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The Effect of Brain Based Learning Approach on Science Process Skills and Learning Motivation of Fifth Grade Elementary School Students

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Abstract

This study aims to describe the science process skills and motivation of students' learning skills by applying the brain based learning model. This research is a quasi-experimental research. The population consisted of all students of SD Inpres Boyaoge and a sample of grade 5a and 5b students. The science process skills instrument used a student activity sheet test and motivation used a questionnaire. The data were then analyzed using the Manwhitney test. The results showed that there was an effect of the learning model on students' science process skills with an average BBL class of 94.48% as well as on students' learning motivation with an average of 90%, these results can be used as an alternative to improve science process skills and motivation in students..

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Introduction

Science process skills are all scientific skills that focus on cognitive and psychomotor learners (Trianto, 2011). Empowerment of science process skills allows students to be able to find facts and develop scientific concepts, theories and attitudes (Prasasti, 2017). The information obtained can be interpreted, so that it will produce new knowledge that is expected to create meaningful learning (Nehring et al., 2015).

Meaningful learning is very important for students to construct their knowledge, investigate problems, and analyze information (Salsabila, 2017). Meaningful learning is closely related to contextual learning, namely learning that is supported by situations or problems in real life. Adopting constructivism, the learning process is emphasized not only to memorize (rote learning), but to reconstruct or build new knowledge and skills through facts experienced in everyday life (Dahar, 2011).

The achievement of the learning process as described above can be influenced by various factors, one of which is student motivation. Motivation is a very important variable in the success of learning outcomes (ElAdl & Saad, 2019). This could explain why highly motivated students tend to show more academic effort, persistence and better achievement than low motivated students (Rosenthal & Wolters, 2000). According to Sari (2018), motivation is born based on awareness of the essential goals of the learning process that is being experienced. Learning activities can arise because of the desire, desire, and encouragement of learning needs to achieve hopes or ideals. Furthermore, Bhakti & Dwi Astuti (2018) revealed that motivation is a complex part of the psychology and behavior of learners that affects how to use their time, how much energy is expended to complete a given task, how to complete the task, and how long it lasts. in the face of this task.

Research conducted by Sani, et al, (2019), examines the effect of brain based learning on students' learning motivation in electric circuit learning which shows that brain based learning can increase student motivation, as well as the results of research from Eladl (2019), that brain based learning has more opportunities great for developing students' memory and learning motivation, previous studies only examined the effect of brain based learning on motivation.

The fact found at SD Inpres Boyaoge is that the fifth grade students have lack of motivation and science process skills, this is indicated by most of the smart students who always have the opportunity to express their opinions in class, while the less intelligent students do not try to do so. Another indication is that students still understand the concept of science based on memorization from reading books, or other learning resources, so that the hierarchy of cognitive processes tends to still be in the aspects of remembering (remembering) and understanding (understanding, even though both of these things will affect student achievement, so it is important In addition, teachers in carrying out the learning process tend not to pay attention to aspects of increasing science process skills and motivation,

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this is because there are still many teachers who do not understand about learning who are able to develop science process skills and motivation, so that these two factors are not optimal.

Maximizing these two things requires a learning approach that not only produces meaningful learning, but also effective learning, namely learning that is able to optimize the thinking potential of students, in other words balancing the potential of the right brain and left brain of students (Lestari, 2014). The right hemisphere of the brain functions in creativity, feeling, imagination, color, spatial imagery, and other abstract realms. While the left hemisphere of the brain works in analyzing logic, facts, theories, calculations, and other concrete realms (DePorter & Hernacki, 2015). A learning environment that can provide opportunities for students to be active and in accordance with the natural learning of their brains, will certainly motivate them to learn, so that their skills can develop (Salem, 2017). The learning approach in question is Brain Based Learning (BBL).

Brain Based Learning (BBL) is a learning approach based on principles derived from an understanding of the brain. Using what is known about the brain, students can explore how their brain works. As a result, students can make better decisions and reach more information that is being studied (Jensen, 2011).

According to Given (2007), the Brain Based Learning (BBL) approach aims to develop five natural brain learning systems that can develop the brain's potential to the fullest. The five learning systems are emotional, social, cognitive, physical, and reflective learning systems. The five learnings influence each other and cannot stand alone (Mustiada et al., 2014).

Brain skills-based learning considers what is natural for the brain and how the brain is influenced by the environment and experience (Nur, 2016). Furthermore, according to Jensen, there are three main strategies that can be developed in the implementation of BBL, namely: (1) creating a learning environment that challenges students' thinking skills; (2) creating a pleasant learning environment; and (3) creating an active and meaningful learning situation (Diani et al., 2019). The purpose of this study is to analyze the effect of applying the Brain Based Learning approach to the motivation and science process skills of fifth grade students of SD Inpres Boyaoge, with the hope that the effect will be positive and significantly increase students' learning motivation and science process skills..

