

Android-Based Interactive Learning Multimedia Validity in Genetic Substance and Synthesis Protein for Students of Medical Laboratory Technology (TLM)

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Abstract - Molecular biology is one of the subjects supporters comm pete Qu for students of Medical Laboratory Technology (TLM) in STIKes Perintis Padang. The learning process and learning outcomes of molecular biology at this time are still a problem because the material contained in molecular biology courses is abstract so that students have difficulty in studying and applying the material, therefore, the role of lecturers is needed in choosing learning media for students. This research aims to produce interactive android based learning multimedia on genetic substance and protein synthesis material for valid medical laboratory technology (TLM) students. This research is a research development of learning media. This research refers to the Plomp development model. What is done in the study up to 4 stages, namely (1) problem analysis, (2) needs analysis, (3) product design and (4) product validity. Data validity based on android interactive learning interactive multimedia obtained from the validity questionnaire filled out by the validator. The results of the validity study obtained a value of 84.45 %. The conclusion of this research is the production of interactive android based learning multimedia on genetic material and protein synthesis material for medical laboratory technology students (TLM) which is very valid.

Keywords - *Multimedia, Interactive, Android, Biology, Molecular.*

I. INTRODUCTION

Molecular biology is one of the subjects supporters comm pete Qu for students of Medical Laboratory Technology (TLM) in STIKes Perintis Padang. The era of technological and scientific development has now entered the *bioengineering* phase which in its application involves the science of biology in solving problems related to living things, looking for similarities in the structure, functions and processes that exist in living things. In order to be able to answer the challenges in the current *bioengineering* era and in the future, TLM expert graduates need to be equipped with competency in mastering theories, principles and procedures in molecular biology as a form of application of *bioengineering*. These competencies can be obtained by students taking lectures in molecular biology. Molecular

biology material is studied for laboratory technology students including chromosomes, DNA, genes and related processes such as transcription and translation).

The learning process and learning outcomes of molecular biology are still a problem because the material contained in molecular biology courses is abstract so that students have difficulty learning and applying the material. The low student learning outcomes in molecular biology courses further reinforce the notion that molecular biology is a difficult science. One of the factors causing the low student learning outcomes is the learning process and the use of teaching materials that are not in accordance with the needs of students in understanding the subject matter.

The development of Science and Technology (IPTEK) will always influence the development of education in Indonesia. Utilization of the development of science and technology in education is done to improve student learning outcomes through increasing the effectiveness and efficiency of the learning process. This rapid change makes education move through the use of information and communication *technology* (ICT) [1].

Learning can be said to be effective if the teaching and learning process goes according to the learning objectives, then the role of lecturers is needed in the selection of methods, media and evaluations for students. The better the learning media used by educators, the more effective the achievement of learning goals [2]

The selection of media in learning based on Edgar Dale's Theory states that students have levels in storing information depending on their learning experience. When viewed from the *Cone of Experience*, 75% of a person's learning experience is obtained through the sense of sight (eye), 13% through the sense of hearing (ear), and the rest through other senses [3]. One of the learning media that can activate several senses in learning is interactive multimedia, but the use of multimedia in the field is still not optimal.

Developing a learning media must meet several aspects of media feasibility so that the media created is worthy of supporting the learning process. There are three criteria for the feasibility of learning media, namely validity, practicality and effectiveness [4]. Theoretical validity is measured based on the perspective of the expert. The feasibility of the media based on aspects of validity is obtained through media validation to experts. In the validation of the media can not be separated from good media ratings. Aspects of good interactive multimedia assessment are aspects of material substance, media design and general aspects including language, creative, innovative and communicative [5].

Based on the description above, a research development is carried out aimed at producing *android*-based interactive learning multimedia on genetic substance and protein synthesis material for medical laboratory technology students, which deserves to be reviewed from the aspect.

