Development of Cheerful Interactive Multimedia (MIC) in Science Subjects for Class V SD KIP V Bara-Baraya Makassar City.

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ABSTRACT

The goal of this research is to determine whether cheerful interactive multimedia (MIC) can be used in science classes for fifth-grade students at KIP V Bara-Baraya elementary school, Makassar City. This research develops products based on the results of an analysis of student needs using research and development (R&D) types. The research subjects were 20 students in class 5A, and the research and development procedure used was the Alessi & Trollip development model, which began with the planning stage, the design stage, and the development stage. Products developed through additional research go through two stages of testing: alpha and beta. The alpha test or validity test in this study involved two validators, namely the material expert validator and the media expert validator. Based on the results of the media expert validation analysis, an overall score of 93 was obtained with a percentage of 83.03%, so multimedia products are in the "very eligible" category. The results of the material expert validation analysis obtained an overall score of 70 with a percentage of 92.10%, so multimedia products are in the "very eligible" category. As for the results of the responses of students and teachers for each product, they obtained percentages of 92.9% and 93.05%, so that multimedia products were in the "very eligible" category. Based on the results of this study, it can be an additional reference for future researchers and an innovation in developing interactive multimedia in elementary schools.

Key Words: *Cheerful Interactive Multimedia, Science Subjects, Allesi and Trollip*

INTRODUCTION

Current technological developments have entered a new era, namely the era of the "Industrial Revolution 4.0." In the era of the industrial revolution 4.0, there is an element of speed in the availability of information, creating an industrial environment where all entities are always connected and able to share information with one another (Schlechtendahl et al., 2015). The era of the "Industrial Revolution 4.0" is marked by the existence of sophisticated technology and the ability to obtain unlimited information. The rapid development of technology cannot be avoided because of its influence on the world of education. The global era necessitates that the world of education constantly adapt to technological developments in order to improve educational quality (Budiman, 2017).

The development of information technology has brought major changes to the advancement of the world of education. Because the development of learning methods has also progressed a lot, both personal learning methods and media in the learning process (Puspita & Setiawan, 2018). The application of learning media is very influential on the learning process in the classroom. The use of instructional media must be utilized by teachers as an effort to improve the quality of education, in accordance with Permendiknas Number 16 of 2007 concerning Standards of Academic Qualifications and Teacher Competence, which

states that teachers must be able to develop a complete learning design using learning media relevant to the characteristics of students in the process of learning.

Based also on the regulation of the Minister of Education and Culture Number 65 of 2013 regarding the use of technology in learning, which reads that the principles that must be used as the basis for implementing the teaching and learning process in the classroom, namely the use of information and communication technology to increase the efficiency and effectiveness of learning, The use of this technology is not only realized by schools but must also be carried out by teachers, who are the subject of education and play an important role in the direction of the learning process.

Teachers can use technology to improve the quality of learning by using multimedia, with the hope that student learning outcomes will improve. According to Dwyer (Ilhan & Oruc, 2016: 878), she explains that Students can gain the knowledge and information that would be impossible to get in traditional ways; besides they could find the opportunity to prepare their own products with multimedia technique and multimedia provide the opportunity for every student to work individually. In other words, a student can work on the subject(s) she/he believes she/he needs to in the way she/he desires.

Teachers will find it easier to teach and create effective learning with the use of multimedia as a learning medium. Based on Talizaro's (2018) research regarding the use of learning media, learning media and tools make it easier for teachers and lecturers to implement learning. so as to create conditions that can encourage students to be able to achieve competence in the learning provided by the teacher or lecturer. The reality on the ground shows that the quality of learning is still very low. The low quality of learning is mostly caused by a decrease in student interest and motivation in learning. Students become bored while participating in learning activities in class due to the teacher's lack of interest in the learning. This is caused by the use of media in learning that is still less varied (Kaniawati, 2017). Teachers should optimize the use of media in learning to support higher-quality learning.

Current learning is not an activity of transferring knowledge from teacher to student, but rather an activity that allows students to be able to construct their own knowledge. The teacher as a facilitator must be able to provide various learning facilities so that students can easily obtain information (Lilisari, Supriyanti, and Hana MN, 2016). Learning that tends to make teachers more active or teacher-centered (teacher center) will certainly not be in accordance with the 2013 curriculum, which emphasizes student-centered learning (student center).

