A RESEARCH ON THE EFFECT OF ENNEAGRAM ON GROUP WORK IN 7TH GRADE MATHEMATICS TEACHING

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ABSTRACT

The aim of this study is to emerge the effect of enneagram on group work in 7th grade mathematics teaching. The research was designed based on a pretest-posttest control group model. The sample consists of 36 7th grade students studying in a public school in 2009-2010 academic year. The research subject was processed by using enneagram with 18 students in experimental group, without using enneagram with 18 students in control group. Application took 4 weeks, 4 hours in each one. During the research, both quantitative and qualitative data were collected. Data were obtained via "Mathematics Achievement Test", "Enneagram Personality Scale", and enneagram exercises. Quantitative data was obtained by using SPSS 15.0 statistic package program; qualitative data, on the other hand, was obtained by applying exercises and from the feedback of the exercises. When analyzed the study results after the experimental process, it was observed that there was not a significant difference between the achievement test scores of the students in experimental group applied group work using enneagram and in the control group applied group work without using enneagram in favor of the experimental group. However, after the experimental process, it was seen that the mean of the achievement test scores of the students in experimental group applied group work using enneagram was higher than the mean of the achievement test scores of the students in control group applied group work without using enneagram. In addition, it was observed that mathematics achievement test scores of the groups composed of different personality types might show differences according to the groups.

Keywords: Enneagram, Mathematics Teaching, Group Work, Collaborative Learning

INTRODUCTION

The matter how learning occurs has attracted many scientists' attraction. The studies in this field are important in terms of their contribution to preparing appropriate educational environments for human's learning easier, developing models related to learning and teaching (Kılıç, 2007).

If mathematics teaching combines with group works, it becomes more meaningful. These studies should be initiated taking into consideration some criteria with a plan to make the group works more successful. Personality characteristics specified in enneagram may be one of these criteria.

It was observed that the students were grouped according to their achievement levels rather than the students' personal features while choosing the members creating each group from observations and researches analyzed, students participating group works. Therefore, the effect of teaching using enneagram in primary 7th grade mathematics teaching on group work creates the basic problem situation of the study.

THE METHOD

18 students chosen from 7th grade students of Manisa City Selendi District Atatürk Primary School and 18 students chosen from 7th grade students of Manisa City Selendi District Fatih Primary School creates the study group of the research. There are 18 students in experimental and control group.

In this study, pre-test post-test control group trial model one of the real ones was used. In real experimental studies, an artificial research environment is created mostly and one or more control

groups are chosen (Çepni, 2005:83). In order to determine the effectiveness of variables, the results of pre-test and post-test are used together (Karasar, 2006:97).

In the model of this study, there are two groups created by neutral assignment. The independent variable, whose effect on experimental group was analyzed during the research, is the teaching method with group work applied with enneagram. Teaching method with group work was used in control group.

As a data collecting tool, Enneagram Personality Identification Scale, Exercises designed all types of Personalities and Mathematics Achievement Test were used.

In analyzing the data in the study, Microsoft EXCEL and SPSS 15.0 were used. In data analysis, firstly the normality of the distribution of the data obtained from the students was examined via Shapiro-Wilks test.

In the situations when the distribution is normal, parametric tests were used for inter-group comparisons, non-parametric tests were used when it is not normal. Frequency, percentage, row totals, row means, Independent Samples T-test, Wilcoxon Signed Rows for Related Measurements Test, Mann-Whitney U test and Kruskal-Wallis test are some of the statistical techniques used in data analysis.

FINDINGS AND INTERPRETATIONS

1. Sub-problem

In this sub-problem, the question "Is there any significant difference between mathematics achievement pre-test scores of the students in experimental group in which group work was applied with enneagram and control group in which group work was applied without enneagram in primary 7th grade mathematics teaching?" was tried to be answer.

Firstly, the normality of the distribution was investigated. Because the group size was smaller than 50, the appropriateness of the normality of the distribution was examined via Shapiro-Wilks test (Table 1).

Table 1. Results of Shapiro-Wilks Normality Analysis

	N	**Mean**	**Standard Deviation**	**Shapiro- Wilks**	**P**
Pre-Test	36	2,8125	3,49950	0,881	,001
Post-Test	36	4,1713	3,42278	0,953	,126

When Table 1 examined, it is seen that data obtained via mathematics achievement pre-test application do not show a normal distribution ($p<.05$). Data obtained via mathematics achievement post-test application show a normal distribution ($p>.05$).

