

The Effectiveness of Project Based Learning with Performance Assessment on Mathematical Reasoning Ability in View of Self Confidence Students at SMA Negeri 7 Semarang

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Abstrak

This study aims to test the effectiveness of learning mathematics after applying Project Based Learning (PjBL) with performance assessments on students' mathematical reasoning abilities and analyzing students' mathematical reasoning abilities in terms of self-confidence in PjBL learning with performance assessments. The research method used is a mixed method with a sequential explanatory design. In this study six research subjects were taken based on the level of self-confidence in class X-10 students of SMA Negeri 7 Semarang for the 2022/2023 academic year. The results showed that (1) PjBL learning with an effective performance assessment of students' mathematical reasoning abilities, and (2) research subjects with high self-confidence categories were able to meet all indicators of mathematical reasoning ability to present mathematical statements, make conjectures, manipulate mathematics, draw conclusions, checking the validity of arguments, and finding patterns of mathematical phenomena; subjects in the medium self-confidence category only meet the indicators of presenting mathematical statements, making conjectures, mathematical manipulation; subjects with low self-confidence category only met the indicators of mathematical reasoning ability, namely mathematical manipulation. Recommendations for students with low levels of self-confidence who have not been able to achieve indicators of presenting statements, making conjectures, checking the validity of arguments, and finding patterns of mathematical phenomena by giving assignments independently and doing peer tutoring.

Kata Kunci: Mathematical Reasoning, Self Confidence, Project Based Learning, Assessment Performance

Abstract

This study aims to test the effectiveness of learning mathematics after applying Project Based Learning (PjBL) with performance assessments on students' mathematical reasoning abilities and analyzing students' mathematical reasoning abilities in terms of self-confidence in PjBL learning with performance assessments. The research method used is a mixed method with a sequential explanatory design. In this study six research subjects were taken based on the level of self-confidence in class X-10 students of SMA Negeri 7 Semarang for the 2022/2023 academic year. The results showed that (1) PjBL learning with an effective performance assessment of students' mathematical reasoning abilities, and (2) research subjects with high self-confidence categories were able to meet all indicators of mathematical reasoning ability to present mathematical statements, make conjectures, manipulate mathematics, draw conclusions, checking the validity of arguments, and finding patterns of mathematical phenomena; subjects in the medium self-confidence category only meet the indicators of presenting mathematical statements, making conjectures, mathematical manipulation; subjects with low self-confidence category only met the indicators of mathematical reasoning ability, namely mathematical manipulation. Recommendations for students with low levels of self-confidence who have not been able to achieve indicators of presenting statements, making conjectures, checking the validity of arguments, and finding patterns of mathematical phenomena by giving assignments independently and doing peer tutoring.

Keyword: Mathematical Reasoning, Self Confidence, Project Based Learning, Assessment Performance

INTRODUCTION

Programme for International Student Assessment (PISA) 2015 in the OECD (2018) states that there are 7 fundamental mathematical abilities that underlie the occurrence of mathematical processes, namely communication, mathematization, representation, reasoning and, formulate a strategy to solve, using symbolic, formal, and technical language as well as operations, and using mathematical teaching aids. Based on these seven abilities, reasoning ability is one of the mathematical abilities that has a central role in achieving the goals of learning mathematics.



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National Council of Teachers Mathematics (NCTM, 2000) reveals that reasoning ability is the ability to do mathematics, will not be separated from mathematical activities, meaning that someone who does mathematics, will not be separated from reasoning activities.

Reasoning is a very important mathematical ability, but the achievement level of Indonesian students in this ability is still low. Based on the results of studies conducted Trends in International Mathematics and Science Study (TIMSS) 2015, Indonesia was ranked 45th out of 50 participants in mathematics lessons from various countries with a score of 397 and the maximum TIMSS score reached 700 (Rahmawati, 2016). TIMSS 2015 results show that the abilities of Indonesian students are the weakest in terms of content and cognitive level reasoning. Besides that, reasoning internationally is also weaker than content and other cognitive levels. So that the fact is obtained that students' mathematical reasoning abilities are still low and require special attention.

It was proven in the preliminary study by giving initial ability test questions to 72 students at SMAN 7 Semarang, Semarang City, the result was that students were able to solve problems in the questions, but the student's answers only wrote down the results of their calculations using the appropriate concept. Students also do not provide clear arguments to make conclusions from the questions given. One of the students' work which shows low mathematical reasoning ability states that indicators of mathematical reasoning ability, namely compiling evidence, and giving reasons or evidence for several solutions are still lacking. There are still many students who cannot compile evidence, and provide reasons or evidence for several solutions that have been done.

