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The Improvement in Students' Conceptual Understanding after Guided Inquiry Learning with Mind Mapping

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Abstract

The implementation of learning in 4th grade SDN Gugus Ki Hajar Dewantara has not guided the students to find their own concepts of knowledge and answer analytical questions. The students feel bored and caused the lack of students' conceptual understanding in learning materials. This research aimed to analyze the improvement in students' conceptual understanding after guided inquiry learning with mind mapping. The research method used quasi experimental with nonequivalent control group design. The research implemented to 4th grade students of SD Negeri Tlogowungu 01 and SD Negeri Tlogowungu 03, Pati Regency. The data collection techniques were documentation, observation, and conceptual understanding test in the form of essay. The data were analyzed by gain score test and T-test. The result revealed that there was significant improvement in students' conceptual understanding after guided inquiry learning with mind mapping. There was significant difference in the average scores of conceptual understanding between the experimental class and the control class with signification rate 5% with the N-Gain of experimental class was 0.85 which included in high category while the control class was 0.51 which included in medium category. The result of independent test stated there was a difference between the experimental class and the control class showed by significance value of 0.003 <0.05. It shows that there was an improvement in students' conceptual understanding after guided inquiry learning with mind mapping. This research can be used as contribution of thoughts to improve the education quality in general and students' achievements in specific.

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INTRODUCTION

21st century known as century of knowledge which is the main base for various aspects of life. According to research of Heni (2015) in integrated thematic learning there is a quite efficient scientific approach to be used in learning. In the learning process, teachers also have an important role. Mayasari (2016) and Nuri (2018) explained that in 21st century the era rapidly develop and along with the sophisticated technologies development. As the facilitators, teachers need to prepare their students to have skills that may help to face the era development, so the students can face the problems in daily life. In this learning, students have to gain skills that leads to conceptual understanding so the student learning outcomes can be maximized after the learning process.

Generally the students' conceptual understanding is still low, it is caused by various factors as follows, suboptimal implementation of conceptual understanding to students (Puspani, 2013:352). If the teachers often to teaches how the good conceptual understanding, students will get used to it and have goodconceptual understanding skill due to it has become a habit in students' life. Developing and practicing the conceptual understanding are not only for students with quick understanding or fast learner, but have to be taught and trained to all students including slow learner students.

The teachers' action in developing student's skills is one of professional teacher characteristic, the teachers not supposed to only teach material learning but widely have to develop students' personality and understanding skills of students. Meanwhile, although teachers are the spearhead in learning quality improvement, it is not tolerated iflearning is focused on teachers only but it must *emphasizes students' active roles, because the more active the students' in learning then the bigger chance to improve students understanding towards the learning materials.*

Based on learning observation in 4th grade SD Gugus Ki Hajar Dewantara found several facts, as follows: 1) Students having troubles in answering analytical questions; 2) The students' answers on question given by the teachers are not deeply answered and based on the book; 3) Half of students cannot solve the problems on the same material but with different model or example problems; 4) In problem solving, students never solve by their own but needed a teacher's participation. If it connected with the result of interview and observation on learning process, the cause of inequality in those skills was lack of learning model variations used by the teachers, so students feel bored and caused the lack of students' conceptual understanding in learning.

The research on guided inquiry and conceptual understanding conducted by Asriningsihet al (2015: 137), the result obtained there was a guided inquiry learning model effect based on environment towards conceptual understanding and character. The next research was conducted by Murnaka, N. P., & Dewi, S. R. (2018: 170) from their research, there was difference in average of improvement in mathematical conceptual understanding between students with guided inquiry learning method and students with conventional learning.Isa, A. (2016: 62) also conducted a research, the result revealed that the implementation of guided inquiry learning method assisted by multimedia could increase students' interest and understanding. Based on the researches above, they show that guided inquiry learning model can improve the students' understanding conceptual.

To complete the researches above, the result of Isnaini, M. (2016: 149) research revealed that implementation of Mind Mapping learning strategy has positive effect on learning process due to helps the

students to be more active and improve students' conceptual understanding.The other supported research is Sartono, et al (2016: 20) the result of students' conceptual understanding test in the experimental class and the control class showed that implementation of reciprocal learning model of mind mapping integrated model influence to students' conceptual understanding.

