membuat ketersediaan media pembelajaran untuk siswa sekolah dasar dalam mengikuti pembelajaran daring menjadi terbatas. Tujuan dari penelitian ini adalah mengembangkan media siklus hidup hewan menggunakan komik digital untuk siswa kelas IV Sekolah Dasar. Penelitian ini merupakan penelitian pengembangan media menggunakan model ADDIE. Situasi pandemi menyebabkan penelitian hanya dilaksanakan sampai tahap pengembangan. Subjek penelitian ini adalah dua ahli materi, dua ahli media, dan dua praktisi. Objek penelitian ini adalah validitas media siklus hidup hewan menggunakan komik digital. Teknik analisis yang digunakan adalah analisis kualitatif dan kuantitatif. Instrumen pengumpulan data penelitian ini adalah angket rating scale. Data yang diperoleh dari uji validitas media dianalisis untuk mencari persentase skor. Hasil uji media yang diperoleh yaitu uji ahli materi dengan persentase 97,33%, uji ahli media dengan persentase 98% dan uji praktisi dengan persentase 91%. Ketiga hasil uji mendapat predikat sangat baik. Dapat disimpulkan bahwa media siklus hidup hewan menggunakan komik digital ini valid dan layak digunakan sebagai media pembelajaran di sekolah. Oleh sebab itu, media media siklus hidup hewan menggunakan komik digital ini dapat dijadikan salah satu alternatif media pembelajaran daring bagi siswa sekolah dasar.

ABSTRACT

The Covid-19 pandemic situation has an impact on various aspects of human life, one of which is education. The Covid-19 pandemic has caused a change in the process of organizing learning from face-to-face to online learning. This change makes the availability of learning media for elementary school students in participating in online learning to be limited. This study aims to develop an animal life cycle media using digital comics for fourth grade elementary school students. This research is a media development research using the ADDIE model. The pandemic situation causes research to only be carried out until the development stage. The subjects of this research are two material experts, two media experts and two practitioners, while the object of this research is the validity of animal life cycle media using digital comics. The analysis technique used is qualitative and quantitative analysis. The instrument for collecting data in this study was a rating scale questionnaire. The data obtained from the media validity test were analyzed to find the percentage score. The results of the media test obtained were the material expert test with a percentage of 97.33%, the media expert test with a percentage of 98% and the practitioner test with a percentage of 91%. The three test results received a very good predicate. It can be concluded that the animal life cycle media using digital comics is valid and feasible to be used as a learning medium in schools. Therefore, the animal life cycle media using digital comics can be used as an alternative online learning media for elementary school students.

1. INTRODUCTION

Pandemic covid-19 impacted various sectors, including the education sector (Chaturvedi et al., 2021; Dhanalakshmi et al., 2021). The covid-19 pandemic has changed from face-to-face learning to distance learning due to schools being closed to avoid transmission of the corona virus (Liu et al., 2021; Pradas et al., 2021). The application of distance learning during the pandemic has various problems due to emergency conditions without proper preparation and supporting facilities. Teachers must innovate to develop distance learning (Hanik, 2020; Rigianti, 2020). One of the obstacles in distance learning is the availability of learning media. Learning media is very important to use in learning, especially for elementary school students. Based on Piaget's cognitive development stage, elementary school students aged 7-12 are at a concrete operational stage (Byrnes, 2016; Halford, 2016). The concrete operational stage is the stage where students cannot think abstractly, so that what students receive must be concrete so that it is easy to understand (Kazi et al., 2019; Sudbery & Whittaker, 2018). Learning media that functions to change abstract things for children to become more concrete.

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The learning media available in schools are designed for classroom learning. Ironically, the media available in schools is limited and less diverse (Faizah et al., 2020; Karina et al., 2019). It was exacerbated by the pandemic condition that caused the existing media to be ineffective for distance learning. As in the results of a survey conducted by distributing questionnaires with google forms to fourth-grade teachers of SD Gugus IX, Buleleng sub-district, it was obtained that the media in schools was limited. Learning media in schools during the pandemic are ineffective for distance learning. The use of media in science learning is very important, considering that not all events in science learning occur simultaneously. Media can overcome the limitations of space and time (Basori & Cobena, 2019; Karo-Karo & Rohani, 2018). In addition to delivering material, learning media in science learning must be made attractive to attract students' attention to learning. Interesting media will affect student interest in learning and learning outcomes (Siswanah, 2017; Suparman et al., 2020). Based on this, animal life cycle learning media using digital comics were developed for fourth-grade elementary school students. Digital comic media is a sequence of sequential images and presented digitally to convey information (Ratnasari & Ginanjar, 2020). As for the characteristics of comics, there are characters in the form of images that change poses, and there are speech balloons and backgrounds that match the comic story. In digital comics, various kinds of innovations can be added according to the creator's creativity without eliminating the characteristics of the comic (Aggleton, 2019). Digital comic media is different from conventional comic media because digital comic media is presented with electronic devices to be accessed by students anywhere and anytime.

