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Development of Articulate Storyline-Based Learning Media on Heat and Temperature

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Abstract: This study aims to develop multimedia using articulate storyline software that can be accessed using smartphones or other devices such as computers. The study used a research and development design created using the ADDIE model (Analysis, Design, Development, Implementation, and Evaluation). The limited trial sample consisted of 15 Class VII SMP Negeri 1 Meluhu. Data collection techniques using interviews, checklists, and tests. The instruments used are validation sheets, student and teacher response questionnaire sheets, and learning outcomes tests. The results showed: (1) the validity of multimedia using the Aiken index (V) obtained the average value of the validation results of 0.78; (2) the effectiveness by using the n-gain test obtained a value of 0.56 and the percentage value of the effectiveness of 66.67%; (3) the practicality of the multimedia teacher response assessment obtained the practicality percentage of 90% and the practicality percentage of the student response obtained by 86.56%. Therefore, learning media can be used as teaching media based on the analysis results.

Keywords: multimedia, articulate storyline, android.

Abstrak: *Penelitian ini bertujuan untuk mengembangkan multimedia dengan menggunakan software articulate storyline yang dapat diakses baik menggunakan smartphone maupun perangkat lainnya seperti komputer. Penelitian menggunakan desain Research and Development yang dikembangkan dengan menggunakan model ADDIE (Analysis, Design, Development, Implementation dan Evaluation). Sampel uji coba terbatas terdiri pada 15 peserta didik Kelas VII SMP Negeri 1 Meluhu. Teknik pengumpulan data menggunakan wawancara, checklist dan tes. Instrumen yang digunakan berupa lembar validasi, lembar angket respon peserta didik dan guru, serta tes hasil belajar. Hasil penelitian menunjukkan (1) kevalidan multimedia dengan menggunakan indeks Aiken (V) diperoleh nilai rata-rata hasil validasi sebesar 0,78; (2) keefektifan dengan menggunakan uji n-gain diperoleh nilai sebesar 0,56 dan nilai persentase keefektifan sebesar 66,67%; (3) kepraktisan multimedia penilaian respon guru diperoleh persentase kepraktisan sebesar 90% dan persentase kepraktisan dari respon peserta didik diperoleh sebesar 86,56%.Oleh karena itu, berdasarkan hasil analisis yang digunakan penggunaan media pembelajaran dapat digunakan sebagai media pembelajaran.*

Kata kunci: *multimedia, articulate storyline, android.*

▪ INTRODUCTION

Technology advancements have had a significant impact on education in the twenty-first century. Teachers must be proficient in using technology in the classroom. According to Minister of National Education Regulation No. 16 of 2007, which mandates that teachers possess proficiency in the use of information and communication technologies, this conforms (Sintawati & Indriani, 2019). One of the technologies that can aid in learning is the computer. Multimedia is a type of computer-assisted learning product that facilitates communication between teachers and students while they are

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learning through text, audio, images, animation, video, and graphics (Husein & Al-Bayati, 2014; Gunawan et al., 2017; Ikbar et al., 2018). The multimedia-based learning process is an instructional strategy that bridges and supports students' learning (Khalil & Elkhider, 2016). It is quite likely that using multimedia will boost student engagement, focus, and interest (Namiroh et al., 2018). According to Nurmaharani et al. (2021), multimedia learning is recommended since it makes lessons more memorable and impactful.

One indicator of the effectiveness of the learning process is the student's interest in the material being covered (Deboer, 2022; Rasyid et al., 2016). Besides multimedia, students can learn autonomously without being constrained by time or location. Due to the current COVID-19 pandemic, multimedia in education is crucial, especially in online learning. Even though various technologies have been employed as learning aids, their effectiveness is still lacking—similar to what occurred at Junior High School 1 Meluhu. According to observations, educators continue to use traditional techniques and have not incorporated interactive technologies into the learning process. Teachers are also aware that the lack of media makes teaching information challenging, particularly regarding temperature and heat, because the subject is abstract. However, the phenomena are palpable (Sundari et al., 2019).

