Development of Android-Based Number E-Modules using Articulate Storyline 3 for Grade 7 Students

Nurul Khusnah[1*], Hamzah Upu[2]

[1]Mathematics Education Master's Study Program, Universitas Negeri Makassar, Makassar, Indonesia
Email[*]: nurulkhusnah9@gmail.com

[2]Department of Mathematics, Universitas Negeri Makassar, Makassar, Indonesia
Email: hamzahupu@gmail.com

Abstract

This research aims to develop an Android-based number material electronic module using the articulate storyline 3 software for students in class VII. The ADDIE development model was used for this study (Analysis, Design, Development, Implementation, and Evaluation). The Android-based electronic module was expected to fulfill a feasibility assessment that is valid, practical, and effective. This research was conducted on 25 students in class VIIB of MTs Negeri 1 Jeneponto with data collection instruments in the form of validation sheets, questionnaire sheets, and learning outcomes testing. Based on the results of the study are: (1) the percentage was valid 4.29% for material experts, very valid 4.33% for media experts, and 3.5% for the questionnaire instrument; (2) very practical percentage of student response questionnaires 88.20% practical from teacher response questionnaires 78; (3) the dominant student learning outcomes are in the very good and good categories. Thus, the e-module is declared feasible to be applied in the mathematics learning process.

Keywords: E-Modul; Articulate Storyline 3; Android.

INTRODUCTION

The optimal use of technology as an educational tool can form a creative, innovative, and competitive generation. According to Mukaromah (2020), learning designed to include information and communication and technology-based media can change students' attitudes to be more passionate about learning. This is evidenced by Amasha et al. (2021) that android applications are more effective in developing students' cognitive skills than traditional methods to improve student learning outcomes in mathematics. Hussain (2019), in his research, found some software that can be used in multimedia development at a low cost but fast, including spring, articulate storyline, and adobe. The researcher himself recommends using e-learning fast authoring tools to easily create e-learning and migrate it with an LMS (learning management system) to get the benefits of e-learning into the world of education.

One of the most important means is the provision of textbooks as a good and correct reference for students and teachers. The inclusion of this book is very important because the textbook is a significant tool in supporting the process of learning activities and achieving learning objectives (Ikhwandi et al., 2015). However, there are still difficulties experienced by both teachers and students in understanding the textbooks provided. Students have difficulty understanding the content, examples, and language in textbooks; students are rarely trained to conduct observations and experiments, and the learning process takes place, and teachers rarely use information technology in the teaching and learning process (Krisdiana et al., 2014). The adequacy of materials that do not have time allocation and material essence makes students difficult, and authentic assessments still make teachers feel confused (Suyanti & Drs. H. Sumardi, 2015). Students and teachers have difficulty developing existing materials in outstanding textbooks (Fauzi et al., 2020).

Based on observations that have been made at MTs Negeri 1 Jeneponto, it is known that the mathematics textbooks used in learning are still in the form of printed books, and even then, they are still limited to being distributed to all students. Consequently, the subject matter can only be written and studied during math class hours (this will reduce the time for the teacher to explain the material). Of course, this

condition is considered less efficient, especially in the limited face-to-face learning (PTM) conditions where learning time at school is limited. Another problem is the difficulty of students in understanding the sequence of material in the textbook. Therefore, learning innovations are needed, one of which is by developing electronic modules (e-modules).

E-modules can be distributed to all devices owned by students so that they can be used anytime and anywhere, making learning time more efficient at school (Meliana et al., 2022). Electronic modules (e-module) can change the presentation of modules that are usually printed into modules that can be read without having to be printed by utilizing developed technology devices such as laptops and androids. Based on the results of research by Rochsun & Agustin (2020), student learning outcomes increase effectively through the application of e-modules of contextual problem-based mathematics. This effect occurs because of the active involvement of students' mathematical knowledge, which attracts interest in learning (Kouhi & Rahmani, 2022; Prendergast et al., 2017), thereby increasing students' theoretical concepts and mathematical abilities (Amasha et al., 2021; Sun & Pan, 2021).

Based on the description above, the researchers are interested in conducting a study by developing an Android-Based Algebraic E-Module Using Articulate Storyline 3 to create more interesting learning both in the classroom and outside the classroom.