The use of learning media must be chosen carefully in order to refer to the 2013 curriculum, which requires students to take an active role in their learning and the teacher to be merely a facilitator. Learning media that can make students more active and can interact directly with the lesson is interactive multimedia. Multimedia functions to send messages in the form of knowledge, skills, and attitudes and is able to stimulate students' thoughts, feelings, and willingness so that the learning process becomes more directed (Baharuddin & Daulay, 2017).

Based on the results of observations at KIP V Bara-Baraya Elementary School, Makassar City, during the learning process, teachers still did not use media and were supported by the lack of available media. The limited use of the media provided has an impact on students, who have to imagine what the teacher explains. This resulted in the emergence of saturation in the learning process.

Departing from these problems, it is necessary to implement improvements in order to produce the expected learning process. To support this, one of the ways taken is to take advantage of technological developments and implement them in the teaching and learning process by implementing cheerful interactive multimedia, which makes the teaching and learning process more different. Moreover, seeing the current situation, children tend to prefer to use and see their smart phones, which is why they are not used to support the achievement of effective learning. Also based on the current era, it is known as "digital native," where students are very familiar with using digital devices and spend more time using technology than their textbooks (Faisal 2020, p. 267). Thus, students will learn easily and be more interested because they combine the use of technology with cheerful interactive multimedia that they can access via smartphones.

Cheerful Interactive Multimedia is here to support innovative and effective learning. Cheerful interactive multimedia is interactive multimedia consisting of various features such as animation, audio, video, and text that create a cheerful learning atmosphere. Multimedia that is interactive provides a level of flexibility so that students can get feedback on what they are doing. The selection of digital-based cheerful interactive multimedia in science subjects is based on findings in the field where it is seen that the learning system only uses sources from books shown to students in a lecture model, which triggers misconceptions in

science subjects. Science learning content has abstract concepts that can lead to misconceptions (Lilisari, Supriyanti, and Hana MN, 2016).

The use of multimedia is considered suitable for improving learning effectiveness. This has been proven by previous research by Ni Komang Ari Ariliah and Maria Goretti (2022) with the research title "Cheerful Interactive Multimedia on the Theme of Caring for Living Things in Class IV SD." The trial results of the development of interactive learning multimedia show effective results in improving science learning outcomes so that they are suitable for use in the learning process. His research aims to describe the design and development of interactive learning media, as well as the validity of interactive learning media in aiding educators in carrying out the learning process and increasing student enthusiasm in order to improve learning outcomes. The importance of researchers' research and development is to make it easier for students to understand the material of the human digestive system in a pleasant learning environment and through interactive multimedia. In addition, this development product is expected to assist teachers in overcoming the limitations of the media used in science learning content.

METHOD

This type of research is called "research and development," or "research and development," where research and development are processes or steps to develop a new product or perfect an existing product and can be accounted for. This development research uses the Allesi and Trollip (2021) model, which consists of 3 stages: planning, design, and development. This research was conducted at KIP V Bara-Baraya Elementary School, Makassar City, with the research subjects being 20 students in class 5A.

RESULTS AND DISCUSSION

Results

The results of the development of cheerful interactive multimedia (MIC) were obtained from the alpha and beta tests. The alpha test, which involves the validation of material experts and media experts, is followed by the beta test, which involves the results of student respondents and class teachers.

Table 1. The results of the material expert validation assessment

Aspect	Percentage	Information
Learning	87.5%	Very Decent
Content Material	91.6%	Very Decent
Language Use	100%	Very Decent
Amount	92.10%	Very Decent

The table is the result of validation carried out by material experts on each aspect. If the learning aspect gets a score of 21 with a maximum score of 24, then the percentage = 21/24 x 100% = 87.5% is included in the "very decent" category. The content aspect gets a score of 33 with a maximum score of 36, so the percentage = 33/36 x 100% = 91.6% is included in the "very decent" category. Apek's use of language gets a maximum score of 16, then the percentage = 16/16 x 100% = 100% is included in the "very feasible" category. So that the overall score is 70 out of a maximum score of 76, with a percentage of 70/76 x 100% = 92.10%, which is in a very decent category in the instrument categorization criteria table. Based on these data, the material for multimedia development is feasible. comments given by material experts, namely implementing very good learning and correcting errors in videos that need to be directly integrated with the material.

