JTAM (Jurnal Teori dan Aplikasi Matematika)
http://journal.ummat.ac.id/index.php/jtam
p-ISSN 2597-7512 | e-ISSN 2614-1175
Vol. 7, No. 2, April 2023, pp. 434-442

The Effect of Inquiry Based Learning on Students Mastery of Concept and Social Skills

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Article History:
Received : 20-01-2022
Revised : 13-03-2023
Accepted : 27-03-2023
Online : 06-04-2023

Keywords:
Inquiry Based Learning, Mastery of Concepts, Social Skills.

ABSTRACT

Inquiry Based Learning is a learning strategy that provides space for students to carry out investigations. This study was conducted to test whether there is a positive effect of Inquiry based learning on mastery of concepts and student social skills. The participant used was students of Early Childhood Islamic Education which consisted of 31 people for the experimental class and 30 people for the control class. The type of research used was quasi-experimental design. To test the analysis prerequisites using the data normality test using the Kolmogorov-Smirnov technique and the variance homogeneity test. Furthermore, to analyze hypothesis testing data using parametric statistics, with Analysis of variance techniques (ANOVA). Based on the results of hypothesis testing concluded that there are significant differences in the mastery of the concept of the experimental group students with the control group. then there are significant differences in the social skills of the experimental group students with the control group. The implication of this study is that the use of Inquiry based learning positively influences the mastery of concepts and student social skills and provides good experience to prospective Early Childhood Education teacher students collaborating on various investigations in solving problems.

https://doi.org/10.31764/jtam.v7i2.13236

A. INTRODUCTION

Teacher are one of the key factors for success in learning, because they act as learning designers as well as facilitators of learning activities, determining learning strategies that accommodate all characteristics of students. Designing and facilitating students to always learn, move, discuss, collaborate, by utilizing various technologies will have a positive impact on learning outcomes (Pratiwi et al., 2016); (Nisa et al., 2018) Learners strive to improve the quality of learning through various ways and activities, increasing commitment to improving the quality of learning; designing learning systematically, empowering technology and learning media in the classroom (Branch & Kopcha, 2014); (Buckner & Kim, n.d.) Quality learning is supported by competent learners in designing, innovating in learning by utilizing various technologies and adequate facilities, so that changes occur as a result of the learning process optimally.

Higher education learning places students as adult learners Garrison & Vaughan (2011), College students tend to be able to organize themselves, collaborate with peers, seek

knowledge to answer the problems they face, integrate new knowledge with the knowledge they have by utilizing various environments and technologies around them (Bili et al., 2022). Working together in conducting various investigations by utilizing technology will have a good impact on social performance and learning outcomes (Scott, 2017); (Lambert & Fisher, 2013). Learning activities in higher education are more on developing the knowledge that they already have, by encouraging students to explore independently or in groups, to build and construct their knowledge. Providing many opportunities to be actively involved in carrying out various activities with friends (Branch & Kopcha, 2014); (Gumilar & Wardani, 2019). Based on the observations of researchers in the field, it shows that there are still many problems that have occurred lately, including students not being given much space to collaborate with peers, not being given the opportunity to convey ideas and also not being given space to conduct various joint investigations to solve the problems they face.

Inquiry based learning as an alternative that can be used in the technological era in an effort to increase student involvement and learning outcomes (Fatayan et al., 2022), (Pratiwi et al., 2016). Collaborative learning is learning carried out by two or more people together to do something, encouraging positive interdependence, interaction between students, individual and group responsibilities and the development of team work skills (Susanti et al., 2020). Inquiry based learning is learning that not only cooperates in groups, but provides opportunities for students to collaborate in constructing knowledge by conducting various investigations in the classroom and outside the classroom, utilizing various learning resources around them such as laboratories, libraries, schools, the internet etc (Munazah et al., 2015); (Qamariyah et al., 2021). So that it can provide a good learning experience in developing social skills and mastery of concepts. There are several results of research which state that learning involving students in study groups to conduct various investigations will have an impact on increasing interaction between learners and learning outcomes (Pecka et al., 2014).

