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Enhancing Science Process Skills and Self-Regulation: Is It Better To Use Inquiry Interactive Demonstration Model?

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Abstract: Enhancing Science Process Skills and Self-Regulation: Is It Better To Use Inquiry Interactive Demonstration Model?. Objectives: This study aims to find out the effectiveness of the inquiry interactive demonstration model to improve students' science process skills and self-regulation. **Methods:** This study used a Quasy Experiment, and research design of The Matching Only Pretest-Posttest Design. This study's population was all 8th-grade students of Junior High School 19 of Bandar Lampung, Lampung, Indonesia, and used a sample of 60 students. The data were analyzed with descriptive statistics with Multivariate statistical test (Mannova test). **Findings:** The result of the Multivariate statistical test of the students' science process skills was Sig. = 0.000, p<0.05). Meanwhile, The result of the Multivariate statistical test of the students' self-regulation was Sig. = 0.000, p<0.05). **Conclusion:** The inquiry interactive demonstration learning model can improve science process skills and self-regulation.

Keywords: inquiry interactive demonstration model, science process skills, self-regulation.

Abstrak: Peningkatan Keterampilan Proses Sains dan Pengaturan Diri: Apakah Lebih Baik Menggunakan Model Inquiry Interactive Demonstration?. Tujuan: *Penelitian ini bertujuan untuk mengetahui keefektifan model inquiry interactive demonstration dalam meningkatkan keterampilan proses sains dan regulasi diri siswa.* ***Metode:*** *Penelitian ini menggunakan Quasy Experimen dan desain penelitian menggunakan The Matching Only Pretest-Posttest Design. Populasi penelitian ini adalah seluruh siswa kelas 8 SMP Negeri 19 Bandar Lampung, Lampung, Indonesia, dan menggunakan sampel sebanyak 60 siswa. Data dianalisis dengan statistik deskriptif menggunakan uji statistik Multivariat (Uji Mannova).* ***Temuan:*** *Hasil penelitian menunjukkan bahwa hasil uji statistik Multivariat (Uji Mannova) pada keterampilan proses sains adalah Sig. = 0,000, p<0,05). Sementara itu, hasil uj statistik Multivariat (Uji Mannova) pada regulasi diri adalah Sig. = 0,000, p<0,05).* ***Kesimpulan:*** *Model inquiry interactive demonstration dapat meningkatkan keterampilan proses sains dan regulasi diri.*

Kata kunci: *model demonstrasi inkuiri interaktif, keterampilan proses sains, regulasi diri.*

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INTRODUCTION

The implementation of the online learning system in all Indonesian schools since early March 2020 is the impact of the outbreak of the COVID-19 pandemic (Rasmitadila et al., 2020). All learning activities at all levels of education are no longer carried out face-to-face (offline) but are directed to using distance learning classes or online. This situation becomes a big challenge for educators in maximizing online learning (Dongoran et al., 2021). Although students cannot be taught face-to-face, they must prioritize the demands of 4C skills in the 21st century, which include critical thinking and problem solving, creativity and innovation, communication, and collaboration (Turiman et al., 2012). According to (Häkkinen et al., 2017), state that although students cannot be taught face-to-face, they must prioritize the demands of 4C skills in the 21st century through science learning.

In addition, the nature of science consists of scientific processes and scientific attitudes (Nuangchalerm & El Islami, 2018). Science is related to all students finding natural phenomena systematically, so science is not only a collection of reliable knowledge in the form of facts, concepts, or principles but also includes the scientific method (Ritter et al., 2018). In science learning according to (Prachagool et al., (2016), students must be given direct experience through a learning process based on process skills. Science learning in the 2013 Curriculum has two approaches, namely the scientific approach and the process skills approach to be applied in science learning in schools which aim to achieve competence in the 2013 Curriculum (Wijayaningputri et al., 2018). Science will produce high quality learners with strong values, attitudes, and critical thinking skills, leading to a generation capable of solving problems (Baydere et al., 2020). The ability of students to obtain information and knowledge is determined by their active participation in the learning process (Simbolon, 2015). The material obtained does not have to be delivered by the teacher, but by students who actively participate in the teaching and learning process (Patterson et al, 2018). Science learning does not only refer to the application of theories and concepts but also the need for a skills process in learning (Prasasti, 2017).

Science process skills are scientific abilities that must be possessed by students in the 21st century (Turiman et al., 2012), in order to be able to use the scientific method in understanding problems, developing and discovering knowledge, and these skills are very essential for students as a provision to use the scientific method in developing science. and become able to gain a new understanding (Zeidan & Jayosi, 2015). According to Tawil & Liliasari, (2014), science process skills have several indicators in order to achieve a scientific process, namely observing, classifying, interpreting, predicting, communicating, asking questions, hypotheses, planning experiment, using tools/materials, apply concepts, and conduct experiments as necessary tools in science and technology learning, such as problem-solving and student development, and in society, such as mental skills, physical skills, and competency skills (Inayah et al., 2020). In addition, according to Handayani et al., (2018), science process skills are needed by students to study science and technology in more detail. Students can learn science meaningfully through the exploration of science process skills.

