

Development of Interactive Learning Media with Animaker and Articulate Storyline on Permutation and Combination Subject

Sinta Dwi Oktaviana

Departement of Mathematics Education, University of Jember, Jember, Indonesia
shintadwioktaviana@gmail.com

Arika Inda Kristiana

Departement of Mathematics Education, University of Jember, Jember, Indonesia
arika.fkip@unej.ac.id

Randi Pratama Murtikusuma

Departement of Mathematics Education, University of Jember, Jember, Indonesia
randipratama@unej.ac.id

Abstract: *Technological development has given a huge impact on education. In this case, it will be shown process and development of interactive learning media with Animaker and Articulate Storyline. The Animaker is a website that used to make animated videos to illustrate the problems about permutation and combination. The animated videos that have been created will be put into the media with the help of Articulate Storyline and made it accessible through a computer. This study is a development research using a Plomp development model consisting 3 phases, namely preliminary research, development or prototyping phase and assessment phase. The subjects of this study were 33 12th grader sciences 4 of SMA Negeri Rambipuji. The result obtained from this study indicate that interactive learning media and guidebooks are included in the very high valid category with a correlation coefficient of 0.95 and 0.99, and the results of the observers during the study equal to 73.63%. This meant that the media was valid, practical, and feasible to be used in mathematics learning.*

Keywords—interactive learning media; Animaker; Articulate Storyline; permutation; combination

1. INTRODUCTION

The 21st century has undergone changes in many sectors. One of the causes of this is the development of technologies with significant innovation improves [1], [2]. Technological development today makes everything accessible and connected to each other. The effects of these changes was vary, among of them was the positive and negative impacts. In education, one of the positive impacts of technology is making technology-based learning media as instrument of study in the classroom. The learning media that it makes might be audio media, video, picture, or multimedia that can be tailored to students' need. Multimedia is a capable media of transmitting messages to participants in integrated text, voice, video, animation and hyperlink [3]. Multimedia can be implemented into interactive learning media forms that living, interesting, understandable, and obvious information.

One of the media that can be developed is interactive learning media with computer. This is in accordance with the current 4.0 industry concept aimed at digitizing transformation and utilizing the latest technology [4]. Using computer as learning media can make it easier for teachers and students to carry out the learning process [5]. In addition, the use of media assisted with technology in learning activities can improve students' understanding of the material that causes an increase in evaluation results [6]–[12].

Some technologies that can be utilized to support the creation of interactive learning media are websites and software. One website that can be used is Animaker. Animaker is an animated video maker website that can be accessed for free and easily. As one of the websites that can be accessed online, Animaker is able to make topics taught by teachers more interesting and entertaining when learning activities go on [13], [14]. The animation that it's created will explain the cases relating to the problems surrounding the material described.

A learning media can be said to be interactive if it can cause interaction with students. Animated videos that have been created cannot be said to be interactive learning media because they only take one direction. Therefore, we need software that can package animated videos into interactive learning media. One of the software that can be used is Articulate Storyline. This software can be used to create interactive learning media that creates a reciprocal relationship between students and the media. The use of learning media with the Articulate Storyline is able to provide a high contribution in understanding the material, so it has the potential to increase student motivation because the media used are practical for learning activities [15]–[17].

Currently, mathematics is one of the subjects that is less liked by students because it has a lot of material that is considered difficult. Combinatorics is one of the more difficult topics to teach and learn [18]. There are still many students in schools who experience difficulties in

combinatorial learning, especially in permutation and combination subject. In common, students have difficulty analyzing the specific differences between permutations and combinations when faced with a story problem. Some mistakes made by students related to the concepts of permutations and combinations are [19] : 1) students are not careful enough in understanding the purpose of the problem that makes them use the formula incorrectly; 2) students are wrong in looking for permutation values caused by students' lack of the concept of permutations so that students simply enter numbers into available formula, also forget because of the similarities between permutation and combination questions; 3) students are wrong in looking for combination values caused by students' lack of the concept of combinations so that students simply enter numbers into available formula, also forget because of the similarities between permutation and combination questions. Therefore, we need learning media that can help students learn permutation and combination subject.

