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## **Development of Anatomy Web-Based Assessment based Augmented Reality (AR)**

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### **Abstract**

The main objectives of this study are to describe the development design of the Augmented Reality (AR) based Anatomy web-based assessment, to describe the implementation of the Augmented Reality (AR) based Anatomy web-based assessment development, and to describe the teacher's response to the use of Augmented Reality (AR) based Anatomy web-based assessment. The research was conducted at the State University of Medan. This web-based assessment development design is based on the Borg & Gall research and development (R&D) stage pattern as adopted by Sugiyono. As for the product design model, this web-based assessment follows the ASSURE model. The results of this study indicate that the product developed, namely web-based

assessment, has gone through design and testing and revision, so the product is declared suitable for use. Students also gave a good response, namely 92% of the use of the web as an assessment tool equipped with Augmented Reality (AR)-based animation.

**KEYWORDS:** WEB, Augmented Reality (AR), Assessment.

## 1. Introduction

Today the development of technology continues simultaneously and never runs out (Syaad, 2012). Technology along with its development continues to exist and provide facilities that allow humans to use them for practical purposes in everyday life. If you pay attention to the development of this technology, in fact it is a natural and necessary thing (Ngafifi, 2014). Technology will always exist and always develop along with human existence. In other words, technological developments are directly proportional to human development itself, where there are humans with their efforts to develop in their lives, there is also technology that follows its development.

Technology in human life takes the form of the systematic application of scientific knowledge to practical tasks with the meaning that technology is a systematic application of human knowledge itself to solve practical problems of life.

However, in reality in the field, technology is rarely used to its full potential. Especially in the overall learning process. Currently, what is developing is technology-based learning media. Especially for assessment, technology is still rarely used. Therefore, in this study, researchers want to use technology as a media assessment.

One of the technology products that can be used in the assessment is technology from Google sites to make it easier for teachers to carry out assessments of learning outcomes. This product is inspired by the concept of a web-based portfolio, where it is actually a transformation of a conventional portfolio into a digital portfolio with a website. Portfolio

itself has the meaning as a collection of student work as evidence of the progress of learners or groups of learners, evidence of achievement, skills, and attitudes of learners. students, but not only limited to a portfolio as web-based portfolio, but the overall assessment technique in the 2013 curriculum.

The Google sites that are the basis for making the website in this research are products from Google itself and have available features which include templates with good designs. In addition, it turns out that Google Sites not only provides facilities for site creation, it also provides flexibility for someone to save documents as they wish and can be shared online. However, at this point, it should be realized that implementing the web by utilizing Google sites in the assessment process is not an easy matter.

Although technological developments have been very rapid and even mushroomed everywhere and provide various facilities as described previously, including the availability of the google sites that can be used for free, in practice this technology facility is rarely used in class. The reason is, of course, that technological devices must be available if they are to be adopted in the assessment, such as computers or smartphones, the internet, and applications that can support not everyone has them. Moreover, not everyone is proficient in operating technology, even the teachers themselves regarding their mastery of technology is still so minimal.

Many researchers have used the web in the learning process. As done by Moh. Solihin with the title "Development of Web-Based Islamic Education Learning Media Design (Case Study of Waqf Materials for Class X Students at Al-Falah Ketintang High School Surabaya)". But the difference Moh. Solihin

conducts research on the website and uses it in learning, while this research intends to use the website in the assessment of students. Then the journal written by Zangyuan Own with the title "The Application of An Adaptive Web-Based Learning Environment on Oxidation Reduction Reaction". The difference between Own's journal and this research is that Own offers a website to create a conducive learning environment, while this research focuses on developing website products to be used in student assessment. Based on the experience of researchers in 2020, the use of AR in the Anatomy course is very helpful. The learning process becomes more effective, and students become more interested in reading AR-based textbooks.

Therefore, on this occasion, the researcher wants to develop an AR-based assessment. Based on this discussion, researchers also want to use the web but not in the learning process but at the learning evaluation stage. Researchers will develop a web-based assessment. Coupled with the help of other applications, namely Augmented Reality (AR). Based on the nature of the Anatomy course which requires carefulness and accuracy, this AR-assisted web-based assessment was compiled to see the speed and accuracy of students' ability to answer each of their questions. So the researchers wanted to carry out a research entitled Development of Augmented Reality (AR) Web-Based Anatomical Assessment to See Students' Speed and Accuracy Ability.

## 2. Research Method

The research methods used follow the pattern of research and development (R&D) stages of Borg & Gall as adopted by Sugiyono, among others; 1) Potential and problems, 2) Data collection, 3) Product design, 4) Design validation, 5) Design revision, 6) Product trial, 7) Product revision, 8) Usage trial, 9) Product revision, 10) Mass production.

The research was conducted at State University of Medan, Faculty of Sports

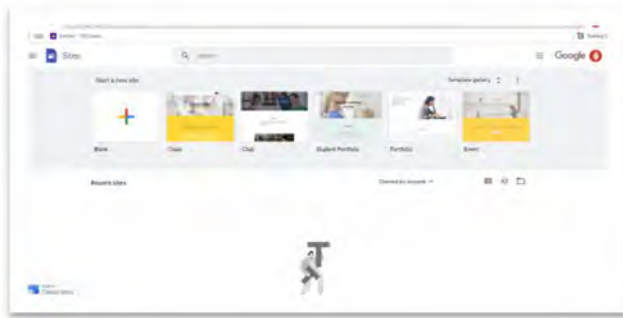
Science. The subjects in this study were students who took the Anatomy course at the Faculty of Sports Science. The instruments used in this study were questionnaires, observations and interviews. Data analysis techniques were used to process data resulting from expert judgment, small group trials and field trials. The analysis technique in this study uses a quantitative descriptive technique. Based on the formulation of the problem that has been proposed, the data sources come from validators (material experts and media experts) as expert judgments and teacher responses to the use of AR-assisted web-based assessment whose data is extracted through questionnaires.

