

Study of the Effect Collaborative Teaching Method on Creativity of Male Third Grade Elementary Students in Experimental Science

Mehdi Sobhaninejad¹, Nahal Shahlavi², Mohammad hasan Tajdary^{3*}, Ghasemabadi Karami Ranjbar⁴

Associate professor, Department of Education School of Humanities, Shahed University, Tehran, Iran

² Undergraduate student of Psychology, York University/ Glendon College

³ Phd, Student of philosophy in Education, Shahed University, Tehran, Iran

⁴ Phd, Student of philosophy in Education, Shahed University, Tehran, Iran

*Corresponding Author: Mohammad hasan Tajdary Email: hassantajdary@gmail.com

Abstract

The present study was conducted to investigate the effect of the cooperative teaching method on the creativity of male students in the third-grade elementary experimental science course in Tehran (District 4) in the 94-95 academic years. The research method was quasi-experimental. A total of 40 students were selected by the multi-stage cluster sampling method and randomly divided into experimental and control groups. Subjects have been exposed to the educational intervention program (courses 1-6 of experimental sciences) for two and a half months. Data were collected using Torrance Creative Thinking Test (Form B) and the results were discussed. The obtained data were analyzed using descriptive statistics (mean, standard deviation, and mean standard error) and inferential statistics (independent t-test). The results of the analysis showed that teaching in a cooperative manner is exploratory teaching in fostering creativity (flexibility, fluidity, content expansion) in a science course.

Keywords: Teaching, Collaborative Teaching Patterns, Flexibility, Creativity.

1- Introduction

Humans spend most of their lives in social groups and interacting as family members or neighbors with their fellow human beings. Collaborative learning is one of the various types of learning and study skills and strategies that lead to students' social development. This type of learning is derived from the human sense of togetherness and cooperation. One of the key and important topics in education is learning; what is learning? How does it happen?

Recently, learning through collaboration has become a permanent issue in education. Collaborative learning is old thinking that re-emerged in the 1980s, but for many teachers, it is a new idea because collaborative groups are different from the

small groups that are common in many classrooms (Susan and Susan, 1997). Elementary, middle, and high school teachers test learning groups through collaboration to see if students' learning is getting better and better. Or they just enjoy learning. Collaboration has a wide scope, the following can be mentioned: providing material and spiritual facilities such as educational materials and tools, counseling, problem-solving, guidance ... which by implementing this method, students either succeed together or they also failure.

Elementary, middle, and high school teachers are testing collaborative learning groups to see if students' learning is getting better and better. Or they just enjoy learning (Adibnia, 2007). Collaborative

learning is the method of teaching collaboratively: a way of building students' classroom learning to work together to achieve common goals while measuring the knowledge and skills of the trained, responsiveness of individual members. The group is considered (Adibnia, 2007).

Instead of considering the teacher as their main reference, students look at their classmates as an important and valuable reference for learning. In such a class, students feel positively dependent on each other, meaning that everyone is responsible for helping others learn, and none of the group members can succeed unless all members of the group succeed (Konani, 2011).

Generally, teaching methods are divided into two models based on the theories of learning psychology. These two models are called teacher-centered and learner-centered educational models, respectively. One of the teaching methods of the learner-centered teaching method is cooperative (research subject) from the family of social teaching models. The key to social models is participation and collaboration, and the presentation of lesson material is hidden within the social interaction of the participants. In these models, the formation of learning associations is recommended. Classroom management is for the growth of participation and cooperation between students and learning can be done only through cooperation, interaction, and participation in group activities.

One of the goals of all educational systems is to train creative and innovative people. Creativity, new ideas, and concepts are always the basis of inventions, discoveries, and the emergence of appropriate ways to solve problems in human life. Vernon (1989) considers creativity as the ability of a person to create new ideas, theories, insights, or objects and to reconstruct them in science and other fields, which is considered by experts as an innovative

phenomenon in terms of science, aesthetics, and technology and considered a social value. Therefore, if students are to be well-educated and useful citizens in the future, they must be creative and critical people with scientific insight and freedom of thought. School curricula should include methods by which students learn the skills of how to learn through intellectual discipline; because cognition grows in the process of regular thought.

