

Original Research Article

Effects of cooperative learning on students' learning progress in high school

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Abstract

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The main goal of this study examines is the effect of exploratory method on critical thinking and attitude towards Social science textbooks in the high school female students took third base The Design of the was quasi -experimental design with pretest - post test. The research population included All Students Girl Third Base Second Secondary school in Roshtkhar during academic year of 2013-2014. The 60 student were randomly selected and divided in to experimental control groups (each group 30). Research tools included a questionnaire on critical thinking and academic Watson Glizer and attitudes questionnaire used books and teaching methods and techniques and collection of books on education and new methods of teaching in Social science lessons. The Statistical methods: Analysis of Samples T Test results: - the effect of exploratory method on students' critical thinking. - the effect of exploratory method on attitude of students towards Social science book - the effect of exploratory method collaborative learning and inference, recognition of assumptions, inference, interpretation, evaluation of students' reasoning. - the effect of exploratory method on students' positive attitude and negative attitude the subjects .

Keywords: Exploratory Method, Critical thinking, Attitude, Science

INTRODUCTION

Method or sample of exploratory teaching originated from thoughts of John Dewey, Herbert Telen, Viliam Hard Kilpatric, Gordon Hullfish, Philip Smith. The sample made of process based on freedom and scientific method. Teacher in time of education to exploratory method pay attention to student activity and motive in face to face with a phenomena and question.

Joyce and Weil believe that the sample was established based on criticism of Richrd Sachman. Exploratory teaching defined as checking and description of unusual phenomena and Collins and Stevens planed its process descriptively (Joyce& Weil, 1989; Shekari, 2001). The sample that has compiled Sachman involved students by processes that researchers used of them for organizing of knowledge and creating of principles. According to concepts of scientific method, from way of exploratory teaching was learned by special skills and language.

Method of exploratory was compiled for face to face students directly by scientific processes. In this method was

considered a long process of a scientific research as summary by low time.

Method of exploratory teaching has created base on the belief that must learner reared independent and it required activity in the form of scientific exploratory and to learner was gotten suitable way for employing of their energy. Sachman interests to education of independent students. Sachman wanted students to ask question about cause of events and concepts and collected and analyzed information about it. He also interests that students must be ready from point of view exploratory (Aghazade, 2009, pp 385-286).

The basis of exploratory education is enabling of learners for getting to questions answers that learners face to face with them. This kind of education enriched exploratory morale in students. The general goal of exploratory education is helping to students till created on self intellectual order and necessary skills for creation of question and research, for answering to them based on their curiosity. Because of in the method was wanted from student that to ask from self, involve by question,

collect the necessary information, coherent to collection information and get to answer.

Joyce and Weil: final goal of exploratory sample is encouragement of students to experience and production of new knowledge, so they emphasized frankly on notification and dominating on exploratory process.

Knowledge scientists believe that kids have curiosity feeling and tending to discovery of physical and mental environment, and they do one of the hardest knowledge tasks that it is language learning by abundant enthusiasm. But unfortunately subsided curiosity feeling of many them with going to school and after several years. Student learning quickly in home, school and society (as elements of deterrence of curiosity feeling and thought) that relinquished of self questions and answers, and instead of it, following questions and answers that teachers interested to them (Mayers; Abili, 1995,p 16).

Such the approach, neither encourage the students to learning, nor made motive for creation, experiment, ordering and expansion but they created things by action and reaction with physical and mental environment that Piaget called it: mental structures; these structures specified way of experiences and guidance of action and reaction for their futures (Piaget; Kardan,1998,p119).

Most of the researches are indicatives of reality that students sound satisfied from which studied preliminary interpretation but they sound very weak in analyzing of questions or defense of their viewpoint. Sometimes their answers in field of analyzing of concept and verdict about viewpoints are very hopeless. Originally students showed low skills in field of solution strategy of question and analyzing thought from themselves (Shaebani, 2001).

Kagan maintained that exploratory method forced students to interaction and seeking and created curiosity felling (Nasrabadi and Novrouzi, 2006).

