



Development of Augmented Reality Based Crawl Swimming Learning Module For Students of The Unu Blitar Sport Education Study Program

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Received: 16 July 2020; Revised: 29 September 2020; Accepted: 5 November 2020

Abstract

Swimming is a compulsory subject in the UNU Blitar Sports Education Study Program curriculum. Has a fairly high Semester Credit Unit (SKS) weight of 4 credits. The crawl style swimming is the basis of all styles so that it needs to be studied more deeply according to the era of the industrial revolution 4.0, namely with a touch of Augmented Reality (AR) technology. This study aims to develop a learning module for swimming crawl style which is integrated with Augmented Reality (AR). The method used by researchers is the Research and Development developed by Dick and Carey which consists of 10 steps. However, due to existing limitations, the researcher only carried out 9 steps. The module was validated by 3 experts, namely: media expert, learning expert, and swimming expert. The input from experts is used to complement the product. Subsequently carried out small group trials totaling 6 students while 30 students as large group trial subjects. The results obtained are: the criteria for product clarity obtained by a percentage of 91.17647% are very valid, the strategic criteria obtained by a percentage of 83.33% are quite valid, the evaluation criteria obtained by a presentation of 75% are quite valid, all criteria have met product eligibility so that product development The module is declared valid enough and fit for use as a medium to maximize the learning process.

Keywords: swimming crawl style; augmented reality; module development

INTRODUCTION

In learning crawl style swimming, it should be carried out with direct practice in the field and it is hoped that students can receive learning clearly. Learning swimming is basically directed so that students can know the correct swimming technique, as well as students can directly practice swimming material, especially crawl swimming (according to Martindar, 2014). At least learning from media that involves audio and visual as stated by Hasriandi (2016), that audio-visual media in Physical Education learning has made a big contribution in that Physical Education material does not only use the aid of props but maximally because more sensory tools are used. Students will find it easier to understand the information presented

and easier to remember it for a longer time.

Students need to have swimming material provisions before college because in the Blitar UNU Sports Education study program curriculum, the swimming course has a fairly high Semester Credit Unit (SKS) weight, as much as 4 credits. Divided into 2 credits in basic swimming courses in the first semester and 2 credits in advanced swimming courses in the second semester. The material on basic swimming includes crawl style and breaststroke, while the material in advanced swimming courses studies all styles, namely back crawl and dolphin style swimming. With so much material that needs to be mastered, ideally students already have swimming skills when attending lectures even though they can only be one style. According to

Oktadinata, completeness in swimming courses is the same as completeness of other courses. Therefore students need to study and practice more often in order to complete the material on basic swimming. With the limited face-to-face lecturers, students need to increase their practice outside of class hours. The availability of modules is deemed necessary to assist students in obtaining information about contextual learning materials because modules are prepared by lecturers who teach and have characteristics of independent learning principles (Lasmiyati, 2014). Modules are also specifically designed and clearly designed based on the speed of understanding of each student to learn according to their abilities (Setianingsih, 2018). Modules are teaching materials arranged systematically and attractively which include material content, methods and evaluation (Tjiptiany, 2016). Learning using modules aims (1) so that students can learn independently (the teacher provides as little assistance as possible), (2) There is no teacher (dominating) and authoritarian role in learning, (3) Students are trained in honesty, (4) accommodate various levels and student learning speed, and (5) students are able to measure their own level of mastery of the material being studied which can be used independently. Meanwhile, according to Arsyad (2012), modules are learning media that can function the same as teachers / trainers in face-to-face learning. Therefore, module writing needs to be based on learning principles and teacher / trainer teaches and students receive lessons. The use of modules in learning aims so that students can learn independently. Students can learn at their own pace.

A module must meet the criteria of a good module, as expressed by (Sanjaya, 2012), in a module that contains at least: 1) The objectives to be achieved, which are usually formulated in the form of specific behaviors so that their success can be measured; 2) Instructions for use, namely instructions on how students learn the module; 3) Learning activities, containing the material that must be studied by students; 4) Summary of the material, namely the outline of the subject matter. 5) Assignments and exercises; 6) Reading sources, namely reading books that must be studied in order to deepen and enrich insights; Test items,

the questions that must be answered to see the success of students in mastering the subject matter; 8) Success criteria, namely signs of student success in studying modules; 9) Answer key

