

Project-Based Learning Model to Improve Student Learning Outcomes for 8th Grade 4 SATAP Kismantoro Wonogiri

Aries Nugraheni¹, Wiedy Murtini², Harini³

¹Post Graduate Student of Economic Education Universitas Sebelas Maret Surakarta, Indonesia

^{2,3}Post Graduate Lecturer of Economic Education Universitas Sebelas Maret Surakarta, Indonesia

¹nugraheni.aries[at]gmail.com

²wiedymurtini[at]staff.uns.ac.id

³harini_uns[at]yahoo.com

Abstract: *This study aims to determine the effectiveness of the project-based learning model in improving student learning outcomes in class VIII SMP 4 SATAP Kismantoro Wonogiri. This study used a quasi-experimental design with a non-equivalent group. The research subjects were 42 class VIII students, which were divided into 17 control class students and 25 experimental class students. The data analysis used was descriptive data analysis, paired simple t-test, independent t-test and N-Gain scores. The results showed that the project-based learning model could significantly improve the learning outcomes of class VIII students of SMP 4 SATAP Kismantoro. However, it still has not shown a high level of effectiveness in its implementation. Therefore, there is a need for further research, for the variables that influenced of implementation project based learning model.*

Keywords: PjBL model; learning outcomes; IPS

1. Introduction

The impact of the COVID-19 pandemic demands changes in all aspects of life, including education. Online education is a new alternative method for implementing classroom learning (Anugrahana, 2020; Novitasari, 2021). Internet networks, data packages, and laptop or mobile phone facilities are prerequisites for achieving the learning process (Sadikin and Hamidah, 2020). The change in the form of learning from face-to-face to online requires every teacher to innovate looking for methods, relevant media (Yantoro, et al. 2021), and of course that can force learning to run effectively and efficiently.

Online learning requires students to be fully involved in the learning process (Cord, 2001; Thomas and Michaelson; 1999). Understanding the material, discussing, doing assignments, is done by students using the help of the internet network. If you refer to the student center of learning paradigm, during a pandemic it is the best condition, while the teacher's function is as a pure facilitator. Students become learners who are able to reconstruct learning independently (BIE, 1999).

Project Based Learning (PjBL) Learning Model, generally trains students to learn independently. The principles of project-based learning are (1) students can manage their own learning (BIE, 1999); (2) students can innovate on their own (Cord, 2001; Thomas, Margendoller, & Michaelson 1999); (3) students are creative in thinking (Berenfeld, 1996; Marchaim, 2001; and Asan, 2005); (4) students are more active in learning (Gaer, 1998); (5) students are interested and motivated (Sukmana, and Amalia, 2021); (6) students feel challenged in the learning process; and (7) students have a broad view (Djamarah and Zain, 2013). Based on the depth of the concepts described, it can be said that the project-

based learning model is very relevant to be used in any conditions, including during the Covid-19 pandemic, or in conditions of distance learning.

The successful implementation of Project Based Learning (PjBL) in improving student learning outcomes in schools is applied (Thomas; 2000; Baran&Maskan, 2010; Ardhian, 2016; Anjarini, 2017; Maula, 2014; Munawaroh, et al. 2012; Hayati, Supardi, and Miswadi, 2013; Hayati, 2016). In addition, the project-based learning model also significantly increases students' creative thinking (Purworini, 2006; Afriana, Permanasari, & Fitriani 2016; Furi Indah, Sri Handayani, and Shinta Maharani, 2018; FitriHikmatul, Dasna, Suharjo, 2018); increase student motivation (Dooplet, 2003; Holm, 2011), besides that it is also able to increase aspects of independence, cooperation (Pratiwi Ari, Sekar and Kanzunudin, 2018), affective aspects (Cook & Roger, 2012; Movahedzadeh& Gonzales, 2012) and aspects of psychomotor mastery (Wiyarsi and Patana, 2009).

