

Aplimath Result of Validity Media Based Android at Courses of Calculus 1

Pukky Tetralian B.N^{1,*} Aris Alfian¹ Ahmad K. Umam¹

¹ Department of Mathematic, Universitas Billfath, Lamongan, Indonesia

*Corresponding author. Email: tetralian1010@gmail.com

ABSTRACT

Technological developments have developed breakthroughs for learning so that it can facilitate students to learn. Calculus I course is the basis for learning mathematics. The purpose of this study is to test the validity of the Android-based ApliMath media in Calculus I. This research method uses the Research and Development design developed by Borg and Gall which includes 5 stages, but in research is only limited to testing, namely (1) Research and information collecting, (2) Planning, (3) Developing preliminary forms of products, (4) Preliminary field testing, (5) Main product revision. Based on the results of the validity test conducted by media experts through a questionnaire, it was found that the media application was suitable to be used as a learning medium. While the validity test results by the material experts through the questionnaire obtained the results of material that is suitable for use as a learning medium. From the results of media experts and material experts, it can be concluded that it is feasible to be tested on students. The conclusion of this research is that the prototype media ApliMath product has been produced which is ready to be tested on Billfath University students as learning media.

Keywords: Validity, ApliMath, Prototype Product

1. INTRODUCTION

There are many technologies that can be used as learning media in the process of learning mathematics in the digital era. Technological developments have developed breakthroughs for learning. Educational practitioners make use of technological developments to be used as learning media. This is in accordance with research [1] about Investigating the Readiness of College Students for ICT and Mobile Learning: A Case Study from King Saud University shows that more than 60% of KSU students use ICT and applications mobile learning in everyday life on campus. On the other [2] Mathematics is known to be a challenging subject for learners in secondary schools across the world. Some countries, particularly developed nations, have adopted different methods and approaches of trying to address the challenge. Within the field of Computer Science and Information and Communication Technology (ICT), mathematics plays a significant role.

Currently the application technology mobile learning is still in the process of development, however, application technology mobile as a learning media is one of the prospective technologies in the future. This is supported by several factors as follows, namely, the

demands of the needs of consumers who want practical things, the relatively cheap mobile phone prices and the relatively more mobile phone users than computer users.

Media is a bridge for students and lecturers to communicate. An attractive media can foster student interest in learning and motivating in the classroom. Android can be developed into a medium that has various variations. One form of media that can be made in the form of android is an application. The android application is an apk, which can be used for all types of android types. Android applications can be used as needed because they are more effective and efficient. Android applications can be made using Adobe Animate software. It is hoped that with the media using this android application students can learn independently and can be an alternative source of learning for students.

Calculus is a branch of mathematics that includes limits, differentials, infinite series, and integrals [3]. According to the Big Indonesian Dictionary, calculus is a part of mathematics which mainly involves understanding and using differential and integral functions and related concepts. Then, it is further stated that differential is a mathematical analysis of the dependence of the rate of change of functions with

changes in function variables and integrals is a mathematical analysis of the technique of finding expressions and evaluating integral functions, especially for the calculation of area, length, curve, volume, and number and the solution of equations simple differential.

In studying Calculus, it is generally divided into Calculus I and Calculus II. Calculus I, also known as Differential Calculus learns about limits, differentials and differential applications, while Calculus II, also known as Integral Calculus learns about indefinite integrals, certain integrals, and the use of certain integrals [4].

In this study, the trial is only limited to calculus I, which is about limits and derivatives, because the material is considered difficult for students, so there is a need for suitable media to support teaching and learning activities. Android-based media application is expected to increase student interest in learning.

Based on this description, it can be formulated the problem of how to develop ApliMath (Application mathematics) in the Calculus I course in terms of the feasibility of the application.

2. METHOD

Design of research use research and development or the type of research development [5]. The development carried out is the Development of Applications in Calculus I Course which will be carried out for 6 months. In this study using 5 stages, namely the stage of gathering information, the stage of planning, the stage of developing products, the stage of testing validation, the stage of revision. The details of this research are carried out in several stages namely, the stage of gathering information that is gathering information sources in the form of data and places that will be used as research subjects, the planning stage that is planning research to be carried out by considering the information that has been obtained, the stage of developing the product that is designing the product and making product assessment instruments, the validation testing stage is testing the products that have been made by considering the assessment, suggestions and comet material experts and media experts, the product revision stage is revising the application media products according to comments and suggestions.

Collected data in the Aplimath form in the quantitative data as data main and qualitative data as suggestions and from respondents as additional data of input. These provide data a feasibility of product be developed overview.