Based on the description, in order to solve the problems, teachers' innovations are needed to change the learning model used in the learning process. Guided inquiry learning with mind mapping model will actualize a meaningful learning. Students were guided to create mind mapping, then students will be easier to clearly and creatively identify what they have learned. The conducted learning will become alive, various, and familiarize students in solving problems by maximizing their thoughts and creativities.

The purpose of this research is to analyze the students' conceptual understanding after guided inquiry learning with mind mapping. The result of this research are expected to give empirical support towards learning theories and concepts, especially for inquiry learning with mind mapping that encourages deeper study in practical level. This research also expected to give alternative reference for educational practitioners in developing the learning process that fits with new theories and concepts based on dynamics and demands of times.

METHOD

The research method used was quasi experimental with nonequivalent control group design. The population in this research was all of 4th grade students SD Gugus Ki Hajar Dewantara in the 2019/2020 academic year. The collection samples by researchers was conducted by purposive sampling technique based on several consideration, then it was decided that students of 4th grade in SD Negeri Tlogowungu 03 as the experimental class and students of 4th grade in SD Negeri Tlogowungu 01 as the control class. The collection data technique used test and non-test techniques. The instruments of collection test data used were pre-test and post-test questions in the form of multiple choices and essay, meanwhile the instrument of collection non-test data used were observation sheets and documentations. The analysis technique of quantitative data used in this research were analysis of prerequisite test and hypothesis test. The analysis of prerequisite test includes validity test, reliability test, difficulty level test, and distinguishing power test. Analysis of hypothesis test used to describe the difference in average scores of students before and after using gain normalized test.

RESULTS AND DISCUSSION

The result showed that guided inquiry learning with mind mapping improves conceptual understanding of 4th grade elementary schoolstudents. This is showed by 0.003 as the significance value which means sig < 0.05 so H0 is rejected. This proves that there was an improvement in students' conceptual understanding after guided inquiry learning with mind mapping. The calculation result of independent sample t-test in students'conceptual understanding can be seen in Table 1 as follows.

Table 1. Independent Sample T-test

Sig. 2 tailed	α	Mean		Information
		Experiment	Control	
0,003	0.05	93.20	85.43	H_0 rejected

Moreover, the improvement of guided inquiry learning model with mind mapping in conceptual understanding can be seen at the control class value with the experimental class which implemented guided inquiry learning model with mind

mapping. In the control class, gained a score of 85.43 and in the experimental class that implemented guided inquiry learning model with mind mapping gained a score of 93.20, this shows that there was a difference between posttest scores of the control class and scores of the experimental class or can be concluded that there was an effect of implementing the guided inquiry learning model towards students' conceptual understanding skill.

The improvement of conceptual understanding was also analyzed with N-Gain test. The purpose of this gain test is to determine the criteria of conceptual understanding improvement. In the control class, the average N-Gain was 0.51 and included in medium category, meanwhile in the experimental classthe average of N-gain was 0.85 and included as high category. Based on the result, known that the experimental class experienced better improvement in conceptual understanding than the control class. The result of N-Gain test can be seen at Table 2 as follows.

Table 2. The Average N-Gain of Conceptual Understanding

Control Class	Experimental Class
Average of N-Gain	
0.51	0.85
Category	
Medium	High

This shows that implementation of guided inquiry learning model with mind mapping can maximized the improvement on conceptual understanding. The improvement caused by the activity of guided inquiry learning with mind mapping, students conduct learning by themselves through information or facts collection process, then analyze and conclude it into comprehension so that students conduct learning not only to memorize but to understand thoroughly from the beginning to the end of learning.

This result is in line with theory explained by McDonnell (2013: 10) stated that "... guided inquiry has the power to improve student's conceptual understanding and higher thinking skills as well as their attitudes towards science." The statement means that guided inquiry learning has the power to improve the skill of conceptual understanding and higher thinking skills and scientific attitudes.