The developing context is not in line with the reality at SMP 4 SATAP Kismantoro. Based on the initial data related to the problems of the learning process, the impact on students' failure to achieve the minimum standard of value. Class VIII A and class VIII B, which totaled 42 children, were in the range of 59% getting equal scores even some children scored below the KKM on cognitive competence, and another 41% were in the range above the KKM. In other words, there is a sharp gap in the knowledge competence of class VIII 4 SATAP Kismantoro students. The influencing factors include the lack of self-study motivation, and the lack of individual infrastructure, thus affecting the motivation to solve learning problems on their own.

Distance learning be an alternative, by using adequate infrastructure. Internet networks, data packages, mobile

phones or laptops are serious obstacles in carrying out distance learning (online). This study examines the effectiveness of the project-based learning model (PjBL) at SMP Satap 4 Kismantoro Wonogiri towards improving the learning outcomes of 42 class VIII students.

2. Research Methods

Research design

This study used a quasi-experimental research design (McMillan and Schumacher, 2001). Creswell (2010) argues that quasi-experimental or quasi-experimental is "Quasi-experimental designs do not include the use of random assignment. Researchers who employ these designs rely instead on other techniques to control (or at least reduce) threats to internal validity. The type of quasi-experimental in this research is the Nonequivalent Control Group Design. According to Creswell (2010: 132), Nonequivalent (Pretest and Posttest) Control Group Design are: In this design, a popular approach to quasi experiments, the experimental group A and the control group B are selected without random assignment. Both group took a pretest and posttest, and only the experimental group received the treatment.

The design of the experimental group and control group can be explained from table 1.

Table Research Design Non-equivalent Control Group Design

Group	Pretest	Treatment	Posttest
Experimental Group (A)	O1	X	O2
Control Group (B)	O3	-	O4

(Sources: Cammbell, Donald T., and Julian C. Stanley. 1963, in Sugiyono, 2011; Hartono, 2019; Fenti; 2017)

Information:

O = pretest result of experimental class and control class

O2 = experimental class posttest results

O3 = control class pretest result

O4 = control class posttest result

X = treatment in the form of project-based learning

Sample

The sample used in this study was grade 8 students of SMP 4 SATAP Kismantoro for the 2020/2021 academic year, totaling 42 people. Sampling was obtained based on the learning outcomes data for class VIII A and class VIII B, with the characteristics of learning outcomes showing those below the KKM (65) to 70 being the experimental class, while those with learning outcomes above 85-90 being the control class.

Table 2: Distribution of Class VIII Learning Outcomes

Learning outcomes	< 65-70	>65 (80-100)
Class VIII A	10	11
Class VIII B	15	6
Amount	25	17

(Source: Student Results Data for Class VIII Odd Semesters)

Data analysis

Paired Sample t-test

The paired sample t-test was conducted to find a comparison of the data before and after the data from the experimental

group. The paired sample t-test was carried out using the formula:

$$t = \frac{Md}{\sqrt{\frac{\sum x^2 d}{n(n-1)}}}$$

Information:

d1 = the difference between the scores after and the scores before from each subject

Md = mean of gain (d)

xd = deviation of the gain score to the mean (xd = di-Md)

x2d = the number of deviations of the gain score to the mean

n = number of samples (research subjects)

Test Independent sample t-test

Independent sample t-test was conducted to determine the comparison of data between two sample groups, between the experimental group and the control group. Independent sample t-test was conducted using the formula:

$$t = \frac{\bar{X}_1 - \bar{X}_2}{s_{gab} \sqrt{\left(\frac{1}{N_1}\right) + \left(\frac{1}{N_2}\right)}}$$

with

$$s_{gab} = \sqrt{\frac{(n_1-1)s_1^2 + (n_2-1)s_2^2}{n_A + n_B - 2}}$$

(Source: Sugiyono, 2017)

Information:

