IMPROVING MULTIPLICATION LEARNING OUTCOMES BY USING QUANTUM LEARNING MODEL

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Abstract: Mathematics, as one of the compulsory subjects in elementary school level, is often regarded as a difficult subject to learn. Yet, in fact, mathematics learning process is still not fully effective which results in low mathematics learning outcomes. Thus, this study aims to improve Mathematics learning outcomes by using quantum learning model on multiplication material in class III B SDN 1 Purwawinangun Kuningan. This study was a Classroom Action Research (CAR) by using Kemmis and Mc. Taggart model consisting of 2 cycles in which each cycle was carried out in four main activities, namely planning, implementing, observing and reflecting. The results of the study indicated an increase in students' Mathematics learning outcomes. In cycle I, the completeness percentage of students' learning outcomes was 68% and the average of students' learning outcomes was 70.2. Whereas, in cycle II, the completeness percentage of students' learning outcomes increased to 92% and the average of students' learning outcomes increased to 83.3. Therefore, it can be concluded that quantum learning model can improve students' Mathematics learning outcomes in class III B SDN 1 Purwawinangun, especially in Multiplication material.

Keywords: *action research; mathematics; multiplication material; students' learning outcomes; quantum learning model.*

INTRODUCTION

Mathematics is one of the subjects included in the subjects group of Science and Technology as appeared in the 2006 Curriculum (Depdiknas, 2006, p. 4). Mathematics is a subject that has a very important role in daily lives. Therefore, mathematics becomes one of the most important subjects to learn since elementary school students are essentially related to mathematical terms in their daily lives. Yet, in factual condition, mathematics learning process still needs to be improved by the teacher because the learning process in the classroom is still not fully effective which results in low mathematics learning outcomes.

Several factors affecting the low mathematics learning outcomes in class III B SDN 1 Purwawinangun are: 1) Class condition when learning mathematics is less fun and difficult to be conditioned; 2) Students' factors, namely: most students are less confidence, passive, hyper active, and there are also some students who think that mathematics is the most difficult and boring subject. Besides, the multiplication material is considered difficult since the students do not understand the concept of multiplication so that they often make mistakes in working on multiplication; 3) Teachers' factors, including the use of conventional learning methods in which teachers are more instrumental in learning and they often limit student activities; and 4) External factors, namely the lack of supporting mathematics learning media at the school. Thus, it is necessary for the teachers to overcome those factors immediately. Here, the writers tried to use Quantum Learning model as an effort to improve students' mathematics learning outcomes.

Learning model is the main requirement in the learning process that was designed and chosen by the teacher. Learning model is a technique or teacher's effort in the learning process that aims to create pleasant and meaningful teaching and learning process. There are many types of learning models, including cooperative learning, collaborative learning, problem solving learning model, and quantum learning model.

Quantum learning model is considered appropriate to apply in an effort to improve mathematics learning outcomes as well as create a pleasant learning process. It is in line with Supramono (2016, p. 369) who explains that quantum learning model is a learning model that involves all aspects supporting the achievement of learning objectives so that the learning process becomes more enjoyable and meaningful for educators and students.

Quantum learning model can be viewed as one of the ideal learning models. This is in accordance with Sholikhah (2017, p. 2) who states that "The learning model of Quantum Teaching Learning can be viewed as an ideal learning model, because it emphasizes the cooperation between learners and teachers to achieve common goals."

The main purposes of quantum learning model, according to Sa'ud (2010, p. 130), are to increase students' participation through composing conditions, to increase motivation and interest in learning, to improve memory and increase a sense of togetherness, to increase hearing power, and to increase behaviour gentleness. Whereas, the principle of quantum learning model according to DePorter, *et al*. (2001) in Wena (2016, p. 161) is quantum learning relies on a concept, namely "bring the students' world to the teachers' world, and bring the teachers' world to the students' world." Precisely, Wena (2016, p. 161) lists the principles of this model which include; a) everything speaks, b) everything is aimed, c) experience before naming, d) acknowledging every effort, and e) if it is worth learning then well worth celebrating.