Students' mathematical abilities are not only influenced by mathematical reasoning as a cognitive aspect, but are also influenced by self confidence or self-confidence as one of its affective aspects (Ahmad et al., 2018). Abdallah & Gasm (2015) provide information that self-confidence influences oral communication and students' academic success. This can be seen from the students who scored high on the self-confidence questionnaire also scored high on the verbal test of oral communication and academic achievement. Research by Syam & Amri (2017) also states that self confidence is able to support students' motivation and success in learning mathematics, because self-confidence affects learning achievement. This statement is supported by Yates in Hendriana (2017) who argues that self-confidence is very important for students to be successful in learning mathematics. With self-confidence, students will be more motivated and prefer to study mathematics, so that in the end it is hoped that the mathematics learning achievement achieved will also be more optimal.

Based on this study, it is necessary to pay attention to learning activities that can support the development of students' mathematical reasoning abilities. The success of learning activities can be influenced by the selection of appropriate learning models. One of the learning models that can be used is project-based learning or Project Based Learning (PjBL). PjBL is a learning model that uses contextual learning. Students play an active role in solving a problem, making decisions, researching, presenting, and creating documents (Sauri, 2017). PjBL can affect students' mathematical abilities because students are directly involved in designing, making, and displaying products that are used to solve real-world problems (Yunita et al., 2021). Students are given projects that are complex and quite difficult but complete and realistic which can then be given sufficient assistance so that students can complete the task (Berhita et al., 2020). The use of PjBL provides opportunities for students to explore realistic problems and gain in-depth knowledge so that students' reasoning abilities will increase (Ismaya et al., 2018). PjBL is a learning model that is recommended for use in the independent curriculum (Dewi, 2022).

Based on the learning guide and assessment of the independent curriculum in Kemdikbud Ristek (2022) the implementation of learning must not only provide quality, interactive, and contextual learning experiences to students, throughout the learning process assessments must also be carried out to find out the extent to which learning objectives have been achieved by students. One of the appropriate assessments for PjBL learning is a performance assessment. Performance assessment is an assessment that requires students to demonstrate and apply their knowledge in various contexts according to the desired criteria. Performance assessment can take the form of practice, produce products, carry out projects, or create portfolios (Kemdikbudristek,

2022). In line with that, Susilo & Pertiwi (2015) also stated that performance assessment is a procedure for giving assignments to students in order to gather information about the extent to which students have just learned. This is also supported by Tejeda & Gallardo (2021) who reveal that by using a performance assessment it can be seen whether students can relate their knowledge with real life situations. In addition, the assessment makes it easier for teachers in the learning process to measure all student competencies (Safitri et al., 2017). Performance assessment can also reflect students' learning attitudes, understanding of subjects and learning difficulties (Sorour et al., 2015). Instruction based on performance assessment increases the abilities students must master and increases students' self-confidence because they will feel more competent in working on math problems (Omid & Sridhar, 2012). One reason is that mathematics teachers should integrate task-based performance assessments into their students' practice (Svihla et al., 2019). Paying attention to the background, the ability of mathematical reasoning is viewed from self confidence on Project Based Learning using performance assessment is very necessary.

METHOD

The research method used is a mixed method (mixed method) by design sequential explanatory where the analysis of quantitative data in the first stage is followed by analysis of qualitative data to strengthen the quantitative results. Quantitative research design using True Experimental Design and Posttest-Only Control Group Design.

The research procedure begins with the first stage, namely pre-field by observing at SMAN 7 Semarang followed by making learning tools and instruments that are tested on expert validators. The second stage is field work by giving treatment to the experimental and control classes. The experimental class is given learning Project Based Learning (PjBL) with a performance assessment while the control group received PjBL learning. After the treatment, both classes were given posttest mathematical reasoning abilities and scales of self confidence. Based on the results posttest Mathematical reasoning abilities were tested for the effectiveness of learning with the help of the RStudio application while based on the results of the scale self confidence determined research subjects who will be interviewed to analyze the ability of mathematical reasoning abilities in terms of self confidence.

