

# Scientific Approach in Physical Education

## *Is it able to Improve Concentration and Spatial Intelligence of Junior High School Students in the Coastal Area?*

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**Keywords:** Scientific Approach, Concentration, Spatial Intelligence, Coastal Area.

**Abstract:** The purpose of this research is to analyze the influence of scientific approach in physical education towards the creativity of Senior high school students in the mountainous area. The methods of the experiment were Pre-test and Post-test designs. The population was students of Senior High School 1 Lembang, with 2 groups, 40 students taken as samples through simple random sampling technique. The instruments used were creativity test. The data was processed by independent t-test with the level of trust 0,05. The result of independent t-test in the component of creativity shows that  $t = 5.297$ , Sig 0,000, so H1 was accepted. Conclusion: A scientific approach in physical education increased the creativity better than a conventional approach of senior high school students living in the mountainous areas.

## 1 INTRODUCTION

Physical education and sport are essentially one of the efforts that can support the achievement of national education goals. Physical education in the 20th century puts more emphasis on physical fitness, movement skills, knowledge and social (Abduljabar, B. 2011); Gu, X., Solmon, MA, and Zhang, Q. 2014). In fact, in field, students feel that learning physical education presented is less attractive and monotonous so it feels boring. One of the factors that make physical education and sports unattractive is because teachers still apply the conventional learning approach with one of the characteristics of teaching is authoritarian impression and all the learning process is designed by the teacher, without involving the students. This is reinforced by the opinion that the old (Conventional) curriculum in its implementation is static and rigid by those who apply it in the field (Beyer, LE and Apple, MW (eds. 1998); Cook-Sather, A. (2009b); Grumet, MR 1990).

Overcoming the current state of physical education in schools, a breakthrough in learning is needed, especially with regard to the application of appropriate learning models and approaches, so it is able to enhance creativity, concentration and students' intelligence. In this regard, the government has adopted a policy to implement the 2013

curriculum at the beginning of the new semester 2014, for all education units ranging from elementary, junior high and senior high schools. One of the emphasis of the curriculum is the approach model called the scientific that consists of Problem Base Learning approach, Problem Base Project and Discovery Learning. Through these three approaches, students are expected to develop aspects of student creativity, concentration and intelligence. This is reinforced by the opinion of experts who assert that intelligence is influenced by environmental factors (Diamond, M., and Hopson, J. 1998); Lucas, A., Morley, R., Cole, T. 1998); Neisser, U., Boodoo, G., Bouchard, T., Boykin, AW, Brody, N., Ceci, SJ, Halpern, D., Loehlin, J., Perloff, R., Sternberg, R. and Urbina, S. 1996); Nisbett, RE 2009), as a congenital trait (Eysenck, H. 1994); Herrnstein RJ and Murray C. 1994); Jensen, AR 1980). Jensen, AR (1998). In contrast, the theory of Multiple Intelligence as a combination of intelligence from potential inheritance and skills can be developed in various ways through relevant experience (Gardner, H. 1983). While the sensory and intelligence factors are influenced by independent systems, where the type and quality of information received by the sensory system (senses) determines one's intelligence (Gardner, H. 1993). Other facts revealed that serum calcium levels are positively associated with lower leg muscle strength, but decreased serum calcium

levels are not followed by a decrease in leg muscle strength in soccer athletes (Yusni, Amiruddin, A Purba, and B Tarigan, 2017). So, in addition to diligent exercise should also be balanced by an adequate supply of healthy food, it is useful to maintain and improve the ability of the body.

In learning physical education with a scientific approach, students are trained to perform analysis and make decisions to perform the motion in accordance with the conditions that occur in every game situation. Other experts predict that the best scientific and ethical approach to the present and the future (Zeigler E F. 1980); Bacanak, A and Gökdere, M. 2009); Hurd, PD 1998). Combination of body movement can improve memory, instruction and sequential skills. Creating movements can boost students' self-esteem, which is very important in the learning process (Gilbert, AG 1992). Through a creative learning process, students are encouraged to use their imagination, collaborate with peers, to solve problems and find solutions to the problems they face. Through regular and measurable physical and exercise education activities, a child will be able to maintain his physical fitness and concentration levels longer than children who do not exercise regularly.