To support the statement, Margiastuti, S. N (2015: 10425) confirmed that guided inquiry learning model can makes students easier to understand the given materials so it can improve students' conceptual understanding. The improvement of students' conceptual understanding gained from their experiences in conducting learning which through research activity and experiences. The result of Balim, AG (2013: 337) research showed that there was significant difference between the experimental class and the control class in academic achievements, learning retention score, and score of inquiry learning skill perception, either on cognitive level or affective level. Moreover, research of Mawarsari, A., &Sudarmin, S., (2013 : 1) stated that the implementation of experiment method with inquiry approach to material of buffer solutions positively affects the students' conceptual understanding.

Furthermore, Ngertini, et al (2013: 9) also conducted a research on guided inquiry and conceptual understanding. The result obtained that there was a difference in ability of conceptual understanding between groups of students with guided inquiry learning model and groups of students with direct instruction learning model. Based on the research above, it shows that guided inquiry learning model can improves the students' conceptual understanding.

This is also supported by the statement of Rahmawati & Budiningsih (2014; 131-132) groups of students with mind mapping learning, have a better

ability inconceptual understanding. Mind mapping learningmethod is able to give students long-term memory because the mind mapping method able to maximize the work of both sides of brain. This gave the long-term memory so they could obtain informations faster, because with mind mapping students were given chance to understand the concepts by using pictures, symbols, colors, and other key points based on their creativity and desires. This shows that mind mapping is able to improve the student's conceptual understanding.

Researchers took three indicators of conceptual understanding including constructing models, giving examples and categorizing. The average score of conceptual understanding for each indicator can be seen in Figure 1.

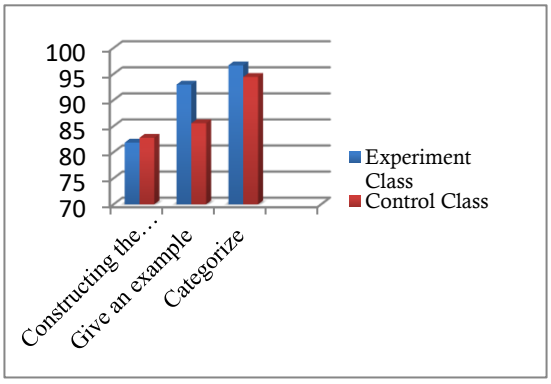

Figure 1. The Average Scores of Each Conceptual Understanding Indicators

On the constructing model indicator, the average score of the experimental class model was 81.85 while the average score of the control class was 82.78 so the average score of the experimental class was lower than the control class. On the giving examples indicator, the average score of the experimental class was 92.96 while the average score of the control class was 85.56, so the average score of the experimental class was higher than the control class. On the categorizing indicator, the average score of the experimental class was 96.67 while the average score of the control class was 94.44, so the average score of the experimental class was higher than the control class. It can be concluded that the average score of the experimental class in conceptual understanding was higher than the control class. The highest average score occurred on the categorizing category, while the lowest average score occurred on the constructing model indicator.

Ambarsari, Santoso & Maridi (2013: 90) stated that the activities of guided inquiry model were more focused on students than conventional learning. In guided inquiry learning, each students were given chance to determine and find their own provided problems to be solved. This is indirectly train students to think how to find and solve the problems, so the problems solving result cause students to understand the learning concepts thoroughly. Based on the discussion above, it can be concluded that guided inquiry learning with mind mapping implementation improves students' conceptual understanding.

The result of this research are expected to give empirical support towards learning theories and concepts, especially for inquiry learning with mind mapping that encourages deeper study in practical level. This research also expected to give alternative reference for educational practitioners in developing the learning process that fits with new theories and concepts based on dynamics and demands of times.

CONCLUSION

There was an improvement in students' conceptual understanding in this research. This is proved by the collection of pretest-posttest scores before and after being given experiment and conduct hypothesis test and collection of N-Gain scores. The result of T-test revealed that there were differences in conceptual understanding between the

experimental class and the control class where the experimental class was better than the control class. The obtained N-Gain score of the experimental class included in high category which means higher than the N-gain score of the control class which is in the medium category. Based on the study above, it can be concluded that there was an improvement in students' conceptual understanding after the guided inquiry learning with mind mapping.