\bar{X}_1 = Average score of the experimental group

\bar{X}_2 = Average score of control group

S_1^2 = Variant value of the experimental group

S_2^2 = Value of variance of control group

N_1 = Number of samples of the experimental group

N_2 = Number of samples in the control group

s_{gab} = combined standard deviation

N-Gain Score Test

The gain test is to see the increase in cognitive learning outcomes in the experimental class project-based learning model. The effectiveness of skills learning outcomes and cognitive learning outcomes was determined after the experimental class treated the project-based learning model. Gain Score test is determined by the following formula:

$$N \text{ gain} = \frac{\text{skor Posttest} - \text{Skor Pretest}}{\text{Skor Ideal} - \text{Skor Pretest}}$$

The category of obtaining the N-Gain Score assessment can be determined based on the acquisition of the N-Gain value or from the N-Gain value in the form of percent (%). The N-Gain value is obtained based on the following table:

Table 3: N-Gain Value

N-Gain Value	Category
$g > 0.7$	Tall
$0.3 \leq g < 0.7$	Currently
$g < 0.3$	Low

(Source: Melzer, 2008)

3. Results

The distribution of descriptive statistics on student learning outcomes of class VIII SMP 4 SATAP Kismantoro from two classes, namely the experimental class and the control class is as follows can be seen in Table 4.

Table 4. Descriptive Results of Learning Outcome Analysis

	PREEX	POSTEKS	PRECON	POSTCON
Minimum value	57	80	86	88
Maximum value	67	88	94	96
median	64.00	86.00	88.00	93.00
Std. Deviation	2,361	1,823	2,322	3.100
Average	63.92	85.36	88.53	91.88

Based on the descriptive results by SPSS 22, it showed that there was a significant increase in the learning outcomes of the eighth grade students of SMP 4 SATAP Kismantoro, from the pre-test cycle with an average of 63.92, increasing to 85.36. While in the control class there was no significant increase.

Table 6: Paired Samples Test

	CLASS	Paired Differences					t	df	Sig. (2-tailed)
		mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
					Lower	Upper			
Pair 1	PREEKS - POSTEKS	-21.44000	2.46779	.49356	-22.45865	-20.42135	-43.440	24	.000
Pair 2	PRECON - POSTCON	-3.35294	2.02920	.49215	-4.39626	-2.30962	-6.813	16	.000

(Source: SPSS 22 data processing)

Based on data processing using SPSS 22, learning outcomes from the pre-test, post-test from the experimental class, and pre-test, post-test control class showed significant because the resulting sig value < 0.005 . Thus the project-based learning method is significant in improving the learning outcomes of class VIII students of SMP 4 SATAP Kismantoro in the subject of economic actors.

Table 6: Independent Samples Test

Results	Levene's Test for Equality of Variances	t-test for Equality of Means								
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
Equal variances assumed	17,943	.000	-8,587	40	.000	-6.522	.760	-8.057	-4.987	
Equal variances not assumed			-7.805	23,542	.000	-6.522	.836	-8,249	-4.796	

(Source: SPSS 22 data processing)

Based on the results of the independent t-test analysis, it shows that there is a significant difference in the experimental class post-test learning outcomes and the control class post-test learning outcomes, with a significance < 0.05 (r count < 0.05). However, the resulting differentiation between the experimental class and the control class showed a significant difference, with a difference of 17%. Thus, it

Normality test

Normality test is a test carried out with the aim of assessing the distribution of data in a group of data or variables, whether the distribution of the data is normally distributed or not. Normality test is useful for determining the data that has been collected is normally distributed or taken from a normal population.

Table 5: Normality Test

	CLASS	Kolmogorov-Smirnova			Shapiro-Wilk		
		Statistics	df	Sig.	Statistics	df	Sig.
Results	PRE_EX	.156	25	.117	.907	25	.026
	POST-EX	.157	25	.112	.909	25	.028
	PRE_CONT	.178	17	.154	.878	17	.030
	POST_CONT	.236	17	.013	.827	17	.005

(Source: SPSS 22 data processing)

Based on the results of data analysis using SPSS22, it shows that the distribution of learning outcomes data is normal, because the results of the sig in the table show > 0.05 . In other words, it is feasible to use in the paired simple t-test process.

