The Effect of Guided Inquiry Learning Model Based On Lesson Study For Learning Community On Chemical Equality Materials

Chesa Defista[1], Andromeda[2], Eka Sovia[3]
[1.2] Department of Chemistry Education, Padang State University. Jl. Prof. Dr. Hamka, West Air Tawar, North Padang, West Sumatra, Indonesia. 25171.
[3] Public Senior High School 1 Padang. Padang Indonesia
Coresponding Author. E-mail:
[1]defistachesa@gmail.com
[2]andromeda@fmipa.unp.ac.id
[3]ekasovia33@yahoo.com

Received: January 14th, 2022 *Accepted:* January 29th, 2022 *Online Published:* January 31th, 2022

Abstract

The learning process on chemical equilibrium material at Public Senior High School 1 Padang tends to use a teacher-centered learning model. This resulted in students' critical thinking skills did not develop because students were not actively involved in the learning process so it had an impact on student learning outcomes. Thus, the guided inquiry learning model can be one solution so that students can be actively involved. To maximize the implementation of the guided inquiry learning syntax, a learning system is applied, namely lesson study for the learning community. In lesson study-based learning for the learning community, learning will be planned and reflected on an ongoing basis. This study was conducted to determine the effect of the guided inquiry learning model based on lesson study for learning community on chemical equilibrium material on student learning outcomes at PUBLIC SENIOR HIGH SCHOOL 1 Padang. The research method is a quasi-experimental research with one group pretest-posttest design. Based on hypothesis testing with the Mann-Whitney test at a significance level of 5% ($\alpha = 0.05$), the value of asymp sig. is <0.001. Then the value of asymp sig. (<0.001) <α (0.05), it can be concluded that the guided inquiry learning model based on lesson study for learning community on chemical equilibrium material affects student learning outcomes.

Keywords: *Guided inquiry learning; lesson study for learning community; learning outcomes; chemical equilibrium*

How to cite this article :

Defista, C., Andromeda, & Sovia, E. (2022). The Effect of Guided Inquiry Learning Model Based On Lesson Study For Learning Community On Chemical Equality Materials. *IJIS Edu : Indonesian Journal of Integrated Science Education, 4(*1), *40-44* . doi:http://dx.doi.org/10.29300/ijisedu.v4i1.6171

Copyright © 2022, Indonesian Journal of Science Education (IJIS Edu)

INTRODUCTION

The learning process on chemical equilibrium material at Public Senior High School 1 Padang tends to be teacher-oriented. The results of the questionnaire filled out by four chemistry teachers at Public Senior High School 1 Padang showed that 75% of chemistry teachers at Public Senior High School 1 Padang still dominate in the learning process or still apply the principles of teacher-centered.

Learning that is still oriented to the teacher results in students not being actively involved in learning. Active student involvement supports students to have higher-order thinking skills. So that it affects the learning outcomes. This is in line with the demands of the 2013 curriculum, where students must have higher-order thinking skills.

Therefore, a learning model is needed that supports students' higher-order thinking skills to develop and students are actively involved. The learning model is a factor that can determine the running of the learning process and influences on the learning outcomes to be obtained (Anggrawan, 2019). Learning outcomes can be in the form of changes in behavior patterns, both in the form of attitudes, appreciation, and skills (Suprijono, 2009).

The learning model can be referred to as a planning activity that is used to plan the form of learning that will be implemented (Trianto, 2007). There are various learning models so that students are active in participating in the learning process, one of which is guided inquiry learning (Marissa et al., 2016).

Guided inquiry learning is a learning model that provides a lot of direction or instructions both through procedures and questions during the process of finding concepts (Lovisia, 2018, p.3). In addition to developing intellectual abilities, guided inquiry learning also helps develop students' full potential (Gulo, 2002).

Guided inquiry learning has five syntaxes, namely orientation, exploration, concept formation, application, and closure (Hanson, 2005, p.1). In this case, to support the guided inquiry learning model, a learning system is applied Lesson Study for Learning Community (LSLC) (Azizah et al., 2014, p.2).

