

IRSTI 27.01.45

A. Rassil¹

¹Suleyman Demirel University, Kaskelen, Kazakhstan

EFFECT OF COOPERATIVE LEARNING MATHEMATICS FOR UNDERGRADUATE STUDENTS

Abstract. We have high top ten practices that could improve students' learning, usually we call them as active learning types. Cooperative Learning is one of that active learnings. Therefore, this research is identified as study of improving learnings of students and effect of Cooperative Learning. If you are interested in Cooperative Learning, We hope that this research will help you to find right answers, right ways. We have worked with several examples and practices. I can work for your wonders. We started deeply learn this study and could demonstrate how We used it in settings as developmental mathematical courses in university for first grade bachelor students. Experiment was in medium offline classes. We tried to describe the application of Cooperative Learning in lesson terminology of math and mathematical analysis.

Keywords: Cooperative learning, mathematical analysis, student learning.

Аннотация. У нас есть десятка лучших практик, которые могут улучшить обучение студентов, обычно мы называем их активными типами обучения. Совместное обучение является одним из таких активных занятий, поэтому это исследование идентифицируется как изучение улучшения обучения студентов и эффекта совместного обучения. Если вы заинтересованы в совместном обучении, надеемся, что это исследование поможет вам найти правильные ответы и правильные пути. Мы работали с несколькими примерами и практиками. Данное исследование было глубоко изучена и продемонстрированы как были использованы в учебных курсах по математике в университете для студентов бакалавриата первого курса. Эксперимент проводился в офлайн-классах. Описаны применения кооперативного обучения в уроке терминологии математики и математического анализа.

Ключевые слова: совместное обучение; математический анализ; обучение студентов.

Аңдатпа. Бізде оқушылардың білімін жетілдіруге мүмкіндік беретін жоғары топ ондық тәжірбие бар. Біз оларды белсенді оқыту түрлері деп атаймыз. Топтық оқыту - бұл белсенді оқытудың бір түрі. Сондықтан

бұл зерттеу студенттердің оқуын жақсарту және топтық оқытудың тиімділігін зерттеу ретінде қолға алынды. Егер сізді топтық оқыту қызықтырса, бұл зерттеу дұрыс жауаптар мен дұрыс жолдарды табуға көмектесетініне сенемін. Бірнеше мысалдармен және тәжірибелермен жұмыс жасадым. Тәжірбиесі аса мол зерттеуші болмасам да, бұл зерттеуді тереңірек қарауға бар күшімді салдым. Университетте бакалавриаттың бірінші курс студенттеріне арналған математикалық курстарда қалай қолданғанымды көрсеттім. Эксперимент офлайн сабақтарда болды. Топтық оқыту әдісін математика терминологиясы мен математикалық талдау сабағында қолданып, алған нәтижелеріммен бөлістім.

Түйін сөздер: топтық оқыту, математикалық талдау, оқушының білім алуы.

Significance of the study: It is first study in Kazakhstan for undergraduate students. In the sphere of Mathematical Analysis. The topics: Limit, Integral. I understood this gap from Literature Review.

Aim of the Study: My aim in this study is to find out progress of students when they work together, when they help to each other. Compare the results of traditional study and with Cooperative Learning Practice Study.

Hypothesis: I assume that the result of this study will be positive. I mean that after practice of Cooperative Learning we will notice that this experiment gives good result and We may give other good advice about Cooperative Learning. Because the several other scientists which have already searched this area had found that Cooperative Learning is better than traditional method studying. I also hope to take good feedback from my experimental work.

Introduction

The chapters show this study in actions, and together introduce you group processing, teams, social and leadership skills. We describe several methods and majority activities. I explain why and how we can change our traditional practices in the way of teaching.

Before carrying out this topic I want to tell a little bit about theoretical background. First of all we have to understand general theories for Cooperative Learning in this areas. My focus is on the discussing the definitions, history, principles, types, advantages, the role of teacher (general background theories) and using several methods which are related to Cooperative Learning.

Individualistic and Competitive Learning was not so important method in the 1960s. In the pedagogical sphere Cooperative Learning is one of the pointed method today's at the same time in schools, colleges and high education (universities) [1].

If students study long time with traditional method, it calls as teacher centered method, and they cannot learn new things, it damages improving their selves. Because of that learners could not practice their lesson-subject daily with groupmates, it may cause some difficulties in self-study. That is why we need to

experiment and search this student-centered method. It is important that students divided into several groups and helped each other in the way of studying by explanation each other. In this type of learning the students are directly responsible to their members that everybody could understand materials, and if somebody appear any problems, they control it and share information between their selves. In this group they can discuss their topic, finish given tasks, and reach the aim together. By the way the teacher may control them always.

It does not mean that in Cooperative Learning teacher not so important. Instructor have to organize activities, tasks, home works, games, and many kind of group projects. Instructor should directly guide students and separate them into several groups [2].

The important aim of Cooperative Learning is that students could take more benefits from studying, could learn a lot of knowledge than traditional method way. Other aim is that best clever students could share with own especially method of studying and explain the topic to students, who are take some difficulties in this way. That is why it is best way to increase the level of average of that class.