Each learner has different characteristics and learning styles Susanti et al. (2020), Involving learners in learning something by giving them the opportunity to experiment with their groups will be able to accommodate a variety of characteristics, interacting with peers and utilizing the learning environment and technological development, will have a good influence on social development and cognition Garrison (2011); Enebechi (2021), impacting on motivation, activity and learning achievement (Fatayan et al., 2022); (Chen et al., 2017). Learning experiences must integrate the interests of individuals and groups, through collaboration, helping each other carry out various investigations to build knowledge and solve various problems in their learning (Garrison & Vaughan, 2011); (Handoyono & Arifin, 2016).

One component in inquiry based learning is the existence of social relationships between students, encouraging students to know each other, collaborating, sharing, being responsible for groups, trusting and supporting, collaborating in conducting investigations to achieve learning goals (Anam et al., 2020); (Susilowati, 2020). Collaborative learning by utilizing technology has an impact on increasing motivation, mastery of concepts and student social skills (Fang et al., 2016); (Sartika, 2022). Collaborative learning encourages students to develop cognitive aspects and their social skills. Social skills is a behavior that needs to be learned, because it allows individuals to interact, get a positive or negative response, with an environment that includes skills in showing empathy, working together, participating in

group activities, helping each other, communicating with others, negotiating, and solving problems (Pratiwi et al., 2016), (Susanti et al., 2020). Social skills is one of the abilities to create social relations that are harmonious and satisfying for various parties, in the form of adjustments to the social environment and solving social problems (Syarifuddin et al., 2020). Social skills can also influence students' learning motivation (Fang et al., 2016). Successful teacher are not only charismatic presenters but those who engage students in tasks that are subject to cognitive and social content and teach them how to do assignments productive (Branch & Kopcha, 2014), (Gumilar & Wardani, 2019).

In this study researchers to focused on the application of inquiry based learning to see their effect on mastery of concepts and social skills in students and are expected to solve various problems of lack of interaction between students, low involvement of students in conducting investigations, lack of mastery of students in concepts that has been studied, has not been fully utilized by various learning resources and various existing technologies. Therefore, the researcher tried to conduct a study on the effect inquiry based learning on mastery of concepts and student social skills in the subject of educational research methods in PIAUD and PGMI Tarbiyah Faculty IAI Muhammadiyah Bima students.

B. METHODS

1. Procedure

The design of this study used quasi experimental design. This study was conducted to determine the effect of inquiry based learning on mastery of concepts and social skills. The design of this study has 2 groups, namely the experimental group is the class used to apply Inquiry based learning, and the control class uses conventional learning as a comparison material. The design in conducting this research is the pretest - posttest non equivalent group design, which is stated in Table 1.

Table 1. Design of Quasi-Experimental Research

Group	Pretest	Treatment	Post-test
Experimental	Q_1	X_1	O_3
Control	Q_2	-	O_4

With:

X : Treatment inquiry based learning

O_1 : Pretest group experiment,

O_2 : Pretest group control

O_3 : Posttest group experimen

O_4 : Posttest group control

2. Treatment

Treatment was given to the experimental group by applying Inquiry Based learning. There are four stages in learning, namely engage, explore, explain, elaborate and evaluate. For more details, it will be presented in Table 2.

Table 2. Stages of Inquiry Based Learning (Maxwell et al., 2015); (Wilson, 2020)

Stages	Learning Activities
Engage	Students are engaged with a challenging situation, prior knowledge is activated, questions are provoked.
Explore	Students investigate the phenomenon, prior knowledge is challenged, ideas are created.
Explain	Students explain the phenomenon, new knowledge is gained and applied.
Elaborate	Students aplay their knowledge towards new situations, knowledge is deepened and extended.
Evaluate	Student reflect on their knowledge and the learning process, assessment.

3. Participants

The students participating in this study were 61 people, consisting of two student groups, the first, the experimental group numbered 31 class A students of the Early Childhood Islamic Education Study Program (PIAUD) and the second, the control group totaling 30 class students B PIAUD study program. The details of the research sample are presented in Table 3.

Table 3. Research Sample Demographics and Treatment

Group	Learning	Number of students
Experiment	Inquiry Based Learning	31
Control	Conventional learning	30

4. Data Collection

Data collection techniques used in this study are techniques in the form of observation sheets, test questions and questionnaires. The observation sheet is used to observe the stages of the learning process, test questions to measure mastery of student concepts, test questions in the form of explanations totaling 10 numbered questions with a scale rating of 10-100, Final score mastery of concepts is an accumulation of individual and group assignments. then the questionnaire was used to measure student social skills adaptation from Gresham and Eliot. Questionnaires numbered 42 items using the Likert scale which has three choices namely often, rarely and never. If students choose "often" given a score of 5, those who choose "rarely" are given a score of 3 and those who choose "never" are given a score of 1.

