

# The Impact of Independency in Lesson Study Based Mathematic Learning in Junior High School

Sutama<sup>1,3</sup>, Sabar Narimo<sup>2</sup>, Diana Purwita Sari<sup>3</sup>

Administration Education Magister Graduate Program of Muhammadiyah Surakarta University<sup>1,2</sup>

Mathematics Education Magister Graduate Program of Sebelas Maret University<sup>3</sup>

[sutama@ums.ac.id](mailto:sutama@ums.ac.id)

**Abstract:** This correlational quantitative research aims to testify students' independency in lesson study based mathematic learning based on the parent's economical status, environment, and learning facilities. Research population was 256 seventh grade students of State Junior High School 1 Salatiga Academic Year 2016/2017. 165 research sample students were determined by using Slovin formula (alpha 5%). Proportional random sampling technique was used by using a lottery. Documentation and questionnaire were used to collect the data and analyzed by using multiple linear regression. Research results are: students' independency supported by parent's economical status, environment, and learning facilities is 87.70% (significance 0.000); 20.01% (significance 0.008) parent's economical status; 28,13% (significance 0.000) environment; and 39.56% (significance 0.000) facility supports students' independency. Thus, good parent's economical status, environment, and learning facilities increase students' independency in lesson study based mathematic learning.

**Keyword:** independency, lesson study, mathematic, learning

## 1. Introduction

In learning activity, students' independency shows that teachers can guide students' learning interest. Mujiman (2007: 1) defines independent learning as an active learning motivated by an intention to master a competence, and built by the science or the prior knowledge. Independent behavior includes many aspects such as searching knowledge actively, planned learning behavior, self-reliance or confident, and learning critically.

Independent in mathematic learning is very important. This statement is strengthened by Tahar and Enceng's research (2006) which states that 130 students indicate 63.91% students' learning result can be explained by their learning independency. It means that learning independency is one of learning result indicators. The higher someone's learning independency, the higher possibility to reach better learning result.

One of supporting factors of student independency in lesson study based mathematic learning results in State Junior High School 1 Salatiga is the student's external factors such as parents' economic social status and learning environment. Research result concludes that 20% of parents' economic social status will affect student learning independency (Suleman and Hussain, 2012; Ankabi, Theophilus, and Augustina, 2014;

Singh and Choudhary, 2015). Learning environment such as family, school, and social environment affect students' independency in lesson study based mathematic learning. The learning environment in this research is limited in school environment. Good school environment will give a good effect to the students' learning activity. A comfortable and supportive physical environment (air, lighting, building and classroom noise) will give positive impact to students and students can learn independently in lesson study based mathematic learning.

The research of result conclude that learning style, learning environment, and learning facility affect students' learning achievement significantly (Muyiwa and Quadri, 2012; Yonitasari and Setiyani, 2014). Widyaningtyas, Sukarmin, and Radiyono (2013) in their research state that learning environment affects learning result. A conducive learning environment will give comfortable situation and positive impact on students and results good learning achievement.

External factor contributes in students' independency in lesson study based mathematic learning is learning facility. Learning facility provided by parents and school affect students' independency. Students will understand about the materials given if they have complete media such as books, workbooks, the internet, and another supporting media to make them learn independently.

Based on those explanations above, researcher makes hypotheses: students' independency in lesson study based mathematic learning is supported by parents' economic social status, environment, and learning facility. The general purpose of this research is to examine students' independency in lesson study based mathematic learning seen from parents' economic social status, environment, and learning facility.

## 2. Research Method

This causal co-relational quantitative research was performed in Junior High School 1 Salatiga in second semester Academic year 2016/2017. Research population was 256 students of class VII, and the 165 students sample was determined by using Slovin formula ( $\alpha = 0.05$ ). Samples were taken by using proportional random sampling by using lottery. The independent variables in this research were parents' economic social status ( $X_1$ ), learning environment ( $X_2$ ), and learning facility ( $X_3$ ), and its independent variable namely learning independency ( $Y$ ).

Data collection technique used questionnaire and documentation methods (Sutama, 2015: 148). The research instrument was tested to 30 students in population which were not included in research sample. The test result was used to examine validity item and questionnaire reliability test. Data analysis technique used multiple linear regression analysis to find the linear connection between one-variable bounded with  $Y$  with free variables  $X_1$ ,  $X_2$ , and  $X_3$  (Budiyono, 2016: 276). Before analyzing the data, analysis pre-requirement tests namely normality, linearity, multi-co linearity, heteroscedasticity, and autocorrelation were performed.