Materials and Method

This type of research is a quasi-experimental research (quasi-experimental). According to Syamsuddin & Damaianti (2011), quasi-experimental research is research that is close to experimental research, but cannot be said to be experimental, because the research subjects cannot be manipulated and controlled intensively. The research design used was a non-equivalent control group.

The population consisted of all students of SD Inpres Boyaoge, totaling 255 students. The sample in this study is class V SD Inpres Boyaoge which consists of 2 classes, each class consists of 29 students, with a total of 58 students. The sample was taken by purposive sampling technique. The data collection technique uses a questionnaire technique to collect student motivation data using the Student Motivation Towards Science Learning (SMTSL) instrument with 6 indicators, namely the desire and interest to succeed, the drive and need for learning, the hopes and aspirations for the future, the existence of rewards in learning, the existence of interesting activities in learning, and the existence of a conducive learning environment which is arranged in the form of 29 statement items with 4 alternative choices, namely strongly disagree, disagree, agree, and strongly agree, and use test techniques to collect process skill results. science students use a test instrument in the form of a student worksheet (LKPD) consisting of 5 numbers in the form of a description with ecosystem material, which has been tested for content and construct validity by experts and tested on 15 students after which they are tested for validity, reliability, level of difficulty and discriminatory power then the data is tested for normality as and its homogeneity and continued with the Manwhitney test using SPPS 21.

Results and Discussion

Validity test

The validity test is carried out using the product moment correlation to ensure that the instrument used is able to measure what it wants to measure so that the data obtained can be trusted or valid. 29 items are valid because sig < 0.05 so the motivation questionnaire is suitable to be used as an instrument. The scientific process skills instrument from validation by expert lecturers stated that it was feasible to use with improvements, while for the trial, the five items obtained were sig < 0.05, which means that the instrument was suitable for use.

Reliability Test

The reliable test is intended to determine the consistency or consistency. The reliable test technique used is alpha cronbach measuring the same object several times and tends to produce relatively the same data, in the motivation questionnaire, the cronbach alpha value is 0.953 including the very reliable category, while for the science process skill instrument, cronbach alpha is 0.650 including the reliable category.

Difficulty Level

The difficulty test was carried out to determine the extent to which the questions were able to be answered by the students, a good

question was if the level of difficulty was 0.25-0.7 including the medium category, on the science process skills instrument, the difficulty level was 0.65, which was included in the medium category.

Distinguishing Power

Distinguishing power is the ability of questions to distinguish groups in the aspect that is measured, in this case the ability of questions to distinguish high-ability groups and low-ability groups, the five science process skill instrument items obtain a level of difficulty in the medium and good categories.

Prerequisite Test

Homogeneity Test

Homogeneity test is conducted to determine whether the variance of the data groups is the same or not by using the Levene test, the purpose of this homogeneity test is to determine whether the sample groups come from the same population or have the same ability. After the homogeneity test was carried out, it showed a significance of 0.00 < 0.05, which means that the data is not homogeneous or the sample group does not have the same ability.

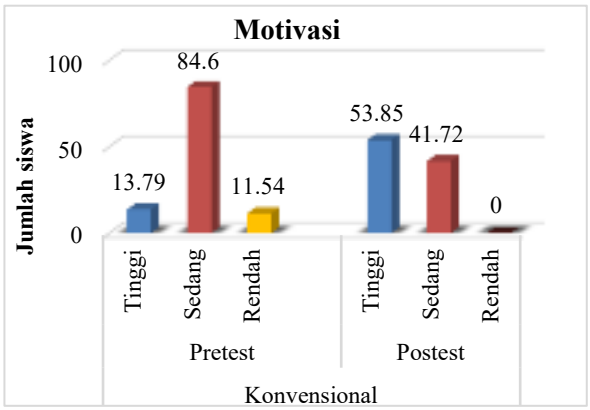
Normality test

The normality test was carried out to determine the distribution of data in the sample group, so that it could be known whether the data was taken from a normal population or not.

The Effect of Brain Based Learning on Students' Learning Motivation

Based on the Manwhitney test, it shows sig 0.00 < 0.005, which means that there is a significant difference or influence of the learning model on students' learning motivation, with the highest average science process skills in the experimental class treated with the Brain Based Learning model.