Today, Interactive multimedia is regarded as one of the best media to address educational issues (Kurniawan & Tangkudung, 2017). Adobe Flash, Macromedia Flash, and a program presently gaining popularity in the educational sector, articulate narrative, are a few examples of software frequently used to produce interactive multimedia (Hidayati et al., 2022). Software like Articulate Storyline is popular because it has the benefit of being easier to use than related programs like Adobe Flash, Lectora, and so on (Purnama, 2014; Sindu et al., 2020). It is known that the articulate storyline software as an interactive learning medium in basic electronics engineering subjects is very suitable to be used to support the learning process both in the learning process in the classroom and in independent learning by students (Hanim et al., 2020; Nisa et al., 2022). Then Aulia & Masniladevi (2021) also developed interactive learning media using articulate storyline software to improve student learning outcomes. As for the final result of the development, it is known that the media is feasible with valid, practical criteria and can be used as a media to support student learning in improving learning outcomes in electrical lighting installation subjects. However, today, many people do not know more about the function and use of articulate storylines for learning media needs. In addition, making learning media using articulate storylines can train the creativity and reasoning of teachers, especially in developing and preparing the material to be made.

Based on the analysis results, the media is made in the form of learning multimedia based on articulate storylines. The articulate Storyline is a computer application that can be used as a presentation media and can also design interactive multimedia. In addition to using, the resulting media can be published online and offline in various formats (Syabri & Elfizon, 2020). The multimedia developed is expected to be an effective means for students to understand learning materials and a teaching aid tool that can facilitate educators in the teaching process so that the learning process becomes more exciting and can foster student interest in learning.

▪ METHOD

This kind of research is development-oriented (Research and Development). In contrast, research and development are used to create specific items and evaluate their efficacy. Run a small experiment at Junior High School 1 Meluhu in Class VII. Students in Class VII A who used multimedia-based learning tools with articulate storylines served as the study's subjects. This study uses the ADDIE development model. ADDIE was also developed systematically and based on the theoretical foundation of the extended learning design (Andrizal & Arif, 2017), which includes several stages: analysis, design, development, implementation, and evaluation. As for the development research chart, the following are the stages of developing an articulate multimedia storyline based on the ADDIE development model.

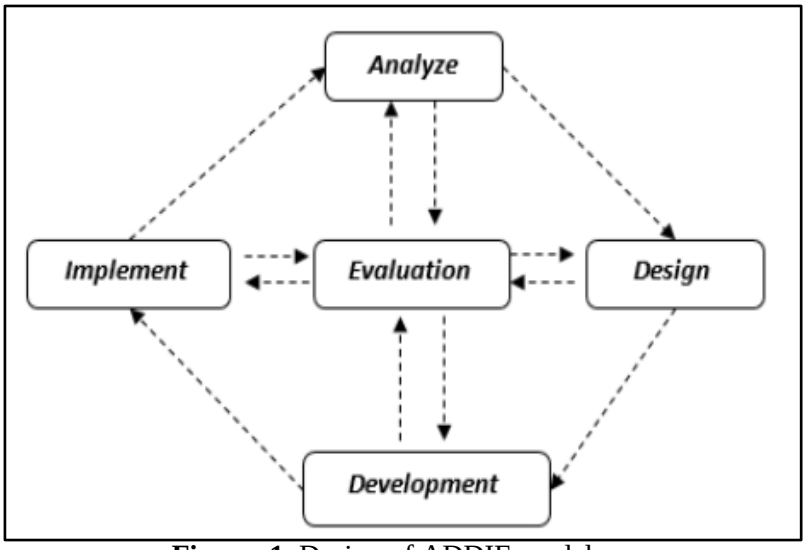

Figure 1. Design of ADDIE model

Stage of analysis: The analysis stage is the initial stage, where at this stage, the researcher conducts a potential and problem analysis, needs analysis, and curriculum analysis as initial information to develop multimedia. Stage of design: At this stage, the design of the material points is carried out, designing a description of the multimedia developed in the form of storyboards and flowcharts. Next, stage of development: The development stage is the product realization stage. At this stage, multimedia development is carried out according to the design. Multimedia that has been completed is then validated to determine the level of validity. And then, stage of implementation is done on a limited basis. Limited trials must be conducted to determine the effectiveness and practicality of the developed multimedia. The research design used at this stage is a one-group pretest-posttest design. Finally, stage of evolution the last stage is the evaluation stage. Where at this stage, a formative and summative evaluation is carried out. Formative evaluation is carried out at each stage of development due to the need for revision. At the same time, the summative assessment is carried out at the last stage, which aims to assess the feasibility of the multimedia developed at the implementation stage.