However Slavin is not agree with this theory if these divided groups do not have any goal, any task which they could achieve together. That is why it is so important to have these two side for Cooperative Learning is being groups and being aim (group tasks).

One of the teachers' goals is to help the leaners to understand the tasks and explain that by the Cooperative Learning the students may have effective way to reach aim. By this skills they may solve difficulties by discussing into the classroom.

Literature Review

Now I am going to tell a little about history of cooperative learning: how it is started, why started, who researched, who developed and shared this type of knowledge. Till the World War II, scientists like Allport, Watson made some research according to work alone and working with group, its efficiency and effectiveness. Researcher Doob found that who works together and cooperate are more successful and productive. And also there are many social theorists like John Dewey who influenced to cooperative learning theory practiced today. He strongly believed that this type of learning is more important not only at school or university, also outside, in social life, in just lifestyle. This type of theory showed that working together, discussing; sharing ideas is more effective than just passive leaning like teacher explaining and student listening one by one, alone. Lewin's idea was that if the people work together, during the groups, they may share their ideas, thoughts, and develop relationship between them in good state. By the way they can reach their goals faster than alone and successfully. Deutsh's idea was also positive, he wanted that students could save best relationships between them by promoting group knowledge. All these social scientists, psychologists, philosophers wanted to actively contribute their ideas,

researches in this big gap in science. However, by reason of them we could know what is important what is not, why we are studying this tree of science and experimenting using their methods in other spheres. In 1975, David and Roger Johnson recognized that Cooperative Learning gives also supporting, best communication, students could trust each other, involves emotional states.

«Two are better than one, because they have a good return for their labour: If either of them falls down, one can help the other up. But pity anyone who falls and has no one to help them up. For if they fall, one will lift up his fellow. But woe to him who is alone when he falls and has not another to lift him up! Also, if two lie down together, they will keep warm. But how can one keep warm alone? Again, if two lie together, they keep warm, but how can one keep warm alone? Though one may be overpowered, two can defend themselves. A cord of three strands is not quickly broken» (Ecclesiastes 4: 9-12). As we see here even in Bible book written that meaning of Cooperate is true. If they are two they can help each other in anyway. If you are alone and may be you need a help, if nobody helps you - it is pity.

Cooperative learning is not new idea. It is historical idea. Early philosophers said that in order to learn anything, we always need a somebody who starts with us, who support us, who gives positive interdependence. Even in first century scientist said that students take benefit if they teach each other. It means that when you teach, you learn twice. Johan Amos Comenius (1592-1679) also said that people both by teaching and being thought are taking just benefit. Also Joseph Lancaster and Andrew Bell used this type of learning in the England in the end of 1770s years. And the other social experts in America took that idea and opened school in New York City in 1806.

In the years of 1870-1900, Colonel Francis Parker started to enter Cooperative learning practically in the public schools. He wanted that classroom atmosphere was democratic and cooperative. Parker's idea about cooperation is dominated in American schools, to students during the century. Cooperative learning was promoted as a famous, important project method in instruction by Parker and John Dewey. And the end of 1960 individualistic learning was started to be researched by scientists, again experimented during 40 years. After these studies researchers demonstrated cooperative learning and American schools returned to their traditional method, using method of cooperative learning [1].

Kurt Koffka is one of the founders of Gestalt School of Psychology. He contributed that interdependence among group members is essence of cooperative learning, which is based on social psychological theory. Kurt Lewin is one of his colleagues. Morton Deutsch is Lewin's most brilliant graduate students. Morton Deutsch took his teacher's idea about this research and formulated giant several theories of cooperation and competition in the end of 1940 years. That is why Cooperative learning is being used again. It is one of the reasons. Then despite Deutsch's theory, practical applicants were slow to materialize in the 1950s years [3].

As we see our topic has long history. If we deeply search it, we may go back to the first century. But we really know that it just developed after 18th century. After 18th century students were started to study in schools by dividing groups. Joseph Lancaster and Andrew Bell were one of the influenced people to organize such kind of school ideas and started directly to work.

After that started to open many type of such schools in other places, locations which are taken as a main point of group learning. As we know during the 19th century raised the number of such schools in not only United Kingdom, also in the United States.

Method

I used both method to collecting data and analyzing it. The Methods Qualitative, which contains observation and method; Quantitative, which has Experimental design were beneficial for me in my direction. The Experimental Study, which I chose, is descriptive. Many scientific disciplines, especially social science and psychology, use this method to obtain a general overview of the subject. It is also useful where it is not possible to test and measure the large number of samples needed for more quantitative types of experimentation. Chose Experimental Design Method. Selected groups as Experimental and Control.

I am their assistant-instructor teacher and advisor. I prepared achievement (same) test (to take pre-test and post-test. (It is reliable and valid) The professor from university already had prepared and tested students, analyzed (item analysis-to easy, hard questions), (had done pilot study) Any Discrimination!

