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Development of Freestyle Swimming Learning Model Based on Static Swimming Tools

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Abstract: ***This study aims to: 1). Find a freestyle swimming learning model based on static swimming tools, 2). Researching the effectiveness of free style swimming learning models based on static swimming tools. Research uses the R & D methodology (research & development) which refers to the ten stages of development introduced by Wolter R. Borg and Meredith D. Gall. Through this method a freestyle swimming learning model is produced based on static swimming tools. The effectiveness of the freestyle swimming learning model was obtained through the experimental research design in the form of Randomized Pretest-Posttest Control Group. The study was conducted on sports coaching education students at the Faculty of Sports Science, State University of Medan, semester 1 of Academic Year 2017-2018 conducted at the SCC State University of Medan swimming pool in the field. To the test effectiveness of freestyle swimming learning models based on static swimming tools, the method used is to compare the results of the pre test and post test. Data from the pretest and posttest swimming skills were generated based on the freestyle swimming test instrument with reliability 0.83 with a high positive correlation interpretation. The research subjects were 40 people for the experimental group and 40 for the control group. Data is processed using statistical procedures with steps; determine the average difference, determine the standard deviation is different and determine the effectiveness of the model with t test statistics. Based on the calculation of the experimental group data, the results of t arithmetic = 21.54 and t table = 1.70, resulting in a meaningful test. Then the product learning model effectively improves freestyle swimming skills. The increase in freestyle swimming skills is known by the normalization average analysis procedure (average normalized gain <g>) with the results of low criteria 7 people (17.5%), medium criteria 33 people (82.5%) and 0% high criteria. To find out the differences in the learning outcomes of swimming between the two groups, use statistical procedures with steps; determine the combined standard deviation of the two groups, and determine the value of the paired t test. Based on the statistical analysis of t test, obtained t count = 2.52 and this value is greater than t table = 1.70 means that there is a significant difference between freestyle swimming skills between the experimental group and the control group.***

Keywords: Freestyle swimming, swimming learning model, Static Swimming

1. Introduction

The Faculty of Sports Science, Department of Sports Coaching is expected to be able to produce quality human resources, be able and ready to become educators / trainers and be able to put themselves in accordance with the skills and abilities possessed in the community as an effort to shape the nation's dignified. Based on the Sports Coaching Education mission at point 6, namely; Organizing education that produces graduates who have the ability to train, teach and manage professional sports activities.

Forming graduates who are good and competitive the role of the lecturer as a facilitator is needed, because the lecturer must be able to provide quality teaching. Quality teaching can not be separated from the learning model that is applied in conveying material in the form of theory or practice. Applying a learning model that will provide an atmosphere of learning and learning that is meaningful to students is not an easy matter because students are unique individuals, different from one another, especially in the cognitive, affective and psychomotor aspects. Based on the Final Score of the 2016/2017 Academic Year swimming course from the number of participants of 35 people, there are 4 students who get an A or 11.43%, B scores 7 or 20%, C scores 11 or 31, 43% and E values as many as 7 people or 20%, while those who did not attend the lecture were 6 people 17.14%. So students who graduate are 22 people or 66.86% and those who do not graduate are 13 or 37.14%. Based on this reality, the success of the basic skills of student swimming is still not good. Swimming which is an individual sport certainly results in its own difficulties in applying learning material because of the different aspects between the students. Brock in Callary, Rathwell and Young (2018, p. 51) states that; It's trial by error, right. If you teach and teach, what works on someone won't work on the other one because they have a different way to process information, especially when you're in the water (Callary, Rathwell, & Young, 2018)

How do students have the same perception of teaching given, of course there must be a model / learning module as a shared guideline that can be guided, and understood also when outside the lecture hours so that information obtained by students is the same. So in this condition a learning model will be needed so that it can accommodate the achievement of learning objectives according to the material provided.

To be able to master the swimming technique, an effective learning model is needed and in accordance with the age level of students. One effort is to design a freestyle swimming learning model by using a swimming learning tool in the form of a static swimming tool combined with a pull bouy and a swimming board. The existence of this learning model will help students master the freestyle swimming technique because it can be a guideline for themselves to learn independently in addition to learning with their lecturers.