Because data obtained via mathematics achievement pre-test do not show a normal distribution, Mann Whitney U-Test for Unrelated Measurements (Mann Whitney U-Testi for Independent Samples) was used to analyze if there was a significant difference between the scores, from mathematics achievement pre-test, of the students in experimental group in which group work was applied with enneagram and in control group where group work was applied without enneagram (Table 2).

Table 2. Mann Whitney U-Test Results related to Mathematics Achievement Post-Test Scores of the Students in Experimental and control Groups

Group	N	Row Mean	Row Total	U	P
Experimental	18	18,19	327,50		
Control	18	18,81	338,50	156,5	0,862

According to the table, it was observed that there was not any significant difference between mathematics achievement pre-test scores of the students in experimental group where group work was used with enneagram and control group where group work was applied without enneagram (U=156,5;p>,05). It can be said that the experimental and control group of students' knowledge about learning area before application are close to each other.

2. Sub-problem

In this sub-problem, the question "Is there any significant difference between mathematics achievement post-test scores of the students in experimental group where group work was used with enneagram and control group where group work was applied without enneagram?" was tried to be answered.

Firstly, the normality of the distribution was investigated. Because the group size was smaller than 50, the appropriateness of the normality of the distribution was examined via Shapiro-Wilks test (Table 3).

Table 3. Results of Shapiro-Wilks Normality Analysis

	N	Mean	Standard Deviation	Shapiro- Wilks	P
Pre-Test	36	2,8125	3,49950	0,881	,001
Post-Test	36	4,1713	3,42278	0,953	,126

When Table 3 examined, it is seen that data obtained via mathematics achievement pre-test application do not show a normal distribution (p<.05). Data obtained via mathematics achievement post-test application show a normal distribution (p>.05).

Because data obtained via mathematics achievement post-test do not show a normal distribution, Independent Samples T-Test was used to analyze if there was a significant difference between the scores, from mathematics achievement post-test, of the students in experimental group in which group work was applied with enneagram and in control group where group work was applied without enneagram (Table 4).

Table 4. Independent Samples T-Test Results related to Mathematics Achievement Post-Test Scores of the Students in Experimental and control Groups

Groups	N	$\bar{X}$	S	Sd	T	P
Experimental	18	4,7933	3,05982			
Control	18	3,5528	3,73400	34	1,090	,283

According to the Table 4, it is seen that there is significant difference between mathematics achievement post-test scores of the students in experimental where group work was used with enneagram and control group where group work was applied without enneagram in favor of experimental group (p>.05). In Table 14, however, it is seen that the mean score of the students, in experimental group where group work was used with enneagram, gained from mathematics achievement post-test after the application was (=3,55) higher than the students' in control group where group work was applied without enneagram. This result can be interpreted as the students in experimental group where group work was used with enneagram comprehended the topic better and showed high performance when compared to the students in control group where group work was applied without enneagram.

3. Sub-problem

In this sub-problem, the question "Is there any significant difference between mathematics achievement pre-test and post-test scores of the students in experimental group where group work was used with enneagram in primary 7th grade mathematics teaching?" was tried to be answered. Accordingly, Wilcoxon Signed Rank Test for Paired Samples used in situations when the amount of data is less than 30 in study group was used in order to investigate if there was any significant difference between the scores gained before and after the application of mathematics achievement test by the students of experimental group where group work was used with enneagram. Wilcoxon Signed Rank Test for Paired Samples was applied.

Table 5. Wilcoxon Signed Rank Test for Related Measurements Result Belonging to the Students' Mathematics Achievement Pre-Test and Post-Test Scores in Experimental Group

Post-Test – Pre-Test	N	Rank Mean	Rank Total	Z	P
Negative Rank	2	3	6	3,21	,001
Positive Rank	14	9,29	130		
Equal	2	-	-		

*Based on Negative Rank

According to the Table 5, it is seen that there is not a statistically significant difference between the students' mathematics achievement test scores before and after the application in experimental group where group work was used with enneagram (z=3,21,p<.05). Taking into consideration rank mean of the difference scores and totals, it is understood that this observed difference is in favor of post-test score or positive ranks. According to these results, it can be said that group work teaching with enneagram provides a significant contribution to 7th grade students at mathematics.