International community of evaluation of educational progress in 90-91 year was done researches in field of humanities lessons by name of "first international sciences study". In the study not only had been considered measurement of educational progress in social science lesson, but had been considered state of tendencies,teaching methods, training of recognition, perception and understanding practical skills. Some of the results are:

1. In lower education hadn't get strong reasons for supporting from the view point that provision of doing experiments and practical affaires influenced on humanities lessons.
2. Operation of students that in social sciences classroom have experience of educational activity are better than students that in their classroom haven't pay attention to educational activity and students that society sciences teachers forced them to researching work were getting better scores.
3. Lewittes by education of critical thought to student among 2001-2004 years found that despite of education, one-third of learners hadn't achieved to these skills. For solution of the problem in small groups formed discussion and asking, ways

of regulation learning and way of motive creation in group members. Results show that educational environment and reaction of learners together helped to creation of critical thought in teaching (Hoseini, 2007). Aronson and others in a research pay to comparison of way of education donation from kind of technique "Jicsav" by traditional education in educational progress and attitude of students in social sciences, in the research about 304 students of fifth primary school take apart in time of 6 weeks. Results show that in the experiment groups, subjects show more interesting to their group and classmates and rate of favorite and loving of lesson topic and positive attitude to school was more than control group (Khodadadnezhad, 2009). Research results of Akay and Boose show that exist of relation between attitude and lesson elements caused increase of student self-efficacy to lesson elements (Zaki, 2010). Researches were done by Akubuiro and Hoshua in Nigeria show that students' educational progress of high school in sciences can predicate base on attitude of students to educational activities and in the predication attitude has more shre (Pasha Sharifi, 2006). Researches were done by Bessey suggested that positive attitude of students to scholastic lessons have positive effect on educational progress. Results of researches show that exploratory method had many effect on students' critical thought and attitude than textbook.

Research assumptions and method

The research is an experiment study from kind of pretest-posttest by experiment group and control group. For experiment group was completed exploratory sample in ten sessions of 45 minutes along 2monthes. Meanwhile in the research controlled variable of age, gender, educational section and educational grade.

Population of the research contained all of girl students (280) in third grade of high school in Roshtkar County, academic years of 90-91. The samples in the study are girl students in third grade of high school in Roshtkar County. For choice of samples was used of random sampling and then 60 students shared to tow groups of experiment and control.

In the study was used of critical thought test of Vatson and Glizer that was translated to Persian and caused of cultural condition and perception level of students was done changes in examples and words that for this purpose before implementation of the pretest, first the questionnaire was given to several third grade student of high school and incomprehensible examples and words were indicated by selves-learners and was done changes in questionnaire then again questionnaire was given to several teachers that teaching in high school and was used of their guidance toward correction of questionnaire so that was suitable for students' third grade of high school and finally corrected was replicated questionnaire for pretest. Final index is %91, also in the study was used from test of educational measurement attitude that was made by Akbari in order to measurement of students than social sciences that according to concepts of

social sciences book which had changed in recent years. Stability of the study with Tasnif method was %83 and by Alfayekoronbakh method was %86 (Pasha Sharifi, 2088).

For evaluation of students' critical thought rate was used of critical thought test of Vatson and Glizer that ability of critical thought measure by 80 questions in five components deduction skill, data identification, resulting, interpretation and evaluation. Total score is 80 and most of triable scores from any section are 16. Scores had obtained in deduction sector through true and false phrases, in data identification sector by recognition of exist or nonsexist of defaults in listed or not listed phrases of situations, in resulting sector by distinguishing of extracted or non extracted results of situations, in interpretation section by distinguishing of extracted or non extracted interpretation of biography and finally in reasons evaluation sector by distinguishing of weak or power reasons. In other word in the study for any correct answer was given to student one score and all correct answers to test question was it total score (maximum 80 scores). Each of triables according to total score that was given can place on in one of the weak class (under 45), average (54-59) and power (60-80) from view of critical thought. In division of scores in each sector, it was considered for weak class 10 and under, average class 11 and power class 12-16. The necessary time for answered the questions of test was 60 minutes. This test was checked after translated to Persian and edit for coordination and adoption by cultural and social elements of Iran (Javadi& others).

In standardization process of critical thought test of Vatson and glizer, final index was reported by various studies in Iran based on Alefbaiekoronbakh test %70 (Mosallanezhad, 2008), (Eslami&others, 2004). In other study that was done by Badrigargari& others on 80 triables. Result of the research show to exist significant different between two groups in level of probability %5 by $t=2.26$. Final results of test was confirmed through further testing on the 50 students of teacher training centers ($p<0.01$) and ($r= 0.46$). Other measurement tools in the study were questionnaire of educational test attitude that was made by Dr. AbolghasemAkbari in 1383 for educational test attitude of students that had 29 questions of 5 choices with choices: totally compatible, compatible, haven't idea, against, totally against. As regards that the questionnaire was made for students of high school was changed in some questions suitable by age and gender of students, the questionnaire was done by its maker for research project and by title of "checking of effect rate of educational and job planning lesson in educational guidance of student" about a group 30 student of high school in Tehran city and was done after checking of its test spirit specification and choice of suitable question in a sample 659.