METHOD

Using the Research and Development (R&D) type of research on the ADDIE model, this research targets to produce a product in the form of an Android-based electronic module that meets the feasibility assessment. The feasibility assessment includes the product's validity, practicality, and effectiveness. Validity assessment will be assessed through two aspects, namely, the material aspect and the media aspect. Assessment of product validity was carried out by involving experts and experts on material aspects and media aspects. The assessment of the product's practicality was based on the respondent's convenience after using the product. The effectiveness assessment is seen from the increase in respondents' understanding as measured through learning outcomes tests. The application used in making this e-module is articulate storyline 3.

The development procedure included analysis, design, development, implementation, and evaluation stages. The research location chosen was MTs Negeri 1 Jeneponto, with the subject of development research was 25 students in class VIIB. Data collection instruments used validation sheets, questionnaire sheets, observation sheets, and learning outcomes testing. Validation sheets were given to two Mathematics Education lecturers and a mathematics teacher from MTs Negeri 1 Jeneponto, who were considered experts in their fields. The data collected was then analyzed quantitatively to show the module's validity, practicality, and effectiveness. The e-module is said to be valid if it meets the minimum "Valid" category with a minimum score of 3.5, meets practical criteria if it gets a minimum score of 60%, and meets effective if the dominant student experiences an increase in understanding.

RESULT AND DISCUSSION

The development of the number e-module adapts the stages of the ADDIE model, which consists of 5 steps with details:

Analysis
This first stage is carried out to find the needs of respondents, which in its implementation, will find supporting data on product manufacture (Syahroni & Nurfitriyanti, 2018). From the problem analysis activities, information was obtained about some of the student's difficulties in understanding mathematics subject matter. Through interviews with students, the difficulties experienced are influenced by various factors such as limited student abilities, a basic mastery of mathematics such as arithmetic operations that are still lacking, a lack of motivation to learn, and the existence of books. The

existence of the book in question has not been able to provide maximum understanding to students regarding the mathematical material they are studying because of the unordered material and sentences that are difficult for students to understand. Not to mention the limitations of books that do not allow all students to be able to bring textbooks to their respective homes.

From the investigation results above, it is deemed necessary to make an electronic module (e-module) as a second learning resource after books; where this module will be made so that students feel that the sequence of material and sentences presented is easy to understand. The e-module developed in this study includes mathematics learning that can be accessed using android. This format was taken from the observation that during the Covid 19 pandemic, the use of Android was recommended. The choice of electronic modules allows each student to have a handbook. Then the material to be taken is number material with the consideration that this material is the basis for students can master arithmetic operations so that it will be easier when studying the next material. Finally, software that can be used to manufacture products is selected, namely articulate storyline 3.

Design

The second stage is carried out as a reference in making a framework or product description to be made (Syahroni & Nurfitriyanti, 2018). In this stage, the framework/description of the module was made in the form of storyboards and flowcharts. After that, instruments that would be used to collect data were also made, ranging from instrument validity sheets, questionnaire sheets, and learning outcomes test sheets.

Development

The development aims to create and modify the product to become a product that is ready to be applied (Cahyadi, 2019). The e-module design that has been made is manifested into a product using an articulate storyline 3. An articulate Storyline is software that can be used to make presentations and has the same function as Microsoft PowerPoint (Sindu et al., 2020).

Figure 1. Example of an E-Module Display

The product validation process was then carried out. The validation process used an instrument that had been prepared and approved by the supervisor. This validation assessment sheet consists of 17 indicators for each material expert and media expert validation and 9 indicators for each teacher response questionnaire and student response. Validation is carried out with the aim that the application that has been developed gets input from validators who are experts in their fields and as evidence that the application is feasible to be used in research. Furthermore, the number of e-module that have been developed, improved, and refined based on input and suggestions from the validators.