4. Sub-problem

In this sub-problem, the question "Is there any significant difference between mathematics achievement pre-test and post-test scores of the students in control group where group work was used without enneagram in primary 7th grade mathematics teaching?" was tried to be answered. Accordingly, Wilcoxon Signed Rank Test for Paired Samples used in situations when the amount of data is less than 30 in study group was used in order to investigate if there was any significant difference between the scores gained before and after the application of mathematics achievement test by the students of experimental group where group work was used without enneagram. Wilcoxon Signed Rank Test for Paired Samples was applied (Table 6).

Table 6. Wilcoxon Signed Rank Test for Related Measurements Result Belonging to the Students' Mathematics Achievement Pre-Test and Post-Test Scores in Control Group

Post-Test – Pre-Test	N	Rank Mean	Rank total	Z	P
Negative Rank	7	7,86	55,00	1,018	,309
Positive Rank	10	9,80	98,00		
Equal	1	-	-		

*Based on Negative Rank

According to the Table 6, it is seen that there is not a statistically significant difference between the students' mathematics achievement test scores before and after the application in control group where group work was used without enneagram (z=1,018,p>.05). According to these results, it can be said that the contribution of group work teaching without enneagram to 7th grade students in mathematics is not so important.

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5. Sub-problem

In this sub-problem, the question "Is there any significant difference between the students in experimental group where group work was used with enneagram and created groups' mathematics achievements after experimental process?" was tried to be answered. Accordingly, in order to investigate if there is any significant difference between the students in experimental group where group work was used with enneagram and created groups' mathematics achievements Kruskal Wallis H-Test for Independent Samples for Unrelated Measurements was used. Kruskal Wallis H-Test for Independent Samples was applied (Table 7)

Table 7. Kruskal Wallis H-Test Results Belonging to Mathematics Achievement Pre-Test of Created Groups and Experimental Group of Students

Method	N	Rank Mean	Sd	x^2	P	Significant Difference
1.Group	3	8,67				
2.Group	3	10,17				
3.Group	3	9,67	5	1,305	0,934	-
4.Group	3	11,67				
5.Group	3	9,83				
6.Group	3	7,00				

According to the Table 7, created groups and students in experimental group where group work was used with enneagram are homogeneous and behaviors that may occur due to the initial behaviors.

Table 8. Kruskal Wallis H-Test Results Belonging to Mathematics Achievement Post-Test of Created Groups and Experimental Group of Students

Method	N	Rank Mean	Sd	x^2	P	Significant Difference
1.Group	3	9,67				
2.Group	3	7,83				
3.Group	3	9,67				
4.Group	3	8,17	5	1,149	0,950	-
5.Group	3	12,00				
6.Group	3	9,67				

According to the table, there is not any significant difference between created groups' mathematics achievement and students in experimental group where group work was used with enneagram. In addition, the differences between created groups' mathematics achievement test pre-test and post-test and the students in experimental group where group work was used with enneagram were examined and the results were given in Table 9.

Table 9. The Differences between Mathematics Achievement Test Pre-Test and Post-Test Results Belonging to the Created Groups and the Students in Experimental Group

Groups	Pre-Test Group Mean	Post-Test Group Mean	Difference
1.Group	3,22	5,45	2,23
2.Group	2,44	3,88	1,44
3.Group	2,44	4,55	2,11

4.Group	3,00	3,88	0,88
5.Group	2,33	5,33	3,00
6.Group	3,33	5,66	2,33

According to the table, it was found that the biggest difference was in 5th group (Leader, Peaceful, Observer), the smallest difference was in 4th group (Reproachfully Transmitter, Observer).

6. Sub-problem

In this sub-problem, the question "Is there any significant difference between mathematics achievements of group created with reproachfully transmitter, observer, tragic-romantic personality types the group created with leader, peaceful, observer personality types after experimental process in primary 7th grade mathematics teaching?" was tried to be answered.

Table 10. The Results Related to Mathematics Achievement Test Pre-Test and Post-Test Score Difference of 4th and 5th Groups Created in Experimental Group

Groups	Pre-Test Group Mean	Post-Test Group Mean	Difference
4.Group	3,00	3,88	0,88
5.Group	2,33	5,33	3,00

When examined difference results, while 4th group of students' mathematics achievement test pre-test and post-test score difference was 0,88; the difference in 5th group was found as 3,00. Accordingly, it was found that the group consists of leader, peaceful, and observer personality types increased mathematics achievement score more than the one consists of reproachfully transmitter, observer, and tragic-romantic personality types.