The population in this study were class X students of SMAN 7 Semarang even semester 2022/2023. The sample in this study were students in class X-10 as the experimental group who received PjBL learning with a performance assessment while students in class X-9 as the control group received PjBL learning. The research sample was taken using the technique cluster random sampling. After the students from the two classes were taught with different treatment for three meetings, it was continued by giving Mathematical Reasoning Ability Tests and a Likert scale to measure self confidence learners. Test questions and Likert scales have previously been validated by experts and tested on classes other than samples that have received opportunity material.

Furthermore, in qualitative research, subject selection was carried out using techniques purposive sampling from the acquisition of a scale score self confidence. There were 6 subjects selected for analysis and interviews, namely two subjects with self confidence high, two subjects with self confidence medium, and two subjects with self confidence low. Interviews were used to determine students' Mathematical Reasoning Ability at each level of self confidence.

Data analysis in this study includes quantitative data analysis and qualitative data analysis. Quantitative data analysis includes initial data analysis and final data analysis. The data used in the initial data analysis is the initial value of students' mathematical reasoning abilities. The initial values of the samples were tested for normality, homogeneity, and average similarity. The final stage of data analysis included prerequisite tests (normality and variance) and three hypothesis tests that were used to answer the problem formulation of PjBL learning effectiveness with performance assessment of students' mathematical reasoning abilities.

Qualitative data analysis is used to describe students' mathematical reasoning abilities in terms of self confidence on PjBL learning with performance assessment. Qualitative data analysis techniques include data reduction, data presentation, and drawing conclusions. Triangulation is used to test the validity of qualitative research. The triangulation used is technical triangulation

which is carried out by checking the data obtained from the same source but with different techniques, namely using tests of mathematical reasoning abilities, psychological scales, and interviews.

RESULTS AND DISCUSSION

In the early stages, initial value data analysis was carried out to determine the initial state of the two samples.

Normality test

Test for normality using the help of the Rstudio application. Criteria for normality test if the value is significant $> 0,05$ means that the data is normally distributed and vice versa.

```
R 4.2.2 - ~/
> pearson.test(DATA_AWAL_TESIS$`EKS`)

Pearson chi-square normality test

data: DATA_AWAL_TESIS$EKS
P = 4, p-value = 0.6767

> pearson.test(DATA_AWAL_TESIS$`KON`)

Pearson chi-square normality test

data: DATA_AWAL_TESIS$KON
P = 8, p-value = 0.2381
```

Figure 1. Initial Value Data Normality Test Results

Based on Figure 1 it can be seen that the significant value in the experimental class (X-10) = 0,6767 $> 0,05$ and control class (X-9) = 0,2381 $> 0,05$. Therefore, it can be concluded that the experimental class and control class data are normally distributed.

Homogeneity Test

The homogeneity test is used to determine whether the variance of the initial sample value is homogeneous or not. Testing the homogeneity of the data using test Lavene with the RStudio application. Homogeneity test criteria if the value is significant $> 0,05$ means that the data comes from a population that has a homogeneous variance and on the contrary.

```
> leveneTest(DATA_AWAL_TESIS$Nilai, DATA_AWAL_TESIS$Kelas, center=mean)
Levene's Test for Homogeneity of Variance (center = mean)
      Df F value    Pr(>F)
group 1  3.8201 0.05463 .
      70
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
```

Gambar 2. Hasil Uji Homogenitas Data Nilai Awal

Based on Figure 2 it can be seen that the significant value of the Lavene test 0,05463 $> 0,05$. Therefore, it can be concluded that the sample comes from a population that has a homogeneous variance.

Average Similarity Test

The average similarity test is used to determine whether the initial average values of the two samples are the same. Testing the average similarity using independent sample tests with RStudio. The test criteria for the similarity of the mean and the sample if the value is significant $> 0,05$ means that there is no difference between the average initial value of students in the experimental class and control class, and vice versa.

```
> t.test(DATA_AWAL_TESIS$`EKS`, DATA_AWAL_TESIS$`KON`,
+         alternative = "two.sided",
+         mu = 0, paired = FALSE, var.equal = TRUE,
+         conf.level = 0.95)

Two Sample t-test

data: DATA_AWAL_TESIS$EKS and DATA_AWAL_TESIS$KON
t = -1.1653, df = 70, p-value = 0.2479
alternative hypothesis: true difference in means is not equal to 0
95 percent confidence interval:
 -9.414981  2.470537
sample estimates:
mean of x mean of y
 61.11111  64.58333
```

Figure 3. Results of the average similarity test of initial value data

Based on Figure 3 it can be seen that the value is significant (2-tailed) 0,2479 $> 0,05$. Therefore, it can be concluded that there is no difference in the average initial scores of experimental and control class students.

