The Comparison between the Effectiveness of Guided Discovery Model and Inquiry Model for Early Childhood Education Students

R. Sihadi Darmo Wihardjo[a*], Yuliani Nurani[b], Syahrul Ramadhan[c],
[a]Environmental Education, Graduate Program, Universitas Negeri Jakarta, Complex of Universitas Negeri Jakarta, Building M. Hatta St. Rawamangun Muka, East Jakarta, Indonesia, 13220, [b]Early Childhood Education Program, Universitas Negeri Jakarta. Complex of Universitas Negeri Jakarta Building M. Hatta St. Rawamangun Muka, East Jakarta, Indonesia, 13220, [c]Yogyakarta State University. Jalan Colombo No. 1, Karangmalang, Yogyakarta 55281, Indonesia, Email: [a*]rsihadi@unj.ac.id

This research paper aims to know the effectiveness of the Guided Discovery model towards the cognitive competence, meticulous attitude, and psychomotor skill and to know the comparison between the effectiveness of the guided discovery model and the conventional model. The type of this research was quasi-experimental research. This research was conducted by Early Childhood Education (PAUD) Major of Jakarta State University (UNJ) by determining one class that would receive the treatment (the experimental class) and one other class as the control class. Based on the analysis results, it can be concluded that the learning by using the guided discovery model is effective to improve the cognitive competence, meticulous attitude, and psychomotor skills. Based on the average scores and the value of the comparison test between the experimental group and the control group for the cognitive competence and meticulous attitude tend to be more effective when guided discovery was applied. While for the psychomotor skill, the result of its effectiveness is relatively the same (there is no significant difference) between the experimental group and the control group.

Key words: *Guided discovery, cognitive competence, meticulous attitude, psychomotor skill.*

Introduction

The educational process of teaching and learning is a potential process to educate students. There is a direct interaction between teachers and students in the learning process, including early childhood education (Sofyan, Anggereini, & Saadiah, 2019). In this process, educators play a role in student development, so that the results of education through the learning process depend on the educators' behaviour to students. Therefore, the changes that lead to the success of the learning process will happen if educators support the learning and development of students. Moreover, based on various studies, teacher performance and characteristics significantly contribute to successful student learning (Wenglinsky, 2002: Ramadhan dkk, 2019).

In education, including early childhood education, the demand of providing professional education services, especially for young children is meaningful (Black et al., 2017). It is due to early childhood development has various aspects of its development. In Ministry of Indonesian National Education Law, Number 16 of 2007 about Academic Qualification and Teacher Competency Standards regulates the demands of qualifications and competencies for early childhood educators, including teaching skills.

Based on it, half of the students quickly understand, while half slowly understands. These all require the knowledge and skills of teachers to understand and guide them so that they can grow and develop properly (Conny, 2002; Ramadhan dkk, 2019). To actualise teacher professionalism, the government has also set standards for the educator. In Article 26 of PP No. 19/2005 about National Education Standards that educators must have academic qualifications and competencies as agents of learning, be healthy physically and spiritually, and possess the ability to achieve national education goals.

The Early Childhood Education students, as future teacher candidates will need to be prepared and equipped with the knowledge and skills to support their competencies in the future. They will teach and improve the students' ability. Therefore, the college institution has to prepare its' students to be ready to teach seriously. Students need to be taught with the best learning models and not only improve cognitive aspects, but also their attitudes and skills.

Mayer (2004) states that *Guided discovery* can be used effectively in learning due to two important criteria in active learning, is to develop the knowledge to create an understanding of the new information and integrate new knowledge with prior knowledge to have the proper knowledge. Janssen, Westbroek, and van Driel (2014) conducted a study based on *Guided Discovery* that its result optimise learning effectively. Based on the previous description, research about the effectiveness of *Guided discovery* model is needed to improve cognitive

competence, meticulous attitudes and psychomotor skills of Early Childhood Education students.

Method
Types of Research

The type of research used in this study is a quasi-experimental study. It is due to not all variables that arise, and the experimental conditions can be measured or controlled. The research design can be as shown in Table 1.

