Interactive Multimedia Development on KPK and FPB Material

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Abstract. This development research aims to: 1) produce interactive multimedia learning products for prospective elementary teacher students in low grade mathematics courses; 2) determine the level of feasibility of the product being developed. The research method refers to the Allesi & Trollip development model which is grouped into three development steps, namely: a) planning; b) design, and c) development comprising components including standards, ongoing evaluation, and project management. This research produces interactive learning multimedia products in the form of Flesdis. The results of the product score validation criteria are very valid (workable). Keywords: Interactive; Learning; Mathematics; Multimedia; Students.

1. Introduction
The development of science and technology that is so rapid, along with the times, allows one to more easily access and add insights related to information. Someone faster can get various information by utilizing available technology, such as the internet. Sophisticated technology requires someone to actively participate in following it so as not to drown by it.

As the development of knowledge in this globalization era, technology has become one medium to transfer knowledge. By utilizing technology, the learning process to master science and technology is faster and saves time, and the process is increasingly individualized according to the needs of each student [1]. Computers can help the learning process, it is very potential to improve the quality of learning, especially mathematics [2]. One computer application that supports mathematics learning is interactive multimedia.

Multimedia is a combination of two words, i.e. multi which means a lot and the media is interpreted as a tool used to convey information. Multimedia is a combination of several media such as technology, images, sound, animation, video and other synergistically using computer or other electronic equipment in achieving certain goals [3], [4]. Interactive multimedia creates a high-quality learning environment. With the ability to create more realistic learning contexts through different media and allow students to take control, interactive multimedia can provide an effective learning environment for various types of students [5]–[8]. Multimedia technology is one of the most interesting innovations in the information age. The rapid growth of multimedia technology over the past decade has brought fundamental changes to computerization, entertainment and education [9]. In addition, forms of interactive multimedia can improve student learning experiences to be more concrete [10]–[13].

Interactive multimedia learning media is needed as one way to overcome the low interest of students in learning mathematics, especially KPK and FPB material.
2. Methods
This study uses a research and development (R & D) model that refers to the Alessi & Trolip development model. This development model comprises three attributes, namely standard (standard), continuous evaluation (continuous evaluation), and project management (project management). The steps for the development of alessi & trollip comprise three stages, namely planning, (planning), design (design) and development (development) [14].

3. Results and Discussion
This research and development is focused on developing interactive multimedia. Product worthiness is assessed by material experts and media experts and product testing to encourage cognitive aspects of elementary students. The results and development are interactive multimedia of KPK and FPB material. There are 4 aspects assessed by material experts described in 16 indicators. The results of expert material assessments 1 and 2 on all aspects and indicators got an average of 4.0 with a decent category. So the second assessment of the Ali material is 4.0. The following diagram results from expert material assessment.

3.1. Media display
After the paper based design is finished, the product design that has been designed in the paper based design is then made in a computer using Microsoft Office Power Point. Researchers also uses the Adobe Photoshop CS 5 program to create images that are needed in this learning media. Learning media that has created in the Microsoft Office Power Point program then packaged in a web display created using the Microsoft Front Page program. The results of the display of learning media can be seen as follows.

Based on an analysis of the system overview discussed, an interactive multimedia learning media application was developed whose functionality can be seen in Figure 1 through 6.

3.1.1. Intro Section
The intro section is an animation that appears when the multimedia learning media of KPN and FPB are run can be seen in Figure 1.

![Figure 1. Display of KPK and FPB Multimedia Intro](image)

3.1.2. Instructions for Use of Interactive Multimedia
Before students use this multimedia students must first understand the media instructions, the following display instructions for figure 2.
3.1.3. Mathematical Figure
In the menu of mathematical figures, researchers enter several photographs of figures or scientists in mathematics such as Archimedes, Al-khawarizmi, Fibonacci, Phytagoras and others. The user can click on the photo of the character and a brief explanation will appear about the character, including the name of the character and his contribution in mathematics. The menu display of mathematical figures can be seen in Figure 3.