LSLC is a practice carried out by teachers that allows them to work collaboratively and develop professional knowledge (Stigler & Hiebert, 1999). LSLC is in the form of direct observation in the classroom by a group of teachers (Lewis et al., 2006). In addition, LSLC can enhance student-centered pedagogical degrees (Vermunt et al., 2019, p.2). LSLC has three syntaxes, namely the planning stage (planning), the do stage (implementing), and the see stage (reflecting) (Rozak & Fauziah, 2013).

The application of guided inquiry learning in the learning process is common. However, LSLC-based guided inquiry learning is a novelty. Guided inquiry learning based on LSLC can help teachers plan and reflect on learning better. Because at the planning stage, the implementation plan for each guided inquiry learning syntax is discussed with the learning community. Then during the do stage, community members act as observers to observe the implementation of each guided inquiry learning model syntax. The results of these observations are reflected in the see stage to improve the implementation of the learning syntax at the next meeting.

Judging from the explanation that has been presented, the research study was directed to find out the effect of the guided inquiry learning model based on lesson study for learning community on chemical equilibrium material on student learning outcomes at Public Senior High School 1 Padang.

METHOD

This research is a quasi-experimental research using a one-group pretest-posttest design. The structure of the research design is shown in Figure 1. The research was conducted at Public Senior High School 1 Padang from October to December 2021 in three phases, namely preparing, then proceeding with implementation, and finally finishing. The subjects used in the study were students of class XI MIPA 3 Public Senior High School 1 Padang in the 2021/2022 academic year. The research object used is the guided inquiry learning model based on lesson study for the learning community.

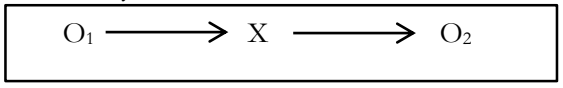

Figure 1. Research Design Structure.

Description :
O_1 : test before treatment
O_2 : test after treatment
X : treatment

In the preparation stage, the researcher prepares matters related to the implementation of the research. These activities include determining the time and place of research, population, research samples, and experimental classes. In addition, observations were made to schools to collect initial information and the reasons for the need for this research to be carried out. The teacher's questionnaire and student's questionnaire were used when observing. After that, the researchers prepared learning tools in the form of lesson plans, document plans for LSLC, and test questions to measure student learning outcomes.

Next is the research implementation stage. At this stage, a guided inquiry learning model based on lesson study for learning community was applied to the sample. Before the treatment was given, a pretest was carried out first, then a posttest after the treatment was given.

The last stage is the completion stage. At this stage, the pretest and posttest values were processed and then analyzed. Then based on the results of data analysis, a conclusion is drawn.

Data collection is done by using multiple-choice test questions to measure learning outcomes, especially in the realm of knowledge (Mulyatiningsih, 2011, p.25). The initial step taken before using the questions was to validate the questions first by testing the validity, homogeneity, discriminating power, and the level of difficulty of the items.

The value of student learning outcomes is then analyzed. The observation process to see the increase in learning outcomes before and after treatment is carried out by using the N-Gain test (Sinaga, 2018, p.5). N-Gain (symbolized by <*g*>) is the normalized gain value (Meltzer, 2002, p.2).

The normality test uses the Kolmogorov-Smirnov test which is a nonparametric test using the continuous equation (Quraisy, 2020, p.2). Meanwhile, to test the homogeneity of data variance was carried out by Levene's test (Sudjana, 2005).

Based on the results of data analysis, it was found that the distribution of the data is normal but not homogeneous, so the Mann-Whitney method of testing will be used. The Mann-Whitney test is a non-parametric hypothesis testing that is carried out if the data is obtained through an abnormally distributed analysis(Nugroho, 2008, p.66).