2. Materials and Methods

a) Learning model

The model is widely used in various analysis or design activities, because the model created can help clarify procedures, relationships and the overall state of what is designed. Rosdiani (2012, p. 4) says "the model is an illustration of something that can clarify various links between the elements that exist". (Rosdiani, 2012). The model is a pattern of steps which includes analysis, development, material making and evaluation in order to facilitate the achievement of goals. Selanjutya Priansa (2017, p. 188), states that the model is a conceptual framework that is used as a guide in carrying out an activity. The model can also be understood as an illustration of the real situation. (Priansa, 2017) From some of these meanings it can be concluded that the model is a series of concepts or designs that are used as guidelines for concretizing theories to help clarify procedures and the various links that exist in them as a whole of what is designed in the real situation.

The model is generally used to select and develop learning strategies, methods of skills and learning activities to put pressure on one part of learning. With the model, it will be able to describe the mindset of doing something. The learning model is a pattern or plan used by the lecturer / teacher as a reference in designing learning in the classroom or in the field. Priansa, (2017, p. 188) states "the learning model can also be understood as the teacher's blueprint in preparing and implementing the learning process". (Priansa, 2017). Furthermore Rosdiani (2012, p. 5) states that "the learning model is a plan that is used to design. The content contained in the learning model is in the form of learning strategies that are used to achieve instructional goals "(Rosdiani, 2012). Therefore, in the learning process it is better for educators to use a prototype of a theory or model. The model is called because it is only an outline or points that require a very situational development.

Some of the known learning models are; (a). Inquiry learning model (inquiry leaning). Al-Tabany (2015, p. 78) states that inquiry in English is inquiry, meaning questioning, or examination, investigation. Inquiry as a general process carried out by humans to search for or understand information (Al-Tabany, 2015); (b). Direct learning model (direct instruction). According to Kardi (1997) still in Al-Tabany (2015, p. 95) states that direct teaching can take the form of lectures, demonstrations, training or practice, and group work. Direct teaching is used to deliver lessons that are transformed directly by the teacher / lecturer to students (Al-Tabany, 2015); (c). Contextual learning model (contextual teaching and learning). Priansa (2017, p.275) states that contextual learning aims to improve student learning achievement through increasing understanding of the concepts of the meaning of the subject matter learned by linking the material learned with the context of their lives, family, as citizens, and as future employees in the future the future (Priansa, 2017); (d). Cooperative learning model (cooperative learning). This special feature of learning includes five elements that must be applied namely positive interdependence, individual responsibility, face to face, communication between members and group process evaluation. Muslich (2009) in Priansa (2017, p. 293) states that cooperative learning is learning in the form of sharing information and experience, responding to each other, and communicating with each other (Priansa, 2017). The cooperative learning model is a method that presents the idea that students / students must be able to collaborate through a team in a more responsible learning process; (e). Project based learning model. Mede Wena (2009) in Al-Tabany (2015, h.42) states that project work is a form of work that contains complex tasks based on questions and problems (problems) that are very challenging and require students to design, solve problems, making decisions, conducting investigative activities, and providing opportunities for students to work independently (Al-Tabany, 2015). The aim is so that students have independence in completing the task at hand. Project based learning is constructivist, meaning that students build their own understanding with the help of groups.

Various types of learning models that have been introduced and applied in each learning process have achieved good results, but none of the models are superior to other learning models unless caused by the situation and conditions of the educator, students and the learning environment, which is more good is a combination of several models based on the situation.

Development of learning models is one form of the application of a system approach in learning activities based on a systematic process in learning activities that produces a system that is ready to be used appropriately. Development of the learning model here adheres to a concept called Research and Development (R & D). Putra (2012) stated that the first to use R & D in the field of education was Robert M. Gagne who was very well known for Instructional System Development (ISD) and The Condition of Learning (TCL) when Gagne worked as an expert in Military Research and Development. (Putra, 2012). Challenges and demands in the field of education, especially in learning activities require the perpetrators (teachers / lecturers) to always be creative in delivering learning material with various styles, methods, approaches and learning models.

