DEVELOPMENT OF ANIMATION-BASED LEARNING MEDIA WITH MUSIC AND SONG LYRICS ON THE CELL DIVISION MATERIAL AT AL-BAHRA HIGH SCHOOL JENEPONTO REGENCY

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ARTICLE INFO

ABSTRACT

Learning media in the teaching and learning process has many uses or functions that significantly strengthen the learning objectives. This research aimed to develop learning media based on animation and song lyrics on cell division material for senior high school students and determine its validity, practicality, and effectiveness. This study used the Research and Development method referred to ADDIE model. The model consisted of five stages (analysis, design, development, implementation, and evaluation). The product developed was animation-based learning media with music and song lyrics and was tested through validity tests, practice tests, and effectiveness tests. The research instruments were validation sheets to validate the media by experts, a response questionnaire to collect information from educators and students regarding the practicality of the media, and learning outcomes tests given to students. In this study, the product was tested on class XII senior high school students of Al-Bahra, Jeneponto, Indonesia. The results showed the validity level of the media was 3.68 with the very valid category. The practicality level of the media was 3.56 with the very practical category with the percentage of the effectiveness rate was 85.71% with the effective category. This study concludes that animation-based learning media with music and song lyrics on cell division material is available in the learning process because it has met the valid, practical, and effective criteria.

INTRODUCTION

Media is one of the factors in improving the quality of learning. The precise selection or determination of the media in learning activities is necessary for educators to

support the efficacy of classes. The teacher-made media affects how well the students comprehend the lessons. Therefore, teachers are considered to have skills in making learning media. According to Fujiawati (2016), educators as professionals should have competence in personality, pedagogy, and social skills to produce humans who have integrity, intellectuality, and spirituality. Therefore, in the teaching and learning process, educators not only have the skills to transfer knowledge. They can also manage classes well and guide students in understanding the material to produce a conducive learning climate as part of the quality of learning.

Students have diverse learning styles when receiving information or material from educators. Therefore, effective learning media is needed to accommodate students with various learning styles. According to Rusman (2012), learning media are all facilities or tools used by educators to deliver learning materials so that students can easily understand and retain the lessons for a long time. Learning media used in the teaching and learning process have many uses or functions that significantly affect the achievement of learning objectives. The functions of the media include learning resources, semantic functions, manipulative functions, and psychological functions (Munadi, 2012).

Early observations had made at SMA Al-Bahra Kampung Beru in the Jeneponto district. It focused on identifying the problems faced by educators and students in the teaching and learning process. Biology classes appeared to be taught primarily through lectures, with textbooks and blackboards as the primary teaching aids, and projectors being used only infrequently due to a lack of projectors at the school. Some students have scores below the MCC (Minimum Completeness Criteria). The data revealed some issues with learning biology in school, such as students' lack of interest in participating in the teaching and learning activities in the classroom. Many students believed Biology subjects were abstract, difficult to imagine, and difficult to comprehend through verbal or traditional explanations. The researcher also looked into the potential issues such as students' lack of motivation for learning and their habits of forgetting about abstract Biology learning materials. There is a need for innovation in delivering biological materials. Students' motivation and enthusiasm for receiving lessons must be generated by the media used in the learning process.

Therefore, one of the learning media is audio-visual-based learning media. Animated videos are computer-based technology media that can convey information,

reconstruct a process, and explain abstract concepts. This media can provide a clear understanding of materials because they contain text, sound, and graphics, all of which become a moving whole. Then, to stimulate students' memory, music and song lyrics were added to the media to make it easier for students to memorize the stages of the cell division process. This study aimed to develop learning media based on animation and song lyrics on cell division material for class XII SMA Al-Bahra, Jeneponto Regency with valid, practical, and effective.

MATERIALS AND METHODS

Types of Research

This research used R&D study. According to Sugiyono (2003), research and development is a type of research that is results-oriented or produced a product that can help humans deal with problems they face in their daily lives. This R & D study used the ADDIE model with five stages (Analysis, Design, Develop, Implement, and Evaluate).