In developing science process skills, students have difficulty in learning science due to several factors, namely student attitudes, management in learning, and misconceptions. Misunderstandings often occur in the learning process. Misunderstandings can also be influenced by emotional aspects such as self-regulation (Nazmi et al., 2019). Self-regulation is the ability of a person to control behavior independently and is one of the main drivers of the human personality, which consists of aspects of observation, self-assessment, and response (Dewi & Taufik, 2020).

Self-regulation is as important as the process of adaptation and maintenance of mental stability, the ability to regulate oneself (Hapidoh et al., 2019). Self-regulation can be measured when a person has been able to control himself and direct his actions well (Haka et al., 2021). According to Marzano (1994), self-regulation has several indicators that must be achieved, namely self-awareness, structured planning, using clear sources, sensitive to feedback, and conducting evaluations, to maximize science process skills, and self-regulation, an appropriate learning model is needed.

Learning using the inquiry model can provide opportunities for students to conduct investigations and hypotheses. One of the inquiry models is the inquiry interactive demonstration learning model developed by Wenning (2004). The inquiry interactive demonstration learning model is one of inquiry learning that can help improve science process skills (Rahmat & Suhandi, 2017). This is because with demonstrations, students can directly compare their conceptions with real events presented through demonstrations and can learn actively (Harizah et al., 2020). Students use an active learning approach to apply science process skills such as hypothesis generation, experimental design, data analysis, and scientific communication (Kramer et al., 2018).

The learning model applied is the inquiry interactive demonstration learning model. This interactive inquiry demonstration learning model was developed by Wenning (2012), which consists of five learning stages, namely the observation, manipulation, generalization, verification, and application stages. Recent research conducted by (Noviani, 2019), find that the learning using the inquiry interactive demonstration learning model can improve science process skills and self regulation, because can reduce misunderstandings in delivering material. According to (Wenning & Khan, 2011), inquiry-based interactive demonstration learning can facilitate students to develop basic skills which include predicting, explaining, estimating, obtaining and processing data, formulating and reviewing scientific explanations using logic and evidence, as well as recognizing and analyzing explanations, and alternative models. Therefore, it is very important to conduct research that explores this problem more deeply, especially regarding the effect of the interactive inquiry demonstration learning model in improving students' science process skills and self-regulation.

■ METHODS

Research Design and Procedures

The research method used was the Quasy Experiment and research design of The Matching Only Pretest-Posttest Design, so there are two classes namely experimental class and control class. Both classes were given a pretest and posttest treatment of science process skills and self-regulation. This research was conducted at Junior High School 19 in Bandar Lampung in 2020/2021 academic. This research procedure consists of four stages, namely (1) measurements were carried out before being given treatment, so that they were given a pretest of science process skills and previous self-regulation to the experimental class and control class to determine the initial conditions related to the dependent variable; (2) the experimental class, namely giving a treatment by applying an inquiry interactive demonstration learning model, while the control class was treated by applying a conventional learning model; (3) measurement after being given treatment, namely giving a post-test of science process skills and self-regulation. Both classes were given the same weight of science process skills questions and self-regulation questionnaires. It aims to see the difference in student scores before and after applying the interactive inquiry demonstration learning model, and; (4) the data is analyzed using Normalized Gain (N-Gain), and inferential statistical analysis consists of prerequisite test and hypothesis testing. The prerequisite test uses a normality test and homogeneity test, while the statistical test uses Multivariate Test (Mannova Test). The Prerequisite testing and hypothesis testing in this study used the IBM SPSS Statistic 26 application.

Population and Sampel

The population in this study were all eighth-grade students of Junior High School 19 in Bandar Lampung, Lampung, Indonesia, in the academic year of 2020/2021. The sample in this study used a cluster random sampling technique to produce two selected classes, namely the experimental class, and the control class. Both of the sample classes are assumed homogenous. The number of students in this study that will be used as a research sample is 60 students who are divided into 2 classes (experimental class and control class), so that it consists of 30 students. The first class was chosen as an experimental class implementing an interactive inquiry demonstration learning model. The second class was chosen as a control class, implementing a conventional learning model.

Data Collection Techniques

The instrument for collecting the data was an test examining students' science process skills and a self-regulation questionnaire. The instrument of science process skill in this study adopted indicators from Tawil & Liliasari (2014), which consisted of twelve aspect, namely observing, classifying, interpreting, predicting, communicating, asking questions, hypotheses, planning experiment, using tools/materials, applying concepts, and conduct experiments. The instrument test of science process skill in this study used two instruments, namely multiple choice tests and observation sheets. The instrument test of science process skill consists of 20 questions about the material of the human digestive system, while on the instrument of observation sheet science process skills using the Guttman Scale which consisted of two intervals, namely Yes and No. Each question represents an indicators of science process skills. The indicators of the science process skills test are presented in Table 2.