Physical education programs should raise awareness, influence attitudes and identify alternatives so that individuals can make informed choices and behavioral changes to achieve optimal physical and mental health (Misner, JE 1984). Other researchers also highlighted and identified the role of physical activity and physical fitness and mental health of school-age children who have implications for public health that are important factors in children's lives (Blair, SN, Cheng, Y., and Holder, JS 2001); Fogelholm, M. 2010). Meanwhile in principle in every fitness program attached to the idea that, we educate teenagers to be fit and stay fit and active throughout life (Corbin, Charles B, Welk, GJ 2014). Consequently, students who exercise regularly with a scientific approach at school or through awareness outside school can improve their brain performance.

## 2 METHOD

The method used in this study is the experiment, which is a study that conducted experiments / giving treatment to a group of students to obtain data as the impact of the treatment given the concentration and intelligence. The data were obtained through concentration tests and spatial intelligence tests (Spatial Intelligence) and then compared them with the control group. When looking at the variables to be

studied, then the research design used is Randomized Control-Group Pretest -Posttest Design, because in this design there are two groups of control groups and experimental groups. The experimental group received treatment of physical education by using a scientific and control approach with a conventional approach. The main objective of this research is revealing the influence of physical education exercise to increase the concentration and students' spatial intelligence (Spatial Intelligence) and test methods are the most effective approach in improving the two components used as the dependent variable.

The instruments used to collect data in this study are, the first is to get information about the concentration level of students, by the dissemination of concentration tests and verify the data. Secondly to get information on the level of students' spatial intelligence (Spatial Intelligence) with spatial intelligence questionnaire spatial (Spatial Intelligence) and then verifying data.

### 2.1 Population and Sample

The population is sixth graders, with a total of 180 students. The sample represents a portion of the population deemed to be representative of the study population, therefore the sample selection technique should be in accordance with the general characteristics of the research objectives. The number of samples used was 10% of the population of high school students. Sample determination technique used is Simple Random Sampling technique, randomly taken as many as 40 students, 20 people get treatment of scientific approach and 20 people with conventional approach.

### 2.2 Analysis

Data analysis with the following steps:

- The normality test used was Kolmogorov-Smirnov in  $p\text{-value} > 0,05$ . Homogeneity test used is Levene test in  $p\text{-value} > 0,05$ .
- Analysis of hypotheses 1 to 4, using Paired sample t test and hypotheses 5 and 6 using Independent t test at  $p\text{-value} > 0,05$ .

### 3 RESULTS AND DISCUSSION

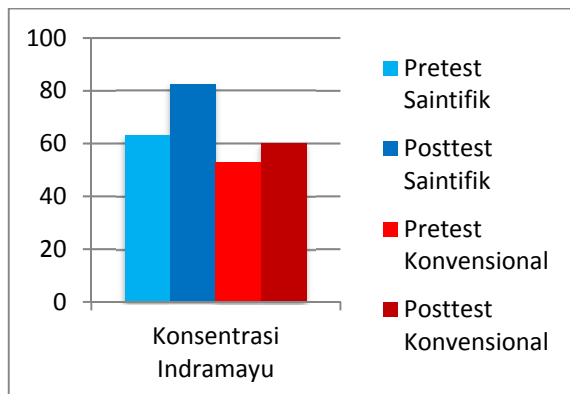


Figure 1: Differences of scientific and conventional approaches towards the students' concentration in the coastal region.

Based on the data presented in Figure 1, it appears that in the experimental group with the Scientific approach in the Indramayu area pretest result of concentration of 1897 with an average of 63.23, while post-test 2475 with an average of 82.50. The control group with the conventional approach in the Indramayu area resulted in pretest concentration of 1581 with an average of 52.70, while the post-test 1807 with an average of 60.23.

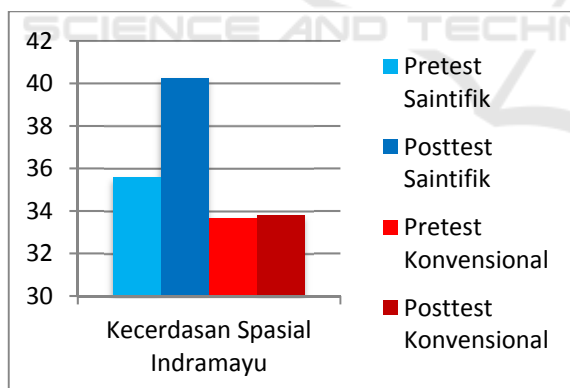


Figure 2: Differences in scientific and conventional approaches towards spatial intelligence of students in coastal area.

