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Swimming Lesson Based on Interactive Multimedia

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Abstract This research aims to develop swimming lesson model based on interactive multimedia and to obtain empirical data about the effectiveness of swimming lesson model based on interactive multimedia in improving learning outcomes of health physics education and recreation (PJKR) students. This research use *research and development* (R&D) method from Borg and Gall. The results of each step of the development research are (1) *research and information collecting*, (2) *planning*, (3) *development of the preliminary from the product*, (4) *preliminary field testing*, (5) *main product revision*. (6) *main field testing*, (7) *operational product revision*, (8) *operational field testing*, (9) *final product revition*, (10) *desimination and implementation*.

Keywords Model Development, Learning Pool, Interactive Multimedia

1. Introduction

Swimming lesson is a learning process consisting of theory and practice, the delivery technique is done simultaneously. This kind of swimming lesson is also not different from another swimming style lesson, such as other swimming styles in college and physical education in school. Swimming lesson is considered more difficult and high risk to the safety of the learners because the field is in water which at once have a certain depth that at any time will endanger learners (drown). Lucero (2008: 25) describes several methods used to improve swimming skills: (1) *multi-stroke method,* (2) *shallow water method,* (3) *flipper-float method,* (4) *swimming board method, and* (5) *rope method.* From the mentioned swimming learning methods, it can be said that they are not maximal in supporting the learning achievement of swimming course, and it still needs some media/learning resource which is suitable with contemporary era (digital era). Conference of *national association sport and physical education* (NASPE, 2007) recommends the application of technology in education because the technology approach is a response to the changing paradigm of learning in which make students as learning centers and teachers as facilitators. Christopher R. Edginton (2011: 118) in his article entitled *Physical Education and 21 Century Learners:* A Consensus *Steatment* of physical education learning (learning movement/ swimming) in the 21st century should "use technology to support individualized learning processes and assessment". Rusli & I Komang (2017: 178) said that "The effectiveness of a learning depends on four main elements, they are content, desired learning outcome, instructional method and the delivery,...". Four components that affect the effectiveness of learning include content, learning outcomes, learning methods and media.

In a four component learning (content, learning outcomes, methods and learning media) will be good conveyed if it is accompanied with appropriate learning models. The learning model in accordance with the digital era is a learning model that involves the use of elements of computer information technology and internet network utilization. Computer information technology can be applied in learning, especially by combining animation, video, sound, images, text and graphics into one learning concept or called as multimedia in learning. Multimedia is considered as a learning medium that is able to facilitate the learning needs of students so students can learn anytime, anywhere and with anyone, not depending on lecture schedule. This media will be able to be a complement and supplement (complementary and additional) from existing learning resources. Besides, this media can be a substitution when the lecturer is unable to attend the class. By applying swimming lesson based on multimedia, it is expected that in the long term it will be able to yield graduates profile (PJKR study program) as a professional and competent PJOK teacher. In addition, the researcher focuses on the effect of learning on students and on nurturants. The effect of learning that researchers expect is the interaction of learning which is not only one direction from the lecturer to the students but the interaction is two-way reciprocity, interaction between students, and student with the environment. The nurturant effect that researchers expect is the change in behavior and lifestyle of students to become physically active individuals because of

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PJOK teacher candidates and avoid from sedentary life style.

However, in general there are some problems that arise during learning process which are the lack of the application of learning models, the lack of the use of media in learning, especialy the use of media or learning models that utilize information technology. In this case, the researchers prove through a preliminary study in the form of student needs analysis. Needs analysis that researchers conudcted refer to 2 (two) components, namely; 1) related to swimming lesson identification; and 2) swimming lesson analysis. Identification of swimming lesson, the researcher gets data that swimming lesson is done by using lecture and drill method, the students must search their own study material (no module and textbook prepared by lecturer of course lecturer). Meanwhile, learning analysis, the researcher gets data that the lecture unit (SAP) used by lecturers is still very simple and conventional / has not shown the use of interesting media and in accordance with technological development.