3.1.4. Display Menu material KPK and FPB
By directly showing all choices of material that can learn in this learning media 5 meetings, instructions for using the media along with summative questions, students can accord to what they want to learn and want. The main page has created by being equipped with menu buttons, navigation buttons. The main page display can be seen in Figure 4.

3.1.5. Display Square Material
Display KPK and FPB material by using a magic card, figure 5.
3.1.6. Display of Practice Questions
After the description of the material has finished explained, then the user will go into practice questions. The display to cover practice questions is equipped with a button to go to the previous page, a button to go to the next page, and a button to exit.

3.2. Product Validation (Prototype)
Validation for computer-based learning media interactive tutorial models on the subject of multiples and number factors are assessed from 4 aspects namely learning aspects, curriculum aspects, program aspects and cosmetic aspects. From table 1 all criteria are very valid, so there are more products to use.

| No | Validator   | Total | Average | Category   |
|----|-------------|-------|---------|------------|
| 1. | Validator 1 | 90    | 3.3     | Very Valid |
| 2. | Validator 2 | 100   | 3.7     | Very Valid |
| 3. | Validator 3 | 103   | 3.8     | Very Valid |

4. Conclusions
Based on research that has been done, an interactive multimedia learning system application is obtained from the KPK and FPB material. This application is expected to be used by students as prospective teachers for aids in the teaching and learning process of mathematics in the KPK and FPB material. The material is displayed in a combination of text, image, sound and animation formats. This interactive multimedia system can be used as an alternative medium of learning besides classroom learning to help the achievement of aspects of mathematical competence. In addition, the application of this system can be developed to use mobile areas to increase the level of efficiency.

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References

[1] Yoon J S and Hoon S S 2009 A Study on the Direction of Education to Prevent Multimedia literacy Journal of the Korea Association for Communication and Information Studies 37 139-167

[2] Herman T 2003 Pengembangan Multimedia Matematika Interaktif Untuk Menumbuhkembangkan Kemampuan Penalaran Matemati Siswa Sekolah Dasar Makalah Seminar Nasional Pendidikan MIPA UPI Bandung

[3] Mayer R E 2009 Multimedia learning prinsip-prinsip dan aplikasi Yogyakarta: Pustaka Pelajar

[4] Surjono H D 2007 Multimedia pembelajaran interaktif konsep dan pengembangan, Yogyakarta: UNY Press

[5] Margie J and Liu M 1996 Introducing interactive multimedia to young children: A case study of how two-years-olds interact with the technology Educ. Resour. Inf. Cent 8(4) 13-43

[6] Jalinus J and Alim J A 2019 Quality Review of Computer Based Interactive Mathematics Learning Media on Geometry Topics in Flat Fields for Elementary Students Proceedings of the UR International Conference on Educational Sciences 397–407

[7] Alim J A, Fauzan A, Arnawa I M and Musdi E 2020 Model of Geometry Realistic Learning Development with Interactive Multimedia Assistance in Elementary School J. Phys. Conf. Ser 8(8) 3579-3584 doi: 10.1088/1742-6596/1471/1/012053

[8] Munir M 2012 Multimedia konsep & aplikasi dalam pendidikan Bandung: Alfbeta

[9] Mukt N Abd and Hwa S P 2004 Malaysian perspective: Designing interactive multimedia learning environment for moral values education J. Educ. Technol. Soc 7(4) 143–152

[10] Atmawarni U M A 2012 Penggunaan Multimedia Interaktif Guna Menciptakan Pembelajaran Yang Inovatif Di Sekolah Perspektif 1(1)

[11] Doymus K, Karacop A, and Simsek U 2010 Effects of jigsaw and animation techniques on students’ understanding of concepts and subjects in electrochemistry Educ. Technol. Res. Dev 58(6) 671–69

[12] Gois J Y and Giordan M 2009 Evolution of virtual learning environments in chemistry education Enseñanza las Ciencias Didáctica las Ciencias, Barcelona 8 2864–2867

[13] Lerman Z M and Morton D 2009 Using the arts and computer animation to make chemistry accessible to all in the twenty-first century Chemistry education in the ICT age, Springer 31–39

[14] Alessi S M and Trollip S R 2001 Multimedia for learning: Methods and development Boston:Allyn & Bacon