Preliminary data analysis shows that the sample comes from a population with normal

distribution, homogeneous variance, and has the same average value. Therefore, it can be concluded that the initial state of the sample is the same.

After the initial data analysis was carried out, the sample was given treatment, namely the application of the learning model Project Based Learning (PjBL) with performance assessment in the experimental class and the application of learning models Project Based Learning (PjBL) in the control class. After learning, the sample is given a Mathematical Reasoning Ability Test (TKPM) whose results are analyzed to answer the formulation of the problem regarding the effectiveness of PjBL learning with a performance assessment of students' Mathematical Reasoning Ability (KPM) as follows.

PjBL learning effectiveness with performance assessment of students' KPM

The PjBL Learning Model with performance assessment is said to be effective against KPM participants if they fulfill the three hypothesis tests that have been set. Before testing the hypothesis, it is necessary to do a prerequisite test, namely the normality test using Chi-Square Test and test different variance using Lavene Test with the help of Rstudio as follows.

Normality test

Test for normality using the help of the Rstudio application. Criteria for normality test if the value is significant $> 0,05$ means that the data is normally distributed and vice versa.

```
> pearson.test(HASIL_TES$`Posttest Eks`)
Pearson chi-square normality test
data: HASIL_TES$`Posttest Eks`
P = 9.5, p-value = 0.1473

> pearson.test(HASIL_TES$`Posttest Kontrol`)
Pearson chi-square normality test
data: HASIL_TES$`Posttest Kontrol`
P = 12.5, p-value = 0.0517
```

Figure 4. Normality Test Results

Based on Figure 4 it can be seen that the significant value in the experimental class (X-10) = 0,1473 $> 0,05$ and the control class (X-9) = 0,0517 $> 0,05$. Therefore, it can be concluded that class data experimental and control class are normally distributed.

Variance Test

The homogeneity test is used to determine whether the variance of the initial sample value is homogeneous or not. Testing the homogeneity of the data using test Lavene with the RStudio application. Homogeneity test criteria if the value is significant $> 0,05$ means that the data comes from a population that has a homogeneous variance and on the contrary.

```
> leveneTest(HASIL_TES$Nilai, HASIL_TES$Kelas, center=mean)
Levene's Test for Homogeneity of Variance (center = mean)
Df F value Pr(>F)
group 1 2.8541 0.09559 .
70
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
```

Figure 5. Homogeneity Test Results

Based on Figure 2 it can be seen that the significant value of the Lavene test 0,09559 $> 0,05$. Therefore, it can be concluded that the sample comes from a population that has a homogeneous variance.

Hypothesis I

The first hypothesis in this study is the classical completeness test which is calculated using the one sample proportion test (right side) assisted by RStudio. Classical completeness in this study if more than 75% of students receive PjBL learning by assessment performance gets a value with a minimum limit of 70. Based on the calculation, the p-value is obtained 0,006177 $< 0,05$, so rejected and it can be concluded that KBKM gets PjBL learning performance assessment with a minimum of 70 completeness criteria and achieves classical mastery.

Hypothesis II

The average similarity test (right side) is used to test whether the average KPM of students who receive PjBL learning performance assessment is higher than the average KPM of students who receive PjBL learning. Based on the calculation obtained p-values 0,003163 $< 0,05$, so rejected H_0 . This means students with PjBL learning with performance assessments were better than the average results of students' mathematical reasoning abilities using PjBL learning.

Hypothesis III

The different proportion test was used to determine the difference in the number of students who achieved completeness of mathematical reasoning abilities who were taught using PjBL performance assessment and the number of students who achieved completeness of mathematical reasoning abilities who were taught using PjBL. Based on the calculation obtained p-values $0,001855 < 0,05$, so it is rejected. This means the proportion of students' mathematical reasoning abilities those who have completed learning to use PjBL with performance assessments are better than the proportion of mathematical reasoning abilities of students who have completed learning to use PjBL learning.