Table 2. The results of the media expert validation assessment

Aspect	Percentage	Information
Layout	75%	Decent
Animation Quality	83.3%	Very Decent
Writing Quality	83.3%	Very Decent
Image Quality	100%	Very Decent
Audio Quality	75%	Decent
Video Quality	75%	Decent
Appearance	75%	Decent
programming	87.5%	Very Decent
Navigation Consistency	91.6%	Very Decent
Amount	83.03%	Very Decent

The table is the result of validation carried out by media experts on each aspect. The layout aspect gets a score of 6 with a maximum score of 8, then the percentage = 6/8 x 100% = 75% is included in the feasible category. If the aspect of animation quality gets a score of 10 with a maximum score of 12, then the percentage = 10/12 x 100% = 83.3% is included in the "very decent" category. If the quality aspect of writing gets a score of 10 with a maximum score of 12, then the percentage = 10/12 x 100% = 83.3% is included in the "very feasible" category. The aspect of the image gets a maximum score of 12, then the percentage is 100%. The audio and video quality aspects both get a score of 9 out of a maximum score of 12, so the percentage = 9/12 x 100% = 75% is included in the feasible category. For the display aspect, a score of 12 is obtained from a maximum score of 16, so the percentage is 12/16 x 100% = 75%, which is included in the feasible category. The programming aspect gets a score of 14 out of a maximum score of 16, so the percentage is = 14/16 x 100% = 87.5%, which is included in the "very feasible" category. If the aspect of navigation consistency gets a score of 11 out of a maximum score of 12, then the percentage = 11/12 x 100% = 91.6% is included in the "very feasible" category. The results of the media feasibility as a whole were obtained, namely 83.03 percent based on a total score of 93 out of 112, so it was included in the "very feasible" category based on the instrument feasibility table. Based on these data, the cheerful interactive multimedia that has been developed is feasible to use with revisions, namely because the font colour matches the background used.

Table 3. Results of respondents' assessments (students)

Aspect	Percentage	Information
Product Use	92.2%	Very Decent
Content Material	92.4%	Very Decent
Appearance	91.04%	Very Decent
Amount	92.9%	Very Decent

The table is the result of a student response assessment conducted by 20 students. If the aspect of using the product gets a score of 443 out of a maximum score of 480, then the percentage = 443/480 x 100% = 92.2% is included in the "very decent" category. The content aspect gets a score of 458 out of a maximum score of 480, so the percentage = 458/480 x 100% = 95.4% is included in the "very decent" category. Apek display gets 437 out of the maximum score of 480, so the percentage = 437/480 x 100% = 91.04% is

included in the "very decent" category. So that the overall score is 1338 out of a maximum score of 1440, with a percentage of 1338/1440 x 100% = 92.9%, including the very decent category.

Table 4. Results of respondents' assessments (teachers)

Aspect	Percentage	Information
Product Use	91.6%	Very Decent
Content Material	91.6%	Very Decent
Appearance	95.8%	Very Decent
Amount	93.05%	Very Decent

The table is the result of the assessment of the teacher's response in grade 5A. The aspects of using the product and the content of the material both received a score of 22 out of a maximum score of 24, so the percentage = 22/24 x 100% = 91.6% included in the "very decent" category. Apek display gets 23 out of a maximum score of 24, then the percentage = 22/24 x 100% = 95.8% is included in the "very decent" category. So the overall score is 67 out of a possible 72, with a percentage in the "very decent" category of = 67/72 x 100% = 93.05%.

Discussion

This research is development research (R&D). This development research uses the Alessi and *Trollip* (2001) model, which consists of three stages: planning, design, and development. According to Surjono (2017), "the Alessi and Trollip model is used as a reference by interactive learning multimedia developers because, from the start, this model was intended for the development of learning multimedia" (p. 62).