In negative question with numbers:2, 3, 5, 8, 10, 13, 14, 15, 17, 18, 21, 22 was given score 1 to totally compatible choice, 2 to compatible, 3 to haven't idea, 4 to against and 5 to totally against and other question that are positive: 1, 4, 6, 7, 9, 11, 12, 16, 19, 20, 23, 24, 25, 26, 27, 28, 29 was given score 5 to totally compatible choice, 4 to compatible, 3 to

haven't idea, 2 to against, 1 to totally against and student score in total test was calculated through total scores of positive and negative questions.

Educational attitude test of Akbari was done in a sample of 659 students, credit and justifiability was calculated in down.

Credit: credit index of questionnaire was calculated by Alphaiekoronbakh method and was reported %91.

Justifiability: for justifiability checking of questionnaire was done after codification (Pasha Sharifi, 2008, p 204).

For analysis of data in the study according to "pretest-posttest plan with control group" had been used down statistic ways.

1. Methods of descriptive statistics like: calculation of average, standard deviation, maximum and minimum.

2. Methods of inferential statistics: t test for independent groups.

For statistics analysis of data was used of fifteenth version of spss software.

FINDINGS

Based on finding of table 1 was increased score average of experiment posttest (43.33) than to average of their pretest (38.06). also the table showed amount of tcr(t of the table) for two-sided test with free grades 58 and in Alpha level 0.01 is same by 2.66, $p < 0.01$ and tcr (58)= 2.66. According to results of table (tob>tcr) was percolated null hypothesis and research hypothesis was confirmed that was "exploratory sample influenced on critical thought of student". In other words with %99 confidence could say that existed difference of significant statistic between scores of two groups.

Based on findings of table 2 had dramatic increase average of score after test of experiment group (100.66) than to average of their pretest (98.43). Also the table showed amount of tob (t was calculated) with free grades 58 and Alfa level 0.01 is same with $p< 0.01$ and tob (58)=5.44. Amount of tcr (t in table) for two sided test by free grades 58 and in Alfa level is same with $p<0.01$, 2.66 and tcr (58) = 2.66. According to results of table (tob>tcr) was percolated null hypothesis and was conformed research hypothesis that was "exploratory sample influenced on kind of student attitude than to social sciences textbook". In other words with %99 confidence could say that existed difference of significant statistic between scores of two groups.

Based on findings of table 3 had dramatic increase average of score after test of experiment group (6.66) than to average of their pretest (5.16). Also the table showed amount of tob (t was calculated) with free grades 58 and Alfa level 0.01 is same with $p< 0.01$ and tob (58) = -2.98. Amount of tcr (t in table) for two sided test by free grades 58 and in Alfa level 0.01 is same with $p<0.01$, 2.66 and tcr (58) = 2.66. According to results of table (tob>tcr) was percolated null hypothesis and was conformed research hypothesis that was "exploratory sample influenced on inference of students". In other words with %99 confidence could say that existed difference of significant statistic between scores of two groups.

Table 1. t test results for comparison of two groups in variable of critical thought

Group	Number	Average of pretest	Average of posttest	Difference between averages	Standard error of averages	T test for comparison between two averages		
						p	df	T
Experiment	30	38.06	43.33	-5.26	6.30	0.000	58	-5.22
Control	30	32.20	29.03	3.16	6.19			

Table 2. Results of t test for comparison average of two groups in variable of attitude kind

Group	Number	Average of pretest	Average of posttest	Difference between averages	Standard error of averages	T test for comparison between two averages		
						p	df	T
Experiment	30	89.43	100.66	11.23	15.34	0.000	58	5.44
Control	30	93.40	82.96	10.43	15.50			

Table 3. Results of t test for comparison average of two groups in inference variable

Group	Number	Average of pretest	Average of posttest	Difference between averages	Standard error of averages	T test for comparison between two averages		
						P	df	T
Experiment	30	5.16	6.66	-1.50	2.20	0.004	58	-2.98
Control	30	4.76	4.66	0.10	1.93			