2- Literature review

Much research has been done on the effectiveness of active teaching methods, including:

Halpern (2008) in a study entitled *Creating a Collaborative Environment and Providing Guidelines for Teaching and Teaching on why we should use collaborative learning*, answered that collaborative learning activities are better and result in more attention and recall. They are effective and improve accuracy and creativity in problem-solving and develop better critical thinking for learners. In the study of cooperative teaching methods conducted by Karjavari (2008), it was concluded that this method increases cooperation and learning more in mathematics and self-efficacy and creativity of students.

Konani (2011) in a study to investigate the effect of collaborative learning on creativity and academic achievement in the course of experimental sciences of fifth-grade elementary school students in Koozdasht in the academic year 2010-2011 and after a month and a half of implementation of the variable on the experimental group. The method of teaching collaborative learning has an effect on students' creativity and academic achievement. Barbook and Abura (2013) reported that the collaborative teaching method had a significant effect on students' academic achievement and creativity in

physics and increased students' understanding of the subject.

Schaffler (2002) believed that the correct application of collaborative learning leads to more creativity and innovation in students, modifies the one-dimensional attitude of teachers and their strictures, and allows students' interaction with each other to open the door to treasures. In this study, the effect of the cooperative teaching method on the creativity of male students in the experimental science course of the third grade of the elementary school in four districts of the city is studied. The present study was conducted to investigate the effect of the cooperative teaching method on the creativity of male students in the third-grade elementary experimental science course in Tehran (District 4) in the 94-95 academic years. In order to achieve the objectives of the research, the following hypotheses have been proposed and tested:

Hypothesis 1- The teaching method (teaching) of cooperation has a significant positive effect on the level of creativity (expansion component) of male students in the course of the experimental science of the third grade of the elementary school in the fourth district.

Hypothesis 2- The teaching method (teaching) of cooperation has a significant positive effect on the level of creativity (flexibility component) of male students in the experimental science course of the third grade of the elementary school in the fourth district.

Hypothesis 3- Collaborative teaching (education) has a significant positive effect on the creativity (fluid component) of male students in the third-grade elementary experimental science course in the fourth district.

3- Materials and methods

According to the research hypotheses, the most appropriate research method is the

quasi-experimental method using a pre-test-post-test design.

3-1- Statistical population and research sample

The statistical population was all-male elementary students in the third grade of Tehran in 2016-2017. Male and female students were counted, of which 320,000 were boys and the rest were girls. The sample of male students was selected and the community was divided into upper and lower sections (center). (First cluster) was randomly selected from one of the two sections and finally, two schools were randomly selected from among these schools. To determine the sample size, Morgan and Krejcie's sampling table was used to determine the sample sizes, which were 40 people.

3-2- Educational intervention

After the administrative procedure; Classes were randomly divided into experimental and control groups. Two classes in the fifth grade of elementary school, each with 20 students, were randomly divided into experimental and control groups. The researcher-made training of the course of the experimental science, which included the first to the sixth courses, respectively, was encountered.

In these six lessons, the method was that in each teaching session, the teacher first gave explanations about the topics to the students and after giving a few examples, asked them to discuss and exchange ideas in small groups and present the result to the class.

The researcher, in the opinion of the principals and teachers, conducted two training sessions for teachers to acquaint them with the teaching methods of cooperation and also with the Torrance Creativity Test and its implementation in the class so that they can learn the teaching method and the test. Perform in class.

Before facing the training program, a pre-test was performed from both experimental and control groups, and after the implementation of the training program, a post-test was performed for both groups and the data were analyzed.

3-3- Research tools

In this study, in order to measure the dependent variable (creativity in the course of experimental sciences), the Torrance Visual Creativity Test (Form B) has been used. In fact, divergent thinking is often synonymous with creativity, and most creativity tests are divergent thinking tests (25). The main reason for choosing the Torrance Creativity Test was to use a test that is both reputable in terms of efficiency and appropriate in terms of validity and reliability for research.

Torrance's (1990) studies have reported that the validity of his creativity test is higher than 0.09. The validity of the content and the structure of the experiment were examined by factor analysis and the studies reported the validity of the content and the desired structure.

In Iran, Pir Khaefi (2010) reported a reliability coefficient of 0.80 in a two-week interval by retesting on 48 students, in fluid elements 0.78, flexibility 0.81, and originality 0.7, expansion 90/0.