Research on digital comics has been done before. Research on electronic comics in marine conservation learning for elementary schools results in students being more interested in learning to use comics than student books (Syarah et al., 2019). Digital comic media development research on the ecosystems topic in elementary schools (Mustikasari et al., 2020). Development of educational comics with the theme of clean and healthy life for grade 2 elementary school students with validation of 97.12% by education experts, 99.04% by educators, and 96.67% by students with very valid categories (Harmawati et al., 2020). Development of digital comics for environmental preservation based on religious character values for thematic learning in elementary school students with an average test of 84.83% with the very good category (Rohmanurmeta & Dewi, 2019). The development of digital comic learning media to improve student learning achievement in elementary schools results from the validity of the material expert of 84% with the very high category and the validity of the media expert of 77% with the high category (Kurniawati & Koeswanti, 2021). Development of comics for motion teaching materials with the percentage of validity of material experts 76.89% with a decent category and media experts with 89.17% with a very good category (Azizul et al., 2020). The development of digital-based comic media towards students' critical thinking skills on metamorphosis material in high class is very well qualified from the validity test of material experts and practitioners (Andayani et al., 2020). The development of digital comics as an educational medium for natural disaster management has received qualifications from both material experts and practitioners (Ratnasari & Ginanjar, 2020). The development of digital comic media in the fifth-grade social studies subject shows decent results based on the validation results of material experts, material experts, and trials by teachers and student responses. (Sukmanasa et al., 2017). As well as the development of appropriate accounting comic media based on the evaluation of material experts obtaining a score of 79%, linguists 100%, practitioners 84.64%, and limited trial 82.71% (Hidayah et al., 2017). Based on this research, it can be concluded that digital comic media is a medium that is suitable for use in learning based on the results that get an average of good and very good criteria.

In previously developed research, there is no digital comic media development research that addresses animal life cycles. In addition, the digital comic media that were developed previously were only digital comic media in general, which were published in the form of image files or books that were published digitally. In developing this media, the product produced is in the form of a video. With publishing in a video format, it can be created by adding dubbing and moving backgrounds. By adding a few things about digital comic media without changing the characteristics of comics, the material delivery can be presented more attractively. Interesting learning media will increase student interest in learning. This study aims to develop animal life cycle learning media using digital comic media tested for its validity to be suitable for use as a learning medium in elementary schools. The development of this medium is expected to be one of the effective learning media.

2. METHOD

This research is development research using the ADDIE model. ADDIE consisting of Analysis, Design, Development, Implementation, and Evaluation, is a strategic and systematic model most often used in development (Hess & Greer, 2016; Rueda et al., 2020; Widyastuti & Susiana, 2019). This research

was carried out until the development stage. The implementation and evaluation stages were not carried out due to the Covid-19 pandemic situation. At the analysis stage, several analyzes were carried out; 1) needs analysis by distributing a preliminary study questionnaire in SD cluster IX, Buleleng District, and curriculum analysis to determine the material being developed. 2) analyzing the characteristics of fourth-grade elementary school students to determine student learning characteristics, 3) analyzing instructional media to determine the appropriate media for student needs, and 4) analyzing the curriculum to determine the material developed in the study. Product design is carried out at the planning stage, starting from 1) creating a digital comic storyline, 2) drawing the characters manually, 3) redrawing the characters digitally and drawing the background, 4) coloring characters and backgrounds. At the development stage, the media development stage starts combining characters and backgrounds, giving animation and transitions to the media, adding dubbing and back sound. After the media was developed, the media validity was tested. The media validity test was carried out by providing the media to be assessed by two lecturers as material experts, two lecturers as media experts, and two teachers as practitioners.