II. METHODOLOGY

This research is a research development of learning media. This research refers to the Plomp development model. What is done in the study up to 4 stages, namely (1) problem analysis, (2) needs analysis, (3) product design and

(4) product validity. Research targets at the development stage are *android*-based interactive learning multimedia on genetic substance and protein synthesis material and the results of interactive multimedia validity. Multimedia validity assessments were carried out by material, media and language experts. The validation results were analyzed using descriptive statistics. The assessment sheet refers to the *Guttman* scale with criteria 4 for answers Strongly Agree, 3 agree, 2 disagree and 1 strongly disagree. The validation is given as follows.

$$\text{Validity Level} = \frac{\text{The number score obtained}}{\text{Highest number of score}} \times 100\%$$

The criteria for evaluating an average score are based on the provisions in Table 1 as follows

Table 1. Validity Category

Persentase (%)	Kategori
81-100%	Very Valid
61-80%	Valid
41-60%	Valid enough
21-40%	Invalid
0-20%	invalid

III. RESULTS AND DISCUSSION

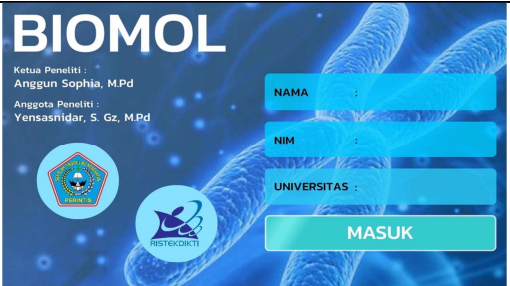
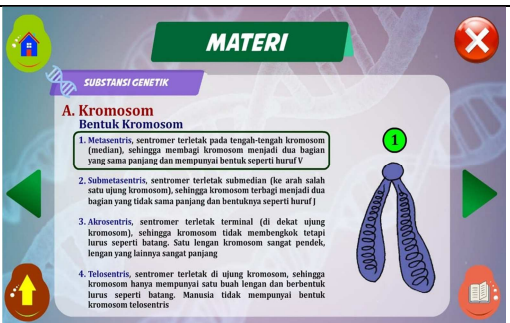
This research is an *Android*-based learning multimedia development research that supports the learning of molecular biology with genetic substance and protein synthesis material in TLM Diploma IV students. Based on the validity of the Android based multimedia interactive learning by three expert lecturers p enilaian includes four aspects: the construct, materials, graphics and language expressed very valid in terms of the aspect of validity. The average validity results can be seen in Table 2..

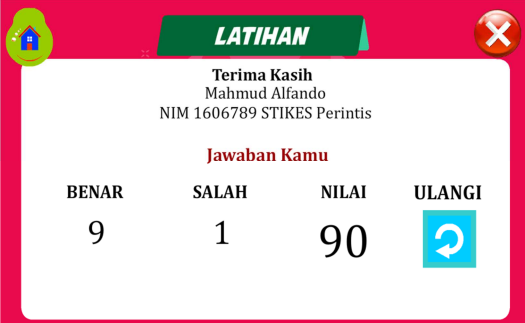
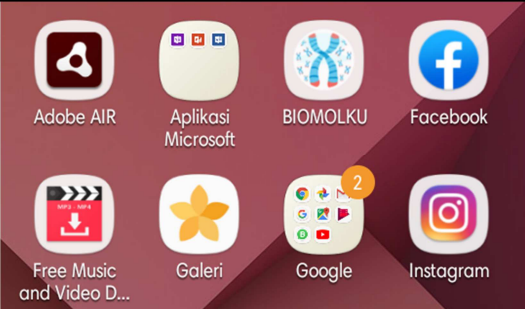
In addition to providing an assessment, the validator lecturer also provides suggestions for improvements to the Android-based interactive learning multimedia that was developed, and the suggestions have been corrected accordingly. Following is an example of an improved *android* based interactive learning multimedia based on validator suggestions in Table 3.

Table 2. The Validity Results of Interactive Learning Multimedia Based on Android

No	Rated aspect	Validation Value (%)	Criteria
1	Construction aspects	82.25	Very Valid
2	Material Aspects	79.00	Valid
3	Graphic aspect	91.05	Very Valid
4	Language Aspects	85.50	Very Valid
Average		84.45	Very Valid

Table 3 . Example of Improvement of Interactive Multimedia Display Based on *Android* Based Learning Validator Suggestions

No	Improvement of Interactive Multimedia Learning Based on <i>Android</i>
1	 Information: Fix the word School to University, the color of the <i>background</i> color has been changed to soft color and on the main screen the application has been inserted a chromosome image.
2	 Information: Fix the <i>background</i> color combination, the definition of the chromosome parts have been checked, the scripts for the chromosome parts have been corrected, so that the chromosome information is clicked then the image according to the information appears.