The Torrance Creativity Test has three activities. Each activity takes 10 minutes, so the whole test takes 30 minutes. Test scoring is based on the Torrance Visual Form (b) booklet. Activity 1 is rated for initiative and expansion and Activity 3 is rated for initiative, fluidity, flexibility, and

expansion. In this activity, special innovative scores will be awarded to the subject. For Torrance, images are the core of creativity because they relate various human achievements to the mental imaginations of scientists.

3-4- Statistical Methods

Statistical descriptive methods (central indices, dispersion indices, and tables) were used to analyze the demographic information and a t-test was used to test the hypotheses according to the nature of the variables. It used Spss21 software for data analysis.

4- Findings

In order to investigate the first hypothesis of the research on the existence or non-existence of a significant difference between the mean scores of students' creativity components in control and experimental groups, considering that the experimental design was pre-test and post-test, first the control and Experiments were evaluated in creativity pretests using t-test. The results are presented in Tables 1 and 2.

According to the data in Table 1 in the pre-test stage and in comparison between the mean scores of control groups and experimental groups, there is a significant difference in the components of creativity (fluidity, flexibility, content development, and creativity) in the pre-test stage. These differences in pre-test may be due to students' previous experiences as well as teachers' creativity.

Table 1- Results of t-test on the mean of creativity test variables in pre-test

Variables	Statistics t	df	Sig Equality of means	Mean difference	Standard error difference	Assurance distance 95%	
Fluid	4.71	38	0.0000	3.45	0.519	1.39	3.50
flexibility	6.16	38	0.0000	1.77	0.288	1.19	2.36
Originality	7.69	28.81	0.000	7.51	7.51	0.943	5.58

Expand content	10.72	25.77	0.0000	-7.50	0.699	8.93	6.60
Creativity	2.85	27.95	0.0000	4.24	1.48	1.19	7.28

T-statistic is the difference between the means divided by the standard error. The results of Table 2 show that the difference between the means of the two control and experimental groups in the components of creativity (fluidity, flexibility, content development, and creativity), after the implementation of collaborative teaching at the level of 0.05 is significant. Tables 3 and 4 show the mean and standard deviation of the variables in the test (pre-test and post-test).

Table 2 - t test results on the mean of creativity test variables in the post-test

Variables	Statistics t	df	Sig Equality of means	Mean difference	Standard error difference	Assurance distance%95	
Fluid	8.64	38	0.000	4.40	.508	3.36	5.43
flexibility	14.97	38	0.000	4.52	.302	3.91	5.14
Originality	16.27	38	0.000	10.56	0.654	0.932	
Expand content	55.76	24.50	0.000	32.40	0.581	31.20	33.59
Creativity	43.002	38	0.000	51.97	1.20	49.53	54.42

Table 3 shows that the means, standard deviations, and variances of the two groups before the implementation of the training program are different. These differences are small and may be due to students 'previous experiences and teachers' creativity.

Table 3- Mean distribution and standard deviation of the studied variables in the pre-test

Variables	Groups	Number	means	Standard deviation	Standard error difference
Fluid flexibility	control group	20	21.10	1.22	0.271
	examination Group	20	21.3000	1.26074	.28191
Originality Expand content	control group	20	16.51	0.80	0.170
	examination Group	20	17.5030	.84082	.18801
Creativity Fluid	control group	20	28.27	1.10	0.39
	examination Group	20	29.2400	1.96934	.44036
flexibility Originality	control group	20	98.36	1.91	0.46
	examination Group	20	100.7500	2.42520	.54229
Expand content	control group	20	110.31	1.71	0.495
	examination Group	20	115.4930	2.97323	.66483

Table 4 shows that the means, standard deviations, and variances in the support group are higher than the control group, so the research hypotheses are confirmed. Since students with a cooperative approach in creativity (fluid) scored higher (26.76) than students in the control group (24.7) and the level of significance obtained is less than 0.05, so the method hypothesis Collaborative teaching has a significant

positive effect on creativity (fluid component) of male students in the third-grade elementary experimental science course in the fourth district of Tehran. Also, the high averages in the components of originality and content development and The flexibility of the subjects after the test compared to the control group also confirms all the hypotheses in the research.