The subjects of this study were two lecturers as material experts, two lecturers as media experts, and two teachers as practitioners who tested this comic media. The object of this research is the validity of the media being developed. There are two types of data in this study: quantitative data in the form of a score of the validity of the developed media and qualitative data in criticism, suggestions, and comments from experts used to improve the media being developed. The data collection method used is the rating scale questionnaire method by providing a media assessment instrument that includes seven aspects: material aspects, language, presentation, sound and text, visuals, characterization, and overall appearance to material experts, media experts, and practitioners to assess the media that was developed. The grid for this media assessment instrument is shown in the following table.

Table 1. Assessment Instruments for Material Experts

No.	Aspect	Dimensions	Number	Total
1	Material / content	Completeness and clarity in conveying identity	1, 2	2
		The delivery of clear learning objectives	3	1
		Deliver material clearly	4, 5, 6, 7, 8,	5
2	Language / Communication	The suitability of using language rules	9, 10, 11	3
		Use language that is easy for students to understand	12	1
3	Presentation	Go to sequence in the presentation	13, 14	2
		Coherence in the presentation	15	1
Total				**15**

Table 2. Assessment Instruments for Media Experts

No.	Aspect	Dimensions	Number	Total
1	Voice and text	Text is presented clearly	1, 2	2
		Sound is presented clearly	3, 4	2
2	Visual	Illustrations are presented clearly	5, 6	2
		Interesting background display	7, 8	2
		The combination in the use of colors	9, 10	2
3	Characterization	Character selection	11, 12	2
		Character attractiveness	14	1
4	Overall Appearance	The integration of the overall display	14, 15	2
Total				**15**

Table 3. Assessment Instruments for Practitioners

No.	Aspect	Dimensions	Number	Total
1	Material / content	Completeness and clarity in conveying identity	1, 2	2
		The delivery of clear learning objectives	3	1
		Deliver material clearly	4, 5, 6, 7, 8,	5
2	Language / Communication	The suitability of using language rules	9, 10, 11	3
		Using language that is easy for students to understand	12	1

No.	Aspect	Dimensions	Number	Total
3	Presentation	to the sequence in the presentation	13, 14	2
		Integrity in presentation	15	1
4	Voice and text	Text is presented clearly	16, 17	2
		Sound is presented clearly	18, 19	2
5	Visual	Illustrations are presented clearly	20, 21	2
		Interesting background display	22, 23	2
		The combination in the use of colors	24, 25	2
6	Characterization	Character selection	26, 27	2
		Character attractiveness	28	1
7	Overall Appearance	Overall appearance integration	29, 30	2
Total				**30**

Before carrying out the media validity test, the assessment instrument must be valid so that it is suitable to be used to assess the media. An instrumented test was performed using cross-tabulation of the Gregory index to determine the feasibility of the instrument. Based on the instrument validity test results, it was found that the assessment instrument for material experts was 0.93. The assessment instrument for media experts was 0.97, and the media assessment instrument for practitioners is 0.95. The three results of the instrument validity test are in the very high category of instrument validity.

The data analysis method used in this research is quantitative descriptive analysis method and qualitative descriptive analysis method. Qualitative analysis in this study was carried out by analyzing comments, criticisms, and suggestions from experts used to improve the media. The quantitative analysis in this study was carried out after the media validity test score was obtained by finding the average percentage score of material experts, the average percentage score of media experts, and practitioners' average percentage score. The percentage obtained is then converted according to the benchmark reference score achievement of the media validity score on a scale of five to obtain meaning and decision making. This media development is said to be successful if the percentage of the media validity score is at least well qualified with a minimum percentage of 75%. If it meets the minimum criteria, the media developed can be suitable for learning media in elementary schools

