The Effect of Quantum Model to Students' Learning Independence for Elementary School in Natural Science Learning

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Abstrak

Penelitian ini bertujuan untuk menemukan pengaruh model pembelajaran quantum terhadap kemandirian belajar siswa sekolah dasar pada pelajaran IPA. Penelitian ini adalah penelitian tindakan kelas. Penelitian ini dilakukan di SDN 060827 Medan dengan subjek penelitiannya terdiri dari 37 siswa kelas V. Pengumpulan data dilakukan dengan observasi dan kuesioner. Data dianalisa dijelaskan dengan bebrapa langkah yaitu pengumpulan data, pengurangan data, penampilan data dan membuat kesimpulan. Hasil dari penelitian membuktikan bahwa ada pengaruh model pembelajaran quantum terhadap kemandirian belajar siswa untuk siswa sekolah dasar pada mata pelajaran IPA. Model Kuantum sangat efektif digunakan dalam pembelajaran IPA untuk anak sekolah dasar.
Kata Kunci: Model Quantum, Kemandirian Belajar Siswa, IPA

Abstract

The purpose of this research was to find out the effect of quantum model on elementary school students' learning independence in natural science learning. The research design was classroom action research. This research was done at SDN 060827 Medan with the subject of the research was 37 students of grade V. The data collection was using: observation and questionnaire. The data were described and elaborated by mixing some steps, they were collecting the data, data reduction, data display, and finally conclusion. The results of the research prove that there was an effect of quantum model on students' learning independence for elementary school in teaching natural science learning. Among of indicators, the highest score was motivation. The Quantum model is very effective to use in teaching natural science learning for elementary school.
Keywords: Quantum Model, Students's Learning Independence, Natural Science Learning

INTRODUCTION

Education is the most important aspect in preparing human resources in the digital era right now. It is very clear that a developing country can be seen by education. Education, especially natural science has a very important role to solve and overcome these recent problems. (Sugiyono, 2015) noted that national education has the aim to develop the potential of students to become good human beings, have faith and fear of God Almighty, as well as skills that are needed by himself, the community, the nation, and the state. So every school has to have a big effort to improve their quality of teaching. The quality of the education process determines the results of education because if the process is taught by the teacher well, the result got by the students will be good. Improving the quality of education can be done through improving the quality of learning which is determined by the teacher in the teaching-learning process in the classroom. Indicators for the success of the teaching-learning process can also be determined by learning facilities and infrastructure, class conditions, learning methods, and also students' learning independence in following the lessons given by the teachers.

Students' learning independence comes from the students themselves which can be shown from the activeness and enthusiasm of students in following lessons in the class. If the students feel interested in learning, of course, the lesson will be interesting. (Sudarwo et al., 2018) stated that independent learning is an active learning method to develop each individual who is not tied to the presence of learners in a face-to-face class meeting or the presence of other study friends. (Siagian et al., 2020) stated that independent learning is learning done by students freely in determining their learning goals, learning directions, planning the learning process, learning strategies, using selected learning resources, making academic decisions, and carrying out activities to achieve learning goals.

Students who study independently will try by themselves to understand the essence of the activities they read or see (Ramadhani & Fitria, 2021). Independent learning is a situation of learning activity-independent, it does not depend on others and they take responsibility for themselves in solving a problem. By knowing the definition of independent learning, it is concluded that the indicators of independent learning include: self-confidence, self-discipline, initiative, responsibility, and motivation (Dharmawati, 2021). The importance of students' learning independent can be seen from situations in the teaching-learning process that really need attention from the education world. Situations that occur in the context of learning are students who almost don't have independence in learning. That's why students' independence in learning is very important and needs to be developed in students. Students' learning independence is also needed in natural science learning as one of the important subjects in elementary school.