Analysis date : (1) Product Validity Level: Aiken's V formula is used to calculate the content-validity coefficient based on the expert panel's assessment of as many

people on an item in terms of the extent to which the item represents the measured construct. Multimedia validity is based on category 0.81 < V 1.00 Very valid; 0.61 < V 0.80 Valid; 0.41 < V 0.60 Sufficiently valid; 0.21 < V 0.40 Less valid; 0.00 < V 0.20 Very less valid. (2) Multimedia Practicality Analysis; Analysis of student and teacher questionnaire data using a Likert scale with a scale of 1-5 with positive statements with alternative answers with answer scores: Strongly Agree (SS) = 5, Agree (S) = 4, Moderately Agree (CS) = 3, Disagree (TS) = 2, Strongly Disagree (STS) = 1. To calculate the final score of the responses of students and teachers, namely by dividing the total score of the assessment results by the number of questions or statements given. The final result obtained is in the form of a percentage. The percentage of student and teacher responses was converted with the criteria of 81% - 100% Very good; 61% - 80% Good; 41% - 60% Fairly good; 21% - 40% Not good; 0% - 20% Not good. (3) Multimedia Effectiveness Analysis: The analysis of multimedia's effectiveness is carried out using the N-gain test; by using the N-gain test, we can see the magnitude of the change in student learning outcomes after using articulate storyline-based multimedia. Articulate storyline-based learning multimedia is declared effective or ineffective according to the criteria N-gain < 0.3; Low 0.3 N-gain < 0.7 Medium; N-gain 0.7 High.

▪ RESULT AND DISSCUSSION

The results obtained from this development research are in the form of an articulate storyline-based learning multimedia product used to support the learning process on the Material of Temperature and Heat for Class VII Junior High School. The stages in development research include seeing potential problems, collecting data, product design stages, product validation, product revision, and product testing. The model used in this development research is ADDIE: analysis, design, development, implementation, and evaluation. The results showed that the learning multimedia developed was feasible to be used in the learning process. It is based on the validity, effectiveness, and practicality of learning multimedia based on articulate storylines. Based on the results of the validation obtained, the level of validity of learning multimedia is 0.78 with a valid category. Where the aspects that are assessed are aspects of the construct and aspects of content, the validation. The result of analysis Construct aspect 0,77 valid, Content aspect 0,79 Valid, with Average 0,78 Valid. And then, the increase in student learning outcomes can be measured by analyzing the pretest and posttest results of students who have been carried out at the implementation stage. The results of the analysis of increasing student learning outcomes with average N-gain 0.56 (tall) and effective percentage 66,67% can be seen Figure 2.

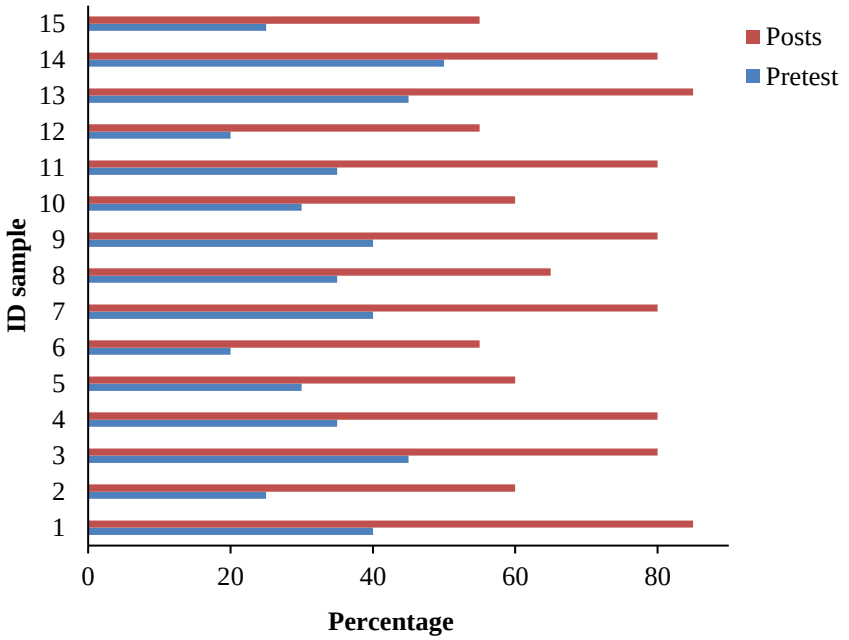

Figure 2. Pre-test post-test learning outcomes student

Figure 3 shows the data from the n-gain test results from 15 students. The results of the n-gain test showed that, on average, the students experienced an increase in learning outcomes of 0.56 in the medium category and the percentage value effectiveness of 66.67%. It means that there is an increase in student learning outcomes after using learning multimedia based on articulate storylines on Temperature and Heat material. So can conclude that the developed learning multimedia is quite effective for learning.