Table 1. The indicators of the science process skills test

Question Number	Indicators	Sub Indicator Question
1, 2	Observing	Students can observe types of food nutrition from the activity of testing the content of food substances and organs of the digestive system of food
3, 4	Classifying	Students can classify the characteristics of foods containing glucose, protein, and carbohydrates
3, 5	Interpreting	Students can conclude from the results of the test for the content of foodstuffs containing carbohydrates, sugars, fats, and proteins from each type of food ingredients in daily life through the activity of testing the content of foodstuffs.
6	Predicting	Students can predict calorie needs to compose a balanced menu of body needs by using patterns or observations

7, 8	Communicating	Students can describe by reading tables or graphs or diagrams of nutritional needs and experimental results of food substance testing
9	Asking questions	Students can provide feedback by asking questions about the structure and use of each type of food nutrition
10, 11, 12	Hypotheses	Students can propose hypotheses to conduct experiments regarding the test of food substance content
13	Planning experiment	Students can plan experiments by determining tools, materials, and sources for conducting food testing
14, 15	Using tools/materials	Students can use tools and materials to determine the content of substances contained in food ingredients
16, 17, 18, 19	Applying concepts	Students can know the concept to explain the organs of the digestive system of food
20	Conduct experiments	Students can determine the working steps of an observation properly and correctly

The instrument of self-regulation in this study adopted indicators from Marzano (1994), which consisted of four indicators, namely self-awareness, structured planning, using clear sources, and sensitive to feedback. The instrument of self-regulation is in the form of a questionnaire consisting of 20 statements. Each statement consists of positive and negative statements. Self-regulation questionnaire using a Likert Scale consisting of four intervals, namely strongly agree, agree, disagree, and strongly disagree. Each statement represents an indicators of self-regulation. Indicators of the self-regulation questionnaires are presented in Table 2.

Table 2. The Indicators of the self-regulation questionnaires

Indicators	Sub Indicator Statements	Question Number	
		Positive	Negative
Self-awareness	Students can efficiently control themselves in their own learning experiences in different ways	1,19	3, 4
Structured planning	Students can plan and organize an efficient learning system	2,6,9	12, 13, 16
Using clear sources	Students can determine and use resources effectively for learning	5, 15, 10	8, 7, 20
Sensitive to feedback	Students actively participate in every learning activity	11, 14	17, 18

Data Analysis

The analysis of the science process skills and self-regulation was carried out in two ways, namely as follows: (1) descriptive statistical analysis was carried out by describing the data from the test results of science process skills and self-regulation. Furthermore, the analysis of science process skills and self-regulation was carried out using the Normalized Gain Score (N-Gain) test. The use of the N-Gain score test can describe the extent of the influence of the inquiry interactive demonstration model in improving students' science process skills and self-regulation. The N-gain value refers to the interpretation of the data which can be seen in Table 3; (2) inferential statistical analysis consists of prerequisite test and hypothesis testing. Analysis of science process skills and self-regulation through qualitative data converted to quantitative data.

Table 3. Interpretation of n-gain value

Large N-gain Value	Interpretation
N-gain < 0.3	Low
0.3 < N-gain < 0.7	Medium
N-gain ≥ 0.7	High

Inferential statistical analysis of the data results of science process skills and self-regulation consisted of prerequisite tests and hypothesis testing. The Prerequisite testing and hypothesis testing in this study used the IBM SPSS Statistic 26 application. Statistical analysis is carried out by first conducting a prerequisite test analysis to determine whether the data obtained will be processed using parametric or non-parametric statistics. The prerequisite test in this study consisted of a normality test using Kolmogorov Smirnov test, while the homogeneity test used the Variance-Covariance Matrix and the Homogeneity test of Variance. Statistical test using Multivariate Test (Manova) using a significance level of 5%. The following assumptions of hypothesis test on the science process skill and self-regulation:

H_0 : There is no effect of the inquiry interactive demonstration model on the improvement of students' science process skills and self-regulation.

H_a : There is an effect of the inquiry interactive demonstration model on the improvement of students' science process skills and self-regulation.

■ RESULT AND DISCUSSIONS

Validity and Reliability

Validation was carried out using validity tests, reliability tests, difficulty tests, and discriminatory tests with the help of the AnatesV4-New application. The results of the validity test can be seen in Table 4.

Table 4. Data validity test results

Description	Number of items valid	Amount items
Valid	1, 2, 4, 6, 7, 9, 12, 14, 16, 19, 20, 22, 23, 26, 28, 30, 31, 34, 39, 40	20
Not valid	22, 23, 26, 28, 30, 31, 34, 39, 40	20
Amount items		40

Based on Table 4, the results of the validity of the science process skills instrument items obtained 20 items that were declared valid, while the invalid items were 20. Items that had been declared valid could be used as learning evaluations, while invalid questions were declared unable to be used for learning evaluation. The reliability test in this study used Cronbach's Alpha calculation. The result of the reliability with Cronbach's Alpha calculations yield .860 > .665, so it can be concluded that the instrument items are consistent. The results of the difficulty test on the science process skills test instrument obtained 5 items (high difficulty), and 35 items (medium difficulty), while the results of the discriminatory test on the science process skills test instrument obtained 5 items (very good), 16 items (good), 10 items (medium), 7 items (low), and 3 items (very low). Based on the results of the validity test, reliability test, difficulty level test, and discriminatory power test, the items used were 20 items out of 40 items as an instrument test of science process skill.