Even the concept of the freestyle swimming learning model developed is a form of theory that is attempted to apply in the research process by using the R & D model to find a freestyle swimming learning model that can be used practically (effectively) and can be generalized at every level of education. Putra (2012, p. 6) states that "R & D is indeed a study designed to find products, models, services and methods / methods that are appropriate, and can be used practically". (Putra, 2012)

b) Freestyle swimming

Swimming is an activity carried out in the water, and the place of activity is not the same as our environment in general. Swimming basically does not determine a certain pattern of motion that must be done which means it can use all members of the body at will, so that it can move from one place to another, but a combination of motion of certain body members regularly and constantly in the water can be more efficient than the other motion, so that it can slide quickly. With the competitions in swimming, and to achieve that victory, it is necessary to try to swim at high speed, so

changes and variations in movement in the swimming style arise. Bay (2016, p. 51) says; Technically speaking, freestyle can be used using any stroke, but the stroke is the fastest stroke and therefore has become synonymous with freestyle. (Bay, 2016). More specifically Bíró., Révész, & Hidvégi (2015, p. 22) states: Freestyle is a natural, cyclical cross movement. It has the least steep body position, so it has minimum resistance, consequently it is the fastest style. (Bíró, Révész, & Hidvégi, 2015).

Freestyle swimming is one of the forces that causes the body to slide horizontally forward as a result of coordinating foot movements and alternating hands both rapidly with the face downward except when taking breath and streamlined body position to reduce obstacles so it will go faster. To master good swimming skills can be obtained through the efforts of learning and training and study of the techniques and factors that support the sport in question.

c) Freestyle swimming techniques

Freestyle swimming techniques that must be learned and mastered consist of; (a). Body position (body position). The position of the freestyle swimmer's body is lying parallel to the surface of the water (streamlined). Covered means the chest and face are in the water, by maintaining a few moments of streamlined position in the water relaxed and balanced. According to Bay (2017, p. 18) states that; Its streamline purpose is to set up a good swimming position and minimize the drag force that slows you down and makes it harder to perform each movement. You will learn more about streamlining in later steps; for now, here are some drills to help you begin to master it. (Bay, 2016). The position of the body that is parallel to the surface of the water is very efficient in building the effectiveness and speed of the rate of movement in swimming; (b). Freestyle legwork. The main role of foot movement is as a stabilizer (regulator of body balance) and as a driving force to keep the body in a streamlined state, so that the prisoner becomes small. Corlett (1980, p. 23) says from the outset that: An efficient action will help maintain a horizontal body position, balance the action of the arms and give varying degrees of propulsion. (Corlett, 1980). The function of foot movement is more dominant as a body balancer than as a body propulsion to slide forward, has been proposed by McCullough, Kraemer, Volek, Solomon-Hill, Hatfield, Vingren, Ho, Fragala, Thomas, Hakkinen, and Maresh (2009, p.195) , who said; These studies have shown that the contribution of the kick adds approximately 10% to the total strike speed. (McCullough et al., 2009); (c). Breathing. Breath taking should be done as effectively as possible, so that the obstacles that occur in the forward motion are smaller. Barclay (2012, p. 19) states that; A swimmer's head position in freestyle is important and none more so than when the swimmer is breathing. When the head turns to the side to breathe, it should turn to a 90 degree angle so that one eye and most of your mouth are out of the water. Aim to keep the head parallel to the water surface with one eye remaining under the water. It is not necessary to turn the head any more than this. Also be aware not to 'lift' the head when breathing as this will increase the resistance against the body and slow the swimmer down. (Barclay, 2012)

Taking breaths when freestyle swimming is done in a way like the right and or to the left only as is customary / considered appropriate; (d). Hold arms (hand rotation). Movement of the arm is carried out alternately or simultaneously when swimming with a frequency that can be adjusted and adjusted for a stroke (cick stroke). McCullough, et al. (2009, p. 2131) say; The front crawl stroke consists of a cyclical pattern of arm rotation while the legs perform a flutter kicking action. The arm stroke provides a majority of the propulsion, but the legs have been observed to contribute to the speed of movement as well. (McCullough et al., 2009).

