

Enhancing Kinaesthetic Intelligence Using Project-Based Learning Models

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Abstract—This study aims to determine the effect of project-based learning models on kinaesthetic intelligence. The population is class XI students of SMA Negeri 1 Lembang, a sample of 80 students was taken using simple random sampling. The method used was an experiment with one group pre-test post-test design. The instrument used was a kinaesthetic intelligence test. Students who study physical education with a project-based learning model score $t = -3,647$, with Sig. (2-tailed) = 0.001. The application of the project-based learning model is able to give effect to the kinaesthetic intelligence of students in physical learning at SMA Negeri 1 Lembang.

Keywords: *kinaesthetic intelligence, project-based learning model, physical education*

I. INTRODUCTION

Physical education is basically an integral part of the overall education system and aims to develop health, physical fitness, critical thinking skills and social skills through physical activities and sports. The advantage of physical activity is the improvement of quality of life related to health [1]. Teaching science must be able to make students have knowledge and understanding [2]. The scientific learning model is also studied by the philosophical theories of constructivism, where constructivism is based on scientific observations and studies, about how people learn [3]. This scientific learning model is also taught by Piaget's theory, which is supported by developments developed from learning experiences [4]. Another view which also influences from John Dewey, who expressed his belief in relying on several bases, namely real knowledge or relating to what is directly present [5]. The development of education in Indonesia in 2013 Planning to use scientific learning, where the learning model is the Problem Based Learning Model, Project Based Learning Model, Discovery Learning Model, and Inquiry Model [6].

Learning is expected to be something new or able to produce works or products that can simultaneously improve the abilities and skills of students at the same time. The intelligence which is commonly used for one's thought process to gain knowledge which is the basis of individual success. The facts that occur in the field, it appears students who have difficulty in learning physical education students who are less active and think are learning that is less interesting. Teachers who like learning activities by providing lecture material [7].

Another fact states that the contribution of physical activity that is classified as generally inactive is 26.1 percent [8]. Other attitudes take their compilation less seriously and consider sport to be less important and more focused on natural subjects. Reduced enthusiasm and low interest in learning physical education, PE only considers bringing other greater benefits [9].

Physical education using project-based learning models always requires students to investigate open topics or not in depth so that they can create solutions, products, or performance. Project-based learning model, which involves students in knowledge and skills through an authentic and complex lengthy and structured Question process and carefully designed assignments and products [10]. Project assignments are used to motivate students to create a state of "need to know" about the learning topic. Project-based model learning also involves several aspects at once from the aspects of attitudes, knowledge and skills. Students can benefit through project-based learning in academic performance, motivation and group work [11] and also students must be involved cognitively with subject matter over long periods of time [12]. This situation is very challenging for students to find, solve problems and find solutions or answers to motion, so that boredom can be avoided. Skills in thinking, solving all problems, accuracy in decision making and risk-taking are aspects that are expected in physical education learning. Through physical education learning, students are expected to be smart in cognitive, affective, and psychomotor aspects. Project-based learning models can increase creativity and physical fitness [13], with certain conditions because if students are active, their creativity will develop and grow [14].

Learning is done by considering the ability of Intelligence Quotient / IQ and the compatibility of the learning model used will be able to train students' intelligence. The low scientific value of students who have limited learning and achievement seems to be related, at least in part, to the teaching and academic context in which students find themselves [15]. The project-based learning model trains students' critical thinking skills and creativity in exploring, finding solutions, and training students' self-confidence. The project-based learning model has other advantages, while students must clearly have a high enthusiasm for learning, a deep understanding of the concept for teachers is needed and is supported by the teacher's

knowledge of Intelligence Quotient / IQ, so that the learning made becomes meaningful.

Intelligence in carrying out movements and knowledge about sports motion or disability are other benefits of physical education. This intelligence in motion and movement is known as kinaesthetic intelligence. Kinaesthetic Intelligence, describes a person's ability to move or control part or all of the body through coordination of the hemisphere of the brain that dominates or controls every movement of the body [16]. In learning, teachers in schools who also still prioritize mastery of the concept of knowledge or cognitive in learning, because many schools have a traditional mind-set in carrying out the learning process, namely schools that only emphasize logic and language skills [17]. Especially for physical education teachers who are expected to be able to design learning that is more directed and well planned so that they are able to develop the potential and talents of students in terms of intelligence development. Teacher must know that students are motivated to play the game and feel it is a positive learning experience [18]. A quality physical education program is a pleasant experience for all students [19]. However, until now the authors have not found relevant research on project-based learning models related to kinaesthetic intelligence. Therefore this study aims to determine the effect of project-based learning models on kinaesthetic intelligence.