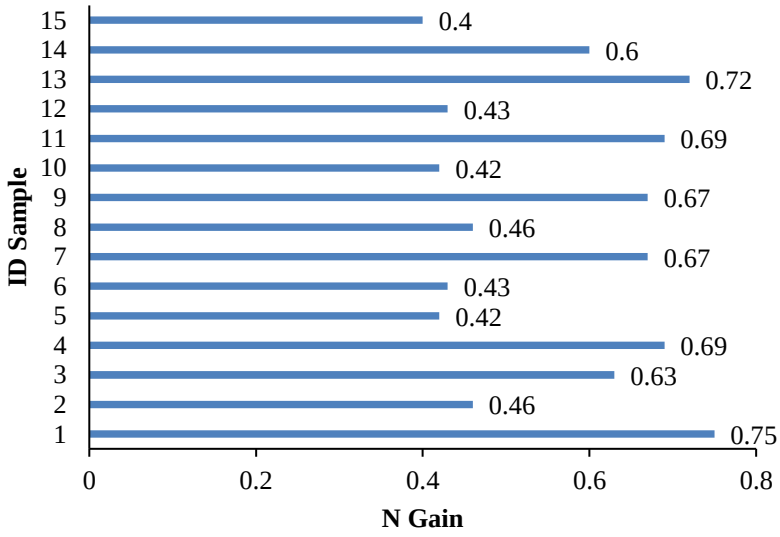

Figure 3. N-gain result analysis of trial class

The practicality of learning multimedia based on articulate storylines is obtained from the results of questionnaires for teacher and student responses. Teacher respond 90 % very good and student respond 86,87% very good. The teacher's response obtained the percentage of multimedia practicality of 90% in the very good category and the results of the student response of 86.87% in the very good category. These results indicate that the use of articulate storylines as a learning resource can provide its attraction so that it can provide satisfying responses, both from teachers and students.

Developing learning multimedia based on an articulate storyline on Temperature and Heat material has passed the development stage using the ADDIE model, which includes the Analysis, Design, Development, Implementation, and Evaluation stages. At the analysis stage, an initial analysis is carried out to determine the potential problems, the needs of students, and curriculum analysis. The second stage is the design stage, where at this stage, the design of learning multimedia designs is carried out, which will be developed in the form of storyboards and flowcharts. Furthermore, at the multimedia development stage, which has been completed, it is designed, validated by experts, and implemented. But before that, the multimedia will be revised according to the validator's suggestions and comments. A limited trial was conducted at the implementation stage using a one-group pretest-posttest research design. The last stage is the evaluation stage. Where at this stage, a formative and summative evaluation is carried out. Formative evaluation is carried out at each stage of development due to the need for revision. In comparison, the summative assessment is carried out at the last stage, which aims to assess the feasibility of the multimedia developed at the implementation stage.

(a) (b)

Figure 4. The results of the learning media made

From Figure 4, this Articulate Storyline is easy and can be used as a solution to making interesting and creative learning media. In line with that, Magdalena et al. (2022)' and Septiana et al. (2022) state that if the use of Articulate Storyline media is appropriate, it can be a generator of motivation and stimulation for the learning process of students. In addition, the Articulate Storyline learning media is also proper as a medium for adding and expanding knowledge in learning that provides accurate and up-to-date information to help students behave, think, develop further and provide high

motivation (Donnelan, 2021). The advantages of Articulate Storyline, as expressed by Firdawela & Reinita (2021); Suppan et al. (2020); Bin Juson & Bin Zakariyah (2019) that the Articulate Storyline application is an interactive multimedia application that teachers and students can use. This application is similar to PowerPoint, so it is easy to apply. Articulate Storyline can be published according to the wishes of its users. It can be accessed via the internet because it is supported in HTML5 format and can also be accessed via computers and smartphones. In addition, Rohmah & Bukhari (2020); Husna & Fajar (2022); Firdaus et al. (2022); Kurnisat et al. (2022) revealed that learning media using Articulate Storyline has several advantages, namely: (1) applications that can be published to the play store, (2) interactive displays, 3) make it easier for students to learn anywhere and anytime, (4) can be accessed offline, (5) learning media that can use at home. Furthermore, for making learning media, it can be feasible to use if it has passed several stages, one of which is the validation stage.

Then articulate Storyline can be published according to the wishes of its users. This application can be accessed via the internet because it is supported in HTML5 format and can also be accessed via computers and smartphones. In addition, Rohmah & Bukhari (2020); Husna & Fajar (2022); Firdaus et al. (2022); Kurnisat et al. (2022) revealed that learning media using Articulate Storyline has several advantages, namely: (1) applications that can be published to the play store, (2) interactive displays, 3) make it easier for students to learn anywhere and anytime, (4) can be accessed offline, (5) learning media that can use at home. Furthermore, for making learning media, it can be feasible to use if it has passed several stages, one of which is the validation stage.