In teaching crawl style swimming, it is necessary to teach parts and from easy to difficult movements as well as from simple to complex movements so that students do not experience confusion. As stated by Malik (2015) if the part training method is a method used by a trainer or educator who teaches his students in part from the easiest to the most difficult which is practiced partially to master a complete series of movements. When learning swimming, it is necessary to introduce water first, then be taught to float, after it can be done then it is taught to slide in a straight position on the surface of the water which is usually called a streamlined body position. The next step is to teach leg movements, moving both hands, the last stage is learning breathing techniques according to the swimming style technique being taught. After everything is taught, then all these movements are assembled into one complete movement, namely swimming. From this theory, the researcher applies the material order of movement in learning to swim, from the introduction of water, floating position, straight float on the surface of the water (streamlined body position), gliding, leg movements, hand movements, breath movements and finally crawl-style swimming coordination.

Learning crawl style swimming movements will be more easily accepted by students if done directly. However, due to time constraints, face-to-face lecture meetings are only face-to-face per week so that study time is not enough if you rely on face to face. Therefore, making modules by researchers is one solution so that students can study on their own outside of class hours. Researchers developed an AR-based crawl style swimming module to facilitate interactive learning and support the National Research Master Plan to face the Industrial Revolution 4.0. so that students have an interest in and more easily receive information from the material in the module because they use more of the five senses. As Hasriandi (2016) said, physical education learning with the help of visual and audio-visual media makes the learning process not only focus students' attention, optimize the available time allocation, but can

also provide experience and facilitate students, increase student learning interest and motivation, which in turn can improve their understanding, both affective, cognitive, and psychomotor.

AR is a technology that is able to combine virtual objects in two or three dimensions into a real environment and then bring them up in real time (Mustaqim, 2016). This makes users perceive virtual objects as being real so that motion information is easier to accept and understand. AR technology offers a natural force for humans to interact with mobile devices and provides a direct or indirect view of the surrounding physical environment (real world) imaged by computers based on input sensors (Graham, Mark and Zook, 2014).

MATERIALS AND METHODS

In this development, the researcher refers to the Dick and Carey Research and Development (R & D) development model as shown below:

The Dick and Carey development model includes 10 steps, namely:

1. Identify Instructional Goals (Identify Learning Objectives).
2. Conduct Instructional Analysis (Conducting Learning Analysis).
3. Identify Entry Behaviors (Identify Student Characteristics).
4. Write Performance Objectives (Formulate Specific Objectives).
5. Develop criterion Reference Tests (Developing Test Items).
6. Develop Instructional Strategy

(Developing Learning Strategies).

7. Develop And Select Instructional Materials (Develop and Select Teaching materials).
8. Develop and Conduct Formative Evaluation (Design and Implement Formative Evaluation).
9. Revise instructional (Revising Learning).
10. Develop and Conduct Sumative Evaluation (Developing and Implementing a Summative Evaluation) (Dick and Carey, 2001: 3

This development research was carried out until the 9th stage, namely revising the product, while the 10th stage was not carried out. Data analysis technique is an important step in development research activities. Researchers used qualitative and quantitative data analysis techniques. Qualitative data analysis techniques are used to analyze suggestions and input from experts by reducing data (summarizing, selecting the main things, focusing on the main and important things) then the data is presented to the conclusion stage (Sugiyono, 2012). The results of the data were analyzed quantitatively. The data analysis technique used is descriptive analysis with a percentage. The formula used to process data with descriptive data analysis techniques in the form of a percentage used to percentage data collection in needs analysis, small group test and large group test data. The formula for processing data in the form of descriptive percentages according to Akbar & Sriwiyana (2010), is as follows:

Information:

- V = Validity
- TSEV = Total empirical validator score
- S-max = the maximum score

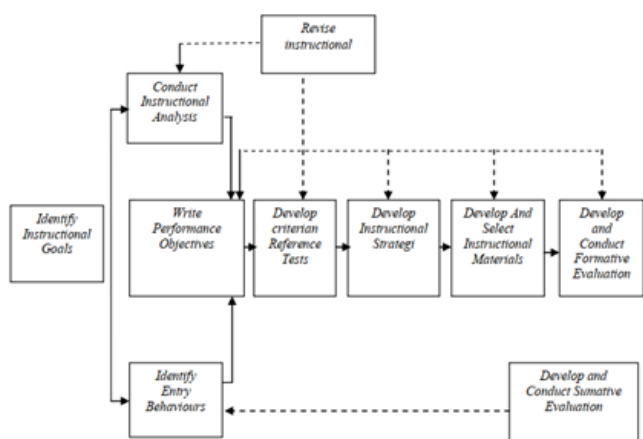


Table 1 Percentage Level Criteria

Percentage Information
80% - 100% Valid/ used
60% - 79% Valid enough/ used
50% - 59% Less Valid/ used
<50% Not Valid/ used