Basically, all learning models have their own characteristics and learning stages (syntax). In the same way, quantum learning model takes into account the stages of learning which are referred to by the *TANDUR*. According to DePorter & Nourie (2001) in Wena (2016, p. 164), the learning framework of quantum learning model are; 1) Growing, 2) Experiencing, 3) Naming, 4) Demonstrating, 5) Repeating, and 5) Celebrating.

Based on the description, the problem raised in this study was formulated into the following research question; Can quantum learning model improve mathematics learning outcomes on multiplication material in class III B at SDN 1 Purwawinangun Kuningan? Therefore, as an effort to achieve the purpose of this study, namely to improve mathematics learning outcomes, the writers conducted a

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classroom action research entitled "Improving Multiplication Learning Outcomes by Using Quantum Learning Model" (A Classroom Action Research in Mathematics subject of Class III B at SDN 1 Purwawinangun Kuningan).

METHOD

This study was a Classroom Action Research (CAR) which aims to imrpove students' learning outcomes. The subjects of this study were 25 third grade students of Class B at SDN 1 Purwawinangun Kuningan in academic year 2017-2018. The subjects consisted of 10 male students and 15 female students.

This action research was carried out in 2 cycles in which each cycle consisted of two meetings. Then, each cycle consisted of 4 stages, as proposed by Kemmis and Mc. Taggart, namely: (1) Action planning, (2) Implementation, (3) Observation, and (4) Reflection (Arikunto, 2013, p. 137).

The stages of activities in cycle I are; 1) Action Planning which consisted of arranging syllabus and lesson plan, preparing the media that will be used, arranging observation sheets, and compiling evaluation questions; 2) The implementation activity is to implement each plan that has been prepared and carry out the learning phase in accordance with the syntax (learning framework) of quantum learning model abbreviated as TANDUR; 3) Observation activities are carried out towards students' learning activities that apply quantum learning model by using observation sheets; and 4) Reflection activities are carried out by describing each of the shortcomings and constraints of the learning process in cycle I and will be corrected in the next cycle. In Cycle II, the stages of activities carried out are generally the same as those in cycle I, namely planning, implementing actions, observation and reflection.

The instruments used to collect the data were test and observation sheets of students' learning activities. Then, the data were analyzed by using quantitative descriptive.

The indicators of success in this study is "this research is said to have been successful when the overall average of students' learning outcomes increase from the KKM (minimum completeness criteria / ≥ 70) per cycle, and reach an average percentage higher than 80%.

RESULTS AND DISCUSSION

Pre-Cycle

The data of students' learning outcomes and activities on pre-cycle showed that students' learning outcomes are still very low. It can be seen that from the number of 25 students in class III B of SDN 1 Purwawinangun Kuningan, there were only 11 students who reached the KKM and the rest 14 students had not yet reached the KKM. Therefore, this problem affects the other things, such as low students' learning activities that only reached 39% which was in the low category.

Based on the data, it can be concluded that the level of learning outcomes of class III B in SDN 1 Purwawinangun Kuningan in Mathematics is still below average or low where most of the students got less than the KKM of ≥70. Table 1 shows the data on students' learning outcomes in multiplication material at pre-cycle.

Table 1. *Students' learning outcomes in class III B on multiplication at pre-cycle*

Total Students	**Pre-Cycle**			
	Completeness		**Percentage**	
25	C	IC	C	IC
	11	14	44%	56%
Students' Total Score				1520
Students' Average Score				60.8

From the table, it can be seen that the number of students who complete is lower than students who have not yet completed. From 25 students, only 11 students managed to reach the KKM, while the rest 14 students did not reach the KKM. Thus, the

completeness percentage obtained was 44% and the average score obtained by was 60.8 so that they have not yet reached the specified KKM.

Cycle I

The learning activities in cycle I are carried out by applying quantum learning model with the TANDUR learning stages. The learning process took place meaningfully and pleasantly, but students' learning outcomes are still not maximal.

Student learning outcomes in cycle I can be seen from the results of the final evaluation of cycle I as shown in Table 2.