Based on the explanation above, the purpose of this study is to develop learning media assisted by Animaker and Articulate Storyline on permutation and combination subject.

2. RESEARCH METHODS

The type of this research is a research development (RnD) with research subjects were 33 12th grader sciences 4 of SMA Negeri Rambipuji. The development model used is a model developed by Plomp. This development model consists of 3 phases : 1) Preliminary Research. In this phase, identifying problems encountered during the learning process, student analysis, material analysis, and environmental analysis; 2) Development or Prototyping Phase. In this phase, media design and development are carried out in the accordance with the problems found in the preliminary research phase. In addition, a feasibility test or validation is carried out by the validator, while the practicality of the media through testing on research subjects; 3) Assessment phase. In this phase, analyzing the data obtained during the trial is carried out.

This research is a quantitative study, which the data obtained will be processed to get the final result. In the validity analysis process of interactive learning media, there are categories of validity coefficient interpretation which will indicate the level of appropriateness of the media. The validity level in the correlation coefficient category is shown in Table 1 below [20].

Table 1: Categories of Validity Coefficients Interpretation

The value of α	Validity
$0.80 < \alpha \leq 1.00$	Very high
$0.60 < \alpha \leq 0.80$	High

Besides to testing the validity of the media, practicality tests were also carried out by the observers. At this stage, there is a percentage of observational data used to see the

practicality of the media. The percentage of observational data is shown in Table 2 below.

Table 2: The Percentage of Observational Data

The value of R	Validity
$80\% < R \leq 100\%$	Very good
$70\% < R \leq 80\%$	Good

3. DISCUSSION

This study uses animated video as a visualization of the problems of permutation and combination subject with the help of Animaker. The animated video is then packaged into an interactive learning media using Articulate Storyline. This interactive learning media can be accessed offline by students without having to install any software.



Fig. 1. Interactive learning media preview



Fig. 2. Interactive learning media menu display

The interactive learning media that have been developed consist of 2 initial menu, they are start and petunjuk or instructor. The main menu consists of the material, evaluation, competence and profile menus. In the material menu, students will be presented with material in the form of animated videos and also cases that are packaged interactively. In the animated video, there is a story that illustrates cases of permutation and combination. Next to the animated video, there is a column containing the possibilities that occur based on the story that must be filled out by students. In this media, there are also other cases that are served with the aim to train students to find solutions based on existing problems.



Fig. 3. Permutation Subject



Fig. 4. Exercises

In this learning media, there are two training menu choices, namely latihan soal or the practice exercise and evaluasi or evaluation. The practice exercise menu is used to train students' abilities in working on permutation and combination questions. On this menu, there is help that can make it easier for students to solve the problems. Meanwhile, the evaluation menu is used to test students' ability to do permutation and combination question. The practice exercise display on learning media can be seen in Fig. 4.

3.1 Validity of Interactive Learning Media

Before conducting trials on research subject, the learning media are first validated by the validators. The validators were 2 lecturers of Mathematics Education at the Faculty of Teacher Training and Education, Jember University and a mathematics teacher at SMA Negeri Rambipuji. There are several aspects assessed in this validation test, including subject matter, auxiliary information, interface, navigation, and robustness. The results of validation by the three validators can be seen in Table 1 below.

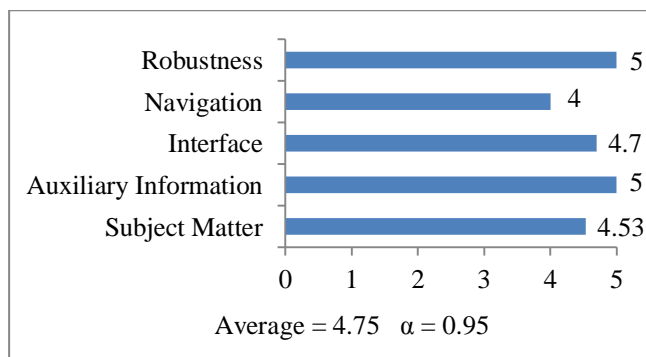


Fig. 5. Learning Media Validation Results

Based on the data above, the coefficient α is 0.95 with an average value is 4.75. This shows that the interactive learning media developed is included in the very high valid category. This interactive learning media is equipped with a handbook validated by 2 Mathematics Lecturers at Jember University with the results which can be seen in Figure 6.