Besides, Dwiyogo (2017:7), explains that the big problem in learning physical including swimming lesson that is happened until now is because the learning is too focused on the results and ignore the learning process. It is strengthen in the international journal of health and physical education that "The existing situation in this country has been offered at both the high school and college level in the past emphasizing the physical rather than the academic aspects of physical education"(Sundar Raj Usr, 2011: 7). So that the interaction of dominant learning such as training on a sport. The role of lecturer is dominant in teaching/ giving information, while students listen and practice. The learning interaction seems rigid even though sometimes a question and discussion session is oppened, which in the end students become passive and tend to become objects and less able to have an active role in learning. In fact, the students of physical health education and recreation program (Prodi.PJKR) are students of education as prospective teachers. Teachers are required to control the learning so the students always actively involved (both affectively, cognitively and psychomotorically) in full and continuous learning to achieve the learning objectives (Dyson: 2014: 144-152). Meanwhile, we all know that the measure of the success of learning in general, including swimming lessonis the process of interaction between students who learn with lecturers who teach. It is not solely the teacher who conveys the information (teaching). Thus, it needs innovation and new learning model and instructional media. Since lecturers are not the only source of learning, lecturers / teachers are only a part of the learning resources. All learning resources are designed to encourage initiatives and to make learning processes more effective, efficient and interesting so that students who learn are not easily bored to continue learning. Therefore, the function of lecturers/ teachers changes towards the lecturers/ teachers as a learning manager.

Based on the conditions mentioned above, there is a gap that the progress and development of digital information technology which is expected to have a positive value and to support the learning process in achieving the goals of learning achievement, in fact the technology is less maximized and functioned. This is in contrast to what is expected that swimming lesson model that applies the progress and development of information technology in the form of interactive multimedia, which can improve the process of interaction between students who learn with lecturers who teach. Similar opinion was expressed by So-An Lao et.al. (2016) who said that "the effectiveness of swimming learning for adults in addition to learning by direct coaching, learning to swim through video modeling and feedback video is also seen as effective and successful". From these findings, students are mature human beings, who possess many activities and demands related to the needs of work, so they required a good self-management. Learning to swim through coaching directly/ through coaches sometimes becomes a barrier because of time. Learning by applying media in the form of video modeling, video feedback and interactive multimedia is very suitable with the conditions of adults/ students.

Interactive multimedia has not become a learning culture among students and lecturers. As if the application of interactive multimedia is a strange thing which is hinder work performance of lecture. Lecturers have objected in making models and multimedia-based learning media. Therefore, the lessons that are shown by the lecturer become less interesting and less adaptive with the progress of time. Students are also less facilitated all the learning needs. Learning only rely on the presence of the lecturers, the lecturers and lecture hours to be a major source of learning.

Based on the problems that have been mentioned previously and the results of needs analysis, it is necessary to develop swimming lesson modelin PJKR study program based on interactive multimedia. Multimedia-based that researcher offer is personification of information technology progress which is increasingly unstoppable. This means that the researcher takes advantage of these technological advances in a positive way which can actually be applied by students to support their learning.

2. Method

The research and development method in this studyis Research & Development (R & D) development model from Borg and Gall (1983: 775) consisting of ten steps: 1) needs analysis and field observation, 2) preparing research plan, 3) initial product development, 6) primary test, 7) product revision, 8) main test to see product effectiveness, 9) final revision, and 10) dissemination and implementation.

The subjects of this study are health physics education and recreation students (PJKR) students who are prospective teachers of PJOK. Subjects in this study include students from: 1) PJKR JPOK FKIP ULM, 2) PJKR STIKP Khusuma State, and 3) PJKR STKIP Setia Budhi.

The type of data obtained is in the form of quantitative data and qualitative data. Quantitative data were obtained by experimental research design in the form of the one group

control pretest-posttest design (Maksum, 2012: 29).

Table 1. Research Design in Model Effectiveness Test

Subject	*Pres-Test*	*Treatment*	*Post-Test*
E	O_1	P	O_2
K	O_3		O_4

The research hypothesis on the effectiveness of the developed model is whether there is significant influence of swimming capabilities before and after being given treatment with swimming lesson interactive multimedia model?

