

DEDUCTIVE TEACHING METHOD AND COOPERATIVE TEACHING METHOD ON ACADEMIC PERFORMANCE OF SECOND STAGE SECONDARY SCHOOL STUDENTS OF TEHRAN CITY

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Abstract. This research aimed to investigate deductive teaching method and cooperative teaching method on the academic performance of second stage secondary school students of Tehran city. The research method was quasi-experimental and had a pre-test post-test design. The statistical population of the research includes all the second stage secondary school students of Tehran city. The statistical sample of the research includes the boy students of the two class (40 individuals) of the same school. One class (20 individuals) was taught through the deductive teaching method and the other class (20 individuals) was taught through the cooperative teaching method. Data collection instrument was the academic performance questionnaire of Pham and Taylor. The validity of the questionnaire was confirmed by the experts and the reliability of the questionnaire using the Cronbach alpha coefficient was confirmed as 0.82. The Covariance analysis was used for data analysis to compare the pre-test post-test means.

The results of the research showed that the cooperative teaching method is more affective on the academic performance than the deductive method.

Keywords: Deductive, Cooperative, Academic Performance

Introduction. In the traditional approaches that are nowadays called inactive methods, the teacher has an active role in the teaching process and the students (without an active role) must listen to his speeches and memorize his intended content. In such situations, the necessary background is not provided for the social development of the personality, academic development, and mental development of the students. Cooperative methods in terms of having an active teaching process, are included in the active methods but, what discriminates cooperative methods from active methods is the issue of cooperation and thinking alike of some students in order to reach the purpose. The active method may take place between teacher and student, but the cooperative methods are collaborative and the group benefits are very important (Khazaei et.al, 2015).

The ultimate goal of using learning teaching method through cooperation is achieving excellent mental activities. This method has been effective in the improvement of basic skills of thinking and actually, this method detects the nature of thinking and using this method, the students learn thinking. This method is codified for guiding the students by the same concept (Mahdizadeh et.al, 2018).

The deductive method is one of the new and active methods in the teaching of courses and is based on the findings of the new psychology. But the traditional approach is of the common and traditional approach in teaching of courses in most of the recent schools and most of the teachers teach the courses through this method (Aboozari et.al, 2008). The deductive thinking method leads to the improvement of the capacity of thinking, collection, organizing, and controlling information and naming the concepts. In the other words, this method collects the organizational information and controls the contents. In this method, the teacher begins the activity because the activities are determined by him, previously. But there is a collaborative and friendly atmosphere between teacher and student. The students have access to the information. This method leads to the personal awareness development and the improvement of self-control in the students and can be used at every academic level (Farhadi Poor et.al, 2016).

Since the main role of the schools is to train individuals and provide basic cognitive instruments which can be used for different purposes and turn students into creative, reasonable, rational, and broad and various intuition (Khazaei et.al, 2015), so we must be careful and pay attention to the selection of teaching method and its correct teaching to teachers and give it high value in the course planning because, the teaching method can have the best role in the academic development of the students. The reason for sensitivity and importance of using appropriate teaching method which has the most effect in the learning and change of the students' behavior and the most important is that the empirical sciences book is designed and written in a way that the active method with cooperation must be used in the teaching. In this research it is tried to investigate the effect of the cooperative active method in the teaching of the empirical sciences book and determine that "Is it effective to use the active cooperative method in the learning of the empirical sciences course?". So, this research investigates new methods of teaching including the deductive teaching method and the cooperative teaching method and

also this question which is “Is there any difference between these two methods on the academic development of the students? Following are some of the performed researches on this area.

Mahdi Zade (2018) performed research under the title “new methods of teaching and its effect on teaching and learning”. The statistical population includes all (176 individuals) the sixth stage elementary girls’ schools of Ghaemshahr in the academic year of 2017-2018. Using simple-randomization method, one class from Shohada school and one class from Hedayat school were selected. For one academic term, the math course was taught to the Shohada students in the traditional approach and to the Hedayat students using new teaching methods (deductive, cooperative, collaborative, explorative, etc). The results showed that there is a direct and significant relationship between the use of new teaching methods and learning performance.

Mohammadi Doost and Rabihavi (2017) performed research to investigate the effectiveness of question and answer, and cooperative teaching methods on the academic development of the boy students of sixth stage elementary school of Ahvaz in the empirical science’s book. In this research, using simple randomization, two classes (every 35 individuals) were selected from all the boy students of sixth stage elementary school of Ahvaz and for a period of 3 months and in 30 sessions (every 45 minutes) were taught the empirical sciences’ course according to the two methods courses design. In comparing means of the two groups according to the teaching methods of question and answer and cooperative, it was concluded that the cooperative teaching method was more effective in the academic improvement of the students.

Khofteh Del et.al, 2016 performed research under the title “investigating the effect of cooperative teaching method and the 5E teaching method on the academic development and social skills of boy students of fifth stage elementary school of Ghoochan in the empirical sciences course. Data were analyzed using multivariate variance. The results showed that there is a significant difference between the average scores of academic development and social skills of the students who were taught using 5E teaching method and those who were taught using the cooperative teaching method. However, teaching with 5E method was effective in the academic development and teaching with cooperative method was effective in the social skills of students.