Paired Sample t-test

Paired sample t-test was used to find differences in the average learning outcomes of class VIII students of SMP 4 SATAP Kismantoro. The paired simple t-test was carried out after the data distribution was normal.

Independent t-test

Independent t-test was used to find differences in learning outcomes between the two classes, both the control class and the experimental class. The difference was made from the results of the post-test experimental class and post-test control class.

can be said that the project-based learning model has a significant advantage in improving the learning outcomes of class VIII students of SMP 4 SATAP Kismantoro in the subject of economic actors.

N-Gain Score

The N-Gain score is used to measure the effectiveness of the project-based learning model in two different classes, namely the control class and the experimental class.

Table 7: N-Gain Score

Results	Experiment class	Control class
Average	59.3706	30.0194
Minimum	45.95	60.00
Maximum	69.23	.00

Based on the results of the n-gain test, the score shows that the average N-gain score for the experimental class is 59.3%, in other words that the project-based learning model is not effective enough or moderately effective in improving the learning outcomes of class VIII students. SMP 4 SATAP Kismantoro. But the control class showed a low effective level.

4. Discussion

The project-based learning model implemented in class VIII of SMP 4 SATAP Kismantoro Wonogiri in general can be concluded to be able to significantly improve learning outcomes, both from descriptive tests, paired simple t-tests, and independent t-tests. However, the N-Gain score still shows a moderate level in the experimental class and low in the control class. The significant increase in learning outcomes is in line with research conducted by Ardhian, (2016); Anjarini, (2017); Maula, (2014); Munawaroh, (2012). However, it is also necessary to develop other variables such as students' creative thinking (Purworini, 2006; Afriana, Permanasari, & Fitriani 2016; Furi Indah, Sri Handayani, and Shinta Maharani, 2018; Fitri Hikmatul, Dasna, Suharjo, 2018); student motivation (Dooplet, 2003; Holm, 2011), independence, cooperation (Pratiwi Ari, Sekar and Kanzunnudin, 2018), affective (Cook & Roger, 2012; Movahedzadeh & Gonzales, 2012) and psychomotor aspects (Wiyarsi and Patana, 2009), students' concern for the environment (Oktavian and EnokMaryani, 2015; Kılınç, 2010; Tseng & Chan, 2013), students' ability to solve problems (Afriana et al., 2016; Lestari, Sarwi, & Sumarti, 2018; Mutakinati, Anwari, & Yoshisuke 2018), improve students' ability to write scientific papers (Probosari, RM, 2015), so that the N-gain score obtained has a high level value. Thus, it can be said that the project-based learning model has a high level of effectiveness if the implementation of the variables is carried out thoroughly, not only in the learning outcome variables, but must be implemented in other variables. Sekar and Kanzunnudin, 2018), affective (Cook & Roger, 2012; Movahedzadeh & Gonzales, 2012) and psychomotor aspects (Wiyarsi and Patana, 2009), students' concern for the environment (Oktavian and EnokMaryani, 2015; Kılınç, 2010; Tseng & Chan, 2013), students' ability to solve problems (Afriana et al., 2016; Lestari, Sarwi, & Sumarti, 2018; Mutakinati, Anwari, & Yoshisuke 2018), improve students' ability to write scientific papers (Probosari, RM, 2015), so that the N-gain score obtained has a high level value. Thus, it can be said that the project-based learning model has a high level of effectiveness if the implementation of the variables is carried out thoroughly, not only in the learning outcome variables, but must be implemented in other variables. Sekar and