Steps taken in this trial include: (1) establishing a group of research subjects, (2) carry out the pre-test (O1), (3) try the developed model, (4) implementing post-test (O2), (5) find the mean score of pre-test and post-test and compare between the two, (6) find the difference between the two averages through statistical methods (t-test) to determine whether there is a significant influence from the use of the model.

The amount of increase in student swimming ability can be calculated from the pretest and posttest values using the Hake gain index that is like the following equation.

$$Normalitas\ gain(< g >) = \frac{skor\ posttest - skor\ pretest}{skor\ maksimal - skor\ pretest}$$

The criteria used to interpret the normalized gain / N-gain obtained by Hake are presented in Table 2.

Table 2. N-Gain Criteria

Average	Criteria
(<g>) < 0,3	Low
0,3 ≤ (<g>) < 0,7	Medium
0,7 ≤ (<g>)	High

Meanwhile, the qualitative data obtained from interviews and suggestions, and inputs of experts.

3. Result

The research was conducted in health physics education and recreation study program (PJKR) by involving students who programmed T & P Swimming lessons 1. The initial activities undertaken by researchers to obtain results that can answer the problem of research comprehely is by performing needs analysis, expert test, and product development trials.

The result of needs analysis that researcher do refer to 2 (two) components, namely; 1) related to swimming lesson identification; and 2) swimming lesson analysis. Identification of the swimming lesson, the researcher obtains the data that is swimming lessonis carried out by using lecture and drill methods, student get the module and textbook given by the lecturer. Meanwhile, results of swimming lesson analysis, the researcherobtains data that SAP, modules, and media used by lecturers is still very simple and conventional/ has not shown the use of interesting media in accordance with technological progress. Based on these data, the researcher asked the students, "is it necessary to update the application of model and instructional media based on information technology?" Most of the students stated that it is very necessary and only few students who did not give an opinion. From a few surveys through classroom interviews during the lecture, the researchers concluded that the development of swimming lesson model information technology based or learning model appropriate to the advancement of time.

After collecting problems / analyzing the needs of students in the swimming course, the next stage is organizing plan research and making a product development draft. The product development draft is prepared based on the material of Swimming 1 course which consists of; 1) basic swimming movement, 2) freestyle, 3) backstroke, 4) breaststroke, 5) butterfly stroke, 6) start in pool, 7) pool reversal. All of these development indicators are designed by the researcher based on interactive multimedia.

After the development product draft is compiled, the next step is testing the product development draft to experts (swimming lesson experts, movement-learning experts, swimming training experts and media experts). Expert opinions are collected using questionnaires consisting questions and suggestions. Based on expert test, it is found that the number of swimming lesson model based on interactive multimedia is 150 variations of learning model. After submitted to all the experts finally it became 138 models of swimming learning variation, 12 variations of the model is dropped. In detail, the number of models for each component is as follows: 1) from 26 basic swimming movementmodels fall 5 into 21 models; 2) from 27 freestyle models fall 2 into 25 models; 3) from 25 backstroke models fall 2 into 23 models; 4) from 28 breaststroke models fall 1 into 27 models; 5) from 24 butterfly strokefall 2 into 22 models; 6) from 10 start in the pool models, no one is aborted; 7) from 10 pool reversal models, no one was aborted.

Expert test produced 138 various model of swimming lesson, and then the next step is testing the development product on a small group trial involving 15 students. From the results of small group testing, it can be concluded that the whole model of swimming lesson based on interactive multimedia is feasible because all of the subjects on a small scale N = 15 students are able to implement and apply all the learning models that researchers arranged. These results indicate that product development can be forwarded to the larger group trials involving larger test subjects.