Table 1. Summary of Suggestions from Validators

Source	Suggestion
Material expert	In chapter 1, it is better to come to the first definition by general about the number round; the questions used results construct questions in the book and attached grille by written and complete with KD to be evaluated.
Media expert	KD must be in accordance with valid KD by general, video on module Use UIN Alauddin background, changing main menu display with custom menu logo researcher, change color arrow learning and transfer video display material, animation photo changed Becomes photo alone.
Instrument questionnaire	Customize destination questionnaire and sheet, validate and create a grille

The results of the overall questionnaire assessment, when viewed from the average value, are in the valid category because each instrument has an average value of more than 3.5, which is in the interval $3,5 \leq M < 4,3$. Assessment of media experts (e-module), the average value is 4.33; this value is in the interval $4,3 \leq M < 5$ with a very valid category. While the assessment of material experts in the e-module obtained an average value of 4.29, this value is in the interval $3,5 \leq M < 4,3$ with a valid category. Thus, the e-module can be said to be feasible to be tested.

Implementation
It is carried out so that the objectives of making the product are met (Cahyadi, 2019). This stage also measures whether the e-module made can solve the difficulties students previously felt. The e-module was applied in the learning of class VIIB students at MTs Negeri 1 Jeneponto for 4 meetings. Students who have downloaded and used the number e-module will be given a number-related learning outcome test to see the progress of their learning outcomes.

Table 2. Learning outcomes test results

Interval	Amount participant educate	Percentage	Category
91 − 100	12	48%	Very Good
90 − 75	9	36%	Well
74 − 60	2	8%	Enough
< 60	2	8%	Not enough
Amount	25		

Based on these data, the highest percentage of 48% of students scored in the very good category, and only 8% were in the poor category. This means that the e-module of numbers as a whole has been effective in increasing students' understanding. Data processing was also obtained from teacher and student response questionnaires. In this study, the results of the student response questionnaire rating were 88.20%, while the results of the teacher response questionnaire rating were 78%. Based on the results of the student response questionnaire rating and the results of the teacher response questionnaire rating, it was found that the use of e-modules for students was in the very practical category, and the practical category was based on the teacher's response questionnaire.

Evaluation
This stage is important to evaluate the shortcomings of the product made. At this stage, not many revisions have been made. As for the advantages of this e-module, there are animations and explanations in the form of videos so that the presentation of the material is clearer, and the teacher directly obtains

the results of student evaluations via e-mail because it is connected by i-spring. As suggested by Brame (2016), videos need to display key information and be divided into smaller parts, which can improve learning quality. The use of learning videos can improve student learning outcomes (De la Flor López et al., 2016). The limitation, as well as the drawback of this e-module, is the application of the research subject which is only carried out in one school; the material used in this study is only the material for class VII numbers.

CONCLUSION AND SUGGESTION

The development of an Android-based number e-module using articulate storyline 3 has gone through the stages of the ADDIE model, which consists of the stages of analysis, design, development, implementation, and evaluation. E-modules in the form of android allow students to be able to use them individually. The results of data processing show that the e-module has met the feasibility assessment with the following details: (1) the percentage is valid at 4.29% for material experts, very valid at 4.33% for media experts, and 3.5% for the questionnaire instrument; (2) very practical percentage of student response questionnaires 88.20% practical from teacher response questionnaires 78; (3) the dominant student learning outcomes are in the very good and good categories.

REFERENCES

Amasha, M. A., Areed, M. F., Khairy, D., Atawy, S. M., Alkhalaf, S., & Abougalala, R. A. (2021). Development of a Java-based Mobile application for mathematics learning. *Education and Information Technologies*, *26*(1), 945–964. https://doi.org/10.1007/s10639-020-10287-0

Brame, C. J. (2016). Effective Educational Videos: Principles and Guidelines for Maximizing Student Learning from Video Content. *CBE—Life Sciences Education*, *15*(4), es6. https://doi.org/10.1187/cbe.16-03-0125

Cahyadi, R. A. H. (2019). Pengembangan Bahan Ajar Berbasis Addie Model. *Halaqa: Islamic Education Journal*, *3*(1), 35–42. https://doi.org/10.21070/halaqa.v3i1.2124

De la Flor López, S., Ferrando, F., & Fabregat-Sanjuan, A. (2016). Learning/training video clips: An efficient tool for improving learning outcomes in Mechanical Engineering. *International Journal of Educational Technology in Higher Education*, *13*(1), 6. https://doi.org/10.1186/s41239-016-0011-4