RESULTS AND DISCUSSION

The results of the student learning process in the cognitive domain are shown in Figure 2 below. Figure 2 shows the average score of students is higher obtained at the posttest stage than the average value of the pretest

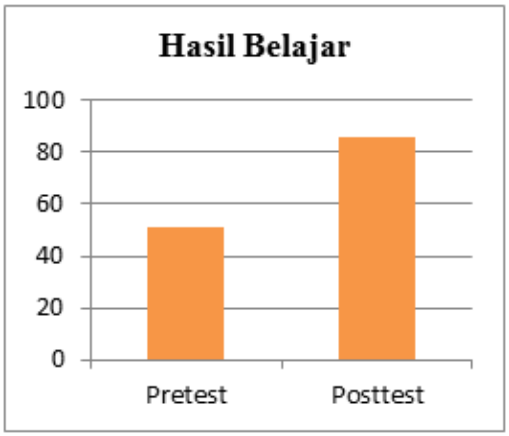

Figure 2. Student Learning Outcomes

The data obtained was tested for the N-Gain value to determine the increase in learning outcomes that occurred. The N-Gain data obtained can be seen in Table 1.

Table 1. N-Gain . Test Results

Average Gain	Average N-Gain	% Average N-Gain
35.13	0.68	68.00

Table 1 shows that there is an increase of 0.68 in student learning outcomes in the medium category.

To select what hypothesis test to use, the data were analyzed through normality and homogeneity tests. Normality test results can be seen in Table 2.

Table 2. Normality Test Results

	Sig.	Interpretation
N-Gain	0.167	Normal

Table 2 shows that the data distribution is normal due to the value of sig. (0.167) > 0.05.

The results of the homogeneity test are seen inTable 3.

Table 3. Homogeneity Test Results

	Sig.	Interpretation
N-Gain	0.003	Inhomogeneous

The data in Table 3 obtained data variance in the form of data that is not homogeneous with a sig value. (0.003) < 0.05.

The analysis results obtained from the distribution of the data is normal and the variance is not homogeneous. So, test the hypotec thesis was conducted nonparametrically using the Mann-Whitney test. Statistical hypotheses, namely:

H_o : μ_o (mean value of pretest) = μ_1 (mean value of posttest)

H_1 : μ_o (mean value of pretest) < μ_1 (mean value of posttest)

The results obtained from testing using the Mann-Whitney test can be seen in Table 4.

Table 4. Hypothesis Test Results

Mann Whitney U	asymp. Sig. (2-tailed)
367,000	<0.001

So from Table 4, it can be seen that the value of asymp. sig (<0.001) <0.05 which makes Ho rejected.

From the results of data analysis, it can be said that the average posttest value after the treatment was given (86.03) was better when viewed from the average reference value at the pretest stage (50.9) before the treatment was given Figure 1.

The N-Gain value obtained is 0.68, it can be concluded that the LSLC-based guided inquiry learning model is said to be effective in increasing learning outcomes. The results of the data normality and homogeneity test results obtained that the data distribution was normal but the variance was not homogeneous. So that the hypothesis test is continued with the Mann-Whitney test. The results of hypothesis testing can be seen in Table 4 where to getasymp value. sig. (<0.001) <0.05. So, Ho is rejected.

The implementation of the guided inquiry learning stage is accompanied by LSLC. In the planning (plan), the model teacher and the observer discussed through a zoom meeting regarding the document plan and lesson plans. Furthermore, the results of the discussion are applied during implementation (do). At this stage, guided inquiry learning syntax is implemented. The first stage in guided inquiry learning is the orientation stage, which is a prerequisite material that students must learn(Hanson, 2005, p.1) In carrying out the research, the teacher shows a PowerPoint slide containing introductory material to students.

Next is the exploration stage where students get the opportunity from the teacher to carry out the process of observing, analyzing data or information(Hanson, 2005, p.1). In carrying out the research, students discuss in groups using the Student Worksheet (LKPD).

Furthermore, students go through the stages of concept formation or concept formation. Student concepts are formed through key questions on the LKPD (Hanson, 2005, p.1). In conducting the research, each group was allowed to present the results of their discussions or provide suggestions to other groups presenting.

The next stage is the application. At this stage, students are given practice questions (Hanson, 2005, p.1). In conducting the research, students did the exercises and collected them through google classroom.

The last stage is closing. This closing stage is in the form of drawing conclusions and connecting one concept to another (Hanson, 2005, p.1). In conducting the research, students were very enthusiastic in conveying conclusions based on the material they had learned.

The results of the implementation are then discussed in a reflection (see) to find solutions to the problems that occur so that they can be improved at the next meeting. Guided inquiry learning based on LSLC is carried out continuously so that there is an improvement in the learning process.