Took Pre-test on beginning of the study. They started learning topics deeply, knowing that I prepared competition especially for them. Always asked questions from me on the lesson without any shy, because they knew after lesson they have to solve problems without difficulties. The teaching method of both group was different. I explained lesson to Control Group in a traditional Method, to Experimental group in Cooperative Learning Method. I gave to Experimental group especially tasks prepared for them. Every lesson tried to divide them into 3-4 groups and gave several problems to solve by competing with each other, during their selves (groups). Gave bonuses to Winner Group. By motivating by extra points, they tried to help each other, because in rule every person in group have to understand topic and could solve problems. Also gave them extra projects to each group after lessons. I will tell about this more later...

As I said I also gave them extra project works. They tried to find out answer to questions, every day collecting with group members they shared their ideas, knowledge to solve one selected main problem (topic of their project work).

Name: (Exp.Group)	Pre-test result (100%)	Post-test result (100%)
Askerbek Farzazhan	25	20.1
Assanova Ayauym	29.6	85.7
Babolatova Aruzhan	32.6	87.45
Iristayev Bakhtiyor	18	30.05
Ismakova Kamulyam	29.3	40.8
Kairzhanuly Bekbol	32	84.6
Kelessova Dana	26.3	50.05
Moldakhanova Zhansuh	26	75.55
Nigmeden Aisulu	20.6	49.7
Rassylkhan Aiganym	32.6	100
Shakhty Zhanel	28.6	59.5
Trukubayeva Kamala	28.6	80
Usseinova Nazerke	26.3	56.25
Zhexenbay Fatima	19.3	57.9
Zholdasbek Yerkinbek	31	46.1

Name: (Control Group)	Pre-test result (100%)	Post-test result (100%)
Absattarova Nassiba	25	73.6
Alimova Munissa	25	77.5
Alirzhanova Zhamiya	17	40.8
Azizova Gavhar	29	80.5
Kuvandykova Alma	30	73.8
Kudabany Bauyrbek	25	46.7
Makulbek Aruzhan	14	33
Maxutova Tursynay	26	95.2
Nazarova Diana	13	55.2
Nurali Agerim	12	21
Oryzbek Mukhammedsaid	0	17.4
Parpyeva Mukhlissa	20	61.1
Sagyndyk Nuray	25	82.8
Seken Zhengis	20	61.5
Serzhan Yeldana	14	53.1
Tashabay Nursana	21	16.1
Taizhanov Zhan	7	27.5
Zholdybayev Arsen	26	77.5

Data Analysis

Used Spss platform to analyze total value of my collected Data. I compared their Achievement test result, their pre-test and post-test differences. It is also important to analyze Frequency, Mean, Median, Mode, Range, Variance, Standard Deviation, Normal Distribution. It is important to compare the result of pre-test and post-test of control group and the result of pre-test and post-test of experimental group. And their differences' statistics. Also first of all compared the pre-tests of both control and experimental group, then pre-test and post-test of both group. Tried to analyze all valuable results. Why Mann-Whitney test? Because my students' number is not available for all types of t-test. That is why for 18 and 18 students, total 36, I could use Mann-Whitney test to take all types of statistical analyzing results. Mann Whitney test is a nonparametric alternative to the standard independent samples t-test.

Comparing Pre-tests of Control group and Experimental group

Group Statistics

	Groups	N	Mean	Std. Deviation	Std. Error Mean
pretest	experimental group	18	26.4111	5.06695	1.19429
	control group	18	19.3889	8.08149	1.90483

Group Statistics

	Groups	N	Mean	Std. Deviation	Std. Error Mean
pretest	experimental group	18	26.4111	5.06695	1.19429
	control group	18	19.3889	8.08149	1.90483

Group Statistics

	Groups	N	Mean	Std. Deviation	Std. Error Mean
pretest	experimental group	18	26.4111	5.06695	1.19429
	control group	18	19.3889	8.08149	1.90483

Result

By calculating the result of achievement test, I noticed that final result of Group Statistics shows that Mean of difference of pre-test from post-test of Experimental Group is more than Control group, however their standard deviation and standard error deviation is less than control group. It means that We have positive Result in Experimental group, but not so much. I hope that We can see big differences, however there is less differences between result numbers.

Between the Means, Standard Deviation, Standard Error Deviation of pretest and posttest of Experimental group has big differences. There is positive result. It, means Cooperative Learns also helps to rise students' achievement and motivation, however The Results of Control Group also shows not bad result. The Control group also has good positive changes of students. We can say that both method: Traditional and Cooperative Learning can give beneficial knowledge and can help to students achieve in successes. As we see the Results of Control group is also not bad.

References

- 1 Burns, M. 1990. The Math Solution: Using Groups of Four. In: Cooperative Learning in Mathematics. *Cooperative learning in mathematics* (1990): pp. 21-47.

- 2 Brush, T. The effects on student achievement and attitudes when using integrated learning system with cooperative pairs. *Educ. Tech. Res. Dev.*, 45 (1997): pp. 51-64.
- 3 Nichols, J.D., Miller, R.B. Cooperative learning and student motivation. *Contem. Educ. Psychol.*, 19 (1994): pp. 167-178.