Wanjari, 2014 performed research under the title “effectiveness of Concept Attainment Model and Deductive Thinking model of teaching on student achievement in science scientific creativity and attitude towards science”. In this research, the statistical sample was 285 individuals from the high school students and the data were collected using questionnaire and in order to analyze data, the structural equations of Lisrel software were used. The results showed that the deductive thinking is affective on the success and creativity of students.

Aziz and Hossein in a research with the title “a comparison of cooperative learning and traditional teaching on the student’s achievement in secondary mathematics” concluded that cooperative teaching method has been affective on their academic development.

Research method

In this research, the experiments were studied using randomization method and the experiment method included a control group and an experimental group. The statistical population of this group includes second stage secondary school students of Tehran. The statistical sample of this research includes boy students of 2 classes (40 individuals) of the same school. One of the classes (20 students) were taught using the deductive teaching method and the other class (20 students) using the cooperative method. Data collection instrument was Pham and Taylor academic development questionnaire. The validity of the questionnaire was confirmed by experts and the reliability of questionnaire using the Cronbach alpha coefficient was confirmed as 0.82. The Covariance analysis was used for data analysis to compare the pre-test post-test means.

Findings

Research hypothesis: cooperative teaching method in relation to deductive method has more effect on the academic performance of Tehran second stage high school students.

The research hypothesis was investigated using Covariance (ANCOVA) test.

Investigating the data

The Covariance (ANCOVA) test was used to analyze the research hypothesis.

Before the analysis, the information of using this statistical model are investigated:

1. Normality of scores distribution

The purpose of investigation is the assumption that the scores are normal so, normality of the distribution of the scores analogous to community is investigated. This assumption states that the observed difference between distribution of scores of the sample group and normal distribution in the community equals to zero. So, we used the Kolmogorov-Smirnov examination. The results of this assumption about the scores of variables of this research can be seen in the table 1.

Table 1: Kolmogorov-Smirnov examination in order to evaluate normality of distribution of scores of academic performance variable in the pre-test, post-test and follow up phases.

Research phase	Variable	groups	The statistics	significance
pre-test	Academic performance	experimental	0.192	0.141
		control	0.185	0.175
Post-test	Academic performance	experimental	0.171	0.2
		control	0.208	0.077

As it is observed in the table, the null hypothesis which shows normality of distribution of the scores in the academic performance variable in the pre-test, post-test and follow up, remained. This means that the distribution of scores of the sample is normal and analogous with the community and the crook and elongation are random (all the significance levels are above 0.05).

-Investigating homogeneity of regression slope

Table 2- results of the investigating homogeneity of the regression slope of the academic performance variable

variable	Sum of squares	Degree of freedom	Mean of squares	F	significance
Academic performance	984.63	2	442.31	1.22	0.086

As shown in the table 2, the F value of the independent variable interaction is 1.69 which is not significant because the significant level is above 0.05. So we can conclude that the null-hypothesis is accepted and the opposite hypothesis is rejected and the assumption of homogeneity of the regression slope is observed.

Homogeneity of variances

Also in order to investigate the variance homogeneity of the group, the Levine test was used and its related calculations are summarized in the table below:

Table 3: summary of the Levine test to investigate variances homogeneity in the academic performance variable

group	Degree of freedom 1	Degree of freedom 2	The statistics Levine	Significance level
Pre-test	1	38	0.099	0.75
Post-test	1	38	0.286	0.59

As considered in the above table, the significance level of the Levine test is above 0.05. Therefore, it can be said that the groups' variance has congruity. The null hypothesis in this test is that variance of the two groups has congruity and regarding that the significance level is above 0.05, the null hypothesis is accepted and the opposite hypothesis is rejected.

Table 4. summary of the ANCOVA test for academic performance test

Dependent variable	Change sources	Sum of squares	Degree of freedom	Mean of squares	F	significance
Academic performance	Pre-test	70565.29	1	70565.29	66.70	0.000
	group	44755.85	1	44755.85	42.30	0.000
	error	39143.81	37	1057.794		
	total	472306.00	40			

Based on the achieved data from table 4, there is a significant difference between the mean of post-test scores of the two groups of control (deductive) and experimental (cooperative) in the dependent variable of academic performance (F=66.70, p=.000). and the effect of the F value of the independent variable (group) (F=42.30, p=.000), is significant. This means that after taking out the effect of pre-test, there is a significant difference between scores of the two group of control and experimental in the post-test. Therefore, the null hypothesis is not significant and the mean difference of the two groups in the post-test and after eliminating the possible effect of pre-test is rejected and we can reject null hypothesis at 0.05 and accept with a 95% confidence level that the cooperative teaching method is more effective in the academic performance in relation to the deductive teaching method.

Results

The purpose of this study was to investigate the deductive teaching method and the cooperative teaching method on the academic performance of second stage high school students of Tehran. Results of the study showed that in comparing two

groups of students according to the deductive teaching method and cooperative teaching method, it was concluded that the cooperative teaching method in relation to the deductive method is more effective in the academic performance of the students. The results of this research is in line with Mohammadi Doost and Rabihavi (2017), and Khazaei et.al (2015) researches.

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