International Journal of Sociologies and Anthropologies Science Reviews (IJSASR), 3 (3): May-June 2023, page 267-266. ISSN: 2774-0366
Website: https://so07.tci-thaijo.org/index.php/IJSASR/index
DOI: https://doi.org/10.14456/jsasr.2023.53

The Effect of Using Cooperative Learning Together with Questioning Technique on Mathematics Achievement of Grade 7 Students

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Received 10/05/2023 Revised 12/06/2023 Accepted 17/06/2023

Abstract

Background and Aims: Mathematics is closely related to human development and social progress. It is an important part of human civilization and has promoted the great progress of society, science, and technology. With the rapid development of modern information technology, mathematics is more widely used in all aspects of social production and daily activities. The purposes of this research were : (1) To compare Mathematics achievement before and after learning management using cooperative learning together with the questioning technique teaching method. (2) To compare Mathematics achievement after learning management using cooperative learning together with questioning technique teaching method with the determined criterion of 70%. (3) To assess the student's satisfaction toward learning management using cooperative learning together with questioning technique teaching method.

Materials and Methods: The sample of this study is 40 students from Class 2, Grade 7, No.19 Middle School of Zhoukou City. Data was collected through achievement tests and satisfaction questionnaires and SPSS software was used to analyze the collected data, the data used for analysis were the mean value of samples, standard deviation, and single sample T-test.

Results: The results of the study were as follows: 1) The mathematics achievement of students after using the Cooperative Learning Together With the Questioning Technique method was higher than before at a statistically significant level of 0.05. 2) The mathematics achievement of students after using Cooperative learning together with the questioning technique method was higher than the 70% criterion at the 0.05 statistical significance level (M=24.35, SD=2.46). 3) The satisfaction of students after using cooperative learning together with the questioning technique method was at a higher level (M=4.11, SD=0.64).

Conclusion: Therefore, cooperative learning combined with the questioning skills teaching method can improve the teaching effect and academic performance, and students are satisfied with the teaching effect of cooperative learning combined with the questioning skills teaching method in a class.

Keywords: Cooperative Learning together with Questioning Technique; Mathematics Achievement; Satisfaction

Introduction

Mathematics is closely related to human development and social progress. It is an important part of human civilization and has promoted the great progress of society, science, and technology. With the rapid development of modern information technology, mathematics is more widely used in all aspects of social production and daily activities. Junior middle school mathematics education can cultivate students' abstract thinking and reasoning ability; Cultivate students' innovative consciousness and

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practical ability; To promote the development of students' emotions, attitudes, and values, and lay an important foundation for their future life, work, and study. Therefore, only learn mathematics well, to better meet the challenges of the future. In the progress and development of social technology, mathematics, as a basic subject of natural science, plays an increasingly important role. Junior middle school is an important preparatory stage for the follow-up study and plays a connecting role. Therefore, the study of mathematics in junior middle school has an important impact on students' higher education and career development in the future. However, such problems often appear in junior high school mathematics teaching: The teacher prepares the lesson earnestly and concentrated on teaching, however, the student's examination results were always very unsatisfactory. According to the survey conducted by relevant experts and scholars of the Ministry of Education in junior middle schools in China, nearly 30 percent of students hate learning mathematics knowledge in junior middle schools, and nearly 20 percent of students almost give up learning mathematics knowledge in junior middle schools. Where exactly did it go wrong? What is the main reason? Therefore, how to improve students' math scores has become a problem worth thinking about for every educator.

We want to change the present situation of junior middle school students in learning mathematics knowledge, you must let the students in the process of learning mathematics knowledge excited and thinking actively, rather than dull sitting on the seat to listen to the teacher, so we teachers should exert the principal role of mathematics teaching students in the class, let the students fully involved in the classroom teaching process. In this way, students can not only give full play to their own level but also cultivate good psychological quality in the process of learning slowly. When students really feel that he/she plays the main role in classroom teaching, it not only arouses students' enthusiasm but also cultivates students' ability to explore problems independently. Students can develop the good habit of self-consciously and conscientiously learning mathematical knowledge (Jin Hong,2013).