The first stage is planning (planning), which began with defining the room material scope, which will be served on multimedia interactive with identifying the KI and KD as well as indicators of competence achievement.Humans have a materially developed digestive system. After that, identification of student characteristics was carried out; it was obtained from interview data that students preferred learning using *mobile phones.* The selection of interactive multimedia is based on the phenomenon of students in the current era known as "*digital natives,"* where students are more familiar with digital devices and also spend more time using *mobile phones.* Palace (2016)

The following step is to create documentation plans for the product that will be developed.After everything is done, the last step in the planning stage is to collect materials and sources related to the material that will be included in the application fiber product that will be used to support multimedia. This is in line with Alessi and Trollip's stages regarding the initial stage, which consists of determining the scope of the study, identifying student characteristics, creating planning documents, and determining related sources.

The next stage is design; from the results of the planning process, designed learning multimedia products are then developed. On Step 1, this researcher is designing content, beginning with cheerful interactive multimedia such as interactive multimedia themes that are tailored to the material, color type, text size, navigation buttons, images, animations, and videos. Cheerful interactive multimedia is "a learning program containing a combination of text, images, graphics, sound, video, animation, and simulation in an integrated manner with the help of computers or the like to achieve learning objectives" (Surjono, 2017, p. 41).

The duty analysis was carried out in the following stage.The task on step this purpose from analysis is to determine the order of the material using a concept map so that students can learn easily.Making flowcharts and storyboards is the final stage of step design.According to Irawati, Astiningrum, and Diwantari (2018), a *flowchart* is a graphical depiction of the steps and sequence of procedures in a program. While the *storyboard* is an illustration of media learning in a manner that will be loaded in the application as well as a guide to facilitate the process of making media (Permana & Nourmavita, 2017)

The final stage of Alessi and Trollip's three stages is stage development.At the development stage, all content is lumped together into files containing text, pictures, animation, audio, and video, and then commands are given to the buttons so that they can function according to what is designed on the *flowchart*. Following that, the combined elements are published in exe and html, so that the program that generated interactive learning multimedia is available as a link drive and as an application.After the product has been completed, validation and revision tests will be performed on Step test validation and revision own steps, which include test alpha, revision beginning, test beta, and final revision.The alpha test will be validated by media experts and material experts. Then suggestions and comments from material experts and media experts will be taken into consideration for the initial revisions. This is in line with the opinion of Tanti, Isnadi, and Maison (2020), according to which an assessment is carried out in the validation process to determine the suitability, strengths, and weaknesses contained in the developed media. Furthermore, according to Carolin, Astra, and Suwiwa (2020), if there is a suggestion from a paraexpert, the researcher must revise the products according to the suggestions and input so that the products are more perfect and valid to use. After that, a beta test was performed on the respondent (student and teacher) school base. The results of the next beta test will be used to complete the revision.

The application used to develop cheerful interactive multimedia is *Articulate Storyline 3*. After the product is finished, an alpha test is carried out by material experts and media experts to determine the validity of the interactive learning multimedia that has been developed. If there are still flaws in the products, experts offer advice.Product testing was conducted on respondents (students and teachers) in class VA at SD KIP V Bara-Baraya Makassar City for the beta test.In the alpha test, an assessment instrument using a *Likert scale rating score was used*, and in the beta test, a questionnaire was used to determine the respondent's response to the product.

Evaluation conducted by a lecturer Education Teacher School Basic where teach on eye studying draft base science, education environment where live multimedia learning this said worth if has fulfilled several aspects of the assessment, including the learning aspects which include the suitability competence base (KD) and GPA, suitability competence base (KD) with Competency Achievement Indicators (GPA), clear instructions for use, learning activities canThe aspects of using language include the accuracy of using standard language, the use of conjunctions, the accuracy of using vocabulary in material, and the accuracy of using punctuation in material. These criteria are arranged based on the criteria for good multimedia quality. Surjono (2017, p. 80) claims that there is only one criterion for good quality multimedia in terms of content: truth structure.Theory, and from the standpoint of instruction, i.e., quality content, returns, indicating that multimedia requires revision.Based on the assessment of material experts, there were deficiencies in the video that were expected to be integrated with each material. From the results of the material expert's assessment, the product being developed is in the "very feasible" category with a percentage of 92.10%.