Learning is said to be effective if: (1) the mathematical reasoning ability of students taught by PjBL learning with classical completion performance assessment is more than 75%, (2) the average mathematical reasoning ability of students taught by PjBL learning with performance assessment is better from the average mathematical reasoning ability of students who were taught by PjBL learning, (3) the proportion of students who completed learning who were taught by PjBL learning with performance assessment was better than the proportion of students who had completed learning who were taught by PjBL learning. PjBL learning with an effective performance assessment of students' KPM because the learning syntax applied in class is able to guide students to get used to doing mathematical reasoning in solving given problems. The results of research by Hasibuan et al., (2022) the PjBL learning model is able to improve students' mathematical reasoning abilities and mathematical dispositions, as well as students' responses to positive PjBL learning. According to Arivina et al., (2017) learning using performance assessment can improve students' mathematical reasoning abilities.

The KPM description of students in terms of self confidence on PjBL learning with performance assessment

Classification Self Confidence

Classification self-confidence conducted on 36 students in the experimental class (X-10) using a scale of self confidence which has been validated by experts and tested for validity and reliability. Scale self confidence consists of 40 statements. Based on the interpretation of the scale score self confidence, students who get scores ≥ 156 classified as students with levels self confidence high, 107-156 levels self confidence medium, dan < 107 level self confidence low. Based on the results of the classification there are 5 students with levels of self confidence high, 25 students with level self confidence medium, and 6 students with levels self confidence low.

Six students were selected as subjects for conducting interviews to describe the KPM of experimental class students in terms of self confidence. The research subjects consisted of 2 students with level self confidence high, 2 students with level self confidence medium, and 2 students with level self confidence low.

Subject with Self Confidence High

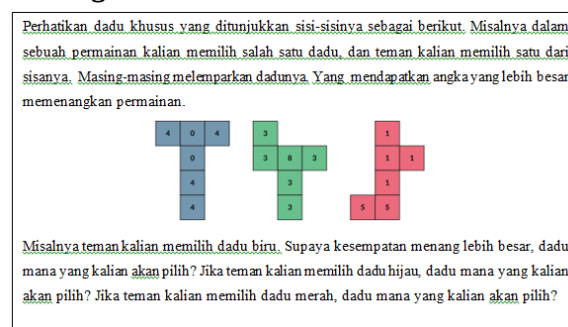


Figure 6. Mathematical Reasoning Ability Test (TKPM) Questions

Based on the TKPM questions in Figure 6, the results of TKPM's work with KPM indicators are obtained which include presenting mathematical statements, making conjectures, mathematical manipulation, checking the validity of arguments, and finding patterns from the subject's mathematical symptoms with categories of self confidence height as follows.

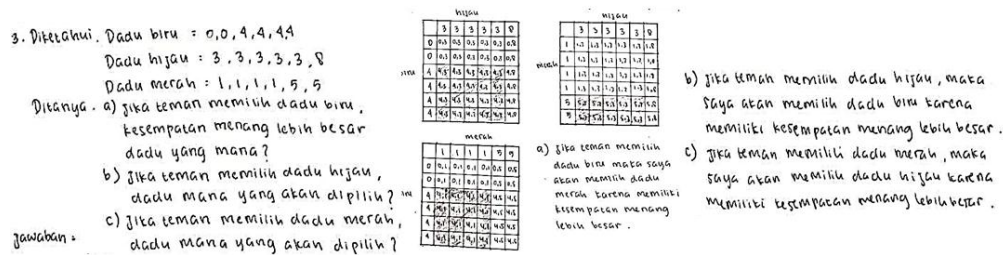


Figure 7. Completion of Subject Questions Self Confidence High

Based on the results of the students' work shown in Figure 7, it was found that the subject's answers had demonstrated mathematical reasoning abilities. This is shown by the subject being able to understand the problem and solve the problem appropriately. able to answer questions using tables to look for possible answers correctly so that indicators of presenting mathematical statements orally, in writing, pictures, and diagrams are fulfilled. The subject was able to make the correct solution process steps, this was seen to look for possible dice wins. The subject calculated using a sample point table so that the indicator made an assumption (conjectures) is fulfilled. The subject can accurately explain problem solving in the questions so that the indicators of manipulating mathematics are met. The subject can determine the dice with the probability of winning based on the highest number so that the indicator finds a pattern from the mathematical phenomena. The subject uses probability theory to check the validity of the question statements by utilizing sample point tables. This shows that the Subject meets the indicators of presenting mathematical statements, making conjectures, manipulating mathematics, finding patterns of mathematical phenomena, and checking the validity of arguments. When the results of students' work are triangulated by interviews, in answering each question, ensure the results of the work that students have written clearly and in detail.