Ministry of Education of the People's Republic of China (2011) points out that teachers can use different teaching methods to help students learn mathematical knowledge in mathematics classes. In the process of mathematics teaching, continuous innovation, improvement, and adjustment are necessary to achieve the teaching purpose, arouse and maintain interest in learning and establish students' mathematical thinking. National Council of Teachers of Mathematics (NCTM) (1989) proposed that cooperative learning is an indispensable part of the current movement of mathematics education and teaching reform (Zhao Yukun,2015).

Qashoa (2013) states that one of the most common and prominent classroom activities is the act of teacher questioning. It can be stated that the teacher has to be able to ask questions in order to have better teaching and learning interaction and students' participation. Finally, it can be concluded that the Questioning technique is a tool for stimulating the students' participation in the classroom. Lawrence (2004) stated that a cooperative learning strategy increases the interest of students in Mathematics and invariably enhances achievement. In the same vain, Fasli & Kopoules (2005) revealed that a cooperative learning strategy provides incentives for students to develop an interest in science and thereby enhance achievement. (Wahyudi, D. 2017)

Cooperative learning, as a learning strategy, can enable students to master a variety of problem-solving methods and skills, provide students with opportunities to learn in a stimulating and cooperative environment and help students form a positive learning attitude. At the same time, in the middle school

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mathematics teaching process, teachers master good questioning skills play a key role in classroom teaching, it can effectively mobilize students to think positively, implement brainstorming, stimulate students' interest in learning, improve classroom efficiency, so as to achieve the purpose of improving students' math scores. Cooperative learning fully embodies the student-centered teaching concept, can stimulate students' participation consciousness, students' passive learning to active learning, and mobilize students' enthusiasm for learning. In addition, good questioning skills are conducive to the development of teacher-student relationships and interaction, can mobilize students' positive thinking, and improve students' interest in learning. Cooperative learning combined with questioning technology is the use of a student-centered, teacher-led education concept, that gives full play to students' subjective initiative and cooperative spirit, cultivate students' cooperative consciousness, expression ability, problem-solving ability, and comprehensive analysis ability, stimulates students' interest in learning and improves their academic performance.

Research Questions

1. How is the Mathematics achievement of Grade 7 students before and after learning management using cooperative learning together with the questioning technique teaching method?
2. How is the Mathematics achievement of Grade 7 students after learning management using cooperative learning together with questioning technique teaching method compared with the determined criterion of 70%?
3. How is the satisfaction of the students after learning management using cooperative learning together with the questioning technique teaching method?

Research Objectives

1. To compare Mathematics achievement before and after learning management using cooperative learning together with the questioning technique teaching method.
2. To compare Mathematics achievement after learning management using cooperative learning together with questioning technique teaching method with the determined criterion of 70%.
3. To assess the student's satisfaction toward learning management using cooperative learning together with questioning technique teaching method.

Literature Review

Cooperative learning is a creative and effective teaching theory and method widely used in many countries in the world because it can improve the classroom atmosphere, improve students' academic performance and promote students to form good non-cognitive psychological qualities. Cooperative learning can be the motivation for students to learn, and transform learning into a kind of internal need of their own development, but also can cultivate students' cooperative spirit, and this spirit is the 21st-century social development must have quality (Sheng Yonglian,2004).