Science Process Skills

The measurement of science process skills is carried out in two ways, namely tests and observation sheets. Measurement of science process skills is given to students at the beginning and end of learning to determine improvement. The results of students' process skills before and after learning can be seen in Table 5.

Table 5. The statistical descriptive results of science process skills

Description	Control Class		Experimental Class	
	Pretest	Posttest	Pretest	Posttest
Amount Sample	31	31	31	31
Average	47.41	66.93	49.03	83.38
Category	Very Low	Medium	Very Low	High

Based on Table 5, shows that in the results of the science process skills pretest there is no significant difference in scores between the experimental class and the control class. In the experimental class, the pretest score got 49.03 (very low), while the control class got a score of 47.41 (very low). This can be interpreted that the initial ability of students in science process skills is still relatively low because it has not been prioritized. The low pretest in the experimental class and control class was caused by several factors, including rarely doing practicum and doing questions on the types of science process skills. In addition to the pretest, a posttest was also conducted to see the improvement of science process skills after being given treatment in the form of an interactive inquiry demonstration learning model. In the posttest, there is a difference between the experimental class and the control class (Table 5). The experimental class scored 83.38 (high), while the control class scored 66.93 (medium), so it can be interpreted that the inquiry interactive demonstration learning model conducted in the experimental class is more helpful for students in mastering science process skills compared to using lecture and demonstration methods (method conventional) conducted in the control class. Another factor is caused by the model or learning method used at the time of learning that has not facilitated students to develop science process skills. This is in accordance with the results of research conducted Harahap et al., (2019), stating that one of the factors causing the low science process skills of students is because in general teaching and learning activities still use traditional (conventional) learning. Meanwhile, there is a comparison of the pretest scores for the indicators of science process skills between the experimental class and the control class. The comparison of the pretest scores of indicators of science process skills in the experimental class and control class is presented in Figure 1.

Based on Figure 1, shows that students in the experimental class and control class already have science process skills. However, the science process skills possessed by the two classes are

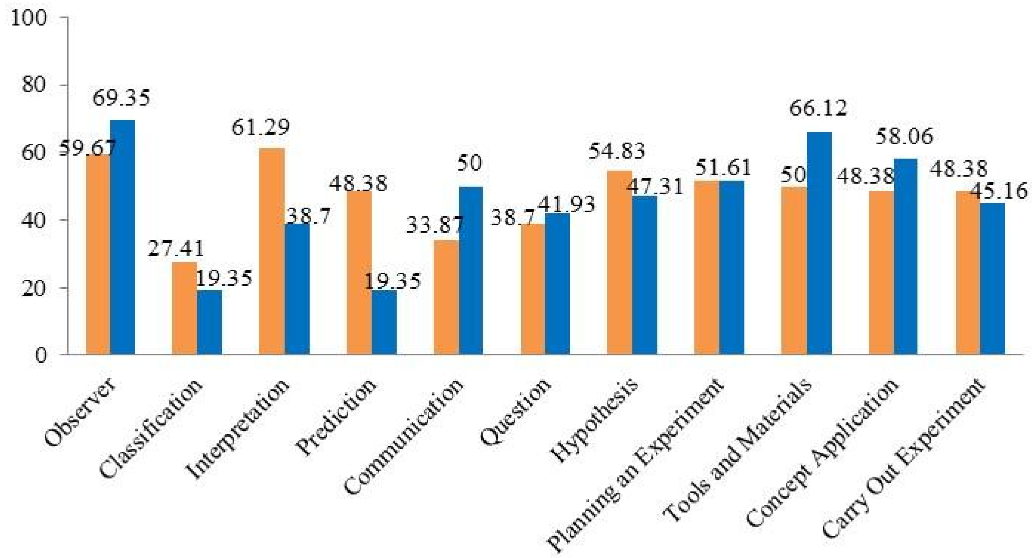

Figure 1. The comparison of the pretest scores of indicators of science process skills in the experimental class (blue) and control class (orange)

categorized as very low so they have met the requirements to be treated with the application of an interactive inquiry demonstration model. In addition, there are differences in the posttest scores of indicators of science process skills in the experimental class and the control class. The comparison of the posttest scores of indicators of science process skills in the experimental class and control class is presented in Figure 2.