Subject with Self Confidence Medium

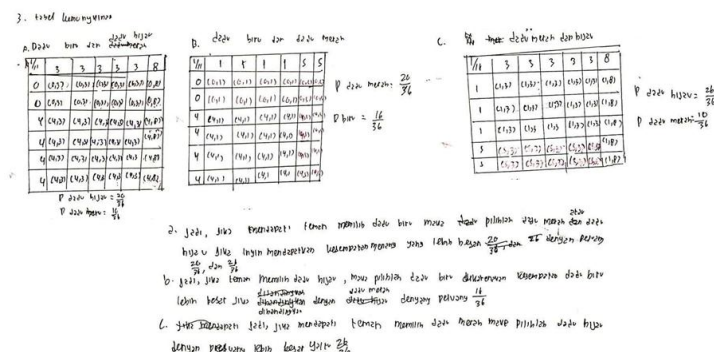


Figure 8. Completion of Subject Questions Self Confidence Medium

Based on the results of the students' work shown in Figure 8, it was found that the subject's answers had demonstrated mathematical reasoning abilities. This is shown by the subject being able to understand the problem and solve the problem appropriately. able to answer questions using tables to look for possible answers correctly so that indicators of presenting mathematical statements orally, in writing, pictures, and diagrams are fulfilled. The subject was able to make the correct solution process steps, this was seen to look for possible dice wins. The subject calculated using a sample point table so that the indicator made an assumption (conjectures) is fulfilled. The subject can accurately explain problem solving in the questions so that the indicators of manipulating mathematics are met. Subject can determine the dice with the possibility of winning based on the highest number so that the indicators find patterns from mathematical symptoms are fulfilled. The subject uses probability theory to check the validity of the question statements by utilizing sample point tables. Subjects can provide conclusions correctly on questions based on problem solving. This shows that the subject meets the indicators

of presenting mathematical statements, making conjectures, manipulating mathematics, finding patterns of mathematical phenomena, checking validity, and drawing conclusions. When the results of students' work are triangulated with interviews, the indicators check the validity of the arguments and find patterns of a mathematical phenomenon that are not met because the subject is unable to provide a detailed explanation, while the answers are written based on consideration of the answers of his friends. So, subjects with category self-confidence while only fulfilling three indicators of mathematical reasoning ability, namely indicators of presenting mathematical statements, making conjectures, and mathematical manipulation.

Subject with Self Confidence Low

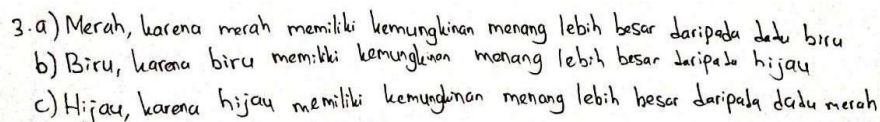
- 
3. a) Merah, karena merah memiliki kemungkinan menang lebih besar daripada dadu biru
b) Biru, karena biru memiliki kemungkinan menang lebih besar daripada hijau
c) Hijau, karena hijau memiliki kemungkinan menang lebih besar daripada dadu merah

Figure 9. Completion of Subject Questions Self Confidence Low

Based on the results of the students' work shown in Figure 9, it was found that the subject's answers had not demonstrated mathematical reasoning abilities. It can be seen that the subject did not write down how to get an answer. Subject S-06 was unable to answer question number 3 using the method to find possible answers correctly so that the indicators presenting mathematical statements orally, in writing, pictures and diagrams were fulfilled. The subject has not been able to make the steps for the solution process correctly, it can be seen that the subject did not write down where to get the chance to win so that the indicator made a guess (conjectures) not fulfilled. The subject can explain problem solving on the questions so that the indicators of manipulating mathematics are met. the subject can determine the dice with the probability of winning based on the highest number without using the calculation of the probability formula so that the indicator finds patterns from mathematical symptoms that are not fulfilled. Subjects were unable to use probability theory to check the validity of the question statements by utilizing sample point tables and probability formulas. This shows the subject by category self confidence low meets the indicators of mathematical manipulation but does not meet the indicators of presenting mathematical statements, checking validity, making conjectures, mathematical manipulation and finding patterns of mathematical phenomena.

Based on the results of the research, in general students with self confidence have a high ability to solve problems related to mathematical reasoning abilities because self confidence and KPM have a positive correlation (Faudziah et al., 2019). In addition, Kusumawardani (2018) also stated that self confidence has a positive influence on students' KPM.