According to Woodard(2004), weaker students experience math anxiety, and this anxiety affects their math performance. Since mathematical knowledge plays an important role in promoting the country's socio-economic development, this negative attitude has aroused wide concern among educators. The quality of education that teachers provide to students depends on what teachers do in the

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classroom (Zakaria & Iksan, 2007). The teaching methods used in class are one of the factors that cause students to become passive when doing tasks and interact less with each other. Therefore, to improve students' understanding of mathematics, they must be more active in the classroom and must acquire knowledge creatively, especially in understanding and solving mathematical problems. Through cooperative learning activities, students are given opportunities to develop, interact and share with friends. So as to promote the development of students' mathematics cognition and emotion. Cooperative learning encourages students to actively participate in the construction of their own knowledge (Webb, Troper, & Fall, 1995). Cooperative learning also encourages students to interact and communicate harmoniously with their peers. In this way, cooperative learning promotes values such as honesty, cooperation, mutual respect, responsibility, tolerance, and a willingness to sacrifice consensus. Performing tasks in cooperative learning can cultivate students' self-confidence. A study by Zakaria, Chin, and Daud(2010) found that cooperative learning improved students' math performance. In addition, cooperative learning is an effective method that mathematics teachers need to integrate into their teaching. Cooperative learning promotes deep learning materials and helps students achieve better results (Shimazoe & Aldrich, 2010). According to Johnson and Johnson(1989), in cooperative learning, students tend to enjoy mathematics, and this enjoyment motivates them to learn. Melihan and Sirri(2011) conclude that cooperative learning methods are more effective in student academic success than traditional teaching methods.(Zakaria, E., Solfitri, T., Daud, Y., & Abidin, Z. Z. 2013)

Scientific, reasonable, appropriate, and effective classroom questioning can activate and enlighten students' thinking, cultivate students' abilities in all aspects, and improve the learning effect. In junior high school mathematics teaching, teachers should master certain questioning skills according to the characteristics and nature of mathematics, so as to better stimulate students' thinking and learning interest, make students actively think and participate in learning, cultivate students' flexibility and agility of thinking, effectively develop students' intelligence, inspire students' thinking, improve students' abilities in all aspects, and promote students' all-round and upward development. (Yang Bin,2019)

It is also approved that there is a significant relationship between teachers' classroom questioning and student outcomes i.e. achievement, retention, thinking skills, and level of participation. Furthermore, some scholars believe that thinking is not driven by answers but mostly by questions. Elder and Paul (2002: 3), for instance, indicate that "Questions define tasks and express problems and issues. Answers, on the other hand, often signal a full stop in thought". Thus, it is perceived that why students who usually ask questions in the classroom tend to learn and think better than those who are quiet during most of the class time. On the importance of questioning in the classroom, Elder and Paul (2006) assert that effective questioning leads to the transformation of the students' thoughts and ideas. Strother (1989: 324) also highlights the significant role of questioning, believing that “Questioning is important because questions motivate students, focus their attention, elicit deeper processing of information, tell students how well they are mastering content, and give them an opportunity for practice and rehearsal". Furthermore, according to Cotton (2006)， the purpose of teachers' classroom questions is to encourage students to become actively involved in lessons; to develop critical thinking skills; and to stimulate students to pursue knowledge on their own. Nasreen (2003) also adds some reasons for asking questions: to signal an interest in hearing what learners feel and think; to encourage a problem-solving approach to thinking and learning; and to deepen learners thinking levels. Since the majority of

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the questions asked in the classroom are at the lower cognitive level of students hence, one strategy for teachers is to carefully plan questions that are at higher cognitive levels (Cotton, 2006). By incorporating higher-level questions into the classroom, students would be encouraged to effectively develop their critical thinking skills. (Etemadzadeh, A., Seifi, S., & Far, H. R. 2013)

Importance of cooperative learning combined with questioning techniques

1) Cooperative learning combined with questioning skills is beneficial to the improvement of classroom teaching efficiency and the cultivation of students' interest in learning. Compared with the traditional teaching method, it can help students more fully participate in the teaching activities, improve the enthusiasm of students to learn, let students feel the fun of learning, and is more conducive to improving the efficiency of classroom teaching. (Liu Jingmin,2013)