Movement of the stroke of the arm can be clearly analyzed cycle / rotation which consists of several phases, namely; the hand goes into the water (entry), catches (catch), pulls (full), pushes (push), exits (releases) from the water and during recovery (recovery) when the arm is above the water surface, then returns to the first phase and so on. To obtain the speed of the body / forward glide as well as control the balance of the body the movement of the stroke of the arm is prioritized in the movement of pulling (full) and push water with a fast frequency; (e). Timing movement. Coordination movement is the right time to coordinate well from all phases of freestyle swimming, gliding, stroke / stroke movements, leg punch movements and breathing movements. Akhmad (2013, p. 120) states that coordination is the result of a combination of performance from the quality of muscles, bones and joints in producing an effective and efficient motion. Where the components of motion consist of energy, muscle contractions, nerves, bones, and joints (Akhmad, 2013). After this coordination gets better, then it will produce a certain skill movement. Widiastuti (2017, p. 233) says that motion skills are movements that follow a certain pattern or form that requires coordination or control of part or all of the body that can be done through the learning process. Someone who is able to move skills well is said to be skilled (Widiastuti, 2017). The purpose of coordinating is to assemble several types of movements into a unified whole movement without interruption in a certain time and space, such as the movement of freestyle swimming skills.

d) Static swimming

In English Static (static / silent) while swimming are translated into swimming / static swimming. Static swim is a term intended for a tool used for learning and practicing swimming. How is meant by static swimming different from swimming in general where it happens to move but this static pool does not occur displacement. In this concept the term used is static swimming. The point is swimmers here do not experience significant displacement but do not reduce the actual meaning of swimming, because the swimming movements carried out are exactly the same as actual freestyle swimming movements. In the use of static swimming tools the results will be better if combined with the use of swimming aids such as buoy boards, pull buoys and various other swimming equipment. Using this tool can also save space, so you can share the pool with others suitable for all pool sizes. Using static swim allows swimming together in a small space that is only 3 meters long: ideal for making multiple workstations in the same pool. For example, to use more equipment, at a pool width

of 1.50 meters. static swimming tool consists of; (a). Belt. The belt is a tool used / worn on the edge of a swimmer that can be tightened, loosened according to the swimmer's waistline and can also be released. This belt is fitted with hooks that will be connected to the belt using a carabiner; (2). Carabinner is a tool that is used as a hook / connector between the end of the rope (string) to the belt and from the other end of the rope to the pillar (fiber) which acts as a liaison; (3). Rope (string / rop). This rope is used to connect a belt with a pole about 5 meters long or adapted to the needs; (4). Stick / stick. 2.10 m high milestone serves as a body restraint so it doesn't slide forward. The posts are set up at the edge of the pool, the ends of the posts are attached to the carabiner that has been tied to one end and the other end is associated with a belt attached to the swimmer's waist. Static swimming tool here is intended to help the smooth running of free style swimming learning / lectures, this tool can also be used by students when practicing outside the lecture hours to help improve their swimming skills / techniques.

e) The initial concept / design of a static swimming tool based learning model was developed

The design of the beas style swimming learning model developed with the name "I-S-L-A-M" consists of five (5) stages consisting of; I = instruction. Lecturers must give instructions (to students about what should be done in implementing the freestyle swimming learning material clearly. Writing instructions in the form of style swimming learning module documents in the form of schemes or descriptions / narratives accompanied by pictures of freestyle swimming techniques that have been arranged in such a way as to attract students to read and study. Oral instructions in the form of direct instructions given to students when face-to-face and if the instructions are unclear, students can ask again directly; S = saving. Is the state of mind students store instructions in memory; L = Learning. Learning to practice instructions that have been stored in memory in the form of stages or phases of the movement of freestyle swimming techniques can be an experience of material that has been studied, turned into a movement skill; A = analysis. Efforts to observe to identify the advantages and disadvantages of learning material that have been learned so that it can be revised so that it becomes better and perfect; M = measurement. This measurement implies measuring the extent to which students have mastered freestyle swimming skills after all previous stages have been carried out.