II. METHOD

A. Design

The aim of this research is to know the influence of project-based learning in physical education towards kinaesthetic aspect of students' in Senior High School 1 Lembang. The research method is an experiment used one group pre-test post-test design [20]. Based on that, author made several preparations: First, conducted a preliminary survey to see the problems. Then determine the population and sample of students Senior High School 1 Lembang. Second, preparing students' kinaesthetic intelligence instruments. Third, conducted pre-test related to kinaesthetic intelligence in students in Senior High School 1 Lembang. Fourth, conducted treatment using the Project Based Learning model. Fifth, conducted post-test, related to kinaesthetic intelligence in students in Senior High School 1 Lembang.

B. Participants

The population was class XI students of Senior High School 1 Lembang. Sample selected from 15 classes, with the following distribution 8 classes of XI Science and 7 classes of XI social. Determine the number of samples of students based on the level of Intelligence Quotient they have. Then determine the group of students who have high and low levels of Intelligence Quotient using Pairing Matching techniques.

C. Instrument

The instrument used Kinaesthetic Intelligence test from Winarto (2010) developed by Prof. Howard Gardner, from the United States, was adapted from various sources including the Learning Disabilities Resources Community, Greg Gay and

J.Ivanco [21]. This test has 8 types of items, but only the Kinaesthetic Intelligence test is used. The categories for each item are positive statements, namely Strongly Disagree = 1, Disagree = 2, Somewhat Agree = 3, Agree = 4 and Strongly Agree = 5.

D. Procedure

First of all, the researcher agreed with the professor about the instrument to be used. After that, conduct research at the school to work together in the research and then discuss the implementation of the test. Next, the school coordinates with its staff about the samples determined by the researcher to take the test and conduct research. Students are also given to parents about tests and research conducted at school. Instruments used to measure students' intelligence, it is expected that students are able to provide honest answers according to what they experience and researchers hope that students do not feel burdened.

E. Statistical Analysis

The data obtained is processed using the following stages: First, gives a score, as well as descriptive statistics which include averages and standard deviations. Second, analyse the normality used the Kolmogorov-Smirnov test and homogeneity used the Levene' test. Third, analyse the hypothesis used Paired Sample Test.

III. RESULT AND DISCUSSION

A. Result

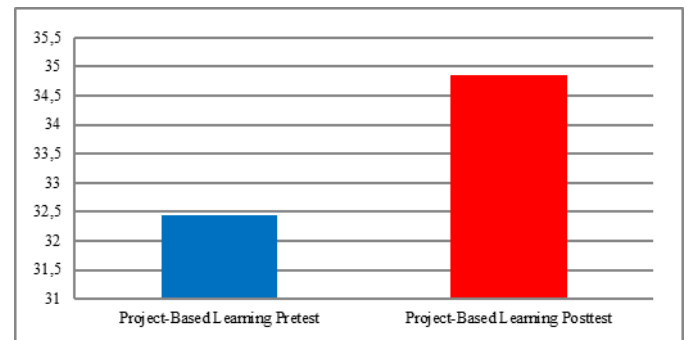


Fig. 1. The average result of students' kinesthetic intelligence at senior high school 1 Lembang.

Based on Table 1, it can be seen that the results of the kinaesthetic intelligence of students studying with the project-based learning model obtained a pre-test value of 1298, an average of 32.45, and a post-test 1394, an average of 34.85.

TABLE I. THE RESULTS OF PAIRED SAMPLE TEST OF STUDENTS' KINESTHETIC INTELLIGENCE OF SENIOR HIGH SCHOOL 1 LEMBANG

Paired Sample Test	t	Sig. (2-tailed)
Kinesthetic Intelligence	-3.647	.001

Based on Table 2, students who study physical education with a project-based learning model obtained t = -3.647, with Sig. (2-tailed) = .001.

B. Discussion

Physical education learning at Senior High School 1 Lembang who used the project-based learning model with the level of Intelligence Quotient ability, which is carried out in a well-planned and well-planned manner both have the same effect on students' kinaesthetic intelligence. Students who learn using project-based learning models show good enthusiasm and desire for learning. Through critical thinking skills, there are two important dimensions, namely a specific mind-set and mental work. Critical thinking requires that what is said is challenged and authenticated based on what is already known or available evidence [22]. This means that critical thinking requires what is said, challenged and evaluated for integrity and authenticity based on what is already known or available evidence. Creative students are students who have good physical fitness, where skills in thinking and problem solving are one of the characteristics of creative students.