7. Sub-problem

In this sub-problem, the question "Is there any significant difference between mathematics achievements of group created with loyal questioner, free-liver, observer personality types the group created with successful, free-liver, observer personality types after experimental process in primary 7th grade mathematics teaching?" was tried to be answered.

Table 11. The Results Related to Mathematics Achievement Test Pre-Test and Post-Test Score Difference of 1th and 6th Groups Created in Experimental Group

Groups	Pre-Test Group Mean	Post-Test Group Mean	Difference
1.Group	3,22	5,45	2,23
6.Group	3,33	5,66	2,33

When examined difference results, while 1th group of students' mathematics achievement test pre-test and post-test score difference was 2,23; the difference in 6th group was found as 2,33. Accordingly, it can be said that mathematics achievement scores of the group consists of free-liver, reproachfully transmitter personality types and the one consists of successful, free-liver, observer personality types are close to each other.

8. Sub-problem

In this sub-problem, the question "Is there any significant difference between mathematics achievements of group created with perfectionist, loyal questioner, leader personality types the group

created with reproachfully transmitter, observer, tragic-romantic personality types after experimental process in primary 7th grade mathematics teaching?" was tried to be answered.

Table 12. The Results Related to Mathematics Achievement Test Pre-Test and Post-Test Score Difference of 2th and 4th Groups Created in Experimental Group

Groups	Pre-Test Group Mean	Post-Test Group Mean	Difference
2.Group	2,44	3,88	1,44
4.Group	3,00	3,88	0,88

When examined difference results, while 2th group of students' mathematics achievement test pre-test and post-test score difference was 1,4; the difference in 4th group was found as 0,88. Accordingly, it can be said that mathematics achievement scores of the group consists of a perfectionist, loyal questioner, leader personality types and the one consists of reproachfully transmitter, observer, tragic-romantic personality types are close to each other.

RESULTS

It was found that there was not a significant difference between achievement pre-test scores of the students in experimental group where group work was used with enneagram and in control group where group work was applied without enneagram after the application. It can be said that experimental and control group of students' knowledge related to particular learning areas before the application and levels of readiness are close to each other.

It is not observed that there is a significant difference between achievement test scores of the students in experimental group where group work was used with enneagram and in control group where group work was applied without enneagram after the experimental process in favor of experimental group. However, the achievement test score mean of the students in experimental group where group work was used with enneagram after the application is higher than the students' in control group where group work was applied without eenagram. This result shows that the students in experimental group where group work was used with enneagram comprehend the topic better and display a higher performance when compared to the students in control group in which group work was applied without enneagram.

It is seen that there is a statistically significant difference between the scores, gained before and after the experimental application, of the students in experimental group where group work was used with enneagram. According to these results, it can be said that instruction applied with group work by using enneagram provides an important contribution to 7th grade students in terms of mathematics teaching.

It is seen that there is not a statistically significant difference between the scores, gained before and after the experimental application, of the students in control group where group work was used without enneagram. According to these results, it can be said that instruction applied with group work by not using enneagram does not provide an important contribution to 7th grade students in terms of mathematics teaching.

When the groups examined, it was found that there was not a significant difference between intergroup mathematics achievements. It was observed that the biggest difference was in the group (5th group) consisted of leader, peaceful, observer personality types, the smallest difference, on the other hand, was in the group (4th group) consisted of reproachfully transmitter, observer, tragic-romantic personality types.

SUGGESTION

As a result of the research, because it was observed that the teaching method with group work by using enneagram increased the student's success and helped about personal development, dissemination of the use of enneagram in mathematics and other disciplines is suggested.

It is obvious that it is useful for teachers in using this method at mathematics teaching based on the effects observed at the end of research of mathematics teaching by using enneagram. For its provision and dissemination, the number of personal development classes for pre-service teachers should be increased in faculties of education and classes related to the use of enneagram in mathematics teaching should be added to instruction programs of departments for teachers.

In-service courses can be organized for teachers to make exercises about enneagram and use reliable measurement tools for identifying students' personal characteristics with in-service education.

Similar study about enneagram can be applied at the levels of secondary and higher educations.

It is thought that considering the personality types while creating the groups for group works and applying suitable exercises for these personality types may be useful.

In this study, the entire group combinations might be created with ternary personality types was not used. Because current personality types are not enough, the groups occurring with all possible combinations can be used in another study.

A study aimed to expose which one of the groups, created by combining different number of people and different personality types, will be more successful can be suggested to carry out.

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