Table 2. *Students' learning outcomes in class III B on multiplication at cycle I*

Total Students	Cycle I			
	Completeness		Percentage	
25	C	IC	C	IC
	17	8	68%	32%
Students' Total Score				1780
Students' Average Score				71.2

Based on Table 2, it can be concluded that there are still many students who have not been completed. From 25 students, those who managed to reach the KKM were 17 students and the rest 8 students had not reached the KKM. The completeness percentage obtained was 68% and the average score obtained was 71.2. Thus, even though the average score of students has reached the specified KKM, but the percentage indicator of success has not been achieved.

The results of observations towards students' learning activities in cycle I are as follows; At the first meeting of the cycle I, students' learning activities amounted to 56.25% with the medium category. Meanwhile, at the second meeting, students' learning activities increased significantly that was 71.87% which belonged to the high category.

Based on the description, it can be concluded that the learning activities of class III B of SDN 1 Purwawinangun Kuningan by using the quantum learning model in the cycle I reached an average percentage of 64.06% which belonged to the high category.

Cycle II

Since the learning outcomes in cycle I have not been maximal, the writers took an action on the cycle II by completing the previous learning. The action in the cycle II was done by re-applying the quantum learning model with the TANDUR learning stages. During the learning process, students showed significant changes that the learning process is more pleasant and meaningful. Therefore, the learning objectives are expected to be achieved thoroughly.

Learning outcomes in cycle II (shown in Table 3) can be seen as the results of the final evaluation on cycle II.

Table 3. *Students' learning outcomes in class III B on multiplication at cycle II*

Total Students	Cycle II			
	Completeness		Percentage	
25	C	IC	C	IC
	23	2	92%	8%
Students' Total Score				2028.9
Students' Average Score				83,3

Based on Table 3, it can be concluded that there are 23 students (92%) out of 25 students, who managed to reach the KKM and students who had not reached KKM were only 2 students (8%). Then, the completeness percentage obtained had fulfilled more than a success indicator of 92%. Whereas, the average score obtained by class III B students was also increased by 83.3. Thus, the students' average score has exceeded the determined KKM and the percentage of success has been achieved even more significantly than the previous cycle.

The results of the observations during the action at cycle II showed that students' learning activities increased significantly from the previous cycle which amounted to 85.93%

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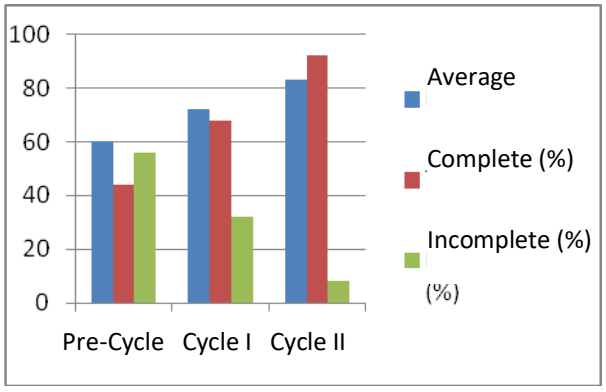
at the first meeting with a very high category. Meanwhile, at the second meeting, students' learning activities increased even more, reaching 93.75% in the very high category. Therefore, it can be concluded that the learning activities of class III B at SDN 1 Purwawinangun using a quantum learning model in cycle II reached an average percentage of 89.84% with a very high category. In other words, applying quantum learning model in Class III B on Mathematics at SD Negeri 1 Purwawinangun Kuningan can improve students' learning outcomes. This result is in line with Sujatmika, *et. al*. (2018, p. 2) who states that quantum learning model is a model allowing students to learn pleasantly and encourages students to use all their potential. Further, Sa'ud (2010, p. 130) describe that quantum learning model can increase students' participation through composing conditions, increase motivation and interest in learning, improve memory and increase a sense of togetherness, increase hearing power, and increase behavioural gentleness.