Figure 1. Student Learning Motivation (Control)



Based on Figure 1 it can be seen that in the high category the percentage of the pretest is 13.79%, the medium category is 84.6% and the low category is 1154%, while in the posttest the high category is 53.85%, the medium category is 41.72% and 0% is the low category.

In the experimental class, the treatment of the brain-based learning model was given after it was evaluated after the post-test of students' learning motivation, as for the results obtained, namely:

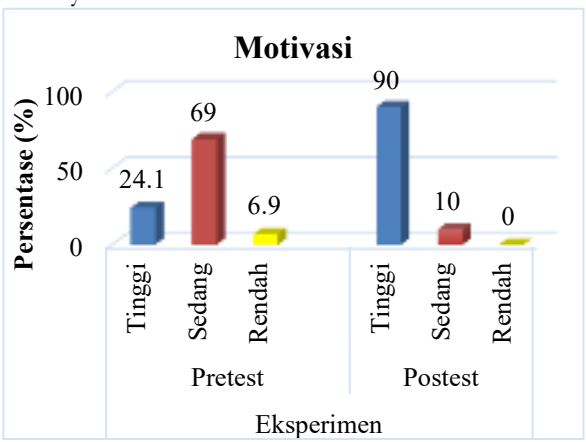


Figure 2. Student Learning Motivation (Experiment)

In Figure 2, it can be seen that the pretest in the high category is 24.1%, the medium category is 69%, and the low category is 6.9%, while the posttest in the high category is 90%, the medium category is 10%, and the low category is 0%.

The comparison of the average percentage of students' learning motivation between the control class and the experimental class in the pretest and posttest phases is as follows:

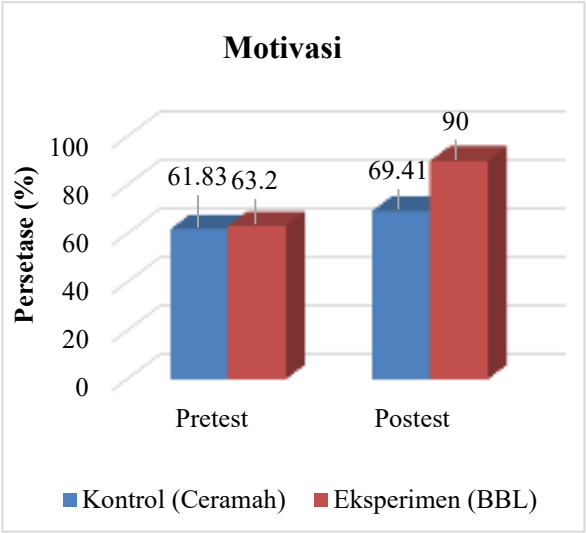


Figure 3. Comparison of Learning Motivation in Control and Experiment Class

Figure 3 shows the difference in the average percentage of students' learning motivation who is taught using the brain based learning and lecture learning models, both at pretest and posttest, overall BBL has a higher average percentage compared to lectures.

The Effect of Brain Based Learning on Students' Science Process Skills (KPS)

Based on the ManWhitney test, it shows that sig 0.00 < 0.05, which means that there is a significant difference or influence of the learning model on students' science process skills.

The measurement of students' science process skills is carried out before the learning process begins (pretest) and then given learning three times followed by a posttest, while the results of the students' science process skills are:

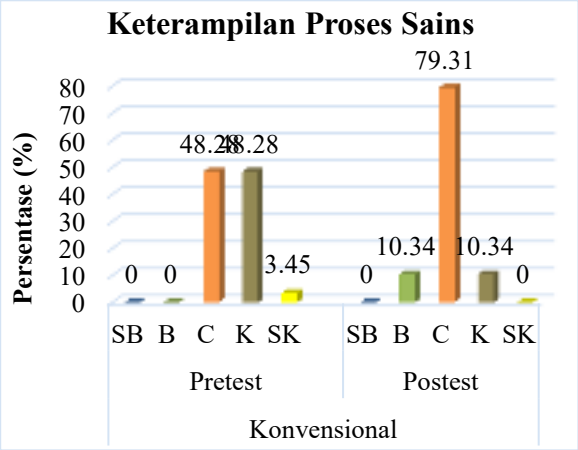


Figure 4. Science Process Skills (Control)

Figure 4 shows the difference in the distribution of science process skills, in the pretest category very good and good 0%, sufficient category 48.28%, less category 48.28%, and very poor category 3.45%, while the posttest category is very good and very poor 0%, good 10.34%, enough 79.31%, less 10.34%.