Kanzunnudin, 2018), affective (Cook & Roger, 2012; Movahedzadeh & Gonzales, 2012) and psychomotor aspects (Wiyarsi and Patana, 2009), students' concern for the environment (Oktavian and EnokMaryani, 2015; Kılınç, 2010; Tseng & Chan, 2013), students' ability to solve problems (Afriana et al., 2016; Lestari, Sarwi, & Sumarti, 2018; Mutakinati, Anwari, & Yoshisuke 2018), improve students' ability to write scientific papers (Probosari, RM, 2015), so that the N-gain score obtained is of a high level value. Thus, it can be said that the project-based learning model has a high level of effectiveness if the implementation of the variables is carried out thoroughly, not only in the learning outcome variables, but must be implemented in other variables. Movahedzadeh & Gonzales, 2012) and psychomotor aspects (Wiyarsi and Patana, 2009), students' concern for the environment (Oktavian and EnokMaryani, 2015; Kılınç, 2010; Tseng & Chan, 2013), students' ability in problem solving (Afriana et al., 2016; Lestari, Sarwi, & Sumarti, 2018; Mutakinati, Anwari, & Yoshisuke 2018), improving the ability to write scientific papers in students (Probosari, RM, 2015), so that the N-gain score obtained is of a high level. Thus, it can be said that the project-based learning model has a high level of effectiveness if the implementation of the variables is carried out thoroughly, not only in the learning outcome variables, but must be implemented in other variables. Movahedzadeh & Gonzales, 2012) and psychomotor aspects (Wiyarsi and Patana, 2009), students' concern for the environment (Oktavian and EnokMaryani, 2015; Kılınç, 2010; Tseng & Chan, 2013), students' ability in problem solving (Afriana et al., 2016; Lestari, Sarwi, & Sumarti, 2018; Mutakinati, Anwari, & Yoshisuke 2018), improving the ability to write scientific papers in students (Probosari, RM, 2015), so that the N-gain score obtained is of a high level. Thus, it can be said that the project-based learning model has a high level of effectiveness if the implementation of the variables is carried out thoroughly, not only in the learning outcome variables, but must be implemented in other variables. students' concern for the environment (Oktavian and EnokMaryani, 2015; Kılınç, 2010; Tseng & Chan, 2013), students' ability in problem solving (Afriana et al., 2016; Lestari, Sarwi, & Sumarti, 2018; Mutakinati, Anwari, & Yoshisuke 2018), improve the ability to write scientific papers in students (Probosari, RM, 2015), so that the N-gain score obtained is of a high level. Thus, it can be said that the project-based learning model has a high level of effectiveness if the implementation of the variables is carried out thoroughly, not only in the learning outcome variables, but must be implemented in other variables. students' concern for the environment (Oktavian and EnokMaryani, 2015; Kılınç, 2010; Tseng & Chan, 2013), students' ability in problem solving (Afriana et al., 2016; Lestari, Sarwi, & Sumarti, 2018; Mutakinati, Anwari, & Yoshisuke 2018), improve the ability to write scientific papers in students (Probosari, RM, 2015), so that the N-gain score obtained is of a high level. Thus, it can be said that the project-based learning model has a high level of effectiveness if the implementation of the variables is carried out thoroughly, not only in the learning outcome variables, but must be implemented in other variables. Yoshisuke 2018), improve the ability to write scientific papers in students (Probosari, RM, 2015), so that the N-gain score obtained is of a high level. Thus, it can be said that the project-based learning model has a high level of

effectiveness if the implementation of the variables is carried out thoroughly, not only in the learning outcome variables, but must be implemented in other variables. Yoshisuke (2018), improve the ability to write scientific papers in students (Probosari, RM, 2015), so that the N-gain score obtained is of a high level. Thus, it can be said that the project-based learning model has a high level of effectiveness if the implementation of the variables is carried out thoroughly, not only in the learning outcome variables, but must be implemented in other variables.

5. Conclusion

The project-based learning model implemented in class VIII of SMP 4 SATAP Kismantoro Wonogiri in particular can be concluded to be able to significantly improve learning outcomes, both from descriptive tests, paired simple t-tests, and independent t-tests, but has not shown a high level of effectiveness. Therefore, there needs to be further research on other variables that affect the high effectiveness of the project-based learning model.

