# Development of interactive Multimedia assisted by Articulate Storyline 3 on Mechanics Material

Ida Wahyuni [1], Yeni Megalina [2], Ratna Tanjung [3], Khairul Amdani [4]

{idawahyuni@unimed.ac.id[1],yeni@unimed.ac.id[2],ratnatanjung@unimed.ac.id[3],amdani.khairul@gmail.com[4]}

Universitas Negeri Medan, Fakultas Ilmu Pengetahuan Alam[1], Universitas Negeri Medan, Fakultas Ilmu Pengetahuan Alam, Universitas Negeri Medan, Fakultas Ilmu Pengetahuan Alam [3], Universitas Negeri Medan, Fakultas Ilmu Pengetahuan Alam[4]

**Abstract.** This study aims to determine the feasibility, student response, and effectiveness of interactive multimedia assisted by articulate storyline three on mechanics material. This interactive multimedia can be used on an Android smartphone because the material can be conveyed thoroughly to students. The research is research and development (R&D) with the 4D development design model (Define, Design, Development, Disseminate). The subjects of this study were FMIPA students majoring in statistics class of 2023 A. The research instruments used were observation sheets, interview instruments, student response questionnaires, and test instruments. Based on the results of the feasibility test by material experts, a percentage of 80.56% was obtained with very feasible criteria, and the results of feasibility by media experts were 97.31% with very feasible criteria. The results of the student response test to multimedia are in the effective aspect 3.58 with a very effective category, in the productivity aspect 3.61 with a very productive category, in the security aspect 3.43 with a very safe category and in the satisfaction aspect 3.38 with a very satisfied category. For the effectiveness of interactive multimedia, the N-gain value is 0.8, with very high criteria.

**Keywords:** Interactive Multimedia, Articulate Storyline 3, Mechanics, Smartphone.

## 1 Introduction

Physics learning contains a collection of knowledge in the form of facts, concepts, or principles that require participants to understand specifically the phenomena that occur in the universe to be shown directly to students so that they can understand the natural world scientifically. Based on a questionnaire distributed to 2021 students who have studied Mechanics material in general Physics courses. A learning media is needed so that it can attract interest and can learn independently, such as Multimedia. Learning media is anything that can be used to convey messages from the sender to the recipient in such a way as to arouse students' thoughts, feelings, attention, interests and desires so that learning takes place

effectively in achieving learning goals. Media activities for learning, where the information contained in the media must involve students both mentally and spiritually and in the form of real activities so that learning can occur [1]. Simarmata & Mujiarto [2], multimedia is a variety of information media content and information processing (audio, graphics, and video) that aims to inform, entertain and educate users. According to Pribadi [3], a multimedia program is a computer application that displays messages and information through integrated text, audio, images, video, and animation elements. The types of multimedia are linear multimedia, hyperactive multimedia, interactive multimedia, and multimedia kits. Because learning is centered on students, the lecturer chooses to use interactive multimedia. Interactive multimedia, according to Surjono [4], is a learning program consisting of a combination of several media, namely text, images, graphics, audio, video, animation, and simulations that are integrated with the help of computer technology or the like and can actively provide feedback (interact) between programs and users in supporting the learning process. Interactive multimedia means that users can control and access various elements in multimedia to be displayed later. For example, games, websites, and learning multimedia.

The interactive multimedia chosen uses the Articulate Storyline 3 application because it is still rarely used, especially in Physics. The Articulate Storyline 3 application produces interactive multimedia that can be published [5]. In addition, according to Husna & Fajar [6], Articulate Storyline 3 is software for creating interactive presentations, similar to Microsoft PowerPoint, but with advanced and easier to use features such as timelines, movies, images, characters, animations, etc. Interactive multimedia will be used in Mechanics material: motion, speed, acceleration, unit conversion, measuring instruments, calibration, speedometer, and velocimeter. The use of educational media can clarify how to convey messages and information, create motivation to learn and then overcome the limitations of the senses, space and time  [1]. Currently, technological developments are developing very rapidly [7] which shows that the development of information and communication technology (ICT) has influenced the world of education, especially learning. Smartphone-based educational devices have arrived and shown great potential to help educators build information and knowledge sharing for learning through mobile devices [8]. [9] State that there is a positive impact of cellular phone utilization. The utilization of usability in mobile phones that help the learning cycle will work on the nature of learning interactions.

Previous research [10] showed that at the expert review stage, the total average percentage value of expert validators was 97.02% with a very valid category, the average percentage was 90.81% at the personal assessment stage and 86.93% at the small group stage, with an overall average percentage of 88.87% for the very practical category. Then [11] produced interactive learning media based on Articulate Storyline 3 software suitable for use to increase the interest and learning outcomes of class X students (2) increasing students' interest in learning obtained a standard gain value of 0.47 in the moderate category. The title of the research is "Development of Interactive Multimedia Assisted by Articulate Storyline 3 on Mechanics material". The objectives of this study are a) To determine the feasibility of interactive multimedia assisted by Articulate Storyline 3 on Mechanics material, b) To determine student responses to interactive multimedia assisted by Articulate Storyline 3 on Mechanics material, c) To determine the effectiveness of interactive multimedia assisted by Articulate storyline 3 on Mechanics materia.