Table 4. Results of t test for comparison average of two groups in data identification variable

Group	Number	Average of pretest	Average of posttest	Difference between averages	Standard error of averages	T test for comparison between two averages		
						p	df	T
Experiment	30	9.40	9.70	0.30	2.53	0.005	58	0.005
Control	30	8.16	6.20	1.96	3.42			

Table 5. Results of t test for comparison average of two groups in deduction variable

Group	Number	Average of pretest	Average of posttest	Difference between averages	Standard error of averages	T test for comparison between two averages		
						p	df	T
Experiment	30	8.86	9.56	-0.70	2.53	0.022	58	-2.35
Control	30	6.53	5.73	0.80	3.42			

Based on findings of table 4 had dramatic increase average of score after test of experiment group (9.70) than to average of their pretest (9.40). Also the table showed amount of tob (t was calculated) with free grades 58 and Alfa level 0.01 is same with $p < 0.01$ and tob (58) = -2.91. Amount of tcr (t in table) for two sided test by free grades 58 and in Alfa level 0.01 is same with $p < 0.01$, 2.66 and tcr (58) = 2.66. According to results of table (tob>tcr) was percolated null hypothesis and was conformed research hypothesis that was "exploratory sample influenced on data identification of students". In other words with %99 confidence could say that existed difference of significant statistic between scores of two groups.

Based on findings of table 5 had dramatic increase

average of score after test of experiment group (9.56) than to average of their pretest (8.86). Also the table showed amount of tob (t was calculated) with free grades 58 and Alfa level 0.05 is same with $p < 0.05$ and tob (58) = -2.35. Amount of tcr (t in table) for two sided test by free grades 58 and in Alfa level 0.05 is same with $p < 0.05$, 2.00 and tcr (58) = 2.00. According to results of table (tob>tcr) was percolated null hypothesis and was conformed research hypothesis that was "exploratory sample influenced on deduction of students". In other words with %95 confidence could say that existed difference of significant statistic between scores of two groups.

Based on findings of table 6 had dramatic increase average of score after test of experiment group (8.23) than to

Table 6. Results of t test for comparison average of two groups in interpretation variable

Group	Number	Average of pretest	Average of posttest	Difference between averages	Standard error of averages	T test for comparison between two averages		
						p	df	T
Experiment	30	7.10	8.23	2.38	2.53	0.017	58	-2.45
Control	30	6.66	6.13	2,84	3.42			

Table 7. Results of t test for comparison average of two groups in variable of logical argument evaluation

Group	Number	Average of pretest	Average of posttest	Difference between averages	Standard error of averages	T test for comparison between two averages		
						p	df	T
Experiment	30	7.53	9.16	-1.63	2.00	0.029	58	-2.24
Control	30	6.06	6.30	-0.63	2.76			

Table 8. Results of t test for comparison average of two groups in variable of positive attitude

Group	Number	Average of pretest	Average of posttest	Difference between averages	Standard error of averages	T test for comparison between two averages		
						p	df	T
Experiment	30	55.06	61.43	6.37	8.94	0.017	58	2.44
Control	30	55.70	55.00	-0.70	13.04			

average of their pretest (7.10). Also the table showed amount of tob (t was calculated) with free grades 58 and Alfa level 0.05 is same with $p < 0.05$ and tob (58) = -2.45. Amount of tcr (t in table) for two sided test by free grades 58 and in Alfa level 0.05 is same with $p < 0.05$, 2.00 and tcr (58) = 2.00. According to results of table (tob>tcr) was percolated null hypothesis and was conformed research hypothesis that was "exploratory sample influenced on interpretation of students". In other words with %95 confidence could say that existed difference of significant statistic between scores of two groups.

Based on findings of table 7 had dramatic increase average of score after test of experiment group (9.16) than to average of their pretest (7.53). Also the table showed amount of tob (t was calculated) with free grades 58 and Alfa level 0.05 is same with $p < 0.05$ and tob (58) = -2.24. Amount of tcr (t in table) for two sided test by free grades 58 and in Alfa level 0.05 is same with $p < 0.05$, 2.00 and tcr (58) = 2.00. According to results of table (tob>tcr) was percolated null hypothesis and was conformed research hypothesis that was "exploratory sample influenced on logical argument evaluation of students". In other words with %95 confidence could say that existed difference of significant statistic between scores of two groups.