Learners by category self confidence being able to solve problems related to mathematical reasoning abilities. Self learners' confidence low students have good reasoning abilities in almost all indicators of mathematical reasoning abilities. Students who are able to meet the indicators of mathematical reasoning ability, namely presenting mathematical statements orally, in writing, pictures, and diagrams, submit conjectures (conjectures), and perform mathematical manipulations. Whereas for the other three indicators, namely drawing conclusions, checking the validity of an argument and finding patterns or properties of all mathematics to make generalizations cannot be fulfilled because the subject has not been able to utilize information from what is known and what is asked to get solutions. This is in accordance with the results of the questionnaire self confidence on the indicator of believing in one's own abilities that have not been obtained by the subject, so that the subject does not have good self confidence (Setyaningrum et al., 2017).

Based on the results of the study, students with low self confidence cannot solve problems related to KPM because students are passive so it is difficult to understand the problems that cause students to be lazy or unable to solve problems. So that students do not get optimal results and are unsure of the results they get. Evidenced by the results of the work of students with self confidence low only able to meet the indicators of mathematical manipulation. This is reinforced by the research results of Susanti et al., (2020) that students with low self confidence are not able to meet all indicators.

CONCLUSION

Based on the results and discussion of the research on class X students of SMA Negeri 7 Semarang, the following conclusions can be drawn: (1) PjBL learning model with an effective performance assessment of the Mathematical Reasoning Ability (KPM) of class X students of SMA Negeri 7 Semarang, and (2) subject with self confidence high able to meet all KPM indicators, namely presenting mathematical statements, making conjectures, performing mathematical manipulations, checking the validity of arguments, and finding patterns of a mathematical phenomenon; subject by category self confidence currently only fulfilling the indicators of presenting mathematical statements, making conjectures, and performing mathematical manipulations; subject by category self confidence low only able to meet the indicators of doing mathematical manipulation. The recommendation that can be given is that PjBL learning with performance assessment is advised to continue to be developed and try to apply it to other materials because this learning is effective for students' KPM. Another recommendation is to provide a scale of self confidence in the experimental class before learning to see self confidence students so that later when implementing learning researchers can give special attention to students with low self confidence by giving independent assignments and peer tutoring(peer teaching).

REFERENCES

- Abdallah, A. A. S., & Gasm, A. A. A. (2015). The impact of self-confidence on EFL Sudanese tertiary level students. *International Journal of Information Research and Review*, 2(09).
- Ahmad, G. A. M., Diniyah, A. N., Akbar, P., Nurjaman, A., & Bernard, M. (2018). Analisis Kemampuan Kemampuan Penalaran Dan Self Confidence Siswa Sma Dalam Materi Peluang. *Journal On Education P*, 1(1).
- Arivina, A. N., Masrukan, & Prabowo, A. (2017). Kemampuan Penalaran Matematika di SMK Kelas X dengan Model LAPS – Heuristik Menggunakan Asesmen Unjuk Kinerja. *Unnes Journal of Mathematics Education*, 6(3).
- Berhиту, M., Rehena, J. F., & Tuaputty, H. (2020). The Effect of Project-Based Learning (PjBL) Models on Improving Students' Understanding of Concepts, Retention, and Social Attitudes. *Formatif: Jurnal Ilmiah Pendidikan MIPA*, 10(2). <https://doi.org/10.30998/formatif.v10i2.5947>
- Dewi, M. R. (2022). Kelebihan dan kekurangan Project-based Learning untuk penguatan Profil Pelajar Pancasila Kurikulum Merdeka. *Jurnal Inovasi Kurikulum*, 19(2).
- Faudziah, L., Kadarisma, G., Siliwangi, I., Terusan, J., Sudirman, J., Tengah, C., Cimahi, K., & Barat, J. (2019). Pengaruh Self Confidence Siswa terhadap Kemampuan Penalaran Matematis Siswa SMK Negeri di Kota Cimahi. *Journal on Education*, 1(3).
- Hasibuan, M., Minarti, A., & Amry, Z. (2022). Pengaruh Kemampuan Awal Matematis dan Model Pembelajaran (PjBL dan PBL) Terhadap Kemampuan Penalaran Matematis dan Disposisi Matematis Siswa. *Jurnal Cendekia: Jurnal Pendidikan Matematika*, 6(2), 2298–2317. <https://doi.org/10.31004/cendekia.v6i2.1487>
- Hendriana, H. (2017). *Hard Skills dan Soft Skills Matematik Siswa* (N. F. Atif (ed.); 1st ed.). Refika Aditama.
- Ismaya, B. F., Cahyono, A. N., & Mariani, S. (2018). Kemampuan Penalaran Matematika dengan Math Trail Project berbantuan MathCityMap. *Seminar Nasional Pendidikan Matematika Ahmad Dahlan, November 2020*.
- Kemdikbudristek. (2022). *Panduan Pembelajaran dan Asesmen PAUD, Pendidikan Dasar, dan Menengah*. BADAN STANDAR, KURIKULUM, DAN ASESMEN PENDIDIKAN. <http://kurikulum.kemdikbud.go.id/wp-content/uploads/2022/06/Panduan-Pembelajaran-dan-Asesmen.pdf>
- Kusumawardani, D. R. (2018). KEMAMPUAN PENALARAN BERDASARKAN KEYAKINAN MATEMATIKA DALAM PEMBELAJARAN PBL MELALUI PENDEKATAN INTERAKSI DYADIC. *Jurnal Ilmiah Matematika Dan Pendidikan Matematika*, 10(2).