5. Data Analysis

The data analysis of this study uses descriptive statistics and inferential statistics, the stages of the tests carried out are prerequisite tests namely data normality test and data homogeneity test, to be able to determine the type of statistical test used. The normality test and homogeneous test are used to determine whether the data obtained is normally distributed and homogeneous. The analysis was carried out with the help of the SPSS 24.0 for Windows program at a significant level of $\alpha = 0.05$. The hypothesis test used in this study is to find out whether there is a significant difference between the mastery of the concepts of students taught using collaborative based inquiry learning strategies with conventional learning strategies, then there is no difference in social skills of students taught using collaborative based inquiry learning strategies with learning strategies conventional. The data

analysis technique used in this study is the Statistical Analysis of Variance (ANOVA) technique with the help of the SPSS Version 24.0 program with a significance level of α = 0.05

C. RESULT AND DISCUSSION

The results obtained in this study are related to the variable mastery of concepts and student social skills. The results in the experimental class with treatment used Collaborative based Inquiry learning and control classes that were given conventional learning treatments. More details are presented in Table 4.

Table 4. Data from the mastery of the experimental group

Descriptive Statistics				
Variable	**Learning**	**Mean**	**Std. Deviation**	**N**
Mastery of the Concept	Inquiry based	80.71	5.048	31
	Conventional	77.23	6.897	30
	Total	79.00	6.229	61
Social skill	Inquiry based	72.90	6.128	31
	Conventional	67.23	6.548	30
	Total	70.11	6.904	61

Table 4 above, it can be seen that the mastery of the concept of students taught using inquiry based learning gets an average score of 80.71 with a standard deviation of 5.048, while in the control class taught using conventional learning gets a score of 77.23 with a standard deviation of 6.897, this shows that there are differences in experimental scores and control class scores with an average difference of 3.78. Furthermore, the social skills variables of students by using inquiry based learning get an average score of 72.90 with a standard deviation of 6.128, while the social skills of students taught using conventional learning get a score of 67.23 with a standard deviation of 6.548, indicating that there are differences in scores of students' social skills in the experimental class and the control class with a difference of 5.67. From the results of the statistical analysis this description shows that there are differences in score scores on mastery of concepts and social skills of students given treatment using inquiry based learning with conventional learning.

1. Normality and Homogeneity

The normality test is used to determine whether the data is normally distributed or not. The test was carried out with the help of the SPSS 24.0 for windows program at a significant level α = 0.05, as shown in Table 5.

Table 5. Normality Test Results

Variable	**F**	**df1**	**df2**	**Sig.**
Mastery of the Concept	3.194	1	59	.079
Social Skill	.662	1	59	.419

Referring to Table 5 above shows that the data concept mastery variable has a significance value of 0.79> value α = 0.05. This means that the variable mastery variable data

is normally distributed. Furthermore, the social information variable obtained a significance value of 0.419> a value of α = 0.05. This means that the variable data on social skills are normally distributed. The test was carried out with the help of the SPSS 24.0 for windows program at a significant level α = 0.05. For more details, see the Table 6.

Table 6. Homogeneity Test Results

Test of Homogeneity of Variances				
Variable	**Levene Statistic**	**df1**	**df2**	**Sig.**
Mastery of the Concept	3.194	1	59	.079
Social Skill	.662	1	59	.419

Table 6 shows that social skills variable data get a significant score of 0.419> α = 0.05, meaning that the data distribution of social skills variables is homogeneous. Furthermore, in the concept mastery variable get a significance score of 0.079> the value of α = 0.05, meaning that the data distribution in the concept of mastery of the concept is homogeneous.

2. Hypothesis Testing

The data analysis technique used for hypothesis testing is Analysis of Variants (ANOVA). The purpose of hypothesis testing is to determine whether there is a difference in mastery of student concepts in the experimental class and control class, then there is no difference in the students' social skills in the experimental class and control class with a significance level of α = 0.05. More details are seen in Table 7.