2) Cooperative learning combined with questioning skills is beneficial to cultivate students' cooperative consciousness. Through cooperative learning, each group should try to maximize the advantages of each member, mutually through continuous communication and division of labor cooperation, the final completion of learning tasks, students' sense of cooperation has gradually been cultivated. The development of society in the 21st century needs the spirit of cooperation. Cooperation can make people give full play to their talents and play a greater role. Therefore, we need to cultivate students' sense of teamwork. (Liu Jingmin,2013)

3) Cooperative learning combined with questioning skills is beneficial to the improvement of students' interpersonal skills. Through, cooperative learning, strengthens the communication between teachers and students, students and students, makes it easier for them to understand each other, and exercises their ability to deal with the relationship between each other, so as to greatly improve their interpersonal skills.

4) Cooperative learning combined with questioning skills is conducive to promoting the innovation of teaching methods and students' innovative consciousness. Innovation is the driving force of social progress, without innovation, there would be no development of science and technology. The new curriculum reform has promoted the transformation of educational concepts, the cooperative learning method has changed the traditional "cramming" learning method, promoted the innovation of teaching methods, and cultivated students' innovation consciousness. (Liu Jingmin,2013)

Research Conceptual Framework

The variables of this study

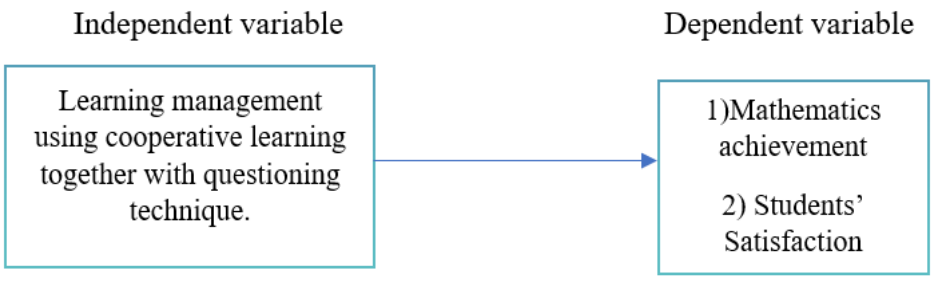

Figure1 Independent Variable and Dependent Variables

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Methodology

1. Population and samples: Population: 1320 students (33 classrooms, each class has 40 students) in Grade 7, No.19 Middle School of Zhoukou City, Henan province, China. Sample: Randomly select 40 students (1 class) from Grade 7, No.19 Middle School of Zhoukou City.

2. Research instruments: The research instruments which were used in this study were as follows:

2.1 Lesson plans on rational number operation course: The researcher provided an evaluation form to 5 experts to check or evaluate the lesson plans. After collecting data, analyze the collected data to determine the appropriateness and consistency of the lesson plans. If the average score of appropriateness and consistency assessed by a group of experts is higher than 3.51, it means that the components of the lesson plans have good appropriateness quality and internal consistency. After obtaining the expert evaluation results, the developed teaching model was revised and improved according to the expert's suggestions.

2.2 Mathematics achievement tests: The evaluation form is provided to 5 experts for content validity check and suggestions. The quality of the evaluation form is considered according to the Index of Item Objective Congruence (IOC) obtained from the achievement test evaluation form. If the Index of Item Objective Congruence (IOC) of each item is greater than 0.5, it can be used. and every item where 1.00 is greater than 0.5. The result of analyzing the IOC index showed that all test items were appropriate and could be used in the test. Finally, analyze each item of the test and find out that item difficulty (p) should range from 0.20-0.80 and item discriminability (r) should be more than 0.20. The reliability of the test was computed using the formula of Kuder and Richardson formulas 20 and more than 0.7 (Richardson, M. W., & Kuder, G. F.. 1939: 681-687).