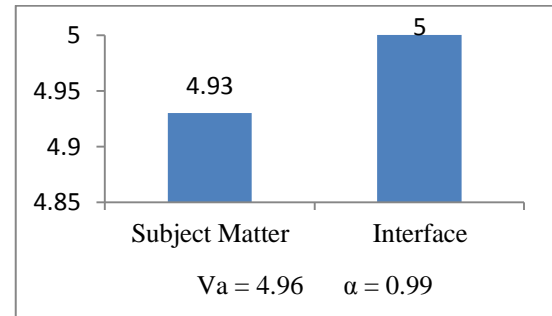


Fig. 6. Learning Media Handbook Validation Results

Based on the data above, the coefficient α is 0.99 with an average value is 4.96. This shows that the interactive learning media handbook is included in the very high valid category.

3.2 Practicality of Interactive Learning Media

The practicality of this interactive learning media was tested through a questionnaire filled out by the observers. They are 2 students of Mathematics Education, The Faculty of Teacher Training and Education, Jember University. This questionnaire was filled in during the learning media trial run in class. Some aspects that are considered related to learning media are content, ease of use, and interaction with students. The observers will give a value to the questionnaire consisting of several aspects of assessment they are aspects of auxiliary information, interface, navigation, robustness, and robustness. The results of this activity can be seen in Figure 7 below.

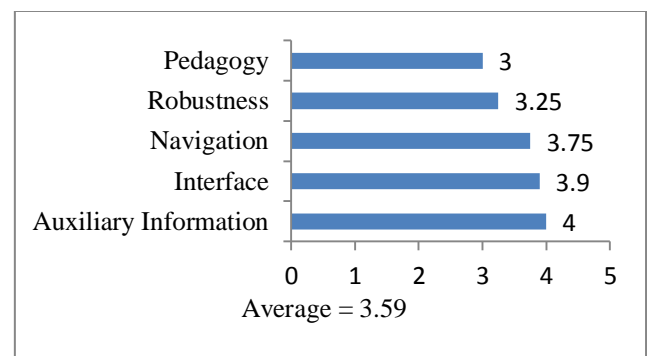


Fig. 7. Observation Data Result

Based on the observation data, the average total obtained from all aspects is 3.59 or equivalent to a percentage of 73.63%. This shows that the learning media developed are included in the practical category.

The advantage of development research is that it can produce interactive learning media that can help students understand the concepts of permutation and combination. The resulting media can be accessed using a computer without having to install any software and does not require an internet connection. This learning media is equipped with animated videos that contain cases of permutations and combinations in everyday life. The use of drag and drop effect can also add an interactive impression in the media because it can increase student interactivity in learning by using media. This media is also equipped with a print result feature that can facilitate the teacher in collecting student work.

4. CONCLUSION

Based on the analysis of the data that has been done, it can be concluded that the interactive learning media assisted by Animaker and Articulate Storyline on permutation and combination material can help students improve their understanding and ability of the material. The interactive learning media that it is developed has a very high feasibility with an average value is 4.75 and a coefficient α is 0.95. In addition, the interactive learning media handbook is also included in the very high valid category with an average value is 4.96 and a coefficient of α 0.99. The practicality level of instructional media based on observers' observations was 73.63%, including the practical criteria with the 'Good' percentage category. So it can be concluded that the interactive learning media assisted by Animaker and Articulate Storyline on permutation and combination subject is valid, practical, and can be used in mathematics learning activities.