The assessment was carried out by an elementary school teacher education lecturer, who teaches ICT courses, Learning Media, and Learning Multimedia Development in Elementary Schools. The media is said to be valid if it fulfills several aspects of the assessment, including layout aspects, which include easy-to-read writing layout designs, and the accuracy of the placement of additional features. Aspect animation covers accuracy use animation, suitability size animation, and motion response speed animation. Font size, font type, and the composition of font color are all aspects of writing.The audio aspect includes the accuracy of the selection audio, termination audio, and speed response audio by changing slides. Video aspects include the suitability of the video with the material, the clarity of the sound in the video, and the response speed of video playback. display aspects, including the suitability of the appearance of each slide, the quality of the design display, and the use of color. Programming aspects include product convenience, operating response speed, large application capacity, and application format. The last aspect is the navigation aspect, which includes the speed of navigation response when used, the accuracy of navigation with the intended page, as well as the navigation function to help users. Based on an assessment by media experts, the text and audio aspects need to be reviewed because the displayed text needs to change the font color and audio to make it clearer. Location could be improved; use animation that is already corresponding.When using speed response navigation, aspects writing, aspect video, aspect appearance, aspect programming, and aspect navigation must be fixed.Surjono's (2017, h. 80) criteria state that quality multimedia on aspect material, including audio and video quality, must be good and in accordance with the material, as well as navigation consistency and functionality.Therefore, a revision is needed. According to results evaluation expert theory, the product that was developed is in the very decent category with a percentage of 83.03%.

Products that are declared feasible by media experts and material experts will then be tested on respondents (students and teachers) in VA KIP V Bara-Baraya elementary school, Makassar City, which is called the beta test. The ease of the product is evaluated, which includes the ease of learning, the ease of running multimedia on smartphones, the reaction time of multimedia buttons, the use of instructions to operate the product, and the ease of using the product at any time and from any location.Aspects of the content of the material include the type of *font* used to facilitate the legibility of the material, the arrangement of the material is easy to understand, the language used is easily understood, the size of the writing is easy to read, the theory presented is easy to understand, and the video displayed is in accordance with the material. Finally, the display aspect includes the attractiveness of the appearance; the colors used are attractive, the video quality is clear, and the *background* supports the appearance of the material presented. Each student completes a questionnaire on cheerful interactive multimedia and provides feedback.From the results of student responses, a percentage of 92.9% was obtained, which, based on the multimedia learning respondent's assessment table, was in the "very decent" category. The teacher's assessment obtained a percentage of 93.05%.

Results from development This takes the form of cheerful interactive multimedia, which can be accessed via an Android or tablet.This product enables students to study independently at home, resulting in more efficient study time.The appearance of the design on this product is attractive to students because it uses a combination of colors that match the background, neither in the color picture nor the text. Students could also review their level of achievement by answering questions provided by the product.Besides that activity, study could be arranged by the student alone. As a result, that could adapt to the level of ability and speed up student understanding of learning. The product that created it has a number of flaws and limitations, including the fact that the application's buttons and display are slow; the resolution of the videos has been reduced to make the application lighter, but some buttons on the application still take a long time to respond.It is well known when students test products with their cellphones.

CONCLUSIONS AND RECOMMENDATIONS

Conclusion

Based on the results of the research and discussion it can be concluded that this development produces cheerful interactive multimedia (MIC) for fifth grade elementary school students which contains material on the digestive system in humans with features that students can control themselves such as material supplemented with videos and animations as well as learning evaluations that result the score can be seen immediately. Based on the results of the alpha test conducted by media experts and material experts with an assessment of material experts of 92.10% and media experts of 83.03%, it is concluded that cheerful interactive multimedia is considered very feasible. Based on the results of the beta test conducted by respondents, namely 20 students with an assessment percentage of 92.9% and class V A teachers with an assessment percentage of 93.05%, it is concluded that cheerful interactive multimedia is considered very feasible

Recommendations

As for some suggestions that can be given in the use of cheerful interactive multimedia (MIC) are as follows:

1. The development of cheerful interactive multimedia is expected to be a support in assisting teachers in implementing learning programs.
2. The development of cheerful interactive multimedia is expected to be developed in further research to make it even better.
3. This research was only carried out up to the feasibility stage, namely by looking at the results of validity and respondents' responses to the product so that it is hoped that in future research it can be used as a reference in conducting development research and can develop this multimedia to the next stage, namely knowing the effectiveness or student learning outcomes of multimedia cheerful interactive.

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