A large group trial is a test of the product in the real group in which this product will be used and implemented in the learning process. The subjects of this large group trialare 120 students which consist of: 40 students of Physical educationstudy program FKIP ULM; 40 students of Physical education study program STKIP Khusuma State Cijantung East Jakarta; 40 students of Physical educationstudy program STKIP Setia Budhi Rangkas Bitung Kab. Lebak Banten Province. Based on suggestions and findings on the

large group trials above, it can be concluded that all models are feasible and can be used in swimming lesson.

The results of model effectiveness test in the experimental group between the initial and final tests yielded data that since Z table (88.59) is greater than Z count (5.722788705) so there is a difference in learning outcomes of students' swimming skills between pretest and post-test.

Meanwhile, the results of model effectiveness test in control group between preliminary and final test, the conclusion is because Z table (88.6) is bigger than Z count (5.615556964) so there is difference between pretest and post test.

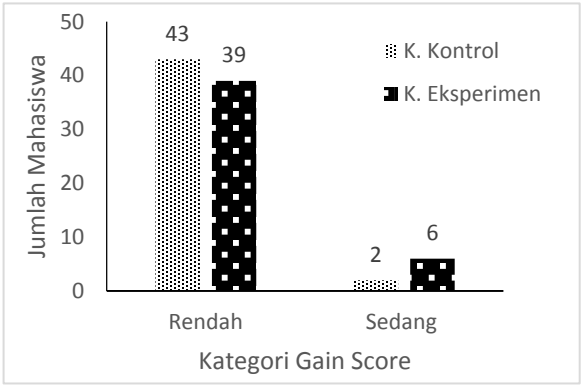
Furthermore, the calculation of different test between groups is done only between experimental group with a special control group on final and post test result. The different test data between the two groups is because the value of z table (88.593) is greater than z count (-1.28114), then there is a significant difference between the control group and the experiment.

The enhancement scale of swimming ability in this study, the researcher uses gain score test. Summary Data of Gain Score students' swimming ability in PJKR study program in the experimental group and control group, are presented in the table below:

Table 3. Summary Gain Score of students' swimming ability in PJKR study program in Experimental Group and Control Group

Criteria	Control	Percentage	Experimental	Percentage
Low	43	95.56%	39	86.67%
Medium	2	4.44%	6	13.33%
High	0	0%	0	0%

To be more specific, the summary of students' swimming ability in PJKR study program in the experimental and control group is presented in the graph below:



Graphic 1. The Data of Students' Swimming Ability in PJKR study program in Experimental Group and Control Group

From the table and graph above, it can be said that students' swimming ability in Physical education study program in the experimental and control group or students who have been treated with swimming lesson based on interactive multimedia is better than the students' swimming ability in PJKR study program in the control group or the comparison group.

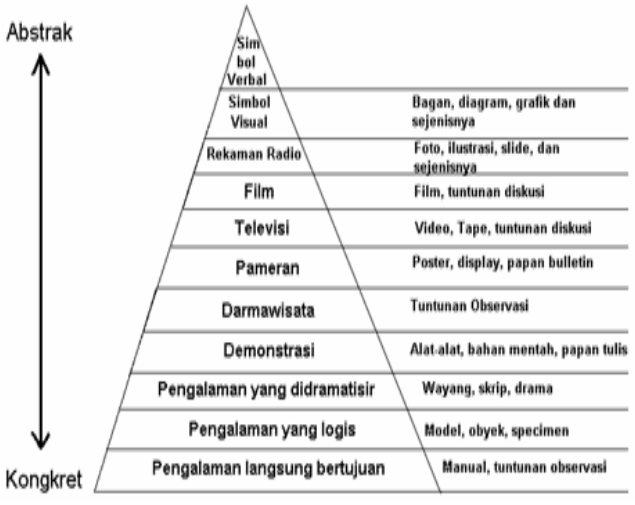
4. Discussion

The research have been produced the product of swimming learning model by interactive multimedia to physical education student. The development conducted through 10 steps of research from *Borg and Gall.* The development product such as swimming model by interactive multimedia has been to improvement the result of student swimming ability.