### 3. Result and Discussion

The result of students' independency questionnaire item validity test consists of 15 statement items resulted  $r_{\text{count}} = 0.891 > r_{\text{table}} = 0.361$  (three invalid items were not used). The result of parents' economic social status questionnaire item validity test consist of 16 statement items resulted  $r_{\text{count}} = 0.731 > r_{\text{table}} = 0.361$  (two invalid items were not used and one valid item for smallest  $r_{\text{count}}$  was not used). In learning environment questionnaire item validity test consists of 15 statement items resulted  $r_{\text{count}} > r_{\text{table}} = 0,361$  (three invalid items were not used). The result of learning facility item validity test consists of 15 statement items resulted  $r_{\text{count}} = 0.921 > r_{\text{table}} = 0.361$  (three invalid items were not used). It means that 15 items indicators of dependent and independent variables appropriated to be used to collect the data.

*Chronbach's Alpha* formula was used to examine the reliability of statement items used to collect the data in each variable of learning motivation, learning environment, learning facility, and parents' social status. The summary of reliability test questionnaire in each dependent variable is in Table 1 below.

**Table 1.** Questionnaire Reliability Test Result

| Variable                                  | <i>Chronbach's Alpha</i> | Note     |
|---|--------------------------|----------|
| Learning Independency ( $Y$ )             | 0,891                    | Reliable |
| Parents' Economic Social Status ( $X_1$ ) | 0,731                    | Reliable |
| Learning Environment ( $X_2$ )            | 0,837                    | Reliable |
| Learning Facility ( $X_3$ )               | 0,921                    | Reliable |

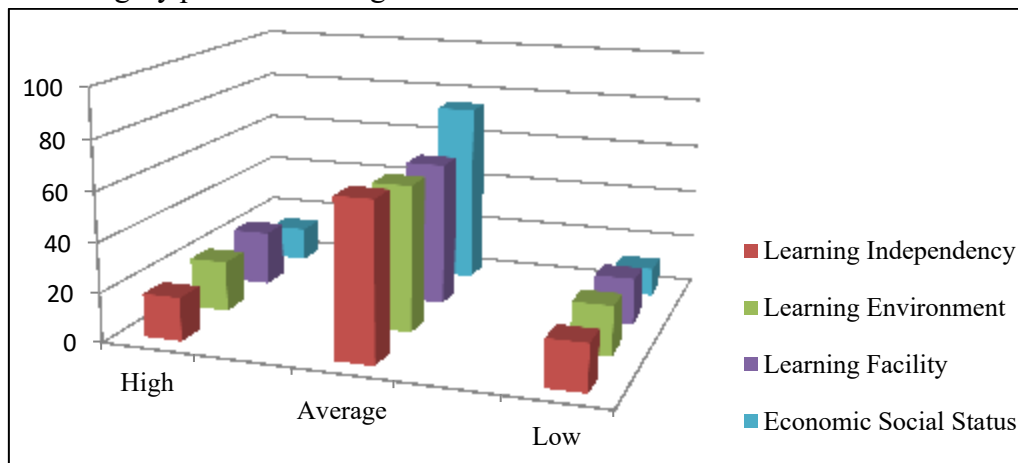
Learning independency data provided from questionnaire consists of 15 statement items. From learning independency, the highest score was 60 and the lowest score was 35 with average score was 50.418 and 6.440 deviation standard. Score classification was provided from 29 students or 17.57% of 165 samples in high learning independency-category, 105 students or 63.64% of 165 samples in average learning independency-category, and 31 students or 18.79% of 165 samples in low learning independency-category.

Parents' economic social status data provided from questionnaire consists of 15 statement items. Parents' economic social status data resulted 60 as the highest score and 30 as the lowest score with 48.030 average score and 6.879 deviation standard. Score classification resulted 23 students or 13.94% of 165 samples in high economic social status-category, 123 students or 74.54% of 165 samples in average economic social status-category, and 19 students or 11.52% of 165 samples in low economic social status-category.

The learning environment was provided from questionnaire consists of 15 statement items. Learning environment data resulted 60 as the highest score and 30 as the lowest score with 48.558 average score and 6.957 deviation standard. Score classification resulted 34 students or 20.61% of 165 samples in conducive learning environment-category, 98 students or 59.39% of 165 samples in less conducive learning

environment-category, and 33 students or 20% of 165 samples in not conducive learning environment-category.