The experimental class was given treatment in the form of a brain-based learning model, while the results obtained were:

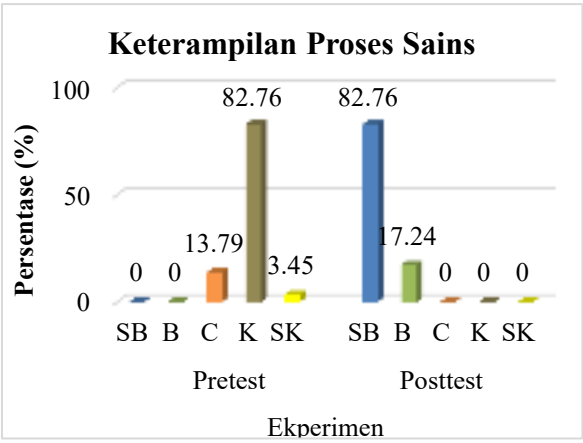


Figure 5 Science Process Skills (Experiments)

Figure 5 shows the difference in science process skills, for the pretest phase the category is very good and good 0%, quite 13.79%, less 82.76%, and very lacking 3.45%, while in the posttest phase the category is very good 82.76%, good 17.24%, quite, less and very less 0%.

The comparison of the average percentage of control and experimental science process skills in the pretest and posttest phases, namely:

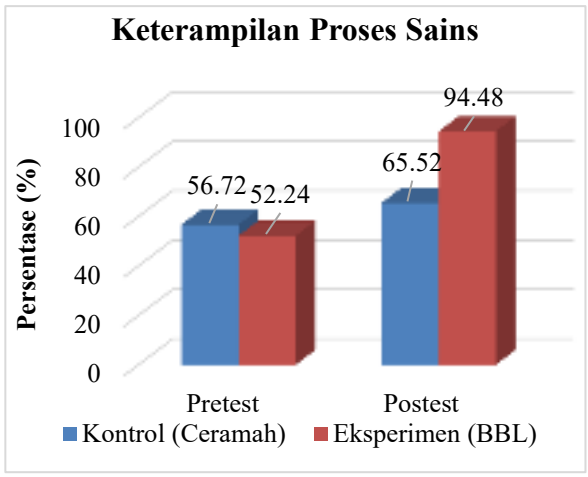


Figure 6 Comparison of Control and Experimental Science Process Skills

Figure 6 shows the difference in the average percentage of science process skills of students who are taught using the brain based learning and lecture learning models, both at pretest and posttest, overall BBL has a higher average percentage compared to lectures.

Brain based learning on learning motivation

Research shows the learning motivation of class students on each indicator, namely on the indicator of the desire and interest to succeed, the percentage in the experimental class is greater, namely 90%, this indicator shows students have the desire to excel and achieve the best possible goals without being asked by others, the indicator is The encouragement and need for learning was greater in the experimental class, i.e. 89% showed students in learning, had an awareness of the importance of the learning being carried out, so that the enthusiasm of students was great in achieving their goals. The indicator of future hopes and aspirations in the experimental class is also higher than the control class, which is 91%, indicating that students in carrying out learning are oriented towards the ideals that have been desired by students, the indicator of appreciation in learning shows that the experimental class is greater from the control class, which is 89%, this means that students need and enjoy every achievement in learning given positive reinforcement, the indicators of interesting activities in learning show higher results in the experimental class compared to the control class, which is 89%, this means that every learning process that is interesting and not monotonous and makes students more motivated to follow the learning process. The brain based learning model facilitates this by presenting a learning process that activates student activities through games and discussions followed by visualization of the material being taught, this makes students more interested in participating in learning. The indicator of a conducive environment shows that the experimental class is better than the control class, which is 92%, this means that students will learn

well if the learning environment is in a state where there is no commotion. The distribution of the categories of student learning motivation appears in the experimental class before being given treatment (pretest), the dominant students are in the medium and high category of learning motivation, after being given treatment and re-measured (postets) there are students with high and medium learning motivation, which means that 90% of students in the middle and low categories in the pretest are in the medium and high categories in the posttest, in the control class the distribution of students' learning motivation at the pretest is in the medium high category. and low, after treatment the high category increased, the medium category fell, which means that students in the pretest who were in the medium category experienced an increase in learning motivation to the high category or students from the low category to the medium or high category in the posttest phase then seen from the comparison of learning motivation students based on the phase, namely in the pretest phase, the difference was less than 2%, but in the posttest phase there was a difference of more than 20% with the highest score in the experimental class, the hypothesis test showed that the brain based learning (BBL) learning model had a significant effect on learning motivation.