## 2 Method

This research uses the Research and Development (R&D) method. Research planning uses the 4D research stages developed by Thiagarajan, et al (1974), namely definition, planning, development and dissemination. The subjects of this research were students majoring in statistics, Faculty of Mathematics and Natural Sciences, class A, State University of Medan. Assessment by material experts, media experts, and effective students for interactive multimedia.

$$P = \frac{X}{Xi} \times 100\%$$

Description:

P = Percentage of each criterion

X = score for each criterion

Xi = maximum score for each criterion

**For Percentage of feasibility**

**Table 1.** Percentage Scale

| Percentage of Achievement | Scale | Interpretation Score |
|---|---|---|
| 76% ≤ P ≤ 100% | 4 | Very feasible |
| 51% ≤ P ≤ 75% | 3 | Feasible |
| 26% ≤ P ≤ 50% | 2 | Feasible enough |
| 0% ≤ P ≤ 25% | 1 | Not feasible |

To test the effectiveness, it is obtained in the following way:

$$P = \frac{raw\ score}{maximum\ raw} \times 100\%$$

**Table 2.** Media effectiveness assessment criteria

| Criteria | Percentage |
|---|---|
| Very good | 80%<x<100% |
| Good | 60%<x<80% |
| Medium | 40%<x<60% |
| Not good | 20%<x<40% |

| | |
|---|---|
| Very not good | 0% <x<20% |

The gain value, according to Hake, can be calculated using formula.:

$$Standar\ Gain\ (g) = \frac{Postest\ Score-\ Pretest\ Score}{Maximum\ Score-Pretest\ Score}$$

**Table 3**. Classification of Gain by Hake

| Criteria | Percentage |
|---|---|
| High | 0,70<gain<1.00 |
| Medium | 0,3 < gain < 0,7 |
| Low | 0,00< gain < 0,3 |
| Same | gain = 0,00 |
| Decreasing | -1,00 < gain <0,00 |

In analyzing product testing, researchers analyzed the results of student response questionnaires. The data obtained through the questionnaire will be analyzed and processed so that the value of student responses to the learning multimedia developed is obtained so that it falls into the quality criteria in use, namely effective, productive, safety, and student satisfaction. Calculations to analyze student responses can use references according to the formula below:

$$P = \frac{\sum x}{N} \times 4$$

Description:

$P$ = category percentage

$\sum x$ = total score of aspects

$N$ = Maximum score of each aspect

After obtaining the results through the score calculation above, the results are grouped based on the quality criteria in use based in Table 4 below:

**Table 4 .** Quality Criteria in Use

| Score | Average Score | Classification | | | |
|---|---|---|---|---|---|
| **4** | 3,26 – 4,00 | Very Effective | Very Productive | Very Safe | **Very Satified** |

| 3 | 2,51 – 3,25 | Effective | Productive | Safe | **Satisfied** |
| 2 | 1,76 – 2,50 | Less Effective | Less Productive | Less Safe | **Less Satisfied** |
| **1** | **1,01 – 1,75** | **Not Effective** | **Not Productive** | **Not Safe** | **Not Satisfied** |

## 3. Research Results and Discussions

**Table 5.** Instrument result from material experts

| No. | Criteria | Value | | | | | Score | Item | Score Max | Percentage |
|---|---|---|---|---|---|---|---|---|---|---|
| | | 1 | 2 | 3 | 4 | 5 | | | | |
| 1. | *Functionality* | - | - | 3 | 20 | 15 | 164 | 38 | 190 | 86,31 |
| 2. | *Reliability* | - | - | 6 | 16 | - | 82 | 22 | 110 | 74,54 |
| 3. | *Usability* | - | - | - | 12 | 10 | 99 | 22 | 110 | 90 |
| 4. | *Efficiency* | - | - | 3 | 4 | - | 25 | 7 | 35 | 71,42 |
| | **TOTAL** | | | | | | **370** | **89** | **445** | **80,56%** |

For the feasibility results of the media expert, see Table 2.

**Tabel 6.** Instrument results from media experts

| No. | Criteria | Value | | | | | Score | Item | Score Max | Percentage |
|---|---|---|---|---|---|---|---|---|---|---|
| | | 1 | 2 | 3 | 4 | 5 | | | | |
| 1. | *Functionality* | - | - | - | 4 | 50 | 266 | 54 | 270 | 98.51 |
| 2. | *Reliability* | - | - | - | - | 15 | 75 | 15 | 75 | 100 |
| 3. | *Usability* | - | - | - | - | 30 | 150 | 30 | 150 | 100 |
| 4. | *Efficiency* | - | - | - | 4 | 5 | 41 | 9 | 45 | 91.11 |
| 5. | *Maintainability* | - | - | - | 4 | 10 | 66 | 14 | 70 | 94.28 |
| 6. | *Probability* | - | - | - | - | 5 | 25 | 5 | 25 | 100 |
| | **TOTAL** | | | | | | **623** | **127** | **635** | **97,31%** |