3. RESULT AND DISCUSSION

Result

The analysis stage was carried out by analyzing Needs analysis, based on distributing questionnaires using google forms to fourth-grade teachers of SD Gugus IX, Kecamatan Buleleng sub-district on November 10-12, 2020. Data on media availability in limited schools was obtained following the questionnaire results distributed that 100% of teachers stated that the media in schools was limited. Instructional media in schools during the pandemic period were ineffective following the results of a distributed questionnaire that stated that 100% of teachers declared ineffective. The teacher lacks media for distance learning. According to the questionnaire distribution, 100% of teachers stated a lack of media in distance learning. Less diverse science learning media with 56% of teachers using PowerPoint, pictures, and videos, 33% using IPA KIT, and 11% not using media. Digital comic media has never been used in learning, with 100% of teachers who have never used it. 2) Analysis of student characteristics is carried out by finding information about fourth-grade elementary school students' development by conducting literature studies in various sources. It is found that elementary school students are at the concrete operational stage to use concrete things to understand them easily. 3) Media analysis is carried out by looking for innovative media information for more interesting learning. It was found that digital comic media is an interesting medium because students being able to listen to the material presented with digital comics can enjoy the storyline and watch the images displayed. 4) Curriculum analysis is carried out to find material that has never been developed and is important. The material on the life cycle is still a little developed and has never been developed in digital comics based on curriculum analysis, teacher books, and student books in the form of analysis of core competencies, basic competencies, learning objectives, and learning objectives,

At the design stage, media design is carried out, preceded by designing a digital comic storyline in the form of a conversation table, a picture of the characters during the conversation, and the displayed background. After the digital comic storyline is finished, character design is done by drawing comic sketches, as shown in Figure 1. Then proceed with electronic redrawing in the Corel Draw x8 using the

image tracing technique 2.After the character is complete and perfected, the character coloring process is carried out as in Figure 3.

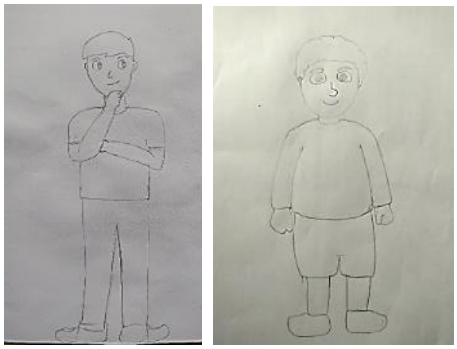

Figure 1. Drawing a comic sketch

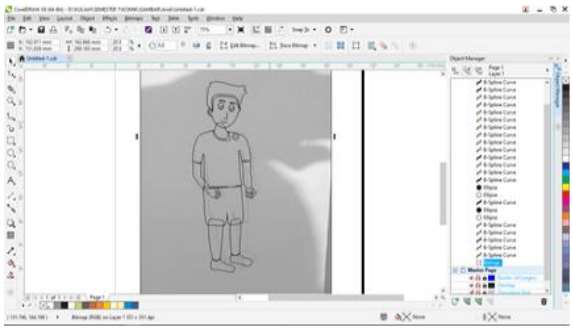

Figure 2. Tracing Process

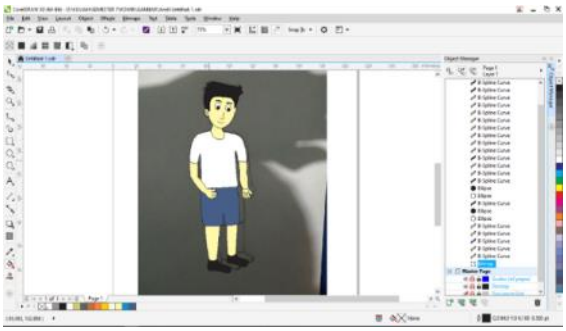

Figure 3. Character coloring process

At the development stage, characters, backgrounds, and images are combined using the 2019 PowerPoint. During this merger, word balloons and conversation text were also carried out, and animation was given as in Figure 4. Then the PowerPoint export results in the form of edited videos using the Filmora 10. In this video editing stage, dubbing and back sound are added, and video transitions are added. The video editing process is as shown in Figure 5.

Figure 4. The merging process

Figure 5. Video editing process

This digital comic consists of a cover, instructions for use, purpose, introduction, material, and conclusion. The cover is the outer part of this research that describes what will be conveyed in this comic. The cover can be seen in Figure 6. Part of the material from this comic is contained in conversation balloons between characters. In addition to the text material, part of the material is also clarified with pictures in Figure 7.

Figure 6. Cover of digital comics

Figure 7. Content of digital comics

After the media was developed, the media validity was tested using the media assessment instrument. The results obtained from the media test were analyzed by looking for the average percentage score of each expert. The results obtained from this study are as shown in Table 4.