Collected data from material experts in the form of product quality is reviewed from the aspect material of content, that is equivalent with RPS, equivalent to students' abilities, learning of topics is clear, material

clutter, coverage of material, appropriateness of evaluation design, relevance of images, videos, and illustrations to the material, easy for use media, and easy for simple of material subject.

Collected data from media experts in the form of product quality are viewed from the media aspects, that is: interaction with students, format of languages, use of colors, quality of image , quality of music, illustration of quality, use of animations, order of presentation, and the appearance of Aplimath.

In this research, the product produced was Aplimath (Application Mathematics) on calculus I. The design of software used to make Aplimath products was Corel draw X8, Adobe Photoshop CS 8, and Adobe Animate CC 2018 and inkscape.

The subjects of this study were Billfath University students of the mathematics study program in the second semester of the 2019/2020 academic year. The practice questions are in the form of an essay of 10 questions, consisting of 5 questions on limit material and 5 questions on derivative material. The practice questions that have been done are then collected via email or messaging applications.

3. RESULT AND DISCUSSION

The results of this research have been produced a prototype aplimath product and aplimath media which has been validated by material experts and media experts. Aplicimath media consists of 2 chapters namely limit and derivative. Media Apps uses universal based Android applications so that it can support various types of Android versions. Here are some views of Android apps:

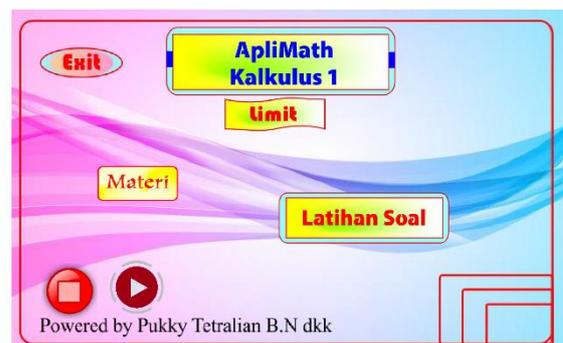


Figure 1 Aplimath Menu Display

In the Aplimath menu display consists of material, exercises, play and off music and exit buttons. First the material button functions to see what material is on the media application. The two question exercise buttons function to fill out essay practice questions that are useful for measuring students' understanding of limit and derivative material. The three play and off music buttons function to play and turn off the instrumental music that is on the media application. The four exit buttons

function to exit the aplimath application. The merging of the Aplimath display design using Corel Draw software is then processed by adding a script using Adobe Animate CC.

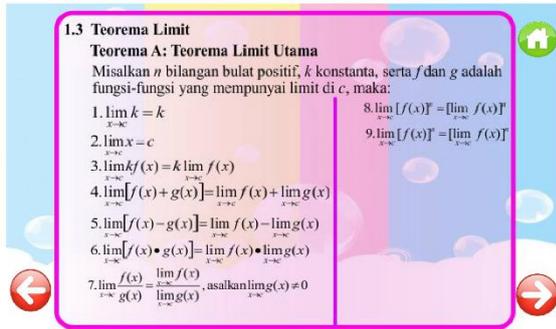


Figure 2 Aplimath Material Display

On the material menu there is a next button, back button and home button. First the next button functions to go to the next page of the material slide. Both back buttons function to return to the previous page. The three home buttons function towards the start page.

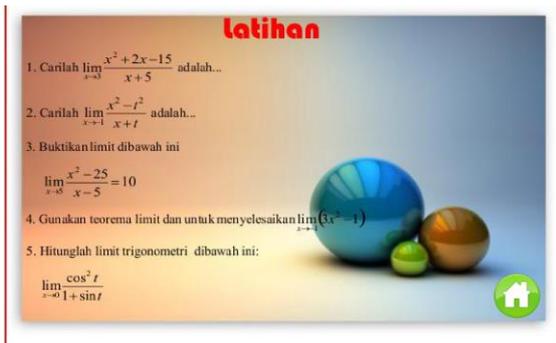


Figure 2 Appearance of Aplimath Material

On the exercises menu there are 5 questions students must do to find out the students' understanding of material calculus I. There is a home button to go to the first page.

The media application aplimath has been validated using an online questionnaire using google form. The online questionnaire obtained responses from material experts and media experts. The following assessment percentages are presented in the form stem diagram and pie chart diagrams below.