The results of the student response questionnaire to Interactive multimedia assisted by an Articulate Storyline obtained a value of 83.26% shown in Table 3 below:

**Table 3.** Results of student responses to multimedia

| No. | Aspects | Frequency | | | | Score | Item | Score Max | Category Percentage |
|---|---|---|---|---|---|---|---|---|---|
| | | 1 | 2 | 3 | 4 | | | | |
| 1 | *Effectiveness* | - | 18 | 81 | 95 | 695 | 194 | 776 | 3,58 |
| 2 | *Productivity* | - | 2 | 41 | 74 | 423 | 117 | 468 | 3,61 |
| 3 | Safety | 1 | 5 | 31 | 41 | 268 | 78 | 312 | 3,43 |
| 4 | *Satisfaction* | 2 | 20 | 121 | 129 | 921 | 272 | 1088 | 3,38 |

The results of interactive multimedia performance using Articulate Storyline 3 obtained an N-gain score of 0.8 with high criteria..

**Dissemination Stage**

This stage is an activity to distribute interactive multimedia products assisted by Articulate Storyline 3 to lecturers teaching General Physics courses.

## 4. Discussions

Development of interactive multimedia Articulate Storyline 3 based on Mechanics material using the R & D model developed by Thiagarajan, et al [12] namely define, design, development and dissemination (disseminating). The implementation step starts from the definition stage, namely initial activities, through needs analysis and literature research to identify products to be developed. At this stage, a questionnaire regarding multimedia needs was given to 2021 B and 2021 C students majoring in Physics who had taken general Physics courses. The next stage is the design of the product to be developed, namely interactive multimedia assisted by an Articulate storyline 3. The material chosen is Mechanics, which consists of motion, speed, acceleration, unit conversion, measuring instruments, calibration, speedometer, and velocimeter. Next, the development stage is an activity where the product is made according to a previously created model, after which a product feasibility test is carried out to obtain suggestions for improving the product so that it becomes a product that meets its intended use. Based on the results of the feasibility test by media experts above, the results obtained in the functionality aspect are 98.51%, in the reliability aspect 100%, in the usability aspect 100%, in the efficiency aspect 91.11%, in the maintenance aspect of 94.28%, in the probability aspect of 100%. Overall, the average obtained by researchers in the feasibility test by media experts is 97.31%. From this acquisition, it can be concluded that the material used in the development of interactive multimedia is very feasible to use. The results of the feasibility test by media experts found suggestions that the Android-Based Interactive Learning Multimedia Using the Articulate Storyline 3 Application on Mechanics Material is very interesting and very feasible to use in the learning process because it is delivered with animation with explanations that are easy to understand with easy-to-follow stages" with descriptive feasibility criteria, very feasible, can be used without revision. Based on the results of the feasibility test by material experts, the results obtained in the functionality aspect were 86.31%, in the reliability aspect were 74.54%, in the usability aspect were 90%, and in the efficiency aspect were 71.42. Overall, the average obtained by researchers in the feasibility test by material experts is 80.56%. From this acquisition, it can be concluded that the material used in the development of interactive multimedia is very feasible to use. The advice from the

material expert, "the flow in and out of the application should be refined," can be used but needs revision. The results of the student response test to the android-based interactive learning multimedia are in the effective aspect 3.58 with a very effective category, in the productivity aspect 3.61 with a very productive category, in the security aspect 3.43 with a very safe category, and in the satisfaction aspect of 3.38 with a very satisfied category. The fourth stage is the dissemination stage, which is the activity of disseminating interactive learning multimedia products that have been developed to be used for individual or group use, including disseminating to lecturers teaching General Physics courses and also the general public who need it. The effectiveness of interactive multimedia on mechanics material is obtained from the Pretest and post-test results of students. From the results, an N-gain value of 0.8 with a high category can be obtained. Therefore, testing the effectiveness of using multimedia in learning can improve students' cognitive abilities. Student interest in interactive learning multimedia is the first step in the next learning process in order to improve student learning outcomes. The advantages of the android-based interactive learning multimedia that has been developed are as follows: 1) Android-based interactive learning multimedia can be used offline, 2) Android-based interactive learning multimedia is small enough so it can be used anytime and anywhere so students can learn independently in accordance with Novia & Hidayat's research[13], Independence and learning outcomes have a positive relationship, that is, the more independent students learn, the better their learning outcomes. 3) Android-based interactive learning multimedia has been declared very feasible by media and material experts so that it can be used in the physics learning process. The shortcomings of the Android-based interactive learning multimedia that has been developed are that interactive learning multimedia can only be run on mobile phones with the Android operating system, so students must have an individual cellphone when installing the application, using perms sentences that scare students to accept this application. To make it safer to install it from the telegram application only.

## 5.Conclusion

This study concludes that Interactive Multimedia assisted by an Articulate Storyline shows very feasible criteria for use according to media experts and material experts. Student responses to interactive multimedia show results in each category, namely very effective, very practical, very safe, and very satisfied. The resulting test results show that interactive multimedia obtained an N-gain of 0.8 for the high category and an N-gain (%) of 80% for high category.

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