Table 1: Research Design

Group	Pretest	Treatment	Posttest
E1	O_1	X_1	O_2
E2	O_1	X_1	O_2

Description:
E1: Experiment Group 1,
E2: Experiment Group 2,
X1: Treatment,
O1: *Pretest*,
O2: *Posttest*

This study was conducted at the Early Childhood Education Study Program, UNJ. The study was conducted in the first semester of the school year 2017 /2018. The population in this study was all students of early childhood education. The sample is one class that will be given *Guided Discovery* treatment and one class acted as the control class.

Data Collection Instruments

The research data was collected through research instrument, such as a test to measure cognitive competencies, before and after the learning and observation sheet used to know the student progress in psychomotor skill and meticulous attitude during the learning process. In this observation, there were four observers for three meetings.

Data Analysis Technique

The effectiveness of learning is related to successful implementation designed by educators to achieve learning goals. Based on this definition, the learning process is effective if the application has quality output in learning objectives. Due to the data of the questionnaire is quantitative, it is necessary to determine the criteria for a particular range of scores. The quantitative criteria without judgment conducted by Arikunto and Jabar (2004), which

divides 100% as a maximum condition with five categories. The results of the division of the five categories as follows.

Table 2: Rating Categories

Values	Percentage Intervals
Very Effective	81-100 %
Effective	61-80 %
Adequate	41-60 %
Poor	21 – 40 %
Very Poor	< 20 %

The data analysis techniques used in this study were paired sample t-test to measure the effectiveness of students' cognitive competence, repeated measures to assess the effectiveness of students' attitudes and psychomotor skills and to determine the comparison of the effectiveness of cognitive competencies, meticulous attitudes, and psychomotor skills in the control class and the experimental class used an independent sample t-test using SPSS 20 program.

Results and Discussion
Descriptive Analysis of the Experimental Class (Guided Discovery Model)

This section will describe the findings of Guided Discovery Model Against Cognitive Competence effectiveness, meticulous attitude and psychomotor skill in the experimental class. This analysis is based on the achievement score of each aspect by all students divided by the maximum value and multiplied by 100%. The findings of experimental data, shown in Table 3:

Table 3: The effectiveness of Experimental Class

No	Aspect	Scores	Description
1	Cognitive	83,19	Very Effective
2	Meticulous	77,96	Effective
3	Psychomotoric	77,50	Effective

Based on Table 3, it can be concluded that the effectiveness of *the Guided Discovery Model* to Cognitive Competence is 83.19% and included effective category. For the aspect of meticulous attitude, there was information that the effectiveness of *the Guided Discovery Model* was 77.96 %. The level of effectiveness of the *Guided Discovery* Model to Psychomotor Competence was 77.50 %.

Descriptive Analysis of Control Class (Conventional Model)

This section will describe the findings of the conventional model effectiveness in cognitive competence, meticulous attitude and psychomotor skill. This analysis is based on the result of each aspect of all students divided by the maximum value and multiplied by 100%. The results of the analysis to the control class, represented in Table 4:

Table 4: The effectiveness of Control Class

No	Aspects	Scores	Description
1	Cognitive	70,87	Effective
2	Meticulous	70,96	Effective
3	Psychomotor	75.83	Effective

Based on Table 4, the effectiveness of the conventional Model to Cognitive Competence was 70.87% and including to very effective category. In an aspect of meticulous attitude, the level of effectiveness was 70.96 % and included in the effective category. In the psychomotor aspect, the effectiveness level was 75.83 % and included in the effective category.

Differentiation Test

The differences between two learning models such as the conventional model and *Guided Discovery* model for cognitive competence, meticulous and psychomotor skill, conducted further analysis by comparing all of them. The gain comparison for cognitive competence in the two models is represented by Table 5.