Figure 1 The flow of the Dick and Carey development model (Dick and Carey, 2001)

expected

The data obtained were then analyzed. The criteria for classifying the percentage level from the results of data analysis can be seen in the percentage level criteria table according to Akbar and Sriwiyana (2010) as follows:

This study develops products based on trials and then revises them to produce products that are suitable for use and also validates the products used in education and learning (Sugiyono, 2011). The development steps are as follows:

1. Analyze needs by conducting a preliminary study.
2. Identifying, analyzing, and developing learning competencies that will be developed according to Dick and Carey's steps.
3. Evaluate and revise development products based on the evaluation of experts and respondents (revisions can be done more than once until the results are worthy of publication).
4. The result is a learning module for AR-based crawl style swimming for Blitar UNU students

RESULT AND DISCUSSION

Identify Instructional Goals (Identify Learning Objectives)

The first thing the researcher does is identify the general purpose of the development, which becomes the basis for determining the next steps. Learning outcomes, students are able to know, understand, analyze, and practice crawl style swimming according to the material in the swimming course syllabus

Conduct Instructional Analysis (Conducting Learning Analysis)

The second stage is to analyze the crawl style swimming learning. The material contained in the book consists of: Basic Concepts of Swimming, Preparation Before Swimming and Introduction to Water, Floating and Gliding Movement, Crawl Style Foot Movement, Crawl Style Hand Movement, Crawl Style Breath Movement, and Crawl Style Swimming Coordination Movement.

Identify Entry Behaviors (Identify Student

Characteristics)

This research is based on the identification of Blitar UNU students who are studying in the Sports Education Study Program. It was found that 61.3% of students started learning swimming while studying at UNU Blitar. There are 51.6% of students stated that they have not been able to swim at all when they enter college at UNU Blitar. 100% of respondents stated that meeting 2 hours of lecture or once a week is deemed lacking. They need a module that can be used as a reference outside of class hours. Of course the technology-based modules. With the limited face-to-face lecturers, students need to increase their practice outside of class hours.

Write Performance Objectives (Formulate Specific Objectives)

The analysis that has been carried out from the identification of the Blitar UNU students who are studying in the Sports Education Study Program then formulates what the students or readers will do.

Develop criterion Reference Tests (Developing Test Items)

The formulation of objectives that has been carried out is then developed test items. The test was developed to train module users when using it. This question can be used by students / readers after studying the material that has been presented.

Develop Instructional Strategy (Developing Learning Strategies)

Dick and Carey has explained the learning strategy as follows: (1) pre-learning activities, (2) presentation of material or content, (3) student participation, (4) assessment, and (5) follow-up activities (Dick and Carey, 2001: 189). In this case, researchers only developed the first to fourth components.

Develop And Select Instructional Materials (Developing and Selecting Teaching Materials)

The development and teaching materials contained in the Augment Reality (AR) crawl-style swimming learning module for students of the Nahdlatul Ulama University (UNU) sports education study program in Blitar are as follows:

Module 1: Basic Concepts of Swimming

- A. History of Swimming
- B. Purpose and Benefits of Swimming
- C. Definition of Swimming
- D. Various styles in swimming
- E. Facilities and Infrastructure
- F. Conclusion
- G. Evaluation Module

Module 2: Preparation Before Swimming and Introduction to Water

- A. Regulations on the Swimming Pool
- B. Preparation in Swimming
- C. Introduction to Water
- D. Evaluation Module 2

Module 3: Float and Glide Movement

- A. Streamline Body Position
- B. Glide
- C. Evaluation Module 3

Module 4: Crawl style footwork

- A. Limbs
- B. Foot movements in place
- C. Movement of the legs with floats
- D. Foot movement without floats
- E. Evaluation Module 4

Module 5: Crawl Style Hand Gestures

- A. Hand Movement on Land
- B. Hand Movement in Water
- C. Errors in Hand Movement
- D. Evaluation Module 5