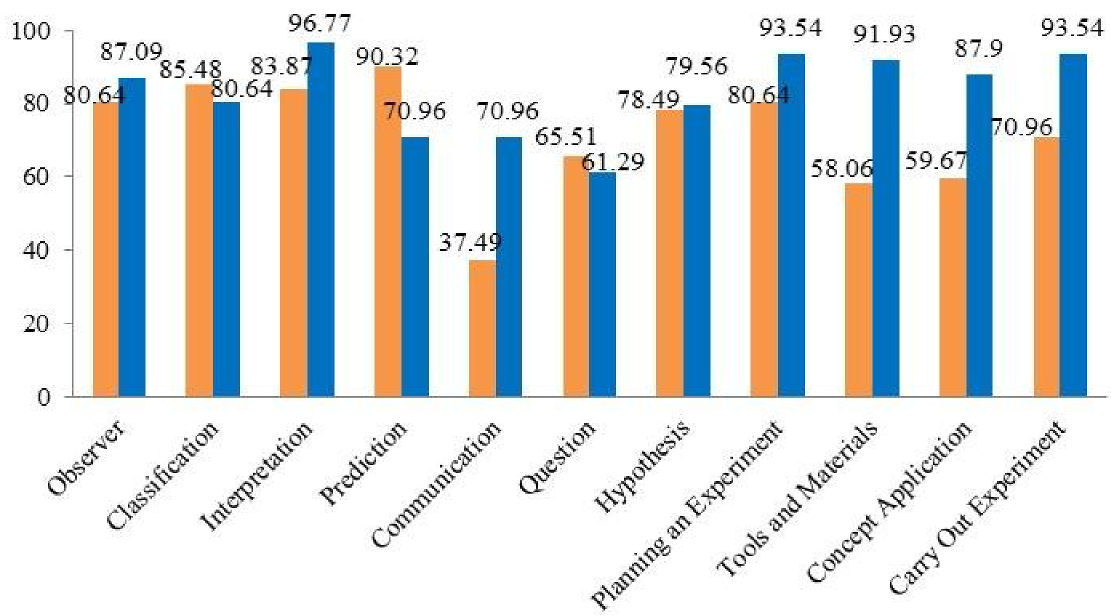

Figure 2. The comparison of the posttest scores of indicators of science process skills in the experimental class (blue) and control class (orange).

Based on Figure 2, shows that there is an increase in science process skills in terms of the posttest results in the experimental class and the control class. In the experimental class, the interpretation indicator was higher with a score of 96.77 (high). This is because in the Inquiry model there are observation activities so that students have gained knowledge. After making observations, students use the observations they get to make conclusions from a learning activity. This is following the results of research conducted by Ghumdia, & Adams (2016), that the inquiry-based learning method is more effective in increasing the achievement of students' science process skills compared to the lecture method, so it can be stated that the inquiry interactive demonstration learning model is better than using the lectures and demonstrations method.

The use of N-Gain test analysis in research is useful to determine the difference in the improvement of students' science process skills between the experimental class and the control class. The results of the N-Gain score of science process skills in the experimental class and control class are presented in Table 6, while the difference in the N-Gain score of the science process skills indicator in the experimental class and control class is presented in Figure 3.

Table 6. The results of the N-Gain score of science process skills in the experimental class and control class

Description	Control Class	Experimental Class
Amount Sample	31	31
N-Gain Average	0.34	0.66
Category	Medium	Medium

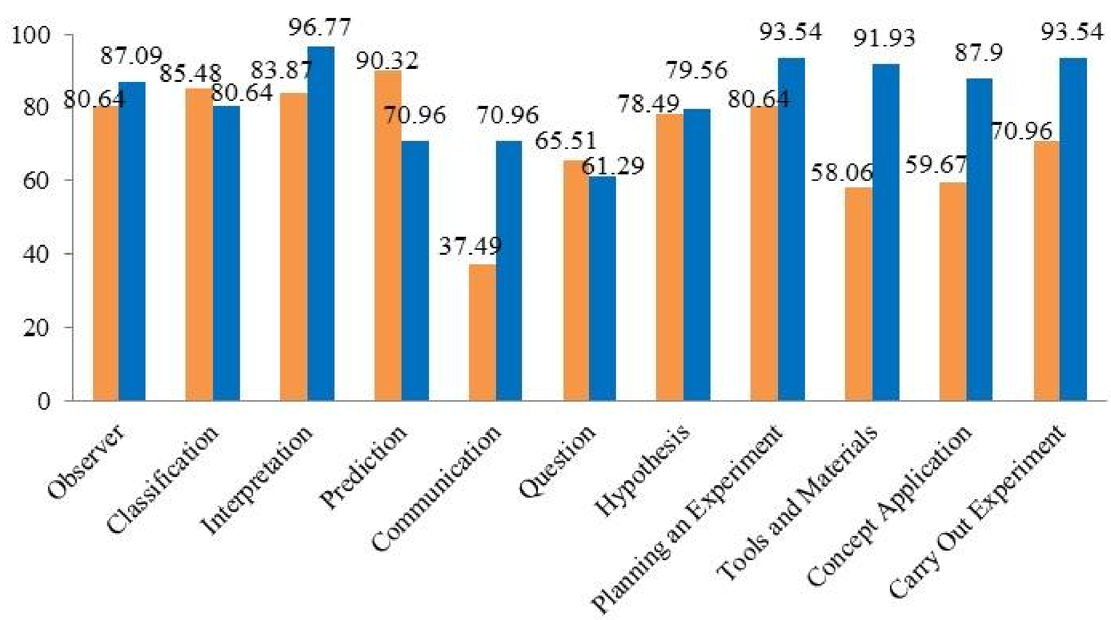

Figure 3. The comparison of the N-Gain scores of indicators of science process skills in the experimental class (blue) and control class (orange)