Learning facility provided from questionnaire consists of 15 statement items. Learning facility data resulted 60 as the highest score and 32 as the lowest score with 48.030 average score and 6.879 deviation standard. Score classification resulted 37 students or 22.42% of 165 samples in complete learning facility-category, 97 students or 58.79% of 165 samples in less complete learning facility-category, and 31 students or 18.79% of 165 samples in incomplete learning facility-category. The detail of each variable category presented in Figure 1.



**Figure 1.** Bar Diagram of Each Research Variable Data

Before analyzing data by using doubled linear regression analysis, trial test-analysis was performed by using *Kolmogorov-Smirnov(K-S)* normality test. The data is normal distributed if significance score  $> 0.05$  and data is abnormal distributed if significance score  $< 0.05$ . Data in this research was distributed normally because the significance score of each variable was more than 0.05. The summary of normality test result presented in Table 2 as follows.

**Table 2.** Normality Test Result

| Variable                                  | Significance | Note   |
|---|--------------|--------|
| Learning Independency ( $Y$ )             | 0.122        |        |
| Parents' Economic Social Status ( $X_1$ ) | 0.334        | Normal |
| Learning environment ( $X_2$ )            | 0.251        |        |
| Learning Facility ( $X_3$ )               | 0.172        |        |

The second prerequisite test was linearity test with F test stated linier if  $F_{count} \leq F_{table}$  and non-linear if  $F_{count} > F_{table}$ . Data in this research had linear relation because of  $F_{count} \leq F_{table}$ . The summary of the linearity test presented in Table 3 as follows.

**Table 3.** Linearity Test Result

| Variable         | F Value            |                    | Note   |
|------------------|--------------------|--------------------|--------|
|                  | F <sub>count</sub> | F <sub>table</sub> |        |
| $X_1$ toward $Y$ | 1.089              | 1.559              | Linear |
| $X_2$ toward $Y$ | 0.637              | 1.596              |        |
| $X_3$ toward $Y$ | 1.543              | 1.577              |        |

The third prerequisite test was multi-co Linearity test by using *Variance Inflation Factor* (VIF) and *Tolerance* (TOL) scores. Multi-co Linearity does not exist if  $VIF < 10$  and  $TOL > 0.1$ . Multi-co Linearity exists if  $VIF > 10$  and  $TOL < 0.1$ . Multi-co Linearity did not exist in this research because of VIF score  $< 10$  and  $TOL > 0.1$ . The summary of the Multi-co Linearity test presented in Table 4 as follows.

**Table 4.** Multi-co Linearity Test Result

| Variable        | Score |       | Note                  |
|-----------------|-------|-------|-----------------------|
|                 | TOL   | VIF   |                       |
| $X_1$ and $X_2$ | 0.980 | 1.020 | No Multi-co Linearity |
| $X_1$ and $X_3$ | 0.999 | 1.000 |                       |
| $X_2$ and $X_3$ | 0.973 | 1.028 |                       |

The fourth prerequisite test was heteroscedasticity test by using *glesjer* test. If the significance score is  $> 0.05$  then heteroscedasticity does not exist, and heteroscedasticity happens if significance score is  $< 0.05$ . Heteroscedasticity did not appear in this research because the significance score was  $> 0.05$ . The summary of heteroscedasticity test presented in Table 5 as follows.

**Table 5.** Heteroscedasticity Test Result

| Variable         | P-Value | Note                  |
|------------------|---------|-----------------------|
| $X_1$ toward $Y$ | 0.682   | No Heteroscedasticity |
| $X_2$ toward $Y$ | 0.132   |                       |
| $X_3$ toward $Y$ | 0.101   |                       |

The fifth prerequisite test was autocorrelation by using *Durbin-Watson* test. If the *Durbin-Watson* score is more than  $Du$  and less than  $4-du$  then there is no autocorrelation. Data in this research had no autocorrelation symptoms because *Durbin-Watson* score was more than  $Du$  and less than  $4-du$ . The summary of autocorrelation test is presented in Table 6 as follows.