Based on findings of table 8 had dramatic increase average of score after test of experiment group (61.43) than to average of their pretest (55.06). Also the table showed amount of tob (t was calculated) with free grades 58 and Alfa level 0.05 is same with $p < 0.05$ and tob (58) = 2.44. Amount of tcr (t in table) for two sided test by free grades 58 and in Alfa level 0.05 is same with $p < 0.05$, 2.00 and tcr (58) = 2.00.

According to results of table (tob>tcr) was percolated null hypothesis and was conformed research hypothesis that was "exploratory sample influenced on positive attitude of students than to social sciences textbook". In other words with %95 confidence could say that existed difference of significant statistic between scores of two groups. In other words used of exploratory sample caused of increase students' positive attitude than to social sciences textbook.

Based on findings of table 9 had dramatic increase average of score after test of experiment group (39.23) than to average of their pretest (24.36). Also the table showed amount of tob (t was calculated) with free grades 58 and Alfa level 0.01 is same with $p < 0.01$ and tob (58) = 5.75. Amount of tcr (t in table) for two sided test by free grades 58 and in Alfa level 0.05 is same with $p < 0.05$, 2.66 and tcr (58) = 2.66. According to results of table (tob>tcr) was percolated null hypothesis and was conformed research hypothesis that was "exploratory sample influenced on negative attitude of students than to social sciences textbook". In other words with %99 confidence could say that existed difference of significant statistic between scores of two groups and different scores average of pretest and posttest of experiment group is more than control group, it means exploratory sample caused of increase students' positive attitude than to social sciences textbook.

DISCUSSION AND CONCLUSION

All beauty of new approach of social sciences teaching is at this point that we trying to every way possible escape from

every divestment frame of flexibility and definitive review that want to limit from sides. So was considered that fluid and non-dogmatic attitude of new approach of social sciences teaching in national level is considering exposure of all principles and advanced methods depend on object and according to situation and pay attention to some of them in any time, such that finally will create comprehensive collection (Amani tehrani, 2001, p 30).

Base on exploratory sample is education for perception of the subject that has been tested science nature and trying instead of offer of definite findings, employed exploratory sample and student was learned exploratory by checking of topic history and following of subject dependent on that period and found subject through perception, experiment, scientific checking and finally checking of exploratory samples of subject answer. It seems in our social sciences textbook tried in side of textbook and also offer of classroom activity propelled educational process of schools to side of the scientific of exploratory sample but which provider scientist of the sample insist on it contained several necessary points:

Exist of aware, experienced, compassionate teachers and teachers having knowledge for doing of the sample is necessary till they can create chances for learning for possibility of students' partnership in exploratory period. One of the effective factors in fast learning of students is effort for learning life needs and try to achieve parents to aware and scientific high level. So exploratory sample through opened valve against of students' eyes and showed students' scientific and researching horizon that more effort and didn't know social sciences as fix, definite, limited, non-development and full subjects.

Results of the research shows that average score of posttest of experiment groups than to average of pretest had dramatic increased in relation by two major assumptions means critical thought and student's kind of attitude than to social sciences textbooks and subsidiary assumptions of critical thought (deduction, data identification, inference, interpretation, logical argument evaluation).

Therefore as you show results of the research in field of employment of exploratory sample on students' critical thought conformed to other studies in the same fields and this shows conformation and consistent of relative results by results of other studies. Thus according to research findings can recommended that:

Authors of textbooks by aware of theoretical and practical basics of exploratory sample organized concepts of textbooks so that the method was available education and also educational officials while on duty in level of ministry and province familiarized teachers by approach of exploratory sample through holding of seminars, scientific conferences and educational periods. And give needed facilities to teachers for effective use of the approach.

From the method can use for students in various level. For beginning recommended that started with less crowded class by stronger students. Performance of it is needy to flexible teacher and aware with exploratory and offer of fields of investigated problem plan. In time of performance must be

used of experiences for students activate because may be some students didn't take apart in activity.

According to the new books of social sciences in second grade of high school was planned base on exploratory method and solution of question and according to results of the research based on effectiveness of exploratory method in improvement of critical thought elements and creation of positive attitude in students rather than social sciences books is suitable with exact checking and supervision created field for employment more and total of exploratory method in schools. For creating teacher relish to use of active method of teaching, recommended as exploratory that officials of education of areas encouraged teachers that used the method in classroom.

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