Module 6: Crawl Style Breath Movement

- A. Breathing Exercises
- B. Breath Movement Exercises on Land
- C. Exercise Breath Movement in Water
- D. Errors in Breathing
- E. Evaluation Module 6

Module 7: Crawl style swimming coordination movements

- A. Crawl style swimming coordination
- B. Evaluation Module 7
- C. Answer key
- D. References

Design and Conduct Formative Evaluation (Designing and Implementing Formative Evaluations)

Implementation of formative evaluation aims to obtain input related to the advantages and disadvantages of the augmented reality-based crawl style swimming module, which can be used as input to improve the module. At this stage the evaluation is carried out by experts.

The evaluation is as follows:

1. Evaluation from media expert Rizqi Darma Rusdiyan Yusron, M.Kom is a computer science lecturer who provides input if the training and evaluation questions contained in the content of the material should be more applicable and tailored to the research objectives
2. Evaluation from swimming expert Wing Prasetya Kurniawan, M.Pd, who is a sports education lecturer with a specialization in swimming, provides input if the crawl-style swimming technique should include additional catch-up, push, and entry arm movements and the position of the leg movements when making a stroke in the water, the content is appropriate and this module is very much needed as teaching material for students to start learning swimming and later it will be useful for the general public for knowledge about crawling swimming as a whole

Results of Media Expert Data Analysis

The results of the analysis from media experts were 5 indicators, namely the suitability of text (87.5%) was very valid, attractiveness of still images (77.77%) was quite valid, audio clarity (100%) was very valid, video clarity (87.5%) was very valid and attractive appearance (80%) is quite valid based on validated results the product can be continued to the trial stage.

Results of Learning Expert Data Analysis

Based on the results of the validation of learning experts, the results about clarity (97.72%) are very valid, about accuracy (91.67%) is very valid, about conformity (100%) is very valid, about convenience (100%) is very valid, attractiveness (100 %) very valid. based on the results that have been validated the product can be continued to the trial stage.

Results of the swimming expert analysis

Based on the results of expert validation, it is obtained that the clarity (95.45%) is very valid, about accuracy (100%) is very valid, about conformity (100%) is very valid, about convenience (100%) is very valid, attractiveness (100%) is very valid. based on the results that have been validated the product can be continued

to the trial stage.

Results of Small Group Trial Data Analysis

The product clarity criteria obtained a percentage of 89.7%, the product attractiveness criteria obtained a percentage of 91.6%, the product usefulness criteria obtained a percentage of 100%. All criteria have met product eligibility so that the module development product is declared very valid and suitable for use and can be continued to large group trials.

Results of Data Analysis of Large Group Trials

The results of the analysis of large group test data obtained results, namely the criteria for product clarity obtained by a percentage of 91.17647% are very valid, the strategic criteria obtained by a percentage of 83.33% are quite valid, the evaluation criteria obtained by a presentation of 75% are quite valid, all criteria have met product feasibility so that the module development product is declared very valid and suitable for use.

Revise instructional (Revising Learning)

The final stage of developing the augmented reality based crawl swimming module is to revise the module draft. Revised materials were obtained from evaluation data. The next step is to integrate the module with AR. The Augmented Reality application in this module is built using Unity software which is supported by the Vuforia SDK engine. This application works when an AR-Tag in the form of an image in the Module is detected by the application. The application automatically activates the camera to detect the AR-tag that has been determined. If an image that is an AR-tag is successfully recognized, the application will run a video that matches the recognized image.

CONCLUSION

The results of the development research that has been carried out starting from the stage of identification of objectives, material analysis, module planning, media expert testing, learning expert test, swimming expert test, all experts stated that it is very feasible to be applied to the

students of the Blitar UNU Sports Education Study Program. The small group test and the large group test state that it is quite feasible and it can be concluded that the Augmented Reality (AR) crawl style swimming module can be used and maximizes the learning process for basic swimming courses.

This development research is still limited to developing the crawl style swimming module. To provide greater benefit to the user, the research can be extended to other swimming styles (backstroke, breaststroke, and butterfly stroke). In spreading the augmented reality-based crawl swimming module to a wider target, this module should be re-evaluated and adjusted to the target to be aimed first so that it fits the characteristics of the user. It is hoped that in the future this module will not only be used at the Blitar UNU but can be used more widely in other universities having study programs in the field of sports.

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