References

- [1] Ahmad Tanzeh. (2004). *Practical Research Methods*. Jakarta: PT. Science Building.
- [2] Amini, R. (2015). The Influence of the Use of Project Based Learning and Learning Motivation on the Learning Outcomes of Class V Elementary School Students. *Proceedings of the National Seminar on Biology Education*, 4 (2), 339–345.
- [3] Anjarini. (2017). *The Effect of Outdoor Study-Based Project Based Learning (PjBL) Model on Creative Thinking Ability and Ability to Compose High School Geography Scientific Work*. Unpublished Thesis. Malang: Postgraduate UM
- [4] Anugrahana, A. (2020). Barriers, Solutions and Hopes: Online Learning During the Covid-19 Pandemic By Elementary School Teachers. *Scholaria: Journal of Education and Culture*, 10(3), 282-289
- [5] Asan, A & Haliloglu, Z. (2005). Implementing Project Based Learning in Computer Classroom. *The Turkish Online Journal of Educational Technology*. 4 (3)
- [6] Baran, M. & Maskan, A. (2010). The Effect of Project-based learning on pre-service physics teachers' electrostatic achievements. *Cypriot Journal of Educational Sciences*, 5:243-257.
- [7] Berenfeld, B. (1996). Linking Students to The Info-Sphere. *Technology Horizon in Education Journal*. 23, 76-84
- [8] Buck Institute for Education. (1999). *Project Based Learning*. accessed on May 11, 2017 at 15.51 WIB (<http://www.bgsu.edu/organization/elt.proj.html>)
- [9] Cord, (2001). Contextual Learning Resources. <http://www.cord.org>.
- [10] Creswell, JW (2010). *Research Design: Qualitative, Quantitative, and Mixed Approaches*. Yogyakarta: PT PustakaPelajar.
- [11] Creswell, John w. (2009). *Research Design: Qualitative, Quantitative, and Mixed Methods Approaches*. Third Edition
- [12] Djamarah & Zain. (2013). *Teaching and Learning Strategies*. Jakarta: Rineka Cipta.
- [13] Hayati, K.I., Supardi, S.S. Miswadi. (2013). Development of Vocational Science Learning with Project-Based Contextual Models to Improve Students' Learning Outcomes and Science Process Skills. *Indonesian Science Education Journal*. JPII 2 (1) (2013) 53-58
- [14] Biological. (2016). The Effectiveness of Project Based Learning-Based Student Worksheets in Developing Students' Critical Thinking Skills in Geography Subjects. *Journal of Education*. 1(3): 468-474
- [15] LaniMeita Indah Furi, Sri Handayani, and Shinta Maharani. (2018). Experiments with Project Based Learning and Project Based Learning Integrated STEM Learning Models to Improve Student Learning Outcomes and Creativity in Basic Competencies of Milk Processing Technology. *Journal of Educational Research*. 35 (1)
- [16] Lestari, TP, Sarwi, S., & Sumarti, SS (2018). STEM-Based Project Based Learning Model to Increase Science Process and Creative Thinking Skills of 5th Grade. *Journal of Primary Education*, 7(1), 18–24
- [17] LindraNurKhanifah, Mustaji, Nasution. (2019). The Effect of Using Project Based Learning Models and Collaboration Skills on Learning Outcomes of Grade IV Elementary School Students on the Theme of My Goals. *Journal of Basic Education Review: Journal of Educational Studies and Research Results*. 5 (1)
- [18] Marchaim, U. (2001). High School Students Research at Migal Science Institute in Israel. *Journal of Biological Education*, 35 (4)
- [19] Maula. (2014). *The Effect of PjBL (Project Based Learning) on Creative Thinking Ability and Student Learning Outcomes on Environmental Management Materials*. (on line).
- [20] Meltzer, David. E. (2002). The Relationship Between Mathematics Preparation And conceptual learning gain in physics: A possible hidden variable in Diagnostic Pretest Scores. Ames: Department of Physics and Astronomy, Iowa State University
- [21] Munawaroh, R., Subali, B., & Sopyan, S. (2012). Application of Project Based Learning and Cooperative Models to Build the Four Pillars of Learning for Junior High School Students. *UPEJ Unnes Physics Education Journal*. 1(1), 33-37.
- [22] Mutakinati, L., Anwari, I., & Yoshisuke, K. (2018). Analysis of Students' Critical Thinking Skill of Middle School through STEM Education Project-based Learning. *Indonesian Journal of Science Education*, 7(1), 54–65.
- [23] Muzria, W., & Indrawati, T. (2020). The Effect of Project Based Learning (Pjbl) Model on Student Learning Outcomes in Elementary Schools. *Journal of Basicedu*, 4(3), 2232–2238.
- [24] Ni Wayan Rati, et al., (2017). Project-Based Learning Model, Creativity and Student Learning Outcomes. *Indonesian Education Journal*. Vol. 6, No.1
- [25] Nofitasari, E. (2021). Building Teacher Creativity with Learning Innovations during the Covid-19 Pandemic
- [26] Octavian. CN, Enok Maryani. (2015). Application of Project-Based Learning Model to Develop Learner's Concern for the Environment. *Gea, Journal of Geography Education*. 15(2), 15 – 30