Table 4 - Mean distribution and standard deviation of the studied variables in the post-test

Variables	Groups	Number	means	Standard deviation	Standard error difference
Fluid flexibility	control group	20	24.7	1.00	0.1830
	examination Group	20	26.7000	1.12858	.25236
Originality Expand content	control group	20	20.22	0.89	0.189
	examination Group	20	20.2540	.93502	.20908
Creativity Fluid	control group	20	40.61	1.14	0.31
	examination Group	20	44.5500	1.63755	.36617
flexibility Originality	control group	20	98.36	1.91	0.46
	examination Group	20	100.7500	2.42520	.54229
Expand content	control group	20	189.23	3.14	0.48
	examination Group	20	192.2540	3.66485	.81948

Discussion

The collaborative teaching method has a significant positive effect on the creativity scores of male students in the third-grade elementary experimental science course in district four in Tehran. This hypothesis was confirmed according to the results of the analysis. In other words, data analysis showed that the collaborative method is effective in fostering science creativity. This finding is consistent with the results of the following studies: Shokoofinejad (2001) investigated the effect of teaching methods on the growth and development of preschool children by randomly selecting two kindergartens from each kindergarten and two classes from each kindergarten in Tehran after the pre-

test. Jean-Louis Seille Creativity Test In each kindergarten, a class was taught in a child-centered way. After a month of training, the Louis Seille Creativity Test was administered. After analyzing the data, the researcher concluded that child-centered education is more suitable for developing creativity. Moshkelati (1997) investigated the effect of the group discussion teaching method in the second experimental science course of the middle school on students' creativity. After 2.5 months of implementing the independent variable on the experimental group, he concluded that the group discussion method has an effect on students' creativity.

Lee Man Joo (1996) study on the comparison of child-centered and teacher-centered open teaching methods on the development of preschool children's creativity was conducted for three months. He concluded that child-centered education is a more appropriate method for initiative and creativity than teacher-centered education.

The collaborative teaching method has a significant positive effect on the level of creativity (fluid component) of male students in the experimental science course of the third grade of an elementary school in the fourth district of Tehran. This hypothesis was confirmed according to the obtained results, in other words, the analysis of information showed that the cooperative teaching method has a positive effect on fostering creativity (fluid). The findings of Konani (2011), Shokoofinejad (2001), Ghazaei (2009), Moshkelati (1997) studies are consistent with the results of this study.

The means flexibility and originality of the two groups in the pre-test have shown that the cooperative teaching method has a positive and significant effect on the creativity (fluid component) of male students in the third-grade elementary experimental science course in the four cities. The relevant research findings are consistent with the findings of Gliss (2003), Schaefer (2002), Chekernick and Micromic (1973), Halpran (2008).

Data analysis showed that the cooperative teaching method is more effective than the exploratory teaching method in expanding the content of science lessons. This finding is confirmed by the results of Konani (2011), Shokoofinejad (2001), Tabar (1379), Judiciary (1999), Moshkelati (1997), Halpran (2008), Gliss (2003), Schaffer (2002) in the world. Because all these researches show the usefulness of the cooperative teaching method in fostering students' creativity (content development).

In today's complex world, where we see intense competition from diverse societies for access to the latest technologies and resources, creative and talented people with new ideas and divergent thinking are highly valued and valued. Children are the endless eyes of creativity. The source of children's creativity is that they do not worry about the reaction of their environment and live freely in their own style and context. Children and adolescents spend the best years of their lives in schools and education centers, and while they are in school, they should think about cultivating the inner energy of their creativity. Considering that the results of this study support the effectiveness of the cooperative teaching method in increasing creativity, based on its findings, it can be suggested to educators and teachers to use the cooperative teaching method in schools more than the traditional method. The results show that cooperative teaching methods have a positive and significant effect on learning and fostering creativity. Teachers should use them to a greater extent and therefore it is necessary to give students the opportunity to communicate and interact closely with each other and with the teacher.

The following items are suggested based on the research results:

- 1) Similar research should be done in other sections.
- 2) The effect of the collaborative method should be researched in subjects such as mathematics, composition, and art.
- 3) Research on fostering the creativity of male students.

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