Location and Subjects

The product was tested at the Al-Bahra High School in Kampung Beru, Bululoe Village, Turatea District, Jeneponto Regency, South Sulawesi, used a one-shot case design. The subjects of this study were 40 students in class XII.

Procedure

According to Gafur (2012), the ADDIE model consists of five stages: (1) Analysis. There were several analyses before the media designed. Those types of analysis are: needs analysis, student analysis, and material analysis. (2) Design. At this stage, choose the learning media to be developed, then design it into a conceptual framework. (3) Develop. The learning media that have been designed and built into products are ready to be implemented. (4) Implement. At this implementation stage, the developed products are tested in the teaching and learning process in the classroom. (5) Evaluate. The evaluation of the media at this stage is based on suggestions and input from students, educators, and validators.

Instruments

The instruments used in this research were the validation sheet, the questionnaire, and the learning outcome test. The validation sheet is given to the experts or validators to obtain data on the quality of learning media developed based on expert judgment. The validation sheet contains assessment indicators covering aspects of design, appearance, and content of cell division material (text, audio, and graphics) of animation-based learning media with music and song lyrics. The response questionnaire was given to teachers and students to measure the level of practicality. This questionnaire consists of aspects of material, language, appearance, and usefulness. The instrument used to measure the level of effectiveness is the learning outcome test, which was given to the students. The research test consisted of 20 multiple-choice questions on cell division material with a minimum completeness criteria (KKM) score of 80.

Data Collection Technique

Data collection techniques carried out in accordance with this research instrument are validity test techniques, practicality tests and effectiveness tests. Validity test was conducted to obtain media validity data. Practicality test was conducted to obtain media practicality data. Meanwhile, the effectiveness test was conducted to obtain effectiveness data.

Data Analysis

Data collection techniques adapted to this research instruments. The instruments were validity test techniques, practicality tests, and effectiveness tests. A validity test to obtain the data validity of the media (**Table 1**). A practicality test to get media practicality data (**Table 2**). Meanwhile, the effectiveness test to gain effectiveness data (**Table 3**).

Table 1. Criteria level of validity

Value	Criteria
$3,5 \leq M \leq 4$	Very valid
$2,5 \leq M < 3,5$	Valid
$1,2 \leq M < 2,5$	Quite valid
$0 \leq M < 1,5$	Invalid

(Nurdin, 2007)

Table 2. Criteria level of practicality

Value	Criteria
$3,5 \leq X \leq 4$	Very Practical
$2,5 \leq X < 3,5$	Practical
$1,2 \leq X < 2,5$	Quite practical
$0 \leq X < 1,5$	Impractical

(Nurdin, 2007)

Table 3. Criteria level of effectiveness

Value	Criteria
$p>80$	Very effective
$60<p\leq80$	Effective
$40<p\leq60$	Quite effective
$20<p\leq40$	Less effective
$p\leq20$	Ineffective

(Widoyoko, 2014)

RESULTS AND DISCUSSION

This research used the ADDIE development model. The model consists of five stages: analysis, design, development, implementation, and evaluation. The description of each stage of media development activities and the results of validity, practicality, and effectiveness tests are described below.

Analysis Stage

Table 4. Interview results of educator

No	Question Indicator	Answer
1.	Methods used during teaching	Lectures and discussions
2.	Media used during teaching	Package books, whiteboards and projectors
3.	Problems experienced in the learning process	The lack of enthusiasm of students in participating in the biology learning process, especially in the dominant abstract material
4.	Student responses in the teaching and learning process	Student responses varied (poor, good and very good)
5.	Expectations of supportive media for mitosis and meiosis sub-cell division material	Using learning media that can increase enthusiasm and according to the needs of students
6.	The response of educator if animation-based media is developed	Agree

All the information gathered to develop the learning media at this stage. This stage includes several analyses, like needs analysis, student analysis, and material analysis. A needs analysis was conducted to determine the main problem and the solution through interviews with teachers and several students (**Table 4 and 5**). The student's analysis is to obtain information about the characteristics of students regarding their interests, talents, abilities, and tendencies in the learning process. Students' analysis data were obtained through class observations (**Table 6**).