Based on Table 6, the N-Gain value obtained by the experimental class is 0.66 (high), while the control class is only obtained by 0.34 (medium). The average value of N-gain was higher in the experimental class compared to the control class. This is following research Rahmat & Suhandi (2017), which states that the application of an inquiry interactive demonstration learning model approach can improve students' science process skills. In addition, there are differences in the results of the N-Gain score, an indicator of science process skills in the experimental class and the control class (Figure 3). In the experimental class, the highest N-Gain score achieved by the interpretation indicator is 0.94 (high), while in the control class is 0.58 (medium). This is because students are emphasized to be able to conclude the results of learning activities through practical activities. Inquiry model with the help of practicum activities, students can identify and make observations so that they can conclude the results of activities well. The person will have skill if the person trains it through practical activities. Likewise, students' science process skills will increase if they have the experience to perform or practice these skills (Juhji & Nuangchalerm, 2020). However, practicum activities are carried out not only to find results but so that students better understand the experiment (Nuzulia et al., 2017). According to Wardani & Susilogati (2015), laboratory activities that are carried out continuously will become a habit to develop self-potential to be more optimal in students' science process skills.

Self Regulation

Self-regulation analysis is given to students at the beginning and end of learning using a self-regulation indicator questionnaire instrument. The results of students' self-regulation before and after learning can be seen in Table 7.

Table 7. The statistical descriptive results of self-regulation

Description	Control Class		Experimental Class	
	Pretest	Posttest	Pretest	Posttest
Amount Sample	31	31	31	31
Average	70.76	75	69.83	79.31
Category	Medium	Medium	Medium	High

Based on Figure 3, the average value of the pretest in the experimental class and the control class is in the high category which indicates that self-regulation has occurred in that class. Not significantly different from the pretest value between the experimental class and the control class. The pretest value in the experimental class was 69.83 (medium) and the control class was 70.76 (medium). So that the average value of the pretest in the experimental class and control class is in the high category which indicates that there has been self-regulation in the class. In addition, there are differences in the results of the posttest self-regulation between the experimental class and the control class. In the experimental class, the average posttest score was higher than the control class. The experimental class obtained an average posttest score of 79.31 (high), while the control class obtained 75 (medium). So it can be said that the experimental class by being given an inquiry interactive demonstration learning model can improve students' self-regulation compared to the conventional class. The comparison of the pretest and posttest scores of indicators of self-regulation in the experimental class and control class is presented in Table 9.

Meanwhile, there is a comparison of the pretest scores for the indicators of self-regulation between the experimental class and the control class. The comparison of the pretest scores of indicators of self-regulation in the experimental class and control class is presented in Figure 4.

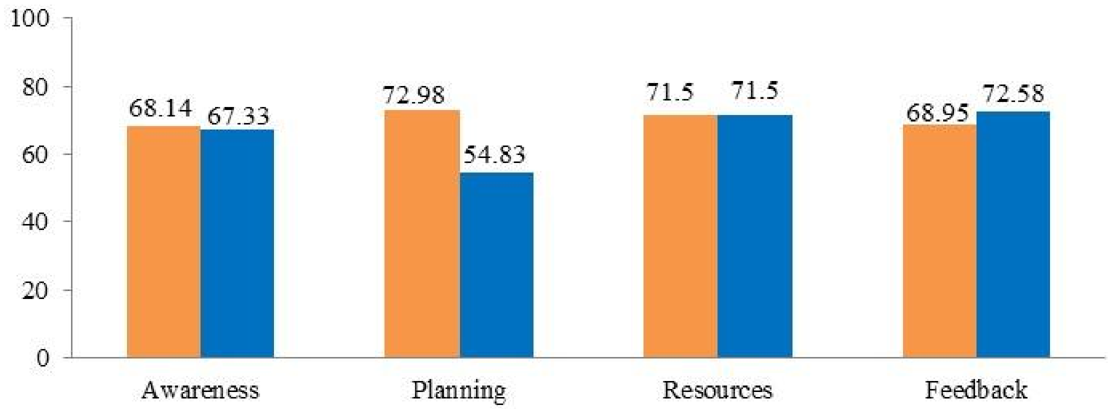

Figure 4. The comparison of the pretest scores of indicators of self-regulation in the experimental class (blue) and control class (orange)

Based on Figure 4, shows that students in the experimental class and control class already have self-regulation. However, the self-regulation possessed by the two classes is categorized as very low so they have met the requirements to be treated with the application of an interactive inquiry demonstration model. In addition, there are differences in the posttest scores of indicators of self-regulation in the experimental class and the control class. The comparison of the posttest scores of indicators of self-regulation in the experimental class and control class is presented in Figure 5.