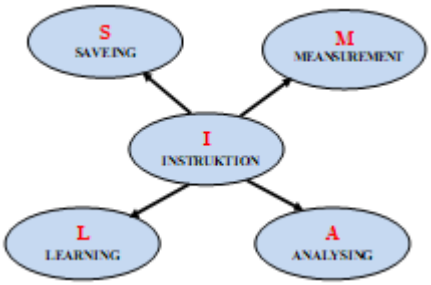
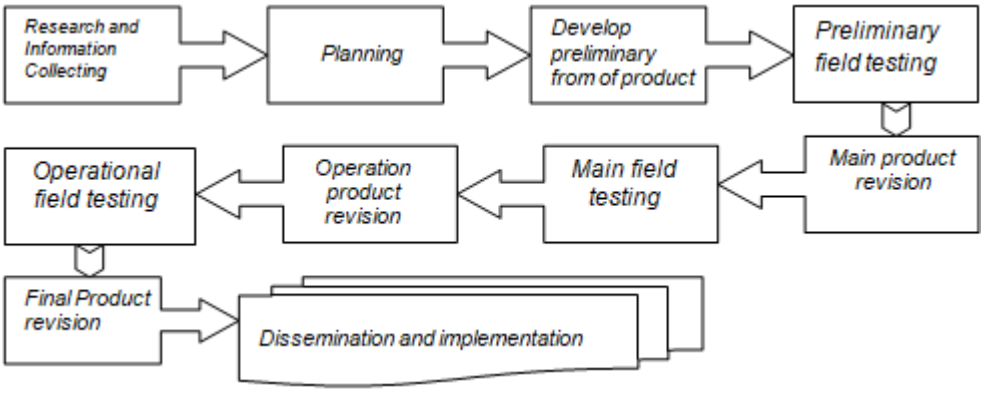


Figure 1: The initial design of a static swimming based learning model

3. Research Approach (Methodology)

This type of research is development research which is often referred to as R & D (research and development) using a product development model by Borg and Gall which consists of 10 steps, as follows;



To find out the product effectiveness of the learning model using experimental techniques in the form of Randomized Pretest-Posttest Control Group using two groups, namely the experimental group and the randomly selected control group, (Riadi, 2015). The experimental design is as follows

Group	Pretest	Treatment	Posttest
Experiment	Y	X	Y_1
Control	Y	-	Y_2

4. Pupulate and Sample

The population in this study are all universities that have sports training and recreational health physical education study programs in the province of North Sumatra. The sampling technique is in accordance with the criteria of the study, namely study programs that have compulsory swimming courses. The research sample consisted of two tertiary institutions, namely the Sports Coaching Education Study Program at the State University of Sport Science and UPMI Recreational Health Physical Education and one high school namely Medan College of Sports Health.

5. Data Analysis Techniques

a) To prove the effectiveness of the learning model, the following steps are taken; determine the different average pretest and posttest subject data; determine the standard deviation of subject data; look for tcount value, using the t-test statistical formula. (Sudjana, 2005)
b) To find out the increase in freestyle swimming ability after the application of the learning model, it was pursued through the gain-normalized analysis procedure <g>. (Hake, 1999)
c) To find out the differences in the results of freestyle swimming learning between the experimental group and the control group, it was done with steps; Determine the average value of the experimental group; determine the average value of the experimental group; determine the combined standard deviation values of the two groups and determine the difference in learning outcomes between the two groups by t test statistics. (Sudjana, 2005)

6. Results of research and discussion

Description of data from design and development

Research has produced a freestyle swimming learning model based on a static swimming tool with the name I-S-L-A-M-T2-E. Conceptually this learning model is the implementation steps in the practice of freestyle swimming learning based on static swimming tools with face-to-face learning with sixteen meetings. In the implementation of learning, students learn by referring to instructions given verbally and in writing and can learn in groups and individuals in the form of lecture assignments to master freestyle swimming theory and skills by using various available resources and developing positive attitudes and behaviors in interactions social with fellow students and lecturers. The I-S-L-A-M-T2-E learning model broadly refers to the direct instruction model and contextual learning model (contextual teaching learning) which emphasizes the life situation of lectures as real life in the student environment. The product development of the freestyle swimming learning model used in this study is the Borg and Gall model which has been successfully developed;