5. REFERENCES

- [1] A. Collins and R. Halversont, "The Second Educational Revolution: Rethinking Education in The Age of Technology," *J. Comput. Assist. Learn.*, pp. 18–27, 2010.
- [2] M. Baygin, H. Yetis, M. Karakose, and E. Akin, "An Effect Analysis of Industry 4.0 to Higher Education," 2016.
- [3] B. A. Pribadi, *Media & Teknologi dalam Pembelajaran*. Jakarta: KENCANA, 2017.
- [4] A. Rojko, "Industry 4.0 Concept: Background and Overview," 2017, vol. 11, no. 5, pp. 77–90.
- [5] I. K. Sudarsana, I. W. P. S. Darma, N. W. Arini, N. N. Selasih, and Setyaningsih, "Computer as Media in Improving Teacher Performance and Student Learning Process," in *Journal of Physics*, 2019.
- [6] A. T. Ampa, "The Implementation of Interactive Multimedia Learning Materials in Teaching Listening Skills," vol. 8, no. 12, pp. 56–62, 2015.
- [7] D. R. Anderson and M. C. Davidson, "Receptive versus Interactive Video Screens: A Role for the Brain's Default Mode Network in Learning from Media," no. May, 2019.
- [8] R. P. Murtikusuma, A. Fatahillah, E. Oktavianingtyas, S. Hussen, and N. Lailiya, "The Development of Interactive Mathematics Learning Media Based on Schoology and Visual Basic Through Industrial Revolution 4.0," pp. 0–6, 2019.
- [9] R. P. Murtikusuma, Hobri, A. Fatahillah, S. Hussen, and R. R. Prasetyo, "Development of Blended Learning Based on Google Classroom With Osing Culture Theme in Mathematics Learning," 2019.
- [10] Hobri, R. P. Murtikusuma, and L. I. Hermawan, "Development of e-Comic Using Pixton and Kelase Web on Linear Program of Two Variables Assisted by Geogebra," 2019.
- [11] N. Kusumaningtyas, D. Trapsilasiwi, and A. Fatahillah, "Pengembangan Media Pembelajaran Interaktif Online Berbantuan Desmos pada Kelaskita Materi Program Linier Kelas XI SMA," 2018, pp. 118–128.
- [12] F. Farruq, Dafik, Suharto, A. Fatahillah, and R. P. Murtikusuma, "Pengembangan Media Pembelajaran Interaktif Online Pokok Bahasan Aritmetika Berbantuan Microsoft Visual Basic," 2018, pp. 89–97.
- [13] N. D. Marican, N. A. Ridzuan, A. F. A. Rashid, and N. A. Rashid, "Integratin of Online Application in Elevating The Value of Entrepreneurship Lessons in Traditional and Complementary Medicine Course," *IUCEL*, pp. 228–231, 2018.
- [14] M. S. Francisco, C. Torres, I. Yilber, and J. Toro, "Desarrollo de un Objeto Virtual de Aprendizaje (OVA) 3D Que Permita Conocery Aprender Sobre Los Servicios Que Brinda," 2019, pp. 16–23.
- [15] H. Rafmana, U. Chotimah, and Alfiandra, "Pengembangan Multimedia Interaktif Berbasis Articulate Storyline untuk Meningkatkan Motivasi SMA Srijaya Negara Palembang," 2018, vol. 5, no. 1, pp. 52–65.
- [16] R. A. Pratama, "Media Pembelajaran Berbasis Articulate Storyline 2 pada Materi Menggambar Grafik Fungsu di SMP Patra Dharma 2 Balikpapan," vol. 7, no. 1, pp. 19–35, 2018.
- [17] R. Wilechansky, M. Burgermaster, D. Jones, and D. Seres, "Obesity, Diet, and Exercise Education for the Primary Care Clerkship Using an Articulate Storyline 2 e-Learning Module," *J. Teach. Learn. Resour.*, pp. 1–7, 2016.
- [18] J. Melusova and K. Vidermanova, "Upper-secondary Student's Strategies for Solving Combinatorial Problems," in *Slovakia: Social and Behavioral Sciences*, 2015, pp. 1703–1709.
- [19] W. Yanti, "Analisis Kesalahan dalam Menyelesaikan Soal Pada Materi Permutasi dan Kombinasi," in *Prosiding Seminar Nasional Pendiidkan Matematika 2016*, 2016, pp. 97–104.
- [20] A. Yusuf, *Asesmen dan Evaluasi Pendidikan (Pilar Penyedia Informasi dan Kegiatan Pengendalian Mutu Pendidikan)*. Jakarta: Rajagrafindo Persada, 2015.