Natural science learning has an important role in improving the quality of education, especially to produce a generation that quality, namely humans who can think critically, creatively, and logically (Fitria, 2017). It consists of concept and abstract principles, so it is needed the ability to think creatively, solve the problem and make a decision by having learning independent. Learning natural science has a very clear learning objective in the life process of school students (Mufarrid & Miaz, 2020). In teaching natural science learning, the teachers need a learning model to improve students' learning independence (Lusidawaty et al., 2020). This statement was also supported by (Marta et al., 2020), who said that in science learning, teachers are needed who are creative in choosing and determining learning models. The teacher also must have many ideas in making an interesting teaching-learning process. One learning model that can be used for the teacher is the quantum model.

The Quantum model is one of the student-centered learning models. In this learning process, students became the center of teaching natural science learning. (Sasmita & Fajriyah, 2018) stated that the quantum learning model is considered capable as an alternative to learning renewal because it provides practical and specific instructions for creating an effective learning environment for how teachers design learning, deliver learning materials, and how to simplify the learning process so that it makes learning easier for students. (Zeybek, 2017) mentioned that Quantum learning aims to realize the individual as a whole, moving from the

findings and assumptions of quantum physics. In this model, there are steps in structuring the learning environment and giving motivation, so that an optimal learning environment can be created to achieve the learning objectives and the learning atmosphere becomes more comfortable and pleasant (Pratama & Solehuddin, 2019).

The Quantum model gives more effective and gives good results because the basic principle in the quantum model is to create or make fun effective teaching-learning process. The Quantum model in the teaching-learning process also includes all related interactions to improve students' learning independence students in natural science learning. The principles of the Quantum Teaching Learning model create the best learning environment for students (Kristiyanto, 2020). A learning environment when the teaching-learning process happens can bring positive attitudes and thoughts. In learning activities for social science, the teacher involves students actively in their learning process.

Based on the observation in October 2021 at grade V SDN 060827 showed that natural science learning as the subject school was carried out with a teacher-centered approach, so students only listen to the lessons explained by the teacher. As the result, the students' KKM (minimum completeness criteria) was still low. The average score of students was 65, meanwhile, KKM from natural science learning was 70. Of 36 students, there were 14 students which got a score of 70. And the rest students got below 70. It means that there were only 38% of students could reach KKM in this school and the other 62% only got under 70. The low achievement in learning natural science of students was influenced by having independent learning in school. The teaching-learning process can succeed not only from face-to-face activities and structured assignments given by the teacher but also in the independence in learning that students have. The problem was found in the classroom when the teacher was teaching natural science learning. The problem was the conventional method used by the teacher make the classroom boring. Teachers who taught Teaching natural science learning makes students passive and the students didn't have creativity in thinking. As the result, they will get a low score. This low score will affect their learning outcomes.

Based on the interview that had been done with the teacher, it was stated that the students' learning was still low. The low students' quality can affect the students' achievement in learning. These low achievements are influenced by students' learning independence. Most of the students wouldn't read their books or do the exercises if the teacher didn't instruct them. When the teaching-learning process happened, students did not have the responsibility to learn by themselves. And some students were playing and talking to with their classmates. They enjoyed it when the teacher didn't give them the assignment, and they did nothing in the classroom. It seemed that they have the motivation to study especially to study natural science learning. Students had not been allowed to involve in understanding the concept of natural science learning, there were also still many students who did not understand the material they had just learned during the evaluation learning is carried out.

This situation was supported by the way the teacher gives teaching material and the learning method used can also affect students' achievement in learning natural science. It was another fact, the results of natural science learning achieved in the fifth-grade students of the elementary school in SDN 060827 so far were still not optimal. So, to solve this problem, the teacher was forced to choose the best method to improve students' learning independence. And the quantum model can be chosen by the teacher in teaching natural science learning for students in grade V. Based on the theory, this research used four indicators of students' learning independence, they are self-confidence, self-discipline, initiative, responsibility, and motivation. Based on the observation during teaching and learning natural science, students in grade V at SDN 060827 have not had the four indicators of learning independence. Based on the background, the purpose of this research was to find out the effect of quantum model on students learning independence for elementary school in teaching natural science learning.