- [27] Pratiwi, Ari, I., SekarDwiArdianti, and Moh. Kanzunudin. (2018). Improving Cooperation Ability Through Project Based Learning (Pjbl) Model Assisted by Edutainment Methods in Social Science Subjects. *Journal of Educational Reflection* 8 (2)
- [28] Probosari, RM (2015). Improvement of Students' Scientific Writing of Biology Education of SebelasMaret University Through Reading Project Based Learning. *Indonesian Science Education Journal. JPPI* 4 (1) 31-35
- [29] Purworini, S.E. (2006). Project-based learning as an effort to develop a case study habit of mind at the Balikpapan KPS National Junior High School. *Journal of innovative education* 1(2):1-3.
- [30] Sadikin, A., &Hamidah, A. (2020). Online Learning in the Midst of the COVID-19 Outbreak. *Biodik*,6(2), 214-224
- [31] Sri Hanipah, Florentine. T.F, &AchmadRifai. (2018). The Effectiveness of Problem Based Learning and Project Based Learning Model to Improve Natural Science Study Outcomes” *Innovative Journal of Curriculum and Educational Technology*, 7 (1) 1 – 6
- [32] Sugiyono. (2017). *Quantitative, Qualitative, and R&D Research Methods*. Bandung :Alfabeta, CV.
- [33] Sukmana, I, K., Amali, N. (2021) The Effect of Project Based Learning Learning Model on Increasing Learning Motivation and Cooperation of Students and Parents in the Era of the Pandemic. *Educational. Journal of Educational Science*, 3 (5), 3163 – 3172
- [34] Sumarni, S. Wardani, Sudarmin, DN Gupitasari. (2016). Project Based Learning (Pbl) To Improve Psychomotor Skills: A Classroom Action Research. *Indonesian Science Education Journal* (2) 157-163
- [35] Thomas, J.W.(1999). *Project Based Learning: A Handbook of Middle and high School Teacher*. New York: The Buck Institute for Education
- [36] Thomas, J.W, Margendoller, J.R, &Michaelson, A. (1999). *Project Based Learning: A Handbook for Middle and High School Teachers*.<http://www.bgsu.edu/organization/ctl/proj.html>
- [37] Tseng, KH, Chang, CC, Lou, SJ, & Chen, WP (2013). Attitudes towards science, technology, engineering and mathematics (STEM) in a project based learning (PjBL) environment. *International Journal of Technology and Design Education*, 23:87–102.
- [38] YantoroYantoro, Ahmad Hariandi, ZakiahMawahdah, Mohamad Muspaw. (2021). Teacher innovation in learning in the era of the COVID-19 pandemic.*JPPI (Journal of Indonesian Educational Research)*Vol.7, No.1 pp. 8-15
- [39] Yulianto, Aris., A. Fatchan, I KomangAstina. (2017). Application of Project Based Learning Learning Model Based on Lesson Study to Improve Student Learning Activities. *Journal of Education: Theory, Research, and Development*. 2 (3)