Table 7. Results of Analysis of Variants

ANOVA						
Variable		**Sum of Squares**	**Df**	**Mean Square**	**F**	**Sig.**
Social Skill	Between Groups	490.120	1	490.120	12.201	.001
	Within Groups	2370.076	59	40.171		
	Total	2860.197	60			
Mastery of the Concept	Between Groups	184.246	1	184.246	5.071	.028
	Within Groups	2143.754	59	36.335		
	Total	2328.000	60			

Table 7 shows that the dependent variable mastery of the concept gets a significant score of 0.028 <α = 0.05, meaning that the null hypothesis is rejected, this concludes the alternative hypothesis is accepted, meaning there are differences in mastery of students given treatment using inquiry based learning with conventional learning, then the social skills variable shows a significance score of 0.01 <value α = 0.05, meaning that the null hypothesis is rejected, this indicates the alternative hypothesis is accepted meaning there are differences in social skills of students taught using inquiry based learning with conventional learning. From the results of the data analysis the above research shows that implementing inquiry based learning positively effects the mastery of concepts and social skills.

This study aims to determine whether there is an effect of inquiry based learning on mastery of concepts and social skills of students. This study was conducted for one semester in the fourth semester in education research methods. Referring to the results of the descriptive statistical analysis in table 4 above, it shows that mastery of the concept of

students applying using based inquiry based learning gets an average score of 80.71 with a standard deviation of 5.048, while in the control class taught using conventional learning scores 77.23 with a standard deviation of 6.897, this indicates that there are differences in the scores of the experimental class and the control class with an average difference of 3.78. The results of inferential statistical analysis using Analysis of Variance (ANOVA) show that there are significant differences in the mastery of the concept of students given treatment using inquiry based learning with conventional learning. This can be seen in the significance value of 0.028 <α = 0.05, meaning that the null hypothesis is rejected. The results of this study are in line with the opinion, which states that collaborative learning can improve student learning outcomes by utilizing learning media or sources around, then according to Pecka et al. (2014); Hikmawati et al. (2020) collaborative learning can increase interaction between learners, thus impacting on students' understanding of the material being studied. Inquiry based learning encourages students to be actively involved in conducting various investigations in the classroom and outside the classroom Feyzioğlu & Demirci (2021), observing various phenomena or problems that occur in the field, encouraging students to collaborate and work together to solve various learning problems by utilizing social media sites such as WhatsApp or Facebook for discussion, so that it affects the cognitive and social development of students (Garrison, 2011); (Qamariyah et al., 2021). In addition, students are encouraged to complete group assignments in the form of Student Worksheets (LKM) so that collaboration between students both in class and outside occur by utilizing technology will have a positive impact on learning outcomes (Branch & Kopcha, 2014).

Based on the results of descriptive statistical analysis shows that the social skills variable of students treated using inquiry based learning get an average score of 72.90 with a standard deviation of 6.128, while the social skills of students who treat using conventional learning get a score of 67.23 with a standard deviation of 6.548 , this shows that there is a significant difference in scores between the social skills of students in the experimental class and the control class with a difference of 5.67. From the results of the statistical analysis this description shows that there are differences in score scores on the social skills of students given treat inquiry based learning with conventional learning. On the results of testing the hypothesis above shows that there are differences in social skills of students given treatment using inquiry based learning with conventional learning on the results of analysis of variants get a significance score of 0.01 <value α = 0.05, the results of this study indicate that the use of inquiry based learning has a positive effect on social skills, this is in line with opinion [9] which states that collaborative learning will be able to develop learner social skills. An important component in inquiry based learning is the existence of social presence, the interaction between students, collaboration, responsibility, empathy etc., so that it will positively influence the development of student social skills (Lambert & Fisher, 2013). Based on the results of the above research, it shows that the use of inquiry based learning positively effects the mastery of concepts and social skills.