The research about the quantum model in learning natural science had ever been done by (Mairina & Amini, 2021). The result was students' achievement in learning natural science learning at SDN 08 Sungai Rumbai improved by using the quantum model seen from the cognitive, affective, and psychomotor aspects. It can be seen that it is different with this research. This research discussed the effect of the use of quantum in learning natural science on students' learning independence for primary students in grade V. The novelty of this research is the use of the quantum model in seeking student learning independence in learning natural science.

METHOD

The research design was classroom action research by using a combination of quantitative and qualitative approaches. (Khasinah, 2013) defined that Action Research is a process in which educators examine their practice systematically and carefully using the techniques of research. The subject of the research was 36 students in grade V of SDN 060827 Medan in teaching-learning natural science for the subject of environmental from thematics book. The data collection used: (1) Observation, it was used to observe students' learning independence related to applying the quantum model in teaching-learning natural science, (2) Questionnaire, it was used to observe students' independent learning. In analyzing the data, it was described by using numbers and presented by the table and figure. The data were described and elaborated by mixing some steps, they were collecting the data (it was taken by having observation, interviews, and document), data reduction (it was done by selecting the data, focusing, and making simplifying), then data display (it was presented in table and figure) and finally making conclusion (it was done by giving the meaning, confirming and verifying).

The scale range of achievement was taken from (Riduwan & Kuncoro, 2012) which explains the score interpretation criteria for having achievement level was presented in table 1.

Table 1
Scale Range of Achievement

Percentage	Category
$80\% < p \le 100\%$	Excellent
$60\% < p \le 80\%$	Very Good
$40\% < p \le 60\%$	Good
$20\% < p \le 40\%$	Bad
$0\% < p \le 20\%$	Very Bad

RESULT AND DISCUSSION

Data in Cycle 1

The analysis of students' independent learning was also analyzed by using the indicators of independent learning, it consists of self-confidence, self-discipline, initiative, responsibility, and motivation. The score resulted from students' independence learning questionnaire in learning natural science subject. The data was taken from the first and second meetings of cycle I, Data obtained from the observation sheet of students' learning independence, it was known as the first cycle, the score an average of 92,5 with a percentage of 64,1% so it was included in the good category of learning independence. The percentage of 64.1% had not reached as the successful indicator, so it must be improved. A questionnaire data of learning independence in cycle I, the learning independent score was 121.5 with an average score of 3.2, and the presentation of learning independence was 65.8%. It was included in the good category.

Data observation of applying the quantum model in teaching natural science learning was shown that students still were not motivated and felt unconfident in sharing ideas and giving an opinion. There was also small discussion group-related questions and answers but it seemed stuffy and boring. They felt afraid and shy to speak up. Based on the description if it was seen from success criteria, the learning independence of grade V

SDN 060827 in the first cycle of meetings one and two could be concluded that learning independence had not been achieved because the indicator of success that students had to achieve was 80%.

Data in Cycle II

Students' learning independence data was taken in the first and second meetings of cycle II, the data of the instrument were in the form of observation sheets and questionnaire sheets obtained an average score of 130.5 with the percentage of 85.5%, it was included in very good criteria of learning independence. So it can be concluded that there was an improving score from cycle I with an average score of 92.5 with a percentage of 64.1% to 130.5 and the average score with a percentage of 85.5%. The results of the students' learning independence analysis were presented in the figure below:
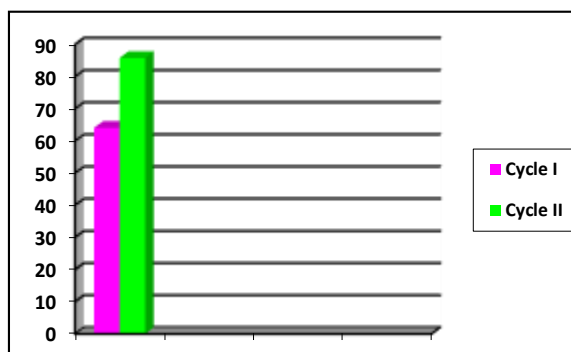

Figure 1 The students' learning independence

Figure 1 shows that from cycle I and Cycle II, there was a very significant improvement percentage in students' learning independence after students learned natural science learning by using the quantum model. It moved from good criteria to very good criteria, which means that students had a successful indicator of learning.