2.3 Student satisfaction questionnaire: The questionnaire is provided to 5 experts for content validity check and suggestions. The quality of the questionnaire is considered according to the Index of Item Objective Congruence (IOC) obtained from the achievement test evaluation form. If the Index of Item Objective Congruence (IOC) of each item is greater than 0.50(0.80-1.00), it can be used. The result of analyzing the IOC index showed that all test items were appropriate and could be used in the test. The Cronbach's Alpha coefficient of the reliability of the student satisfaction questionnaire is 0.76, which is greater than 0.70. Therefore, the reliability of the student satisfaction questionnaire meets the requirements (Cronbach, L. J., 1951)

3. Data collection: The procedures of data collection were as follows:

3.1 The samples were given the pretest by measuring Mathematics Achievement with constructed instruments.

3.2 The samples were taught by using Cooperative Learning Together With the Questioning Technique Method

3.3 After finishing the instruction, the samples received the post-test by using the same instrument which was used in the pretest.

3.4 The samples were given the students' satisfaction questionnaire.

4. Data analysis: In this study, data were analyzed by using the statistical program according to the research objectives.

4.1 Compare Mathematics Achievement before and after learning through Cooperative Learning Together With the Questioning Technique Method by using a t-test for a dependent sample.

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4.2 Compare Mathematics Achievement with the determined criteria set at 70 percent by using a t-test for one sample.

4.3 Assess the student's satisfaction with Cooperative Learning Together With the Questioning Technique Method by using arithmetic mean and standard deviation.

Results

The results were presented according to the research objectives as follows:

1. Compare Mathematics achievement before and after learning management using cooperative learning together with the questioning technique teaching method.

Table 1 The result of comparing the mean score of Mathematics Achievement before and after learning through cooperative learning together with the questioning technique teaching method.

Group	N	Pretest scores		Post-test scores		t	p-value
		M	SD	M	SD		
Experimental group	40	17.63	2.82	24.35	2.46	28.99*	.000

p＜0.05

As presented in Table 1, the mean score of the pre-test of students' mathematics achievement was 17.63 (SD = 2.82) and the post-test of students' Mathematics Achievement was 24.35 (SD =2.46). The result of this table showed that after learning through cooperative learning together with the questioning technique teaching method in the classroom, post-test scores of students' Mathematics Achievement were higher than pretest scores.

2. Compare Mathematics achievement after learning management using cooperative learning together with the questioning technique teaching method with the determined criterion of 70%.

Table 2 The result of comparing the mean score of compare mathematics achievement of students before and after learning through cooperative learning together with the questioning technique teaching method with the determined criterion set at 70 percent of full scores.

Group	N	Full score	Criteria score	M	SD	t	p-value
Experimental group	40	30	21	24.35	2.46	8.63*	0.000

p＜0.05

As presented in Table 2, the mean scores of the students' mathematics achievement after learning through cooperative learning together with the questioning technique teaching method was 24.35 from a full mark of 30 and the standard deviation was 2.46. Which was statistically higher than the criterion of 70% at.05 levels of statistical significance (t_{39} =8.63*, p=0.000<.05). It can be seen that the mathematics achievement of the Grade 7 students who accept cooperative learning together with questioning technique teaching method are higher than 70%.

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3. Assess the student's satisfaction with learning management using cooperative learning together with the questioning technique teaching method.

Table 3 The results of students' satisfaction after learning through cooperative learning together with the questioning technique teaching method.

NO.		ITEM	M	SD	Level of appropriateness
Learning aspect	1	Changes in interaction between students or between teachers and students in the "cooperative learning combined with questioning skills" class.	4.05	0.64	High
	2	In the "cooperative learning combined with questioning skills" class, students can actively complete the tasks assigned by the teacher.	4.10	0.63	High
	3	In the class of "cooperative learning combined with questioning skills", students can take the initiative to participate in group discussion activities.	4.03	0.62	High
Instructional strategy	4	In cooperative learning activities, the help of teachers' guidance to the activities.	4.20	0.65	High
	5	The teacher's questioning skills in class stimulate students' flexibility of thinking.	4.15	0.62	High
	6	The teacher's questioning skills in class promote the smooth progress of cooperative learning.	4.08	0.66	High
Teaching efficiency	7	"Cooperative learning combined with questioning skills" teaching model, to improve your enthusiasm for learning mathematics evaluation.	4.23	0.66	High
	8	In the process of cooperative learning, improve your language skills.	4.00	0.64	High
	9	In the process of cooperative learning, you will improve your ability to communicate with others.	4.13	0.65	High
Instructional evaluation	10	The teaching mode of "cooperative learning combined with questioning skills" is adopted to deepen students' understanding of what they have learned.	4.15	0.66	High
	11	The teaching mode of "cooperative learning combined with questioning skills" is adopted to improve the learning atmosphere in the classroom.	4.08	0.62	High