**Table 6.** Autocorrelation Test Result

| Variable                            | DW    | D-Table |       |       | Note                  |
|-------------------------------------|-------|---------|-------|-------|-----------------------|
|                                     |       | DI      | Du    | 4-Du  |                       |
| $X_1, X_2,$ and $X_3$<br>toward $Y$ | 1.861 | 1.708   | 1.783 | 2.218 | No<br>autocorrelation |

Based on F test or doubled linear regression model test provided that result score  $F_{\text{count}} = 49.014 > F_{\text{table}} = 2.660$ , with significant score 0.000 less than  $\alpha = 0.05$  means significant. The result shows that parents' economic social status, learning environment, and learning facility support students' independency in lesson study based mathematic learning. Meanwhile the determination coefficient score ( $R^2$ ) was 0.877. It can be understood that the percentage is given by parents' economic social status, learning environment, and learning facility toward students' independency were 87.7%, and the other 12.3% influenced by another factor outside the research. It is supported by the research of Mujisuciningtyas (2014) about the influence of learning independency and learning facility toward learning independency with determination coefficient score ( $R^2$ ) was 58.24%. From the research can be seen that high parents' economic social status, conducive learning environment, and complete earning facility support students' high learning independency so it increases mathematic learning result.

F test result test showed that  $H_0$  was denied so it could not perform T test or partial test. T test in first hypotheses resulted the result of  $t_{\text{count}} = 2.751 > t_{\text{table}} = 1.975$  with significant score 0.008 less than  $\alpha = 0.05$  or significant.

This research result shows that parents' economic social status significantly supports students' learning independency. The support of  $Y$  was  $0.4473^2 \times 100\% = 20.01\%$ . This research result is in line with the research of Bayat, Louw, Rena (2014) and Kalaycioglu (2015). It shows that contribution of parents' economic social status toward students' learning independency was 20.0%, which means that the changes of parents' economic social status will affect about 20.0% of students' learning independency. Based on those explanations, it can be understood that the higher parents' economic social status the better learning independency in lesson study based mathematic learning result.

The second partial test resulted the score of  $t_{\text{count}} = 5.773 > t_{\text{table}} = 1.975$  with significant score 0.000 less than  $\alpha = 0.05$  or significant. It means, a learning environment significantly supports students' learning independency. Meanwhile, the support of  $X_2$  toward  $Y$  was  $0.5304^2 \times 100\% = 28.13\%$ . The research result was supported by Kolb (Al-Saai, 2011) which states that learning environment has to be prepared well to fulfill students' characteristics and learning style. If those are not fulfilled, the learning activity will not happen. Thus, learning environment has to be prepared well. Based on this research, it can be concluded that the more conducive learning environment, the higher students' learning independency in lesson study based mathematic learning result.

Atmojo (2013), Rao and Reddy (2016) in their research also states same thing about learning environment. In his research, he concludes that a proper and conducive

learning environment management will increase learning result of 80% students class VII A in SMP Bhakti Kedungtuban with the score  $\geq 75$ . It proves that learning environments not only giving a positive impact toward student independency but also increasing learning result.

The third partial T test resulted score of  $t_{\text{count}} = 3.592 > t_{\text{table}} = 1.975$  with significant score 0.000 less than  $\alpha=0.05$  or significant. It means that learning facility significantly supports learning independency. In learning independency, the support of  $X_3$  toward  $Y$  was  $0.629^2 \times 100\% = 39.56\%$ . It is in line with Alimi (2012), Babatunde and Olanrewaju (2014) which states that there is a significant influence of learning facility toward students' learning achievement with the contribution 14.15%. It can be understood that a complete learning facility, the higher students' independency and increase lesson study based mathematic learning result.

#### 4. Conclusion

Parents' economic social status, environment, and learning facility (significance = 0.000) support students' independency in lesson study based mathematic learning. The support of economic social status, environment, and learning facility toward students' independency in lesson study based mathematic learning is 87.7%. Parents' economic social status supports students' independency in total 20.01% (significance = 0.008). Environment supports students' independency in total 28.13% (significance = 0.000). Facility supports students' independency in total 39.56% (significance = 0.000). It means, the better parents' economic social status, environment, and learning facility will increase students' independency in lesson study based mathematic learning.

#### Acknowledgements

We express our gratitude to all parties supporting this research. Our gratitude expressed to the head of Research Directorate and Community Service, Empowerment Research General Directorate and Research Development, and Ministry of Research, Technology, and Higher Education who helped us in funding this multiyear research through Graduate Team-Research Fund. We also express our gratitude to the Director of Graduate Program of Muhammadiyah University of Surakarta, and the Head of Research Organization Muhammadiyah University of Surakarta and staffs who facilitated and encouraged us so we can accomplish this research. We also thank the Head of *DIKPORA*, headmasters, and Mathematic teachers in Junior High Schools of Salatiga Central Java who had helped this research process so it ran as planned.