Table 5: Comparison of Cognitive Gain

Group	Cognitive Gain
Experiment (*Guided Discovery Model)*	0,5513
Control (Conventional Model)	0,0642

Based on Table 5 for cognitive aspect, the gain for the Experimental Group (*Guided Discovery* Model) is greater than in the control group (conventional model). The value of the gain Guided Discovery Model was 0.551 while the conventional model was 0.064. The difference in the effectiveness needs to be analysed to determine whether differences are significant or not. Therefore, to analyse these differences, an independent sample t-test was conducted. The following Table 6 is the results of the independent sample t-test for cognitive competency.

Table 6: Independent sample t-test

	Independent Samples Test		
	T	Df	Sig. (2-tailed)
Equal variances assumed Cognitive	8,345	58	0,000
Equal variances not assumed	8,345	56,692	0,000

Based on Table 6, the value of sig 0.001, less than 0.05. Therefore, it can be concluded that there are significant differences between the results of cognitive competence in these two models. Thus, learning using the *Guided Discovery* Model is more effective than the conventional model in terms of cognitive competency aspect. The mean comparisons for a meticulous attitude of two groups are shown in Table 7.

Table 7: Mean Comparison of Meticulous Attitude

Group	The Mean of Meticulous Attitude
Control (The Conventional Model)	0,3570
Experiment (Guided Discovery Model)	0,3946

In a meticulous attitude, the value of the control group (conventional model) was 0.3570 while the experimental group (Guided Discovery Model) was 0.3946. The difference in effectiveness between these two models needs to be analysed to see whether the difference is significant or not. Therefore, to analyse these differences, independent sample t-test was conducted. The following are the results of the independent sample t-test for the aspects of meticulous attitude shown in Table 8.

Table 8: Independent Sample T-Test

	Independent Samples Test		
	T	Df	Sig. (2-tailed)
Equal variances assumed Attitude	3,371	58	0,001
Equal variances not assumed	3,371	54,286	0,001

Based on Table 8, the value of sig 0.001, less than 0.05. Therefore, it can be concluded that there are significant differences between the results of the meticulous attitude in these two groups. Thus, learning by using the Guided Discovery Model is more effective than the conventional model in terms of meticulous attitude. The ratio means aspects of the psychomotor skill of these two models are shown in Table 9.

Table 9: Comparison of The Mean Psychomotor Skills

Group	The Mean of Psychometrics
Experiment (*Guided Discovery Model)*	0,1117
Control (Conventional Model)	0,1178

In the psychomotor skill aspect, the score of the experimental group (*Guided Discovery*) was 0.1117 while the group control (conventional model) was 0.1178. The difference in effectiveness between the two models needs to be analysed to see whether the difference is significant or not. Therefore, to analyse these differences, independent sample t-test was conducted. These following are the results of the Independent sample t-test for the psychomotor aspects shown in Table 10.

Table 10: Independent sample t-test

	Independent Samples Test		
	T	**Df**	**Sig. (2-tailed)**
Equal variances assumed Skill	1,455	58	0,151
Equal variances not assumed	1,455	56,965	0,151

Based on Table 10, the score was 0.151, which means that sig is greater than 0.05. Therefore, it can be concluded that there is no significant difference between the results of the skills of the two models. Thus, learning by using the *Guided Discovery* Model and conventional model does not show different results significantly in psychomotor skill aspect.

Discussion

This study aims to determine the effectiveness of learning by using the *Guided Discovery* Model of cognitive competence, meticulous attitudes and psychomotor skill. Learning using *Guided Discovery* Model can be done in many ways, according to Udo (2010) including simple experimental method, where student activities are directed to practice "exercise" in problem analysis. Besides, it can also knowing the fact of the study object, find out the tools and materials used correctly, or demonstrate experimental procedures appropriately.