Table 4. Percentage of Average Media Validity

No	Trial Subject	Persentase rata-rata Skor	Criteria
1	Media Expert	97.33%	Very good
2	Material Expert	98%	Very good
3	Practitioner	91%	Very good

The average percentage of media validity by material experts is 97.33%, so that the media validity qualification obtained by material experts is very good. The average percentage of media validity by media experts is 98%. The qualification of the average media validity score obtained is very good. For the practitioner's assessment of 91%, practitioners' average percentage of media validity also received a very good predicate. It means that this media is very good to be applied as a learning medium in elementary schools. As for the comments from material experts, media experts, and practitioners, 1) the duration of the video is further slowed down to suit the students' abilities. 2) At the end of the comic, greetings and greetings are added to those who help the media-making process, and 3) pay more attention to the grammar of writing so that it fits the characteristics of elementary students

Discussion

The results obtained in the media validity test qualify very well. It is inseparable from the aspects assessed by this media, which also received very good ratings. The aspects of this media assessment are material/content aspects, linguistic aspects, presentation aspects, sound and text aspects, visual aspects, characterization aspects, and overall appearance aspects. The material aspect of this digital comic is very well qualified. It indicates that the completeness of identity in this comic is good. The media identity completeness is very important because the basic information from the media is contained in its identity. In this media, the objectives and material are conveyed clearly and following fourth-grade elementary school students' characteristics. The ability of students to understand the material varies according to the stage of children's cognitive development (Antara et al., 2020; Byrnes, 2016; Halford, 2016). Based on this, this media delivers material following the stage of child development so that the assessment of the material aspects gets a very good assessment.

The linguistic aspect is very well qualified. It means that the use of language is following the characteristics of elementary school students. The language in this media uses good, simple, and easy language for children to understand. The use of good and simple language is important to use in media because elementary school children have different stages of language development from adults (Firmansyah, 2018; Khaulani et al., 2020). In the presentation aspect, it gets very good qualifications. It indicates that the ordered and comic presentations integrate the material and the story being told. The integration with the stories that are told makes children interested in listening to this media. In addition to learning, children can enjoy the storyline presented. The combination of material with stories allows children to learn and listen to stories that add to the appeal of this media because learning from listening to stories is effectively used and interesting for children (Astuti et al., 2020; Surachman, 2020). The sound and text aspects of this digital comic media are highly qualified. In the selection of text, sound and music are following fourth-grade elementary school students' characteristics. Besides being able to read conversations in comics, children can also listen to character conversations. There is also back sound music that matches the characteristics of the story. The back sound music in the learning carried out

affects learning outcomes (Hermita & Zufriady, 2019; Ramadhona, 2016). It assesses the voice and text aspects very well qualified.

The visual and characterization aspects are very well qualified. The visuals displayed are the suitability of illustrations with the subject matter, the accuracy of the illustrations, the background, the use of color and color harmony, and the selection of characters according to the characteristics of fourth-grade elementary school students. The use of colors in the developed media is adapted to the characteristics of elementary school students by using bright colors, interesting characters to increase students' imagination. Media needs to be developed to be interesting, full of colors and images to increase students' imagination (Suparman et al., 2020). The overall performance aspect is very well qualified. The proportions of the placement of illustrations, characters, background, and word balloons are appropriate and interesting according to fourth-grade elementary school students' characteristics. Good media performance makes students more interested in learning. It is based on research (Mustikasari et al., 2020; Syarah et al., 2019), showing that electronic comics make students more interested in learning than student books.

The results of the assessment are very good on these aspects of media assessment. (Hidayah et al., 2017) The evaluation of material experts gets a score of 79%, linguists 100%, practitioners 84.64%, and limited trials of 82.71% based on the constituent aspects that get a very good category in each expert. Other studies are not much different. (Andayani et al., 2020; Azizul et al., 2020; Harmawati et al., 2020; Kurniawati & Koeswanti, 2021; Ratnasari & Ginanjar, 2020; Sukmanasa et al., 2017) It also showed that the development of digital comics gets good to very good qualifications with high scores. The results obtained are related to the characteristics of the comic itself, which is the arrangement of ordered pictures and storytelling, which is an interesting thing for elementary school students. It shows that the use of digital comics has a positive impact on learning. Likewise, the development of this media has received a very good qualification assessment based on media testing by two material experts. Two media experts and two practitioners can be a suitable medium to be applied in elementary schools.

4. CONCLUSION

The development of animal life cycle media using digital comics is valid and suitable for learning in elementary schools. As for the suggestion for further research, the development of digital comic media continued until the evaluation stage to obtain more accurate results and follow the characteristics of students.

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