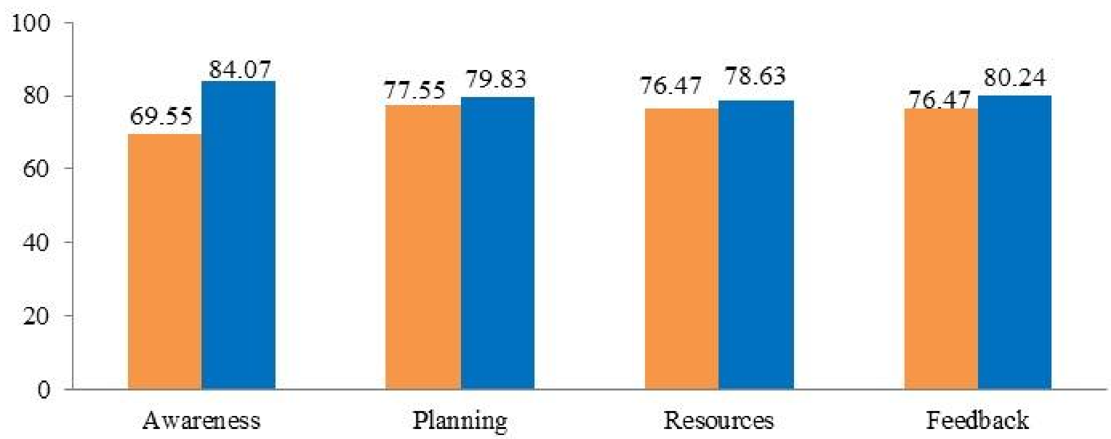

Figure 5. The comparison of the posttest scores of indicators of self-regulation in the experimental class (blue) and control class (orange)

Based on Figure 5, the difference in the value of self-regulation indicators in the experimental class and control class increased in the posttest. Overall, self-regulation indicators The experimental class is superior to the control class in the posttest score section. The posttest average value of the awareness indicator in the experimental class was higher than in the control class. In the experimental class, the highest self-regulation indicator was achieved by the awareness indicator of 84.07 (high), while the control class obtained a score of 69.55 (medium). In the interactive inquiry demonstration model, there are practicum activities, discussions, and presentations of students who can realize their own thoughts for learning, plan on time, do school assignments at home, prepare relevant information, read books before the learning process and improve the quality value on the daily tasks of students. This is following the statement of Wenning & Khan (2011), which states that the advantage of the inquiry interactive demonstration learning model is that students can think scientifically (Science) and tend to think about the material being taught because the material has been presented. In front of the eyes in a concrete way, and students can manage a good learning system to create a good awareness. Find out the difference in the improvement of students' self-regulation between the experimental class and the control class, an analysis was carried out using the N-Gain test on self-regulation. The results of the N-Gain score of self-regulation in the experimental class and control class are presented in Table 8, while the difference in the N-Gain score of the self-regulation indicator in the experimental class and control class is presented in Figure 6.

Table 8. The results of the N-Gain score of self-regulation in the experimental class and control class

Description	Control Class	Experimental Class
Amount Sample	31	31
N-Gain Average	0.11	0.31
Category	Low	Medium

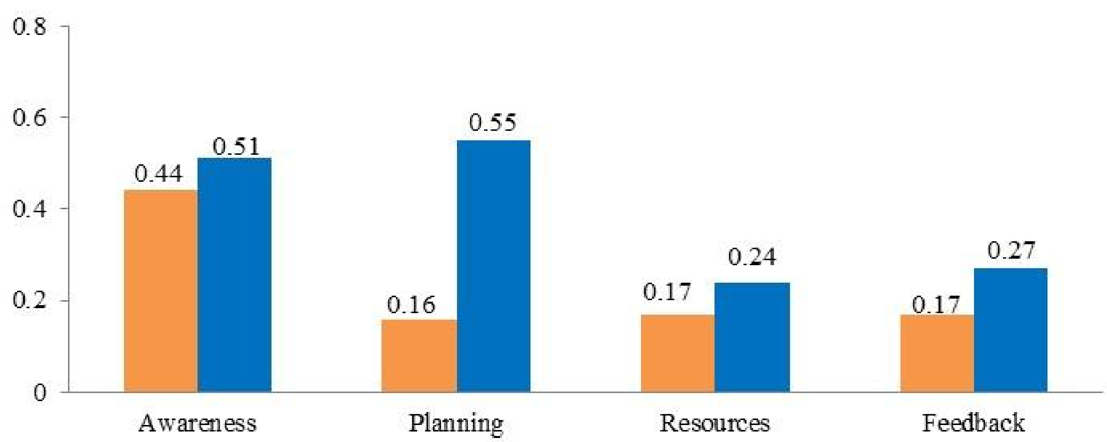

Figure 6. Difference of N-Gain scores of indicators of self-rgulation in in the experimental class (blue) and control class (orange)