Other experts also state the importance in learning physical education used the project-based learning model are the environment that supports learning process. The learning environment must provide a suitable context for learning by challenging or compensating for intellectual and work methods of students [23]. Therefore, the teacher can apply these teaching methods because the students' academic success is a significant relationship between emotional intelligence and kinaesthetic intelligence has been identified [24]. Literally the meaning is as the results of the study that students' academic success is a significant relationship between emotional intelligence and kinaesthetic intelligence has been identified. Then the parties involved in the learning process of students in schools should pay attention to the potential of students' Intelligence Quotient. For physical education teachers, because through a good kinaesthetic intelligence can affect academic success. Students who have a good level of concentration certainly have the ability of Intelligence Quotient and good kinaesthetic intelligence.

In the learning process, each person has its own characteristics that vary from one individual to another. A teacher certainly must understand the different characteristics of each student. Before choosing a learning model, a teacher must be as wise as possible so that later the chosen learning model can work effectively. Conditions that occur in the field show that sports extracurricular activities at Lembang 1 Public High School are numerous and are in demand by their students. The anticipatory effects on health should not be underestimated, because they often last longer than stress [25]. Students with good Intelligence Quotient ability have good movement ability, especially in controlling movement more accurately. This is clarified that sport and exercise will improve the capability of nerve systems and is expected to optimize the lifetime learning and improve memory [26]. Any form of exercise or other motion activity will improve the ability of the nervous system and is expected to optimize lifelong learning and improve memory. Based on the research found that the emotional intelligence and kinaesthetic intelligence affect academic achievement [24]. Students who likes to do physical activity / sports activities, is expected to create a balance of ability development aspects of cognitive, affective and psychomotor. There is positive correlation between the

kinaesthetic perception and the skill of football techniques. This means that the better the kinaesthetic perception is the better the skill in football techniques or the other way around. Thus, the kinaesthetic perception is the variable relevant to the skills [27]. Literally it means there is a positive correlation between kinaesthetic perception and football engineering skills. The better the kinaesthetic perception, the better the skills in football techniques or vice versa. Thus, kinaesthetic perception is a variable that is relevant to skills.

Students who have a high Intelligence Quotient are also interested in activities such as art, knowledge, spiritual activities and self-development activities other than sports. Some of them are able to perform at the District / City level. Doing regular sports activities continuously can improve brain performance. The correlational analysis of the learners, kinaesthetic intelligence correlated only with memory learning strategies [28]. This means that physical education should supported by a good learning strategy, especially to the memory aspect can increase students' kinetic intelligence.

Experts argue about the development process of one's intelligence, viewed from the theory of MI (the theory of Multiple Intelligences). The intelligence develops and changes over time, especially when individuals get experience and education specifically [29]. Physical education learning uses a learning model based on project learning model provides an opportunity for students to gain knowledge through the process of observation, investigation and implementation of knowledge that has been obtained in order to find solutions / answers to the questions given by the teacher. Students who have a low Intelligence Quotient, should be able to adapt to the learning given by the teacher, because well-designed and directed learning will enhance creativity and critical thinking skills, so that students will easily run every instruction and direction from physical education teachers in their learning. Literally it means that the skills in thinking and problem solving skills, clearly require a good level of Intelligence Quotient, students are expected to be able to adapt to the learning carried out. Students must be precise and brave to take risks and be given the freedom to do the learning process. The importance of physical education teachers to be able to motivate students in physical education learning [30]. The motivated students will obviously be interested to learn with all their heart and on the other hand can increase their creativity, concentration and students' intelligence. In this study physical education learning using the project based learning model was designed in an interesting and fun way in order to develop the ability to think critically and have a positive attitude or personality for students. When faced with a Project Based Learning model that prioritizes complex tasks, the student will not feel objected because he is used to working on each task given by his teacher. Besides that physical education must begin to use a learning model that is able to improve critical abilities, enhance creativity, intelligence and in accordance with the level of needs, growth and development of students. The fact showed that sports activities and exercise in physical activity can improve spatial abilities [31]. The Project Based Learning model puts forward very complex tasks, where there is a final task that must be done by students is to create a kind of project. These projects can be in the form of papers written alone with

the group, on matters relating to the learning process. In order for the project task to get maximum results, the teacher will always invite him to work on the project in stages. This is in line with the concept of 21st century education that invites students to learn to become experts in a particular field. This in line with competency in the 21st century, because the developed learning in a higher education environment should have an impact on improving academic and student social interactions [32]. This final learning project will be very favoured by students because they make something original made.

IV. CONCLUSIONS

Physical education using the project-based learning model makes students active. Students who are active and creative in moving are the keys to practicing kinaesthetic abilities. So, physical education learning using project-based learning models can improve the kinaesthetic intelligence students' of SMAN 1 Lembang.

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