Table 5. Students interview results

No.	Question Indicator	Answer
1.	Students' interest in biology subjects	Student responses varied (less interested, overall interested and interested depending on the material being taught)
2.	Constraints found in the process of learning biology	If there is material that is difficult to understand and difficult to memorize
3.	Media used in biology learning	Package books, whiteboards and occasionally using projector/LCD
4.	Expectations of media that support biology learning	Interesting and fun learning media
5.	Interest in animated videos	Most students like animated videos
6.	Interest in music	Most of the students like to listen to music

Table 6. Students analysis results

No.	Observed characteristics	Results
1.	Quantity of students	Total Quantity: 40 Boy: 16 Female: 24
2.	Ages	17-18 Years
3.	Interest to learn	Varied (less enthusiastic, enthusiastic and very enthusiastic)
4.	Learning Style	Varied (audio, visual and audio-visual)

The material analysis is to determine the main content of the developed learning media. The material analysis includes basic competency analysis activities based on the applicable curriculum and formulating indicators (**Table 7**).

The Designing Stage

The second stage is designing. This stage aims to turn the initial design of the media developed into a conceptual framework (prototype) by referring to the data obtained at

the analysis stage. The design stage includes media selection activities, media format selection, and making the initial media design (prototype). Furthermore, this design will be presented to experts or validators to be examined and given an assessment to determine whether the media is valid or not. The final result of this stage is the initial design of the developed media (prototype).

Table 7. Material analysis results

Basic competencies	Indicator
3.4 Analyzing the process of cell division as the basis for the inheritance of traits from parents to offspring	1. Students are able to describe the meaning of cell division through literature study 2. Students are able to know the function of cell division through literature study 3. Learners are able to classify information about mitosis and meiosis including processes, results and places that take place through literature study 4. Students are able to describe the meaning of mitotic division through literature study 5. Students are able to understand the process/stages of mitotic division through literature study and observation of learning animation videos 6. Students are able to describe the meaning of mitotic division through literature study 7. Students are able to understand the process/stages of meiotic division through literature study and observation of learning animation videos

Development Stage

The third is development stage, aims to develop the initial design of the media into a development product. This includes revision activities based on experts' (validators') assessments until the product is valid. The final result of this stage is a valid animation-based learning media equipped with music and song lyrics on cell division material.

Implementation Stage

The fourth stage is implementation. This stage aims to assess the products that have been declared valid by experts. The assessment done in the classroom as a real situation. This stage includes two observation activities. The first is the observation of media implementation, which is measured by the response questionnaire instrument. The second is the observation of student activities, which is measured by the learning outcomes test

instrument. The final result of this stage is data on the level of practicality and effectiveness of the developed learning media.

Evaluation Stage

The fifth stage is evaluation. This stage aims to find out the extent to which the results of the developed media after the implementation stage. The data obtained at the implementation stage is used to analyze the shortcomings and advantages of the media after passing the trial stage while still considering suggestions and input from experts (validators). The final product of animation-based learning media equipped with music and song lyrics met the valid, practical, and effective criteria. This development product is expected to help teachers and students in the teaching and learning process. According to Apriansyah et al. (2020), the use of animation-based learning media can assist teachers in teaching, allowing students to grasp the material more easily. For students, the use of animation-based learning media can have an impact on learning motivation, interest in learning, and student learning outcomes.

Animation-Based Learning Media Validity Level

An assessment instrument in the form of a validation sheet was designed to measure the validity of the animation-based learning media equipped with music and song lyrics whether or not this learning media is feasible to use by teachers and students (**Table 8**) . The validity test was carried out by experts (validators) as media experts and material experts.