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NO.	ITEM	M	SD	Level of appropriateness
12	The teaching model of "cooperative learning combined with questioning skills" has improved your academic performance.	4.18	0.64	High
	Overall Total	**4.11**	**0.64**	**High**

As shown in Table 3, the overall results of the cooperative learning together with the questioning technique teaching method by experts are at a very high level with (M=4.11, SD= 0.64). Thus, it was concluded that students' satisfaction of the Seventh grader students after receiving cooperative learning together with the questioning technique teaching method was high.

Discussion

1. Cooperative learning combined with questioning techniques can effectively improve students' academic performance.

This may be due to the following two reasons: On the one hand, cooperative learning combined with the questioning skills teaching method is a teaching method that enables students to acquire knowledge and problem-solving skills in the form of group cooperation. It changes the teaching form of the traditional teaching method, makes full use of the "zone of proximal development" theory, and emphasizes the combination of learning and thinking. On the other hand, in the teaching process of cooperative learning combined with questioning skills, solving problems based on group cooperation encourages students to activate their existing knowledge, promotes their understanding of new information, and provides opportunities for students to cooperate, communicate, summarize, and exercise their expression ability, which optimizes the learning method, enhances their learning interest, and cultivates their learning ability, thus improving their math scores. This is consistent with the research of Man Shiyu(2020). The application of cooperative learning in Middle school Mathematics classroom teaching (Master's thesis, Southwest University). The subjects of this study are three junior middle school mathematics teachers and 248 students (2 classes from each grade) from No. 107 Middle School in Shenyang. This article uses the classroom observation method, questionnaire survey method, and interview method, from the teachers and students two aspects, the application of cooperative learning in junior middle school mathematics teaching status quo is investigated. According to the survey results, due to many reasons, the application effect of cooperative learning in junior middle school mathematics classroom teaching is not satisfactory, there are still some difficulties. From the perspective of solving problems, this paper discusses the countermeasures of using cooperative learning strategies in middle school mathematics classroom teaching, hoping to provide certain guidance for better cooperative learning in middle school mathematics classroom teaching. According to the research, firstly, cooperative learning can give full play to students' initiative of autonomous learning, cultivate students' awareness of cooperative learning, and enhance students' skills of cooperative learning, which is to meet the requirements of the new curriculum reform. Cooperative learning, as an effective teaching method, has been widely used in classroom teaching in primary and secondary

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schools. Secondly, under the influence of schools, teachers, and students, cooperative learning presents different problems in different subjects, different stages of education, and different schools. Therefore, in order to play the role of cooperative learning and realize the effect of cooperative learning, it is necessary to expand the scope of cooperative learning research and carry out in-depth research. Third, although cooperative learning is an effective learning strategy proven by practice, it does not mean that cooperative learning can solve all the problems in current education. To apply cooperative learning in junior middle school mathematics classroom teaching, we must adjust the method of cooperative learning in time according to local conditions. And also corresponds to Dahal, N. (2022). Narratives of Nepali school mathematics teachers on classroom questioning techniques. Journal of Mathematics and Science Teacher. This article examines the impact of Nepali math teachers' questioning methods on current classroom practices in mathematics pedagogy. In this collection of short stories, four high school math teachers from Kathmandu Valley, Nepal share their experiences. This investigation used a criterion-based selection strategy to select high school, math teachers. This article aims to focus on the difficulties students face in the classroom using questioning techniques. Behaviorist, social constructivist, and constructivist theoretical frameworks are employed in this study. "How do high school math teachers describe their questioning techniques?" was the research question for this study. I listened to four math teachers' perspectives to learn more about the power dynamics in the classroom, specifically who is valued and whose voice can be heard when students ask questions in the context of a narrative inquiry for meaning-making. Most high school math teachers initially appear to be conformists to perceived appropriate methods of questioning but later become nonconformists, which is defined as being more adaptable in their questioning technique. Many high school math teachers also ask a wide range of questions, from simple to complex, in the belief that this encourages students to participate in mathematical discussions.