3	 Information: The score on the exercise has been raised
4	 Information: App design view in android handphone, use chromosome image with color the soft one

Based on the validity test, the three validators stated that interactive *android*-based multimedia learning that the researcher designed was included in the category of very valid with an average value of 84.45 %. *Android*-based interactive learning multimedia is said to be very valid because it has fulfilled all four aspects of construct, material, graphics and language. *Android*-based interactive learning multimedia meets the construct aspect because it is designed to be used on an *Android phone*. *Android*-based interactive learning multimedia contains visual components in the form of text, images and animations, videos and is designed based on learning outcomes

The results of the validation of interactive learning multimedia based on android aspects of the construct is 82.25 % with very valid criteria. This is appropriate that if a data generated from a product is valid, it can be said that the product developed has provided a description of the development goals correctly and in accordance with reality and the actual situation [6].

Android-based interactive learning multimedia meets aspects of the material because it already contains important concepts in the material DNA, chromosomes, genes,

and protein synthesis in accordance with learning outcomes. Presentation of difficult concepts such as object shapes and processes are well visualized using video animation. Conformity to the material aspects makes it easy in the process of delivering material. Conformity of material aspects is very important to avoid mistakes in the acceptance of concepts. The results of multimedia interactive learning based on *android* aspects of the material is 79.00 % with valid criteria. Android multimedia is able to visualize material that is abstract through images and animations, making it easier for students to understand the subject matter [7].

The results of interactive learning multimedia based on android aspects of graphics are 91.05% with very valid criteria. Mul *android* -based interactive learning multimedia meets the graphic aspect because it already contains instructions for use to facilitate students in using *android* -based interactive learning multimedia. The image is in accordance with the explanation of the material, has a size that is easy to see, has a clear shape and attractive colors. Video animation is in accordance with the explanation of the material, has a size that is easy to see, the movement is not too fast and attractive colors. Audio which is a *background* makes the display of interactive learning multimedia based on Android becomes more interesting. The writing used is appropriate so it is easy to read, the colors used are appropriate, have the right punctuation. Interactive multimedia learning based on *Android* already has an attractive appearance. Media interesting learning can increase the motivation of all-students to learn on their own according to their ability and interest [8].

The results of multimedia interactive learning based on *android* aspects of language are 85.50% with very valid criteria. *Android* -based interactive learning multimedia meets aspects of the language because it is based on the rules of Indonesian language that is good and right. And already using communicative language. The sentences used are also in accordance with Indonesian language rules. The language aspect is one aspect that needs to be considered in the preparation of teaching materials, the language used should be a language that is simple and easy to understand [9].

IV. CONCLUSION

Based on the development that has been done, it is concluded that android-based interactive learning multimedia on genetic substance and protein synthesis

material for medical laboratory technology students has validity with a very valid category.

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REFERENCE

- [1] Setiawan, H. 2014. Analisis Perbandingan Hasil Belajar Siswa Menggunakan Multimedia Pembelajaran Interaktif dengan Media *Powerpoint*. Yogyakarta: Universitas Negeri Yogyakarta.
- [2] Wena, Made. 2009. Strategi Pembelajaran Inovatif. Jakarta: Bumi Aksara
- [3] Arsyad, Azhar. 2016. Media Pembelajaran. Jakarta: Rajawali Pers.
- [4] Hidayati, S.N, Sabtiawan, W.B dan Subekti, H. 2016. Pengembangan Instrumen Penilaian Otentik: Validitas Teoritis dan Kepraktisan". *Jurnal Penelitian Pendidikan IPA* Vol 1 No. 1 ISSN:2549-2209
- [5] Kamila, H.R. 2018. Validitas Multimedia Interaktif Model Tutorial Sistem Peredaran Darah Manusia. *Jurnal Pensa* Vol 6 No. 02 Hal 119-122.
- [6] Arikunto, S. 2013. Dasar-dasar Evaluasi Pendidikan (Edisi 2). Jakarta: Bumi Aksara.
- [7] Bustomi, A. Y. 2010. "Aplikasi Pembelajaran Panca Indera pada Manusia Berbasis Android". *Jurnal Telematika*, 3(1): 25-36.
- [8] Sukiman. 2012. Pengembangan Media Pembelajaran. Yogyakarta: Pedagogia.
- [9] Hamdani. 2011. Strategi Belajar Mengajar. Bandung: CV Pustaka Setia.