Based on Table 8, anda Figure 6, shows that there is an increase in self-regulation in the experimental class and higher than in the control class. The N-Gain value in the experimental class was 0.31 (medium), while the control class was 0.11 (low). This proves that the use of the inquiry interactive demonstration learning model can improve students' self-regulation abilities. Learning using an inquiry interactive demonstration learning model by conducting demonstrations in the form of learning videos and practical activities can improve student self-regulation. In the experimental class, students do practicums, discussions, and presentations students can realize their own thoughts to plan, set strategies, do homework, and prepare information related to learning materials can improve the quality of students' daily tests. This statement is supported by Dewi & Taufik (2020), stating that self-regulation is the ability of individuals to regulate themselves in achieving the desired target so that this ability will affect the processes and results of the efforts carried out by individuals. If the individual can manage himself well, then he will get the results following the target. Conversely, if the individual cannot manage himself properly, then the desired target will not be achieved.

Normality Test and Homogeneity Test Result

The data of science process skills and self-regulation were then analyzed using the analysis technique of the Multivariate Test (Manova Test). Normality test using Kolmogorov-Smirnov test. The results of the normality of science process skills for the N-gain in the experimental class and control class obtained the value of sig. 0.200 from Kolmogorov-Smirnov of > 0.05, while the results of the normality of self-regulation for N-gain in the experimental class obtained a sig value. 0.688, and the control class obtained a sig value of 0.078 from Kolmogorov-Smirnov of > 0.05. Therefore, the research data obtained comes from the normally distributed population.

Meanwhile, The results of the homogeneity test used the Variance-Covariance Matrix obtained the value of sig. 0.579 from the homogeneity test of > 0.05 can be concluded that the data is homogeneous. The results of the homogeneity test using the Homogeneity of Variance test on science process skills obtained the value of sig. 0.881 from the homogeneity test > 0.05, and the results of the Homogeneity of Variance test on self-regulation obtained the value of sig. 0.222 from the homogeneity test > 0.05 can be concluded that the data is homogeneous.

Multivariate Statistical Test

The results of the normality test and homogeneity test data is normally distributed and homogeneous, so it was continued to the parametric testing stage using the Multivariate Test. The results of the Multivariate Test and the between-subjects effect test on science process skills and self-regulation obtained sig. 0.000 (2-tailed) d" á 0.05, then H_a is accepted, and H_0 is rejected. Hypothesis testing using a multivariate test and a between-subjects effect test showed that the use of an inquiry interactive demonstration learning model could improve students' science process skills and self-regulation. This can be interpreted that the treatment given to the experimental class in the form of inquiry interactive demonstration learning model affects the mastery of science process skills. According to Noviani (2019), the use of inquiry interactive demonstration learning model during the learning process takes place the teacher guides and trains students to develop and master science process skills.

Learning with the inquiry model provides opportunities for students to find and investigate concepts procedurally, systematically, and interrelated from one concept to another. at the level of junior high school, students need guidance in exploring a phenomenon to get a concept. This statement is supported by Abdi (2014). stating that the use of this model will foster intrinsic motives because students will feel satisfied with their own experiences in learning and inquiry learning is also very suitable for material that is cognitive, but requires a lot of time and if it is not directed and directed will not clear the material being studied. In general, this learning will develop science process skills and student learning outcomes to a certain level of expectation (Af'idayani et al., 2018).

In addition, inquiry interactive demonstration learning model can enhance self-regulation (Table 8). During the learning process in the experimental class, students are motivated to learn actively, manage time well and collect relevant information for learning resources so that they can organize learning strategies well to solve problems because the advantages of the inquiry interactive demonstration learning model are to make students the center of learning and tend to solve the problem presented. Thus, students can regulate self-regulation well. This statement is supported by Marhayati et al., (2021), which state that self-regulation is the ability to regulate behavior and implement such behavior as a strategy that affects one's performance in achieving learning goals.

The results also found that there is a relationship between self-regulation and science process skills, indicating that self-regulation can help students improve learning outcomes in the form of science process skills. This statement is supported by Hapidoh et al., (2019), which state that the higher the self-regulation possessed by students, the higher the learning outcomes obtained. In addition, according to Harizah et al., (2020), the advantage of the inquiry interactive demonstration learning model is that it makes it easier for students to think scientifically.

CONCLUSIONS

Based on the results of research conducted on the effect of the inquiry interactive demonstration learning model on students' science process skills and self-regulation, it can be concluded that there is an increase in science process skills and self-regulation through the inquiry interactive demonstration learning model. The achievement of science process skills and self-regulation of students in the experimental class was higher than in the control class. This is because the using inquiry interactive demonstration learning model can train scientific skills, facilitate scientific activities, and help students for management in learning. The researcher suggests applying the inquiry interactive demonstration learning model to other science materials so that it can help students develop science process skills and reduce difficulties in other science learning materials.

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