2. Cooperative learning combined with the questioning technique method improves students' satisfaction.

The reasons may be related to the following two aspects: First of all, cooperative learning combined with questioning skills is conducive to improving students' intrinsic interest, making the learning process more educational and interesting. The group cooperative discussion process of cooperative learning combined with the questioning skills teaching method is the process of building solidarity and cooperation. Group students support and understand each other, promote students to learn more effectively, and improve students' ability to cooperate. Second, the evaluation system of cooperative learning combined with questioning skills teaching runs through the whole process of students' learning. Teachers no longer blindly evaluate students' performance in exams, but praise students' active interactive learning behavior in class, encourage more students to participate in class and express their doubts and opinions and evaluate students' learning effect according to their interactive learning behavior. Therefore, the teaching evaluation system of cooperative learning combined with questioning skills is conducive to comprehensively improving students' learning effect. Enable students to learn in evaluation, evaluation in learning, and gain the majority of students' recognition.

Students believe that the teaching mode of cooperative learning combined with questioning skills helps to improve their learning attitude towards mathematics, improve their ability to learn mathematics independently, and significantly increase their participation in mathematics class. It can be seen that the

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International Journal of Sociologies and Anthropologies Science Reviews (IJSASR), 3 (3): May-June 2023, page 267-266. ISSN: 2774-0366
Website: https://so07.tci-thaijo.org/index.php/IJSASR/index
DOI: https://doi.org/10.14456/jsasr.2023.53

teaching mode of cooperative learning combined with questioning skills greatly improves students' enthusiasm in mathematics class, and students are willing to participate in the class, become the master of the class, and improve their learning achievement and satisfaction. And also corresponds to Yalçin Karali and Hasan Aydemir(2018). The effect of cooperative learning on the academic achievement and attitude of students in Mathematics class. Educational Research and Reviews. In the axis of basic skills and values, students' enjoyment of mathematics lessons and the realization of learning by taking a certain distance depending on the appreciation of the effort of the individual. Cooperative learning provides this requirement with a great deal of rewards and success. Success increases an individual's self-confidence and makes him/her more powerful and positive in mathematical learning. By developing an individual's positive attitude, mathematical barriers that may adversely affect his/her success in social interaction with friends might be removed. An individual can also help his/her friends in learning and reinforce his belief and self-esteem. This study aims to reveal the effect of the cooperative learning method on students' academic achievement and attitudes toward mathematics in primary school fourth-grade math class. The study was carried out with a "pretest -post-test control group experimental design". This pattern allows for the comparison of the success of the cooperative method used in the mathematics course to improve students' achievement and positive attitude towards mathematics."Team Play Tournament Supported Student Teams and Achievement Divisions" (TPT supported STAD) technique, which combined the application of Student Teams Achievement Divisions (STAD) and "Team Play Tournament" (TPT) techniques from the cooperative learning applications, was applied to the test group. In the control group, the lessons were taught using the instructions in the Ministry of National Education (MoNE) 4th-grade Mathematics Teacher's Guide Book. 4th-grade primary school students in Malatya Battalgazi during the 2015-2016 academic year were the study participants. They were 40 students (20 in the test group and 20 in the control group). The "Mathematics Attitude Scale" developed by Baykuland "Mathematics Achievement Test" developed by the researcher was applied to the test and control groups as a pre-test and post-test. TPT-supported STAD technique is more effective in increasing the academic achievement of the students in mathematics courses compared to teacher-centered teaching; however, it is less effective than teacher-centered teaching in their mathematics attitudes. Cooperative learning has a positive influence on the student's academic achievement and attitude toward mathematics in the fourth grade of primary school.