The findings are in line with the study of Balim which indicates the same thing; the results state that the discovery learning method influences academic achievement, skills in the method of discovery and knowledge retention at both cognitive and affective levels (Balım, 2009). Champine, Duffy, and Perkins (2009) also conducted a study of discovery learning methods. The findings indicate that the use of discovery learning methods can improve student knowledge. By discovery learning, students can maintain their knowledge. The discovery learning provides a student-centered learning experience and helps students understand new knowledge, can build their confidence in learning what is around them. The

study of Kurniawati (2010) also points out the *Guided Discovery* learning methods significantly affected students' cognitive learning outcomes and scientific attitudes. The findings of Ergül et al. (2011) study which suggested that students' scientific attitude and process skills significantly improved when using inquiry-based science techniques of students in Turkey.

Conclusion

Based on the analysis, we can conclude that learning process by using guided discovery model effectively improve cognitive competencies, meticulous attitudes and psychomotor skills. Based on the average score and comparative test experimental group and the control group for cognitive competence and meticulous attitude, it tends to be more effective when applied *Model Guided* discovery than the conventional model, while for the psychomotor skills show a similar result (not significantly different) between experiment and control groups. The findings of this study are expected to be a reference and guide for lecturers to improve cognitive competence, conscientious attitudes and psychomotor skills of their students, especially for Early Childhood Education students.

REFFERENCES

Arikunto, S., & Jabar, C. S. A. (2004). Evaluasi program pendidikan pedoman teoritis praktis bagi praktisi Pendidikan. *Jakarta: Bumi Aksara*.

Balım, A. G. (2009). The Effects of Discovery Learning on Students' Success and Inquiry Learning Skills. *Eurasian Journal of Educational Research (EJER)*(35).

Black, M. M., Walker, S. P., Fernald, L. C., Andersen, C. T., DiGirolamo, A. M., Lu, C., . . . Shiffman, J. (2017). Early childhood development coming of age: science through the life course. *The Lancet, 389*(10064), 77-90.

Champine, S. L., Duffy, S. M., & Perkins, J. R. (2009). Jerome S. Bruner‟s Discovery Learning Model as the Theoretical Basis of Light Bounces Lesson: Online).

Conny, S. (2002). Belajar dan Pembelajaran Dalam Taraf Usia Dini. *Jakarta: Ikrar Mandiri Abadi*.

Ergül, R., Şımşeklı, Y., Çaliş, S., Özdılek, Z., Göçmençelebı, Ş., & Şanli, M. (2011). The effects of inquiry-based science teaching on elementary school students'science process skills and science attitudes. *Bulgarian Journal of Science & Education Policy, 5*(1).

Janssen, F. J., Westbroek, H. B., & van Driel, J. H. (2014). How to make guided discovery learning practical for student teachers. *Instructional Science, 42*(1), 67-90.

Kurniawati, D. (2010). Implementasi Metode Guided Discovery dalam Pembelajaran Matematika untuk Meningkatkan Aktivitas dan Hasil Belajar Siswa Kelas IXB SMP N 1 Punung Kabupaten Pacitan: Skripsi.

Mayer, R. E. (2004). Should there be a three-strikes rule against pure discovery learning? *American psychologist, 59*(1), 14.

Ramadhan, S., Mardapi, D., Sahabuddin C., & Sumiharsono R. "The Estimation of Standard Error Measurement of Physics Final Examination at Senior High Schools in Bima Regency Indonesia." Universal Journal of Educational Research 7.7 (2019) 1590 - 1594. doi: 10.13189/ujer.2019.070713.

Ramadhan, S., Nasran, S. A., Utomo, H. B., Musyadad, F., & Ishak, S. (2019). The Implementation of generalisability theory on physics teachers' competency assessment instruments development. *International Journal of Scientific and Technology Research*, *8*(7), 333–337.

Sofyan, H., Anggereini, E., & Saadiah, J. (2019). Development of E-Modules Based on Local Wisdom in Central Learning Model at Kindergartens in Jambi City. *European Journal of Educational Research, 8*(4), 1137-1143.

Udo, M. E. (2010). Effect of Guided-Discovery, Student-Centred Demonstration and the Expository Instructional Strategies on Students' Performance in Chemistry. *African Research Review, 4*(4).

Wenglinsky, H. (2002). The link between teacher classroom practices and student academic performance. *Education policy analysis archives, 10*, 12.