#### References

- [1] Alimi, O. S. (2012). School Types, Facilities and Academic Performance of Students in Senior Secondary Schools in Ondo State Nigeria. *International Education Studies*. 5 (3), 44-48.
- [2] Al-Saai, A. (2011). Effect of a Blended E-Learning Environment on Students Achievement and Attitudes Toward using E-Learning in Teaching and

Learning at The University Level. *International Journal for Research in Education*, 9 (2), 35-47.

- [3] Ankabi, M. I., Theophilus, A. B., & Augustina, G. (2014). Influence of Socio Economic Status on Achievement Motivation Among Science Students of Private Senior Secondary School in Ilorin Metropolis, Kware State. *International Journal of Research*, 1 (8), 1110-1114.
- [4] Atmojo, S. E. (2013). Penerapan Model Pembelajaran Berbasis Masalah dalam Peningkatan Hasil Belajar Pengelolaan Lingkungan. *Jurnal Kependidikan*, 43 (2), 125-136.
- [5] Babatunde, M. M., & Olanrewaju, M. K. (2014). Parental Involvement and School Infrastructural Facilities as Determinants of Secondary School Students Learning Achievement in Itesiwaju Local Government Area of Oyo State, Nigeria. *International Journal of Research*, 1 (4), 299-311.
- [6] Bayat, A., Louw, W., & Rena, R. (2014). The Impact of Socio-Economic Factors on the Performance of Selected High School Learners in the Western Cape Province, South Africa. *Journal Humanities Economic*, 45 (3), 183-196.
- [7] Budiyono. (2016). *Statistika Untuk Penelitian*. Surakarta: UNS Press.
- [8] Kalaycioglu, Dilara Bakan. (2015). The Influence of Status, Self-efficacy, and Anxiety on Mathematics Achievement in England, Greece, Hongkong, the Netherlands, Turkey, and the USA. *Educational Sciences Theory & Practice*, 15 (5), 1-11.
- [9] Mujiman, H. (2007). *Manajemen Pelatihan Berbasis Belajar Mandiri*. Yogyakarta: Pustaka Pelajar.
- [10] Mujisuciningtyas, N. (2014). Pengaruh Kemandirian Belajar dan Sarana Prasarana Pembelajaran Terhadap Hasil Belajar Praktik di SMK Negeri 2 Tuban. *Jurnal Ekonomi Pendidikan dan Kewirausahaan*, 2 (1), 103-115.
- [11] Muyiwa, A., & Quadri, A. (2012). Influence of Universal Basic Education (UBE) Facilities on School Learning Environment in Lagos State, Nigeria. *Journal of Economic Education and Practice*, 3 (2), 30-39.
- [12] Rao, J., & Reddy, V. (2016). Impact of Environment, Home Environment, and Mental Health Status on Achievement Motivation Among High School Students. *Indian International Journal of Research*, 5(4), 426-429.
- [13] Singh, P., & Choudhary, G. (2015). Impact of Socio economic Status on Academic-Achievement of School Student: An Investigation. *International Journal of Applied Research*, 1 (4), 266-272.
- [14] Suleman, Q., & Hussain, I. (2012). Effects of Parental Socioeconomic Status on the Academic Achievement of Secondary School Students in Karak District, Pakistan. *International Journal of Human Resource Studies*, 2 (4), 16-31.
- [15] Utama. (2015). *Metode Penelitian Pendidikan Kuantitatif, Kualitatif, PTK, R&D*. Surakarta: Fairus Media.
- [16] Tahar, I., & Enceng. (2006). Hubungan Kemandirian Belajar dan Hasil Belajar Pada Pendidikan Jarak Jauh. *Jurnal Pendidikan Terbuka dan Jarak Jauh*, 7 (2), 91-101.



- [17] Widyaningtyas, A., Sukarmin., & Radiyono, Y. (2013). Peran Lingkungan Belajar dan Kesiapan Belajar Terhadap Prestasi Belajar Fisika Siswa Kelas X Sekolah Menengah Atas Negeri 1 Pati. *Jurnal Pendidikan Fisika*, 1 (1), 136-142.
- [18] Yonitasari, D., & Setiyani, R. (2014). Pengaruh Cara Belajar, Lingkungan Belajar, dan Fasilitas Belajar Terhadap Prestasi Belajar Ekonomi Akutansi Siswa Kelas XI IPS SMA Negeri 4 Magelang Tahun Ajaran 2013/2014. *Economic Education Analysis Journal*, 3 (2), 241-248.