<https://doi.org/10.20884/1.jmp.2018.10.2.2842>

- NCTM. (2000). *Principles and Standards for School Mathematics*. The National Council of Teachers of Mathematics, Inc.
- Omidi, M., & Sridhar, Y. N. (2012). Effectiveness of performance assessment on meta cognitive skills. In *Journal of Education and Practice* (Vol. 3, Issue 10).
- Rahmawati. (2016). *Seminar Hasil TIMSS 2015*.
<https://id.scribd.com/document/377660375/Rahmawati-Seminar-Hasil-TIMSS-2015-pdf>
- Safitri, A. N., Sari, R., & Wahyuni, S. (2017). The Influences of Mathematics Ability toward Physics Learning in Senior High School Based on an Authentic Assessment System. *International Journal of Learning*, 3(1). <https://doi.org/10.18178/IJLT.3.1.11-14>
- Sauri, S. (2017). MENINGKATKAN KEMAMPUAN PENALARAN MATEMATIS SISWA SMP DI KOTA BANDUNG MELALUI MODEL PEMBELAJARAN PJBL (PROJECT BASED LEARNING). *Intermathzo Jurnal Pendidikan Dan Pembelajaran Matematika*, 2(1).
- Setyaningrum, A., Ariyanto, L., & Matematis, K. P. (2017). Pengaruh Self-Confidence Terhadap Kemampuan Penalaran Matematis Siswa Kelas VII. *Senatik : Seminar Nasional Matematika Dan Pendidikan Matematika*.
- Sorour, S. E., Mine, T., Goda, K., & Hirokawa, S. (2015). A predictive model to evaluate student performance. *Journal of Information Processing*, 23(2). <https://doi.org/10.2197/ipsjjip.23.192>
- Susanti, D., Waluya, S. B., & Rosyida, I. (2020). Student's Mathematical Reasoning Ability Viewed from Self-Confidence in Mathematical Modeling with Open-ended Approach Learning. *Unnes Journal of Mathematics Education Research*, 9(1).
- Susilo, B. E., & Pertiwi, A. D. (2015). ANALYSIS OF MATHEMATICAL COMMUNICATION ABILITY THROUGH 4K MODEL BASED ON 7 th GRADERS' PERSONALITY TYPES. In *International Journal of Education and Research* (Vol. 3, Issue 7).
- Svihla, V., Kubik, T., & Stephens-Shaugar, T. (2019). Performance assessment practice as professional learning. *Interdisciplinary Journal of Problem-Based Learning*, 13(2). <https://doi.org/10.7771/1541-5015.1812>
- Syam, A., & Amri. (2017). Pengaruh Kepercayaan Diri (Self Confidence) Berbasis Kaderisasi IMM Terhadap Prestasi Belajar Mahasiswa. *Biotek*, 5(87).
- Tejeda, S., & Gallardo, K. (2021). Performance Assessment on High School Advanced Algebra. *International Electronic Journal of Mathematics Education*, 12(3). <https://doi.org/10.29333/iejme/648>
- Yunita, Y., Juandi, D., Kusumah, Y. S., & Suhendra, S. (2021). The effectiveness of the Project-Based Learning (PjBL) model in students' mathematical ability: A systematic literature review. *Journal of Physics: Conference Series*, 1882(1). <https://doi.org/10.1088/1742-6596/1882/1/012080>