From this result which apply the interactive multimedia have strengthen, showing the picture, video, audio so that the student can be easy to understand the material because the information be permeated by sense of sight and hearing (Wahjoedi, 2016).

This finding supported by So-An Lao et al (2016) that the effectiveness of swimming for adult through the video modeling and. From this finding, the student is an adult who has many requirements especially related to need a job. It is need the existence of good self-management. Swimming lesson through the coach become the obstacles because of timer. Study with applying of media such as video modeling, feedback video and interactive multimedia is suitable with the adult condition.

In the other hand, Edgar Dale (in Daryanto, 2016:15) states that the using of media in the learning giving the meaningful experience to student because the media can make it easier for students in understanding of abstract form to be more concrete. Edgar Dale classify the experience of child learning from the concrete things until to the things that are considered abstract, start from the student who participate in real experience, and then the student as the real observer, and the next the student as media observer, and the last the student as the symbol observer. This concrete-abstract step showed with cone of experiment as the below:



Swimming lesson be delivered with concrete learning media and through direct experience hence the learning will be understood and practiced by the student.

Supported by Sutopo states that learning model which apply multimedia system have some an advantages, which is: (1) decrease the time and space which used to save and show

the electronic document than the paper; (2) improving the productivity to avoid lost file; (3) giving an access document in the same time and showed in the screen; (4) giving a multidimensional information in organization; (5) decrease the time and fees in making a photo; and (6) giving the facilities of speed information which needed with visual interaction. Besides that, the advantage of multimedia is dialog, improving the creativity, facilitate the collaboration, improving the experience, and improving the skills.

Product development of swimming lesson based on interactive multimedia model is a media which has the positive effect to learning effectively. The learning does not only take one direction such as the lecturers to the students, the lecturers explain and the students is listening; the lecturer give an example and the students do the assignment and the last the lecturer evaluate and follow up their learning, and so on so that the lesson is passive and not interacted. But, with this media, it is expected to be a multi-way learning that is the lecturer with the student and vice versa, students with students, and students with the environment.

The multi-directional learning interaction is ideal in learning so that learning resources, students, media, and environment will construct and complement each other to accelerate optimal learning outcomes with the development product in the form of swimming lesson based on interactive multimedia model, students and lecturers can be flexible in providing learning. Lecturers can give the task for next week's material to learn the next material, the task and the material to be learned already exist in the media made by lecturers, so that students can easily learn, discuss and practice individually or in groups. Therefore, students already know what they want to learn, students will be able to imagine what will be studied next week, so the student must have prepared some questions and some difficulties while studying outside the lecture to be asked to the lecturer. Moreover, the lecturer gives evaluation and control about the assignment given to the students and found the things that must be met by students who are not available in the media prepared by lecturers hence the lecturers give the individual assignment to be more active looking at other sources.

By implementing swimming lesson based on interactive multimedia model, interaction between students will surely increase, this can happen because by learning, seeing, practicing together in the lecture, especially outside the lecture will occur the discussion and give each other opinions and observations on what students learn. Even if the class discussion, the problem can be solved yet, and then the problem can be used as a note of question or discussion material during lectures. It could also be some of the problems students experience while learning together and inadvertently that students while studying along with a coach, a more senior teacher or a swimming activist. Students may consult and discuss together. This is the form of student interaction with the environment.

So if the swimming lesson based on interactive multimedia model is applied as well as possible, then big expectations of swimming learning will work well. Students' competencies of swimming will be better. Students can learn well and continue, students will have a picture of learning and teaching this methofin the future (despite after passing the swimming course). The most important is that students have a strong provision to teach how to swim at the time the students have graduated and work in the community.

5. Conclusions

Based on the results of needs analysis, expert assessment, field trials and discussion of development research on the product development of swimming lesson based on interactive multimedia model, it can be concluded that: a) development research has been successfully implemented and has resulted in a development product in the form of swimming lesson based on interactive multimedia model; b) the development product in the form of swimming lesson based on interactive multimedia model, after tested in the model effectiveness test, this model has been proven to improve the swimming learning outcomes of students in PJKR study program.

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