Table 8. Animation-based media validation results

Assessment Aspect	Rating result	Category
Content Relevance	3,75	Very Valid
Language	3,5	Valid
Content/View	3,5	Valid
Usefulness	4	Very Valid
Average	**3,68**	**Very Valid**

According to the media validity test analysis, the media has a value of 3.68 (a very valid category). The result showed that animation-based learning media equipped with music and song lyrics on cell division material are available in the learning process. Based

on Sugiyono's (2003) theory that if the average value of the media validity test results is 3.5 ($3.5 \geq 4$), the media is "very valid" and suitable for use in the learning process.

Animation-based learning media is valid due to several conditions. The media contains material based on competencies and learning indicators, contains concepts and terms that are accurate and do not have a double meaning. It also has a communicative language and attractive design. This is in line with Leacock and Nesbit (2007), who state that a learning media is valid if the media follows writing guidelines, based on competencies and brief content. As a result, abstract and high-substance materials will be easy for students to learn as well as for educators to use.

The Practical Level of Animation-Based Learning Media

Practical learning media means that the media are easy to use and available in the learning process (Mashuri, 2019). It is necessary to test the media's practicality to determine how easy it is to use it and how it applies in the learning process. Teacher and student response questionnaires were used to collect data for the media practicality test in this study. It given at the implementation stage of the media in the classroom after carrying out the learning process using the developed media (**Table 9**).

Table 9. Overall response result analysis

No.	Rating Type	Average
1.	Educator Response	3,8
2.	Students Response	3,33
	Total Average	**3,56**
	Category	**Very Practical**

The media received an average value of 3.56 on the media practicality test, indicating that it is very practical. Rahayu (2020) in her research on the Development of Smart Cybpowrector Media Based on Poetry and Songs in Science Subjects for Human Digestive Devices, has a percentage of media practicality test results of 87.1%, with the category of very practical to use in the learning process in the classroom.

Animation-based learning media equipped with music and song lyrics on cell division material are practical because teachers and students gave positive responses. The aspects in the response questionnaire include; material, language, appearance, and

usefulness. In the material aspect, most students agree that the developed learning media can improve the student's understanding. In the language aspect, students agree that the language used was communicative, easy to remember, and helps students justify the songs in the media. On the aspect of appearance, on average, students like the design and feel interested and motivated to learn since it combined with music and song lyrics. In the aspect of usefulness, the students agree that the media was related to their learning style. This media was easy to use because it is in video form, can be accessed anytime and anywhere. This data was generated from the analysis of practicality tests using response questionnaires.

The Effectiveness of Animation-Based Learning Media

Effective learning media means learning media can develop and improve students' cognitive abilities. Fatmawati (2016) asserts that the media is effective if the learning objectives are met. It is necessary to test the effectiveness of the media by administering learning outcome tests to students (table 10). The learning outcome test consisted of 20 multiple-choice questions with a Minimum Completeness Criteria (MMC) score of 80. This test was administered to 28 students.

Table 10. Percentage of complete learning outcomes of students

Student Completeness	Amount	Percentage (%)
Students who complete	24 students	85,71 %
Students who did not complete	4 students	14,29 %
Total	**28 students**	**100 %**

Based on the media effectiveness test, the classical student learning outcomes were 85.71%, which means that 24 students completed it individually and another four did not. It appears that the animation-based learning media equipped with music and song lyrics is in the "effective" category because, classically, it is more than 80%. Widoyoko (2017) said that learning is successful if at least 80% of students achieve a complete score, where students who complete getting a value greater than or equal to the MMC value. In other words, the animation-based learning media equipped with music and song lyrics on cell division material is effective because it can support learning achievements as can be seen from the number of students who get the complete predicate in the learning process. In

brief, a learning completion rate of 85.71 achieved by 24 out of 28 students. As Haviz (2013) stated, a product is effective if it increases student learning outcomes and supports the learning goals.