Fauzi, A., Sawitri, D., & Syahrir, S. (2020). Kesulitan Guru Pada Pembelajaran Matematika Di Sekolah Dasar. *Jurnal Ilmiah Mandala Education*, *6*(1), Article 1. https://doi.org/10.36312/jime.v6i1.1119

Hussain, A. (2019). Using The Rapid Authoring Tools In E-Learning Content Design: A Case Study Of Online Course Design. *International Journal of Scientific & Technology Research*. https://www.semanticscholar.org/paper/Using-The-Rapid-Authoring-Tools-In-E-Learning-A-Of-Hussain/b527ae678de41e5c87fa0e81892e7ffc858ef618

Ikhwandi, I., Dafik, D., & Suciati, S. (2015). Telaah kesesuaian buku guru matematika kelas x kurikulum 2013 berdasarkan pendekatan saintifik. *Pancaran Pendidikan*, *1*, 117–128.

Kouhi, M., & Rahmani, M. (2022). Design and Development of a Mobile Application for Teaching Triple Multiplication to Preschool Children. *SN Computer Science*, *3*(2), 156. https://doi.org/10.1007/s42979-022-01033-z

Krisdiana, I., Apriandi, D., & Setyansah, R. K. (2014). Analisis kesulitan yang dihadapi oleh guru dan peserta didik sekolah menengah pertama dalam implementasi kurikulum 2013 pada mata

pelajaran matematika (Studi Kasus Eks-Karesidenan Madiun). *JIPM (Jurnal Ilmiah Pendidikan Matematika)*, *3*(1), Article 1. https://doi.org/10.25273/jipm.v3i1.492

Meliana, F., Herlina, S., Suripah, S., & Dahlia, A. (2022). Pengembangan Bahan Ajar E-Modul Matematika Berbantuan Flip Pdf Professional pada Materi Peluang Kelas VIII SMP. *SJME (Supremum Journal of Mathematics Education)*, *6*(1), 43–60. https://doi.org/10.35706/sjme.v6i1.5712

Mukaromah, E. (2020). Pemanfaatan Teknologi Informasi dan Komunikasi dalam Meningkatkan Gairah Belajar Siswa. *Indonesian Journal of Education Management & Administration Review*, *4*(1), 175–182. https://doi.org/10.4321/ijemar.v4i1.4381

Prendergast, M., Spassiani, N. A., & Roche, J. (2017). Developing a Mathematics Module for Students with Intellectual Disability in Higher Education. *International Journal of Higher Education*, *6*(3), 169. https://doi.org/10.5430/ijhe.v6n3p169

Rochsun, R., & Agustin, R. D. (2020). THE DEVELOPMENT OF E-MODULE MATHEMATICS BASED ON CONTEXTUAL PROBLEMS. *European Journal of Education Studies*, *7*(10), Article 10. https://doi.org/10.46827/ejes.v7i10.3317

Sindu, I. G. P., Santyadiputra, G. S., & Permana, A. A. J. (2020). The effectiveness of the application of Articulate Storyline 3 learning object on student cognitive on Basic Computer System courses. *Jurnal Pendidikan Vokasi*, *10*(3), 290–299. https://doi.org/10.21831/jpv.v10i3.36094

Sun, L., & Pan, C. E. (2021). Effects of the Application of Information Technology to E-Book Learning on Learning Motivation and Effectiveness. *Frontiers in Psychology*, *12*, 752303. https://doi.org/10.3389/fpsyg.2021.752303

Suyanti, S., & Drs. H. Sumardi, Ms. (2015). *Analisis Kesulitan Guru Dalam Memahami Materi Buku Guru Dan Buku Siswa Matematika SMP Kelas VIII Berdasarkan Kurikulum 2013* [S1, Universitas Muhammadiyah Surakarta]. https://doi.org/10/LAMPIRAN.pdf

Syahroni, S., & Nurfitriyanti, M. (2018). Pengembangan Media Pembelajaran Interaktif Berbasis Komputer dalam Pembelajaran Matematika, Materi Bilangan pada Kelas 3 SD. *Formatif: Jurnal Ilmiah Pendidikan MIPA*, *7*(3), Article 3. https://doi.org/10.30998/formatif.v7i3.2237