The analysis of students' independent learning was also analyzed based on the indicator of learning independence. The scores resulted from students' independence learning questionnaire in learning natural science and the result can be shown in the table below.

Table 2
Indicator of Independent Learning

No	Indicator Classification in Independence Learning	Average Score
1.	Self-confident	77,54
2.	Self Dicipline	79,13
3.	Initiative	77,92
4.	Responsibility	82,33
5.	Motivation	82,46
	Average	79,87

Table 2 described that the average score for self-confidence was 77.54, self-discipline was 79.13. The average score for the initiative was 77, 92, responsibility was 82.33 and motivation was 82.46. And the average score for indicator classification in independence learning is 79.87, it was included was very good. Among of indicators, the highest score was motivation. It means that students have good motivation to learn natural science by using the quantum model. The result of this research where there was an improvement in students' learning independence, can prove that there is an effect of quantum model on students' learning independence for elementary school in teaching natural science learning.

From the analysis of the data, the result of this research was the same with (Jannah, 2015), she mentioned that by using the quantum model in the teaching-learning process, students' learning independence could be

improved. The Quantum model can also improve students' motivation as one indicator of learning independence. (Wote et al., 2020) also supported this research result, they stated that the quantum model is very effective to use in teaching natural science learning for elementary school and it can improve the students learning outcomes. From the analysis, it was also concluded that teaching natural science learning could improve the student's activities in learning than using the conventional model. As it was proved by the research result from (Anggara & Rakimahwati, 2021) proved that students' learning activities who were taught by using the quantum model were higher than those taught by using the conventional model. (Fayanto et al., 2019) stated that quantum teaching is higher than conventional teaching models in learning the topic of vibration and wave physics because the quantum model is a teaching model which can create an interesting situation in learning natural science.

CONCLUSION

Based on the description from the result and discussion of the research, it can be concluded that from cycle I and cycle II, it was obtained there was an improvement from the score for students' learning independent. The average score from indicators of learning independence such as self-confidence was 77.54, self-discipline was 79.13, the initiative was 77, 92, responsibility was 82.33 and motivation was 82.46. Among of indicators, the highest score was motivation. And the average score for indicator classification in independence learning is 79.87, it was included was very good and there was an effect of quantum model on students' learning independence for elementary school in teaching natural science learning. The Quantum model is very effective to use in teaching natural science learning for elementary school.

REFERENCES

Anggara, A., & Rakimahwati, R. (2021). Pengaruh Model Quantum learning terhadap Aktivitas dan Hasil Belajar Peserta Didik dalam Pembelajaran Tematik di Sekolah Dasar. *Jurnal Basicedu*, *5*(5), 3020–3026.

Dharmawati, D. (2021). An Analysis of Students' Learning Independence in Learning English for Computer Using Google Classroom. *Budapest International Research and Critics Institute (BIRCI-Journal): Humanities and Social Sciences*, *4*(2), 1635–1642.

Fayanto, S., Musria, M., Erniwati, E., Sukariasih, L., & Hunaidah, H. (2019). Implementation of quantum teaching model on improving physics learning outcomes in the cognitive domain at junior high school. *IJIS Edu: Indonesian Journal of Integrated Science Education*, *1*(2), 131–138.

Fitria, Y. (2017). Efektivitas capaian kompetensi belajar siswa dalam pembelajaran sains di sekolah dasar. *Jurnal Inovasi Pendidikan Dan Pembelajaran Sekolah Dasar*, *1*(2), 34–42.