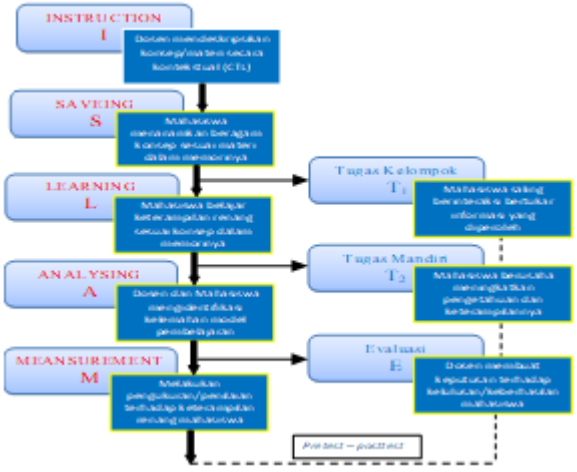


Figure 2: I-S-L-A-M-T2-E learning model

The results of the design of the freestyle swimming learning model using a static swimming tool as shown above are called the I-S-L-A-M-T2-E model consisting of five (5) main components plus three (3) supporting components, namely; I = Instrution: The lecturer gives all instructions to the student either through oral or written in order to equalize the perceptions of all students during learning / lectures; S = Seveing: Students try to keep all instructions in their memory so that they can be carried out properly; L = Learning: Students learn in theory or practice freestyle swimming movement techniques in accordance with the instructions both from the results of reading the module and direct instructions from the lecturer; A = Analysis: The lecturer identifies errors made by students during the learning process and analyzes the weaknesses of the applied learning model; M = Meansurement: The lecturer measures and evaluates students with the aim of knowing how far students have mastered freestyle swimming skills during the lecture process; T1 = Group assignments: students form groups consisting of two or more people with the aim of forming a sense of solidarity and shared responsibility in completing tasks assigned; T2 = Individual tasks: students complete independent assignments as part of a business in increasing their knowledge and skills outside of lecture hours; E = Evaluation: the process of checking, determining, making decisions about the learning that has been done and how far it has achieved. The evaluation at this stage concerns the decision whether the student deserves to graduate with an A (very good), B (good), C (Enough), or D (not graduating).

Model effectiveness and increased freestyle swimming skills

The effectiveness of the learning model is proven through statistical processing procedures with steps; determine the average difference, determine the standard deviation is different and determine the results of the t test. Based on the results of the t test, obtained t count 21.54 while t table 1.70 with this situation it can be proved that the product freestyle swimming learning model is effective in improving student swimming skills.

To find out the increase in freestyle swimming skills for each student was done by determining the normalized g-score. After knowing the value of the g-score can be determined the category of increasing the swimming pool of students in the low, medium and high categories. In the experimental group it is known; 7 people or 17.5% at low level, 33 people or 82.5% at moderate criteria and 0% at high criteria. Whereas in the control group is known; 31 people or 77.5% at low criteria, 9 people or 22.5% at moderate keriteria and 0% at high keriteria.

To find out whether there are differences in freestyle swimming skills learning outcomes between the two experimental groups and the control group performed by steps; determine the combined standard deviation and determine the price of the t test. Based on the calculations obtained t count 2.52 and t table 1.70 this figure shows that the price of t count is greater than the price of t table, this means there are significant differences in the results of

freestyle swimming skills in the experimental group and the control group.

7. Conclusions and implications

7.1 Conclusion

1) Development of a static swimming-based freestyle swimming learning model is needed in recovery because it is in accordance with the characteristics of students in learning theory and practice skills.
2) Development of learning models has produced I-S-L-A-M-T2-E learning model products
3) The I-S-L-A-M-T2-E learning model developed was effective in improving student freestyle swimming skills

7.2 Implications

Based on the research findings several implications in the lecture process are as follows;

1) Make it easier for lecturers to deliver recovery material in stages
2) Assessment of student learning outcomes can be more objective.
3) Make it easier for students to take part in learning because they have lecture guidelines
4) Implementation of freestyle swimming learning models based on static swimming tools can change the mindset of students in improving their knowledge and skills.
5) The product of this research is one of the references of students and anyone, other researchers to develop a freestyle swimming learning model in a wider and more specific scope, space, time, opportunity.

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