Conclusion

Through the comparative analysis of the results of the pretest and post-test of the seventh-grade students using the teaching method of cooperative learning combined with questioning skills, after the intervention of cooperative learning combined with questioning skills. The conclusion was as follows:

1. The mathematical scores of seventh-grade students after using the "cooperative learning combined with questioning skills teaching method" were higher than those before, and the difference was statistically significant (0.05).

2. After adopting the "cooperative learning combined with questioning skills teaching method", the mathematics achievement of grade 7 students was higher than the standard of 70%, with a statistical significance of 0.05 (M= 24.35, SD =2.46).

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Therefore, cooperative learning combined with questioning skills teaching method was feasible in junior middle school mathematics teaching, which helped to improve students' learning effect and mathematics achievement. The experimental results verify the research hypothesis.

In this study, SPSS software was used to evaluate the student's satisfaction with the teaching of cooperative learning combined with questioning skills. The results show that students have higher satisfaction with cooperative learning combined with questioning skills. In the classroom practice of cooperative learning combined with the teaching method of questioning skills, the learning method of group cooperation and communication provides students with sufficient opportunities to discuss and learn from each other. Students will be involved in learning faster, helping to improve student learning and math performance, and can win the popularity of students.

Recommendation

1. Recommendation for implication

Based on the findings from the study, the following recommendations are made:

1.1 Teachers need to strengthen the knowledge reserve of cooperative learning methods and questioning skills, strengthen theoretical learning, improve teaching ability, complete the course preparation carefully, and make teachers full of confidence in teaching.

1.2 The students in the school should be encouraged and trained on the effective usage of cooperative learning techniques. This will make the students adopt an effective attitude towards enhancing Mathematics learning achievement.

1.3 Questioning in teaching and learning sessions is one of the most important aspects of mastering knowledge. Teachers should focus on questioning techniques in the teaching and learning process to nurture students' interest and interest in learning.

1.4 Teachers are to be trained on how to improve cooperative learning techniques. This will serve as an effort to assist the students in overcoming the challenges of low Mathematics learning achievement among secondary school students.

To sum up, strengthening the management of the cooperative learning process and improving the efficiency of cooperation, optimizing classroom questioning, and making good use of questioning skills play an important role in improving students' comprehensive learning ability and improving classroom teaching effect.

2. Recommendation for further research

2.1 Limited by my academic level and external resources, this study still has some shortcomings in the exploration of cooperative learning combined with questioning skills teaching method, which requires further exploration and attempts in the later stage.

2.2 One school cannot represent the whole basic education, so cooperative learning combined with questioning skills teaching method needs to be verified in more schools to make the experimental results more convincing.

2.3 In future teaching activities, this study will continue to reflect on and improve the shortcomings of cooperative learning combined with questioning skills in practice. In my opinion, with the continuous popularization of information technology and in-depth research, the value of cooperative learning combined with questioning skills teaching will be more perfectly reflected in future teaching.

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Due to my limited practice time and lack of experience in the initial stage of exploration, the research on the teaching mode of cooperative learning combined with questioning skills has just started. In future teaching, I will continue to devote myself to the implementation of cooperative learning combined with questioning skills, further improve the teaching mode of cooperative learning combined with questioning skills, and provide references for other teachers. It is hoped that the masses of educators can further explore and study the teaching mode of cooperative learning combined with the question technique teaching model, change the traditional concept, conform to the trend of teaching reform, and promote the development of education cause in our country.

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