D. CONCLUSION AND SUGGESTIONS

The results of this study indicate students' mastery of concepts using inquiry based learning is higher than conventional learning, this is related to several factors including students who are actively involved in various discussions, motivation students to become higher because they are supported by their groups, facilities for learning adequate, Furthermore, the use of inquiry based learning can improve social skill compared to conventional learning, because in inquiry based learning students get many opportunities for discussion, working together, helping each other among students, providing positive assistance in the development of student social skills. Inquiry based learning encourages students to be actively involved in learning that is fun and more creative. This shows that there is an implication that the use of inquiry based learning has a positive effect on the mastery of concepts and social skills, providing good experience for students in basic education teachers collaborating to carry out various investigations in solving various problems. Future researchers, they can develop other dimensions such as communication skills and students' critical thinking skills.

ACKNOWLEDGEMENT

The researcher thanked IAI Muhammadiyah Bima which had provided moral and material support.

REFERENCES

Anam, K., Sudarwo, R., & Wiradharma, G. (2020). Application of the Problem Based Learning Model to Communication Skills and Mathematical Problem Solving Skills in Junior High School Students. *JTAM (Jurnal Teori Dan Aplikasi Matematika)*, *4*(2), 155. https://doi.org/10.31764/jtam.v4i2.2553

Bili, S., Suparmi, S., & Sarwanto, S. (2022). Problem-based Learning: Improving Students' Concept Mastery and Learning Activities. *Journal of Educational Science and Technology (EST)*, *8*(1), 25. https://doi.org/10.26858/est.v8i1.21970

Branch, R. M., & Kopcha, T. J. (2014). Instructional design models. In *Handbook of Research on Educational Communications and Technology: Fourth Edition* (pp. 77–87). Springer. https://doi.org/10.1007/978-1-4614-3185-5_7

Buckner, E., & Kim, P. (n.d.). *Running Header: Mobile Inquiry-based Learning Integrating Technology and Pedagogy for Inquiry Based Learning: The Stanford Mobile Inquiry-based Learning Environment (SMILE) Elizabeth Buckner and Paul Kim 1*. 1–26.

Chen, B., deNoyelles, A., Patton, K., & Zydney, J. (2017). Creating a Community of Inquiry in Large-Enrollment Online Courses: An Exploratory Study on the Effect of Protocols within Online Discussions. *Online Learning*, *21*(1), 165–188. doi:10.24059/olj.v21i1.816

Enebechi, R. I. (2021). Effect of inquiry-based learning approach on senior secondary school students' retention in biology. *British International Journal of Education And Social Sciences*, *8*(8), 9–19. https://cirdjournal.com/index.php/bijess/issue/view/134

Fang, S. C., Hsu, Y. S., Chang, H. Y., Chang, W. H., Wu, H. K., & Chen, C. M. (2016). Investigating the effects of structured and guided inquiry on students' development of conceptual knowledge and inquiry abilities: a case study in Taiwan. *International Journal of Science Education*, *38*(12), 1945–1971. https://doi.org/10.1080/09500693.2016.1220688

Fatayan, A., Safrul, S., Ghani, A. R. A., & Ayu, S. (2022). The Implementation of Problem-Based Learning on Multiplication and Division Lessons in Improving Elementary School Students' Learning Motivation. *JTAM (Jurnal Teori Dan Aplikasi Matematika)*, *6*(4), 857. https://doi.org/10.31764/jtam.v6i4.9084

Feyzioğlu, E. Y., & Demirci, N. (2021). The Effects of Inquiry-Based Learning on Students' Learner Autonomy and Conceptions of Learning. *Journal of Turkish Science Education*, *18*(3), 401–420.

https://doi.org/10.36681/tused.2021.81

Garrison, D. R. (2011). *Online Community of Inquiry Review: Social, Cognitive, and Teaching Presence Issues*. doi:10.24059/olj.v11i1.1737

Garrison, D. R., & Vaughan, N. D. (2011). *Blended Learning in Higher Education: Framework, Principles, and Guidelines*. John Wiley & Sons.