Based on the description, it can be concluded that students' learning outcomes experience an increase in the percentage. The explanation of students' learning outcomes at the end of cycle I and cycle II is as follows:

a. The final evaluation results of cycle I showed that there were still 8 students (32%) whose grades had not reached the KKM, and students who had reached the KKM were 17 students (68%) with the average score of 71.2.
b. The final evaluation results of cycle II showed that there were only 2 students (8%) whose grades had not reached the KKM, and 23 students (92%) had reached the KKM, with the average score of 83.3.

The final evaluation results at the end of the cycle I and the end of the cycle II are presented in the following graph.



Graph 1. *Diagram of evaluation at pre-cycle, cycle I and cycle II*

The result of this study is in line with Supramono (2016, p. 369) who expressed that quantum learning model is one of the learning models that involve all aspects supporting the achievement of learning objectives so that the learning process becomes more enjoyable and meaningful for educators and students. In the same vein, Sujatmika, *et. al.* (2018, p. 4) said that "quantum learning models can be applied by teachers to improve the quality of learning. Through this learning, the students are trained to use all the potential of brain owned. The learning process is also more challenging and fun. Through memorable learning, the information or materials learned will be longer stored in the memory."

Based on the results obtained from the pre-action stages (pre-cycle) to post-actions (cycle II), it can be concluded that quantum learning model has a positive impact since the application of quantum learning models can improve students' learning outcomes in Class III B of SDN 1 Purwawinangun Kuningan on multiplication material.

CONCLUSION

Based on the analysis, it can be concluded that; 1) The application of quantum learning model can improve students' mathematics learning outcomes in Class III of SDN 1 Purwawinangun Kuningan, especially in multiplication material; 2) The improvement of students' learning outcomes in class III B of SDN 1 Purwawinangun Kuningan can be seen from the increase in the average and the completeness percentage of students in Mathematics subject on Multiplication material in which the students' average score was 60.8 with the completeness percentage was 44% in pre-cycle. The average score increases to 70.2 with the completeness percentage of 68% in cycle I, and increases again to 83.3 with a presentation of students' success of 92% in cycle II; and (3) Learning activities using the TANDUR stages of quantum learning model can make the learning process pleasant and meaningful since every students' learning success is always celebrated together with praise or reward.

The following suggestions are presented based on the above conclusions; 1) The teacher should pay more attention to the role of syntax of the quantum learning model which is abbreviated as TANDUR; 2) Teachers should guide students thoroughly when learning in groups; 3) Every students' success should always be celebrated by the teacher and students with more interesting and challenging praise and rewards; 4) To foster students' motivation and involvement in the learning process, in addition to applying the quantum learning model, it should be assisted with the use of interesting mathematics learning media; and 5) The application of the quantum learning model is not only expected to increase learning outcomes, but also to increase students' motivation and learning outcomes in which its presentation reaches 100%.

REFERENCES

Arikunto, S. (2013). *Prosedur penelitian: Suatu pendekatan praktik*. Jakarta: Rineka Cipta.

Depdiknas. (2006). *Kurikulum tingkat satuan pendidikan (KTSP).* Jakarta: Depdiknas.

Sa'ud, U. S. (2010). *Inovasi pendidikan*. Bandung: Alfabeta.

Sholikhah, H. O. (2017). Implementation of quantum learning viewed from multiple intelligences in mathematics learning. *Procedings International Seminar of Primary Education, 1*, 1-8.

Sujatmika, S. dkk. (2018) Effect Of Quantum Learning Model In Improving Creativity And Memory. *Journal of Physics: International Conference on Science Education (ICoSEd).* doi: 10.1088/1742-6596/1006/1/012036.

Supramono. A. (2016). Pengaruh model pembelajaran quantum (quantum teaching) terhadap hasil belajar IPA kelas III SD YPS Lawewu Kecamatan Nuha Kabupaten Luwu Timur. *Jurnal Nalar Pendidikan, 4*(2), 78-86.

Wena, M. (2016). *Strategi pembelajaran inovatif konteporer: Suatu tinjauan konseptual oprasional*. Jakarta: Bumi Aksara.