The results of this development research are in line with several previous studies. Rahayu's (2020) research on the Development of Lyrics-Based and Song-Based Smart Cybpowrector Media in Natural Science Subjects for the Human Digestive System concluded that this media is suitable as a learning media. The animation media developed by the researcher includes lyrics and songs that he worked on independently. In contrast to this study, the music and song lyrics adopted the music and song lyrics that already existed. Another study was conducted by Saputri et al. (2017) about Biology Learning Media with Macromedia Flash Based on Science Song. Although it differs in the video editing, this media is available as a learning media through the assessment. Another relevant research by Afifah and Karna (2018) developed learning media using Macromedia Flash as an application for video editing. All the learning and material experts and the teachers determined that the media was a very feasible category. About 85.04% of the student assessments fell into the very decent category. The distinguishing features of this research are that the product does not have music and lyrics, and the video editing process application.

The media in this study are different from the previous media products. The media developed is based on the Tri Marta, or three-dimensional animation application, created with Sony Vegas Pro 11.0 (64-bit) software. This application can modify sounds or audio files by adding sound effects, cutting and pasting, and combining several sounds to make one sound. The Sony Vegas application is software produced by Sony, Inc. for video and audio editing processes. Because of its features and usability, Sony Vegas is used frequently by editors and animators. The capabilities of Sony Vegas itself in this study can be seen through the features provided in this software, which include modifying, trimming, and internalizing video or audio files in real-time (Purnama, 2013).

The merit of this application is evident when the produced media in the learning process. The sounds (audio) and pictures (visuals) are clear and vivid for students. With the help of the Sony Vegas Pro 11.0 (64-bit) software, this product is available in digital form in MP4 format containing music and song lyrics on cell division material, especially in the sub-material of mitosis and meiosis division. Based on interviews with teachers

and students, the material is difficult to understand. The characteristics of the material are predominantly abstract, difficult to imagine, microscopic, and hard to explain in verbal or conventional ways. The lack of complete laboratory facilities and infrastructure makes it more difficult for students to understand. In addition, the motivation of students in learning and how easily they forget the material also play a role. All those things impact the number of students' KKM or MCC (Minimum Completeness Criteria).

In the cell division material, not all of the sub-materials were covered in the song lyrics. Since mitosis and meiosis were the most challenging sub-materials for students to comprehend, the researcher decided to focus on them in order to get around this limitation. Students often forget the stages of cell division and the processes that occur. In addition, to make it easier for students to remember mitosis and meiosis material, animated videos are equipped with lyrics. The lyrics include ideas and words that are true to their definitions, communicate ideas clearly, and don't have double meanings. The selection of songs that become music is one of the issues. The more famous the chosen song is, the easier it is for students to sing and memorize the lyrics. When the developed media applied, the students were active, and it didn't take long to follow the song with the lyrics of the mitosis and meiosis sub-materials. It appears that students easily understand the material, and the teacher finds it easier to explain each stage of cell division.

Therefore, this media can support biology education for teachers and students, particularly in the Cell Division material. For school policymakers, this could be one of the tools that can be tested on a large scale in other schools. This research is also expected to provide information on the development of learning media based on animated videos that are equipped with music and song lyrics, especially using the Sony Vegas application for further research.

CONCLUSION

The animation-based learning media equipped with music and song lyrics on cell division materials was developed as the product of this research. The development model used was the ADDIE development model, with five stages (analysis, design, development, implementation, and evaluation). The feasibility of the media is measured by its level of validity, practicality, and effectiveness. Based on the media validity test, the media validity level was 3.68 with a very valid. The practicality level of media was

3.56 with a very practical and the effectiveness of media was 85.71% with an effective category. It concluded that animation-based learning media equipped with music and song lyrics on cell division material are available in the learning process.

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