Gumilar, R. P., & Wardani, S. (2019). The Implementation of Guided Inquiry Learning Models on The Concept Mastery, Scientific Attitude, and Science Process Skill. *Journal of Primary Education*, *8*(5), 148-`154. https://journal.unnes.ac.id/sju/index.php/jpe/article/view/29256/12919

Handoyono, N. A., & Arifin, Z. (2016). Pengaruh Inquiry Learning Dan Problem-Based Learning Terhadap Hasil Belajar Pkkr Ditinjau Dari Motivasi Belajar. *Jurnal Pendidikan Vokasi*, *6*(1), 31. https://doi.org/10.21831/jpv.v6i1.8114

Hikmawati, H., Kusmiyati, K., & Sutrio, S. (2020). Inquiry Learning Model to Improve Student Cognitive Learning Outcomes in Temperature and Heat. *Jurnal Penelitian Pendidikan IPA*, *6*(1), 97. https://doi.org/10.29303/jppipa.v6i1.330

Lambert, J. L., & Fisher, J. L. (2013). Community of inquiry framework: Establishing community in an online course. *Journal of Interactive Online Learning*, *12*(1), 1–16. http://www.ncolr.org/jiol/issues/pdf/12.1.1.pdf

Maxwell, D. O., Lambeth, D. T., & Cox, J. T. (2015). Effects of using inquiry-based learning on science achievement for fifth-grade students. *Asia-Pacific Forum on Science Learning and Teaching*, *16*(1), 1–31. https://www.eduhk.hk/apfslt/download/v16_issue1_files/cox.pdf

Munazah, Y., Sugianto, S., & Nugroho, S. E. (2015). Model Learning Community Berbasis Inkuiri Terbimbing Untuk Meningkatkan Hasil Belajar Siswa Dalam Pelajaran Ipa Fisika SMP. *UPEJ Unnes Physics Education Journal*, *4*(3). https://doi.org/10.15294/upej.v4i3.9981

Nisa, E. K., Koestiari, T., Habibbulloh, M., & Jatmiko, B. (2018). Effectiveness of guided inquiry learning model to improve students' critical thinking skills at senior high school. *Journal of Physics: Conference Series*, *997*(1). https://doi.org/10.1088/1742-6596/997/1/012049

Pecka, S. L., Kotcherlakota, S., & Berger, A. M. (2014). Community of inquiry model: Advancing distance learning in nurse anesthesia education. *AANA Journal*, *82*(3), 212–218.

Pratiwi, E. R., Wonorahardjo, S., & Arief, M. (2016). The Implementation Of Community Of Inquiry (Coi) Through Blended Learning In Distillation Based On Understanding Of Concepts. *Research Report*, *0*(2). http://research-report.umm.ac.id/index.php/research-report/article/view/652/861

Qamariyah, S. N., Rahayu, S., Fajaroh, F., & Alsulami, N. M. (2021). The Effect of Implementation of Inquiry-based Learning with Socio-scientific Issues on Students' Higher-Order Thinking Skills. *Journal of Science Learning*, *4*(3), 210–218. https://doi.org/10.17509/jsl.v4i3.30863

Sartika, D. (2022). The Effectiveness of Community of Inquiry Learning and Learning Styles Towards Students ' Concept Mastery (Vol. 4, Issue 1, pp. 45–58). DOI: https://doi.org/10.15642/jeced.v4i1.1650 , http://jurnalftk.uinsby.ac.id/index.php/JCED/article/view/1650

Scott, M. D. (2017). *The Effect Of Community Of Inquiry In The Development Of Evidenced-Based Nursing Competencies For The Rn-Bsn Programs*.

Susanti, N., Juandi, D., & Tamur, M. (2020). The Effect of Problem-Based Learning (PBL) Model On Mathematical Communication Skills of Junior High School Students – A Meta-Analysis Study. *JTAM (Jurnal Teori Dan Aplikasi Matematika)*, *4*(2), 145. https://doi.org/10.31764/jtam.v4i2.2481

Susilowati, W. (2020). Meta-Analisis Pengaruh Model Inquiry Learning Terhadap Keterampilan Berfikir Kritis Pada Mata Pembelajaran Tematik. *Jurnal Ilmiah Pendidikan Profesi Guru*, *3*(1), 211–216. https://ejournal.undiksha.ac.id/index.php/JIPPG/article/view/28193

Syarifuddin, Setyosari, P., Sulton, Kuswandi, D., & Sartika, D. (2020). The effect of the community of inquiry (COI) learning model and learning style towards social skills. *European Journal of Educational Research*, *9*(2), 569–578. https://doi.org/10.12973/eu-jer.9.2.569

Wilson, C. E. (2020). *The Effects of Inquiry-Based Learning and Student Achievement in the Science Classroom*. https://scholar.umw.edu/student_research/370/