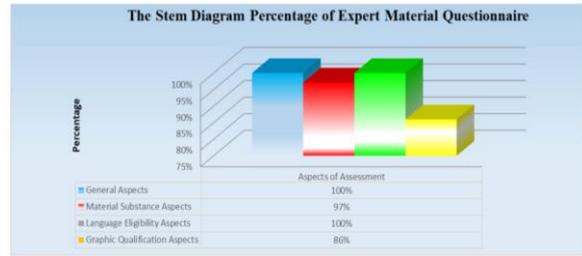


Figure 4 The Stem Diagram of Expert Material

Based on the percentage picture above, the material expert evaluates the application product that is 100% general aspect, which means that calculus I material is easy enough to be understood by students, 92% learning presentation aspect means that this teaching material is quite complete, there are examples of questions, practice questions and summaries, aspects of language feasibility 100%, which means the use of language in this teaching material is in accordance with the level of intellectual development of students, the feasibility aspect of the graph is 86%, which means the sentences and images in the calculus I material are quite clear.

Based on the results of interviews with material experts, it is suggested that the design needs to be made more interesting to make it more fun in learning and in the material menu it is necessary to add material so that students are more detailed in understanding the material. Whereas the advantages of aplimath media are the calculus I material available in the aplimath media is quite complete based on examples and practice questions so that it can help students in independent learning and can be used as a medium for teaching and learning.

Furthermore, the following is results of the material expert questionnaire through Google Form. The grading percentages are presented in the form stem diagram and pie chart diagrams below.

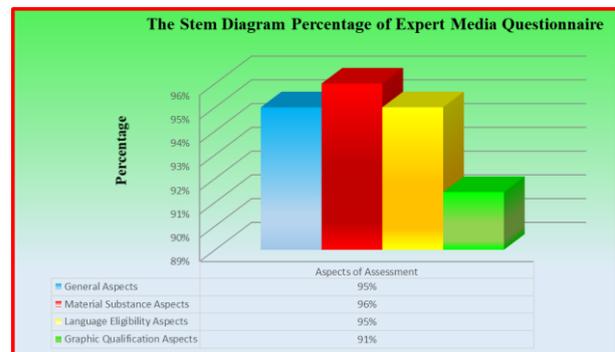


Figure 6 The Stem Diagram of Expert Media

Based on the diagram of the results of the adoption of media experts, the assessment of aplimath media products is a general aspect of 95%, which means that the media of the application is classified as creative and

innovative media, 96% of the learning presentation aspect means that the systematics and media presentation of the aplimath media are good, the aspect of language feasibility is 95%, it means the level the use of language and language norms is reasonable, the feasibility aspect of 91% means that the appearance of the layout and color elements match the background requirements.

Based on the results of interviews with media experts, it was suggested that there should be added animation so that students are more interesting in learning. As for the advantages of the media application, it can help students in the digital era as it is currently based on Android so that students will be helped in learning. Android-based media application is an innovative and creative media in its development as a learning media.

From the description of the assessment and interview above, the average result of an Android-based aplimath assessment obtained by material experts is 96%. While the average Android-based aplimath assessment by media experts is 94%. It can be concluded that the results of the Android-based aplimath media assessment of material experts and media experts are classified as valid, amounting to 94.46%. Whereas based on the results of the interview there needs to be revisions related to relating to the appearance and material but for the whole it is appropriate to be used on students. It can be concluded that the android-based media application on calculus I material is valid and deserves to be tested on students.

4. CONCLUSION

Based on the results of research and discussion of the problem, it can be concluded that the results of validation by media experts and material experts obtained an average of 94.46%, which means that the android based media application is classified as feasible to be tested. Android based media apps are appropriate for use by Billfath University students with a revisions about display and more examples so that the media can be used for maximum students based on the advice of media experts and material experts.

REFERENCES

- [1] A. Husain and Hammo, "Investigating the Readiness of College Students for ICT and Mobile Learning: A Case Study from King Saud University," *International Arab Journal of e-Technology.*, vol. 4, no. 1, pp. 48-55, 2015.
- [2] Admire and Jere, "Implementation of Mobile Games For Mathematics Learning: A Case Of Namibian Schools," *International Journal of Scientific Knowledge.*, vol. 5, no. 5, pp. 6-16, 2014.
- [3] S. Rejeki, "Kontribusi Kemampuan Kalkulus I Dan Kalkulus Ii Terhadap Hasil Belajar Mata Kuliah Analisis Vektor," *JPM IAIN Antasari*, Vol. 03, No. 1, pp. 1-14, 2015.
- [4] H.W Slamet, *Kalkulus Integral*. Muhammadiyah University Press, 2015.
- [5] Sugiyono, *Metode Penelitian Kuantitatif, Kualitatif, dan R&D*. Alfabeta, 2016.