The results above indicate that the BBL learning model is better than lectures to increase students' learning motivation, learning motivation is a will, drive, intention, both internal and external that is able to associate students with academic activities, with learning motivation will make students more motivated to maximize involvement in the learning process so that it will be more meaningful. This learning motivation can be triggered by making a fun learning process for students, one of which is the brain based learning model, this learning model is able to create a comfortable and fun learning atmosphere so that it can increase relaxation and reduce or even eliminate students' fear and anxiety when dealing with students. With learning challenges, this is also evident when the learning process takes place, students tend to ask various questions and are active in responding to the opinions of their classmates or responding to the stimulus given by the teacher.

Hamalik (2011), suggests that brain based learning facilitates student-centered learning processes so that students are active in discovering their knowledge about the topic being studied, with student involvement in the learning process will increase student learning motivation as stated by Dermitzaki, et al., 2013; Furio et al., 2015; Serio et al., 2013 that the level of student motivation reflects their involvement and contribution in the learning environment, students who are active and highly motivated will spontaneously engage in learning activities.

This is in accordance with the results of Lestari's research (2014), namely the learning motivation of students who are taught using BBL shows a positive attitude. If you look at the overall value of the control class below the experimental class, this is because the lecture learning model causes students to become inactive in the learning process, teachers tend to dominate the class and do not act as facilitators so that learning is centered on the teacher not on the students.

Brain based learning on science process skills

The distribution of the categories of students' science process skills, in the experimental class the pretest phase seemed dominated by the categories of less, sufficient, very poor, very good and good, after being given treatment and seeing the postets results showed a change in the distribution of science process skills, namely in the very good and good categories. This shows that students who were previously in the sufficient, less and very less categories experienced an increase in science process skills after being given learning using the brain based learning model.

In the control class, the pretest phase seemed to be dominated by the sufficient and less categories with the same percentage, very poor, very good and good, after being treated and seen the post-test results showed a change in the distribution of science process skills where the post-test results showed science process skills using a learning model lectures were dominated by very good and good categories. Comparison of the average science process skills of the experimental and control classes in the pretest phase there is a difference of 4.48% while in the posttest phase there is a difference of 28.96%, the results of hypothesis testing also show that there is a significant effect of the brain based learning (BBL) learning model on science process skills.

These results indicate that the use of brain based learning learning model is effective for improving science process skills, which are a form of procedural skills, thinking habits, and scientific investigations, science skills provide students with observing, handling things and exploring the environment (Ango, 2002). This can be done by applying a brains-based learning model because the BBL learning model requires students to actively discover their knowledge about the topic being studied so that it encourages students to carry out activities that encourage student interaction with classmates, teachers and the surrounding environment as shown. reflected in the syntax, namely Pre-exposure, in this phase the teacher opens learning by greeting and then invites students to pray as a form of good behavior, after that students are checked for attendance, then proceed with repeating the material previously through an explanation by the teacher, followed by questions to provoke students' memories of the previous material, the students seemed enthusiastic in answering the questions asked, then continued with the opposite word game, namely a game to focus students' focus so that they could follow the learning maximally. and students seem enthusiastic

in participating in the opposite game to focus their brains and attention, at the preparation stage (provoking curiosity) students pay attention to learning objectives so that the direction of learning becomes clear and students become goal-oriented, after that the teacher explains the general description and benefits of the material and is associated with daily life to increase motivation to learn the material being taught and followed by questions and students try to answer the questions posed by the teacher, initiation and acquisition (creating brain neuron connections) in the phase given a lot of content. n learning, then students are given a student worksheet (LKPD) to work on, students seem eager to work on questions on the LKPD and actively ask the teacher about things they don't understand, then elaborate (manage information), in this phase students are asked to present their work , and other students were asked to respond and provide questions, it seemed that students were active in discussing with their friends by asking questions and or answering questions, incubation and memory coding (priorizing knowledge) at this stage rest time and repetition time became an important thing and it is highly emphasized, students pay attention to the video displayed by the teacher to further improve students' understanding of the material, then verify and check, at this stage the teacher evaluates student knowledge to check student understanding, then at this stage celebration and integration (involves emotion), p At this stage, it is very important to engage the emotions. This stage instills the importance of a sense of love for learning, the teacher appoints students to conclude the learning outcomes and pays attention to the teacher's explanation and is followed by shouts and clapping together as a form of appreciation for what has been done in the learning process (Kuswidi, 2015).

Conclusion

Based on the research that has been done right, can it was concluded that the brain based learning (BBL) approach had a significant effect on improving science process skills compared to the lecture model and the brain based learning (BBL) approach had a significantly better motivation than the lecture model.

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