## 3. Results

Web-based assessment of Anatomy begins with creating a website that can be used as a medium for assessing Anatomy courses. In this study, the development of the Anatomy web-based assessment uses the Borg and Gall development pattern adopted by Sugiyono. The results of its development are described as follows:

### a. Potential Problems

In this study, the potential product provided is a product from Google, namely the Google site. Where through these google sites the researcher projects the creation of a web-based assessment that can be used in the assessment of student activities. Web-based assessment Anatomy can be used as an assessment tool which is more flexible and easier to use. This means that the assessment is independent of time or place, the assessment can be easily carried out anywhere. Another potential is the presentation of simple usage. The point is that in terms of making websites using Google sites, this can be operated even by ordinary users. In fact, these google sites are integrated with gmail where almost everyone has them. Therefore, the use of these google sites should be tried and used as an online evaluation tool used in conducting student assessments.



**Figure 1** – Google Site View.

**b. Gathering Information**

The collection of information referred to is information in designing and making web-based Anatomy assessments through google sites. The way to make an assessment instrument is to create an account that is used to login to the google site, then create a website draft, choose a template as needed, create a website design and publish the completed website. While the information about the questions given is using questions that already exist before.



**Figure 2** – Markers used in the assessment.

**c. Product Design**

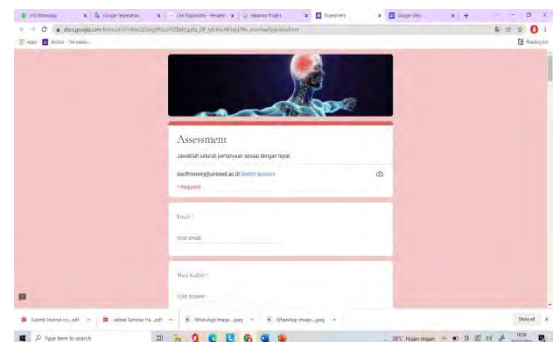
The product design referred to in this research is of course all things related to the design process or designing this web-based assessment. In accordance with the discussion in the previous chapter, this web-based assessment product design model follows the ASSURE model which stands for analyze learners, state objectives, select method, media and materials, utilize media and materials, require learner participation, evaluation and review. After going through the ASSURE stage, a WEB-based assessment is produced as follows.



**Figure 3** – Front Page of WEB.



**Figure 4** –WEB Assessment Anatomy.



**Figure 5** – Assessment Content of WEB.

**d. Design validation**

At this stage, on the WEB product that has been completed, the researcher validates two experts, namely media and material experts. The results of the two validators become the basis for product improvement. Table 1 is a summary of the results of the expert's assessment.

In addition to the assessment above, there are also notes given by experts regarding web

products developed, including the following:

The use trial was carried out on 6 students of FIK UNIMED. The

#### EXPERT VALIDATION RESULTS

Validation	Percent	Description
Media	87%	Valid
Lesson	77%	Quite valid

**Table 1** – Expert validation results.

- Each icon button should use the symbol
- Instructions given use simpler language
- Make sure this web product can connect with other browser pages

#### e. Product Trial

Product trials were carried out on 3 FIK UNIMED students. The data was obtained by giving response questionnaires to students. From the results of the calculation of the questionnaire data, it can be concluded that the student response to this web product is "very good" with a percentage reaching 88% and no revision suggestions/improvements are given.

#### f. Product Revision

Based on the product trials that have been carried out, it does not produce suggestions for improvements to the products developed. Because there are no suggestions and revisions and the response to the theme product reaches 88%, no improvements have been made to the WEB.

#### g. Trial Usage

data was obtained by giving response questionnaires to students. From the results of the calculation of the questionnaire data, it can be concluded that the student response to this web product is "very good" with a percentage reaching 92% and no revision suggestions / suggestions for improvement are given.

#### h. Product Revision

The results obtained during the usage trial also did not find suggestions and revisions to this WEB-based assessment. The response results also reached 92% or "very good". So no improvements were made to the WEB as an assessment tool.

#### i. Mass Production

After there are no revisions and improvements to this WEB product, the product is distributed to be used by users, namely all lecturers and students who want to train or see their abilities in Anatomy.

This study uses the Borg & Gall development (R&D) method as adopted by Sugiyono and follows a product design commonly referred to as the ASSURE model (Analyze learners, State objectives, Select method, media

and materials, Utilize media and materials, Require learner participation, Evaluation and review). This web-based assessment product has also gone through the validation stage of expert judgment, which includes material expert validation with 88% valid qualifications.

Implementation is done by providing information about how to use the web product. All students can use this web-based assessment easily.

The results of the trials carried out provide information that students are very happy and enthusiastic in using this product. Students feel comfortable using the web as a way of taking exams. Something new is not just using paper in the implementation of the exam.

## 5. Discussion and Conclusions

Based on the results of the description of the research activities above. the development of the WEB-based assessment has gone through the product improvement stage and has gone through the validation stage to material experts and media experts as well as trials. Based on the results of validation to the validator, it shows that this WEB-based assessment is valid and can be used. The next step is product testing, namely a WEB-based assessment of students from the Department of Physical Education, Health and Recreation, Faculty of Sports Science, State University of Medan. The result is that students are very happy and enthusiastic in using web-based assessment products. Because this is a new thing for students in carrying out the exam.

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