Jannah, N. F. (2015). *Peningkatan Kemandirian Belajar Siswa dengan Model Pembelajaran Quantum Teaching dalam Pembelajaran Matematika Kelas VIII E SMP Negeri 25 Purworejo Tahun Pelajaran 2015/2016*. Pendidikan Matematika-FKIP.

Khasinah, S. (2013). Classroom action research. *PIONIR: Jurnal Pendidikan*, *4*(1).

Kristiyanto, W. (2020). The Effect of the Science Technology Society and the Quantum Teaching Models on Learning Outcomes of Students in the Natural Science Course in Relation with Their Critical Thinking Skills. *International Online Journal of Education and Teaching*, *7*(1), 177–191.

Lusidawaty, V., Fitria, Y., Miaz, Y., & Zikri, A. (2020). Pembelajaran IPA Dengan Strategi Pembelajaran Inkuiri Untuk Meningkatkan Keterampilan Proses Sains Dan Motivasi Belajar Siswa di Sekolah Dasar. *Jurnal Basicedu*, *4*(1), 168–174.

Mairina, V., & Amini, R. (2021). Peningkatan hasil belajar IPA melalui model pembelajaran kuantum di sekolah dasar. *Jurnal Basicedu*, *5*(2), 784–788.

Marta, H., Fitria, Y., Hadiyanto, H., & Zikri, A. (2020). Penerapan Pendekatan Contextual Teaching and

Learning Pada Pembelajaran Ipa Untuk Meningkatkan Hasil Belajar Dan Motivasi Belajar Siswa Sekolah Dasar. *Jurnal Basicedu*, *4*(1), 149–157.

Mufarrid, H., & Miaz, Y. (2020). Improving the science learning outcomes of elementary school student using quantum teaching. *Primary: Jurnal Pendidikan Guru Sekolah Dasar*, *9*(2), 185–193.

Pratama, Y. A., & Solehuddin, M. (2019). Effect of Quantum Learning Model on Higher Order Thinking Skills in Grade 4th Elementary School. *3rd Asian Education Symposium (AES 2018)*, 396–400.

Ramadhani, W., & Fitria, Y. (2021). Capaian Kemandirian Belajar Siswa dalam Pembelajaran Sains Tematik menggunakan Modul Digital. *Jurnal Basicedu*, *5*(5), 4101–4108.

Riduwan, E. A. K., & Kuncoro, A. (2012). Cara menggunakan dan memaknai path analysis (analisis jalur). *Bandung: Alfabeta*.

Sasmita, A., & Fajriyah, K. (2018). Pengembangan modul berbasis quantum learning tema ekosistem untuk kelas V Sekolah Dasar. *Refleksi Edukatika: Jurnal Ilmiah Kependidikan*, *8*(2).

Siagian, H., Pangaribuan, J. J., & Silaban, P. J. (2020). Pengaruh kemandirian belajar terhadap hasil belajar Matematika siswa di sekolah dasar. *Jurnal Basicedu*, *4*(4), 1363–1369.

Sudarwo, R., Yusuf, Y., & Anfas, A. (2018). Pengaruh Sarana Belajar Dan Motivasi Belajar Terhadap Kemandirian Belajar Mahasiswa (Studi Empirical Pada Mahasiswa Beasiswa Bidikmisi UPBJJ-UT Ternate). *Jurnal Pendidikan*, *19*(2), 68–83.

Sugiyono, P. (2015). Metode penelitian kombinasi (mixed methods). *Bandung: Alfabeta*, *28*, 1–12.

Wote, A. Y. V., Sasingan, M., & Kitong, O. E. (2020). Efektivitas penggunaan model quantum teaching dalam meningkatkan hasil belajar IPA. *Journal of Education Technology*, *4*(2), 96–102.

Zeybek, G. (2017). An investigation on quantum learning model. *International Journal of Modern Education Studies*, *1*(1), 16–27.