Based on the data presented in Figure 2, it is seen that in the experimental group with the Scientific approach in the Indramayu area, the pretest results of 1067 spatial intelligence with an average of 35.57, while the post-test 1207 with an average of 40.23. The control group with the conventional approach in the Indramayu area pretest results of spatial intelligence

1014 with an average of 33.80, while post-test 1017 with an average of 33.90.

Table 1: Paired test of concentration and spatial intelligence test in the coastal region.

Concentration		
Group	T	Sig. (2-tailed)
Scientific	-7.434	.000
Conventional	-1.548	.132
Spatial Intelligence		
Group	T	Sig. (2-tailed)
Scientific	7.687	.000
Conventional	-.100	.921

Based on the results of processing and data analysis in Table 1, shows that physical education conducted in coastal areas with scientific approaches affect the increase in concentration and spatial intelligence of students. Through a scientific approach, students are required to be able to improve their skills and ability to think, curiosity and are able to think or understand quickly. Sensation, movement, and brain function can be united in physics as a whole (Hannaford, C, 2005). Accordingly, scholars argue that some theories of intelligence, when compared to traditional learning methods create a positive effect on students' success and attitudes toward science as school subjects (Özdemir, P., Güneysu, P., and Tekkaya, C. 2006). Learning process that in the scientific approach encourage students to learn actively through their active involvement in physical education learning, with concepts, principles, and teachers encourage students to have experience and experiment that allows them to find principles for themselves on their own (Suprihatiningrum, J. 2013). Students studying with learning strategies based on Multiple Intelligences theory, scored higher than students learning through traditional learning (Abdi, A., Laei, S., and Ahmadyan, H. 2013).

Meanwhile, physical education conducted in coastal areas with conventional approach does not affect the increase in the concentration and spatial intelligence of students. The learning process emphasizes the mastery of techniques first through repetitions before stepping into the real game. In the process of mastering those skills, students are never given the opportunity to think critically like how to do good and correct techniques. This happens because all the processes and learning steps are

managed by the teacher. As a result students only do what the teacher instructs and there is no tolerance to take alternative steps to solve the problem. Therefore, students are easily bored and tired and that makes students not creative. Other experts suggest to diagnose and promote intelligence systematically to equip students with the knowledge and experience of multiple intelligences and to use them in future teaching practice (Elena, R., Carlín, T., and Castillo, C. (nd). It is because students studying with the Multiple Intelligences learning approach have significantly improved from aspects of student achievement and attitudes toward science, compared to traditional learning approaches (Kaya, ON 2007).

Table 2: Independent sample T test results of concentration and spatial intelligence.

Paired Sample t Test	T	Sig. (2-tailed)
Concentration	2.128	.038
Spatial Intelligence	3.902	.000

Based on the results of processing and data analysis in Table 2, shows that physical education conducted in coastal areas with a scientific approach gives better influence on the concentration and spatial intelligence of students compared with conventional approach. So the teacher must master the scientific approach in the process of physical education. Therefore to increase interest, motivation and creativity of students, the model and learning process of physical education should make students more active and creative and have challenges in doing physical education activities (Gu, X and Chang, M and Solmon, A M. 2016). Regarding spatial intelligence, it is found that physical education conducted with a play approach has a better impact on student‘ spatial intelligence than those with conventional approaches (Tarigan, Beltasar, 2014); Tarigan B, Habibudin T and Ikbal Gentar Alam IG. 2016). Furthermore, the expert suggests that the scientific approach has a significant effect on student concentration (Tarigan, Beltasar, 2015). This is supported by the opinion of experts who affirm that “... Children who have good spatial thinking ability, have better performance in the field of geography, and this spatial intelligence is correlated with all kinds of intelligence, in addition to musical intelligence...” (Klonari, A., and Likouri, AA (nd). In order to achieve the quality of physical education that is useful for the students‘ spatial concentration and intelligence, learning activities are required using the following principles: (1) centering on learners; (2) developing the creativity of learners; (3) creating

favorable and challenging conditions; (4) has values, ethics, aesthetics, logic, and kinesthetics; (5) providing a diverse learning experience through the application of fun, contextual, effective, efficient and meaningful learning strategies and methods (Hosnan, M. 2014).

#### 4 CONCLUSIONS

Physical education conducted in coastal areas with scientific approach, three times a week have an effect on the increase of spatial concentration and students‘ intelligence, while physical education with conventional approach done once a week doesn‘t have an effect to the improvement of spatial concentration and students‘ intelligence. Physical education conducted in the coastal areas with a scientific approach has better influences on students‘ spatial concentration and intelligence compared with conventional approaches.

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