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REFERENCES

Ambarsari, W., & Santosa, S. Maridi. (2013). Penerapan Pembelajaran Inkuiri Terbimbing Terhadap Keterampilan Proses Sains Dasar Pada Pelajaran Biologi Siswa Kelas VIII SMP Negeri, 7, 81-95.

Asriningsih, K. K. A., Supardi, K. I., & Wardani, S. (2015). Pengaruh Model Pembelajaran Inkuiri Terbimbing Berbasis Lingkungan Terhadap Kemampuan Pemahaman Konsep dan Karakter Pada Siswa Kelas V SD. Journal of Primary Education, 4(2), 132-138.

Balim, A. G. (2013). The effect of mind-mapping applications on upper primary students' success and inquiry-learning skills in science and environment education. International Research in Geographical and Environmental Education, 22(4), 337-352

Heni, Dwi Nur. (2015). Pengembangan Perangkat Pembelajaran Tematik Bervisi SETS Berkarakter Peduli Lingkungan. Journal Of Primary Education. 4(1).

Isa, A. (2016). Keefektifan pembelajaran berbantuan multimedia menggunakan metode inkuiri terbimbing untuk meningkatkan minat dan pemahaman siswa. Jurnal Pendidikan Fisika Indonesia, 6(1).

Isnaini, M. (2016). "Pengaruh Strategi Pembelajaran Mind Map terhadap Pemahaman Konsep pada Materi Sistem Ekskresi Kelas XI IPA SMA Negeri 1 Pampangan Oki". Jurnal Bioilmi. 2 (2): 142-150.

Margiastuti, S. N. (2015). Penerapan model guided inquiry terhadap sikap ilmiah dan pemahaman konsep siswa pada tema ekosistem (Doctoral dissertation, Universitas Negeri Semarang).

Mayasari, Tantri. (2016). Apakah Model Pembelajaran Problem Based Learning dan Project Based Learning Mampu Melatihkan Ketrampilan Abad 21?. JPFK. 2(1): 48-55.

Mawarsari, A., & Sudarmin, S. (2013). Penerapan Metode Eksperimen Berpendekatan Inkuiri Untuk Meningkatkan Pemahaman Konsep Dan Sikap Ilmiah. Jurnal Pembelajaran Kimia, 2(1).

McDonnell, J. B. (2013). The effects of guided inquiry on understanding high school chemistry.

Murnaka, N. P., & Dewi, S. R. (2018). Penerapan Metode Pembelajaran Guided Inquiry untuk Meningkatkan Kemampuan Pemahaman Konsep Matematis. Journal of Medives: Journal of Mathematics Education IKIP Veteran Semarang, 2(2), 163-171.

Ngertini, N. N., Sadia, I. W., & Yudana, I. M. (2013). Pengaruh

Implementasi Model Pembelajaran Inkuiri Terbimbing Terhadap Kemampuan Pemahaman Konsep Dan Literasi Sains Siswa Kelas X SMA PGRI 1 Amlapura. Jurnal Administrasi Pendidikan Indonesia, 4(1).

Nuri. 2018. Pembelajaran Berbasis Produksi sebagai Upaya Peningkatan Ketrampilan Produktifitas Siswa SMK. Phys. Comm. 2 (1): 46-51.

Puspani, P. (2013). Pengaruh Strategi Pembelajaran STAD Menggunakan Penilaian Portofolio Dan Kemampuan Akademik Terhadap Pemahaman Konsep SMP Pada Pembelajaran Biologi. Jurnal Pendidikan Sains,. 1(4), 351-364.

Rahmawati, M. M. E., & Budiningsih, C. A. (2014). Pengaruh Mind Mapping dan Gaya Belajar terhadap Pemahaman Konsep Siswa pada Pembelajaran IPA. Jurnal Inovasi Teknologi Pendidikan, 1 (2), 123-138.

Sartono, N., Komala, R., & Dumayanti, H. (2016). Pengaruh Penerapan Model Reciprocal Teaching Terintegrasi Mind Mapping terhadap Pemahaman Konsep Siswa pada Materi Filum Arthropoda. Biosfer: Jurnal Pendidikan Biologi, 9 (1), 20-27.