CONCLUSION

The results of the analysis of research data, it can be concluded that the guided inquiry learning model based on lesson study for learning community has a significant effect on student learning outcomes on chemical equilibrium material.

BIBLIOGRAPHY

Anggrawan, A. (2019). Analisis Deskriptif Hasil Belajar Pembelajaran Tatap Muka dan Pembelajaran Online Menurut Gaya Belajar Mahasiswa. *MATRIK : Jurnal Manajemen, Teknik Informatika Dan Rekayasa Komputer*, *18*(2), 339–346. https://doi.org/10.30812/matrik.v18i2.411

Azizah, A. S. N., Susilo, H., & Nugrahaningsih. (2014). Implementasi inkuiri terbimbing berbasis lesson study untuk meningkatkan kemampuan berpikir kritis dan hasil belajar siswa kelas X IPA 4 SMA Brawijaya Smart School Malang. *Proceeding: Biology Education Conference, 11*(1).

Gulo. (2002). *Metode Penelitian*. PT. Grasindo.

Hanson, D. M. (2005). *Designing Process-Oriented Guided-Inquiry Activities* (Issue March). Pacific Crest.

Lewis, C., Perry, R., Hurd, J., & O'Connell, M. P. (2006). Lesson study comes of age in North America. *Phi Delta Kappan*, *88*(4), 273–281. https://doi.org/10.1177/003172170608800406

Lovisia, E. (2018). Pengaruh Model Pembelajaran Inkuiri Terbimbing terhadap Hasil Belajar. *Science and Physics Education Journal (SPEJ)*, *2*(1), 1–10. https://doi.org/10.31539/spej.v2i1.333

Marissa, A., Ayu, N., Tri, A., Tindakan, P., Sma, I. P. A., & Umar, T. (2016). Peningkatan Aktivitas dan Hasil Belajar Siswa Melalui Penerapan Guided-Inquiry Berstrategi Buzz Group. *Jurnal Inovasi Pendidikan Kimia*, *10*(2), 1721–1730.

Meltzer, D. E. (2002). The relationship between mathematics preparation and conceptual learning gains in physics: A possible "hidden variable" in diagnostic pretest scores. *American Journal of Physics*, *70*(12), 1259–1268. https://doi.org/10.1119/1.1514215

Mulyatiningsih, E. (2011). *Riset Terapan Bidang Pendidikan dan Teknik*. UNY Press.

Nugroho, S. (2008). *Statistika Nonparametrika*. UNIB Press.

Quraisy, A. (2020). Normalitas Data Menggunakan Uji Kolmogorov-Smirnov dan Saphiro-Wilk. *J-HEST: Journal of Healt, Education, Economics, Science, and Technology*, *3*(1), 7–11.

Rozak, & Fauziah. (2013). Implementasi lesson study sebagai upaya peningkatan kompetensi pedagogik guru bahasa indonesia di SMP kabupaten Cirebon. *Jurnal Pendidikan Bahasa Dan Sastra*, *13*(1), 1–11.

Sinaga, K. (2018). Pengaruh Penerapan Flipped Classroom pada Mata Kuliah Kimia Dasar untuk Meningkatkan Self Regulated Learning. *EduChemia (Jurnal Kimia Dan Pendidikan)*, *3*(1), 106. https://doi.org/10.30870/educhemia.v3i1.2626

Stigler, J. W., & Hiebert, J. (1999). *The teaching gap: Best ideas from the world's best teachers for improving eduaction in classroom* (Issue May). The Free Press.

Sudjana. (2005). *Metode Statisika*. Tarsito.

Suprijono, A. (2009). Cooperative Learning Teori dan Aplikasi Paikem. In *Kumpulan Metode Pembelajaran*. Pustaka Belajar.

Trianto. (2007). *Model-model Pembelajaran Inovatif Berorientasi Konstruktivistik*. Prestasi Pustaka Publisher.

Vermunt, J. D., Vrikki, M., van Halem, N., Warwick, P., & Mercer, N. (2019). The impact of Lesson Study professional development on the quality of teacher learning. *Teaching and Teacher Education*, *81*, 61–73. https://doi.org/10.1016/j.tate.2019.02.009