The validation results also show weaknesses in the content aspect, namely the use of effective sentences in multimedia—the importance of using effective sentences in multimedia so students can easily understand the material presented. In addition, effective sentences can also support multimedia as a means of communication and information delivery because effective sentences in language function as communication tools. Tatan & Sumiati (2012) state that the media is anything that can utilize to distribute messages and information. Therefore, statements and knowledge conveyed through the developed multimedia will be easily understood by students if they use effective sentences. Weaknesses in the aspects of the construct and content obtained from the validation results are essential in making multimedia. Therefore, these aspects need to be improved. However, overall, the three validators' multimedia validation results indicate that the developed multimedia is valid. This validity becomes a benchmark for researchers to continue the development process to the implementation stage. It is to Nieven's (1999) statement that the validity of multimedia development is based on the decisions or judgments of multimedia experts.

Multimedia learning is said to be effective if, after using multimedia, students experience an increase in learning outcomes. The results of the n-gain test showed that students experienced an increase in learning outcomes in the medium category. Increased learning outcomes can occur due to several factors, namely external factors and internal factors (Van Dither et al., 2011). In this study, the internal factor that affects student learning outcomes is the interest in learning from the students themselves. In addition, each student can acquire different knowledge.

Meanwhile, external factors include learning methods and media used. The initial condition of students before being given learning multimedia based on articulate

storylines, the learning process in the classroom still uses the lecture method and is only teacher-centered. So that students' interest in learning is still relatively low, which causes the average pretest score of students to only be 36.33. Then after being given treatment, students experienced an increase in learning outcomes. This can be seen from the posttest average value of 70.66.

Learning media significantly affects students' interest in learning in class (Putri et al., 2018), and interest in learning positively and substantially affects learning outcomes both partially and jointly (Dalimunthe & Putri, 2022). This is in line with the results of research conducted, where there is an increase in student learning outcomes after learning multimedia based on articulate storylines. So it can be concluded that the developed multimedia is quite effective for learning, in line with Agustin & Zuhdi (2021) states that there are two criteria for a learning media to be said to be complete and adequate, namely; if the average test result of all students takes the test can reach the KKM or more and if the percentage of test results of all students get the KKM or greater than 80% of all students who take the test.

The practicality of learning multimedia based on articulate storylines on Temperature and Heat material was assessed based on the responses of teachers and students to the use of multimedia developed in the learning process, which was obtained from the results of the response questionnaires given to teachers and students very good response to the use of multimedia developed in the learning process, with a final assessment percentage of 90%. Based on the practicality level assessment criteria, the score of 90% is included in the very good category, and for the results of the student response questionnaire as a whole, the final percentage is 86.97% in the very good category. Akbar (2016) explains that multimedia is said to be practical if users (educators and students) are easy to use interactive multimedia. The teacher's response questionnaire assessment results indicated the ease of use of multimedia with a very good assessment category. Meanwhile, in the student response questionnaire, there are indicator assessments about multimedia that can be used anywhere and anytime with the ease of following the learning material on temperature and heat-assisted by multimedia articulate storylines with a very good assessment category; this proves that articulate storyline-based learning multimedia is efficient to use in the learning process.

▪ CONCLUSION

Based on the results of the research obtained process of developing learning multimedia based on articulate storylines was created using the ADDIE development model (Analysis, Design, Development, Implementation, and Evaluation). This includes several stages, namely analyzing potential and problems, making multimedia designs, making multimedia according to the design, implementing multimedia, and evaluating and revising multimedia at every stage of its manufacture. Articulate storyline-based learning multimedia is said to be feasible with a level of validity of 0.78 with a valid category, the level of effectiveness obtained from the n-gain test of 0.56 with a medium category, and the level of practicality of multimedia obtained from the results of the questionnaire response of teachers by 90% and participants students by 86.87% in the very good category. Based on the limitations of the research, several suggestions are shown for the improvement of development research at a further stage, including learning multimedia based on articulate storylines on Temperature and Heat material

that has been developed. It will be more interesting if it can be developed into complete multimedia, be it animation, simulation, video, and the addition of multimedia background. Articulate storyline-based learning multimedia can be further formed on other physics materials. Extensive trials can be carried out for further developers at the implementation stage.

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