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The Comparison of the Effect of the Modular Teaching Method and Problem-Solving Method on Academic Achievement of the Students in Natural Science

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ABSTRACT

In this research the effect of two modular teaching method and problem-solving methods are studied on academic achievement of fifth grade of elementary school students in natural science of Dezful in academic year 2010-2011. Statistical population of this research is including all girl students of fifth grade of elementary school in Dezful. The results showed that there is significant difference between the average of academic achievement of the students being exposed to modular teaching method and the students exposed to problem solving method. It means that the students being exposed to modular teaching method had higher academic achievement in comparison with the students being taught by problem solving method. Also there was significant difference between average of intelligent and moderate students being exposed to modular teaching method and intelligent and moderate students being exposed to problem solving method. It means that the intelligent and moderate students being taught using modular teaching method had higher academic achievement in comparison with the students being taught using problem solving method. But there was significant difference between weak students academic achievement average being exposed to modular teaching method in comparison with the weak students being exposed to problem solving method.

KEY WORDS: Modular teaching method; problem solving method; academic achievement.

INTRODUCTION

The requirement for strength and stability of human being in today rapid change is giving more thought to the quality of educational system. Rapid changes in educational centers are more than other organizations, thus the schools should re-evaluate the traditions and trends and have critical view toward better achievements in this field. Permanency of schools is depending upon their variability. As we advance, the decisions are going faster and increasing number of students, considerable changes in scientific findings, knowledge explosion, inequity in having access to education and all other effective factors in the schools increase the importance of the quality of each educational system. Sometimes when the teachers think that they are teaching well, encounter with astonished faces of the children and get surprised. The students don't understand some issues about some subjects. In such time, the teacher can help children by implementing a good teaching method to be released of confusion (Allan & Herison &Richard, 2006).

Hopkins (cited in Abdollahi, 2008) said about the main objective of teaching as:" The teaching aim is not merely helping the students to attain the required knowledge in curriculum and they should be helped to be strong learners.

Indeed, teaching is both science and art. The parents expect the teachers to master the subject and know how to explain them to their students, but teaching is beyond explanation (Driver & Robinson).

In recent years, fundamental changes are occurred in the structure, content and education methods in the world. Some of these changes influenced our educational system and remaining to some extent affects the different aspects of our educational system. Nowadays the teaching objects are different from that of two decades ago. Similarly, the current teaching methods are different from traditional teaching methods.

One of the main learning factors is teaching method that has crucial effect on enhancing the students' capabilities and correct understanding of new teaching methods can help us in preparing future labor force and equip the students with knowledge and skills to be successful in new unknown world challenges. The teachers should find some ways to change the monotonous atmosphere of the class of an exciting environment.

As it was said above and the necessity of implementing active teaching methods, the researcher tries to evaluate the efficiency and effect of modular teaching method and problem solving method on the students'

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academic achievement in natural science and conclude that which one of these two methods have more effect on the students' academic achievement in natural science in order than the results create interest in changing educational methods in curriculum namely, the teachers.

Statement of the problem

Active teaching models help the students with their development as an individual and increasing their creative, clear, wise thinking and building social commitments and skills. In other words, teaching active models create self-study, self-control and self-making in students and teachers. Generally, applying new models and active teaching methods can result into meaningful and deep learning in the students (Khorshidi, 2008).

Active learning is the result of teaching method in which students are involved actively. Active teaching methods involve the students in the groups with defined roles for each student and the task is done in the group. Active teaching method increases class learning knowledge and memorization (Keyser, 2000).

Learning based on problem solving began by encountering the student with a problem, team or individual work based on the teaching objective. The teachers here are facilitator not the primary database (Kar and Hamkaran, Translated by Fardanesh, 2008).

And the students test their solutions and conclude based on the test (Rahalzadeh, 2008).

There are different methods for problem solving method that most important models are stated by John Dewy and George Polya and this research is designed based on Polya four -step model.

In modular teaching method, teaching objectives divide into partial objectives (Modules) and for each of partial objective a working desk is used. In this method the teacher is not the only source of knowledge and the learner is not dependent to the teacher. Learning environment is student-centered and the teacher can play effective role in giving information to the learner and guide each learners according to their need (Aqazadeh, 2005).

Thus, teaching models have considerable effect on learning. Because the students learn different strategies of learning and divide into smaller groups designed in individual and group levels to support increasing capability. In other words in this way learning experiences of teachers are increased (Joyce et al, 1949, Translated by Mehr Mohammadi, 2009).

Meany researches in abroad emphasized on the efficiency of the active methods.

(Jecklin 2007, Dinescu et al, 2010) and the researches done in our country indicated the effectiveness of active teaching methods (Heidari, 2005, Kanani, 1998, Abiri, 2010, Dehqanpur, 2010).explorative studies of the researches showed that in Iran, no research is done that can directly compare the effect of modular teaching method and problem solving method on students academic achievement in natural science and it is necessary to do some researches in this regard.

Explaining modular teaching method

In this method objectives of lessens are divided into clear and definite components, it means that functional goals are defined. Functional goals are exact expression of a definite learning ability observed clearly.

All functional partial goals together form the main learning objectives of a curriculum. In this method the main goal is divided into equivalent and similar goals (modules) having the same role in forming main goals.

Modular methods steps

In modular method after defining the content of teaching and the main objectives and determination of the capability of presenting content based on the method the following steps are taken:

1- The main goals are divided into functional partial goals.

2- Good functional activities and condtions are designed in relation to each of the above goals. These condtions are called "Activity station" or task desk".

3- Students groups are arranged in a way to the activities as periodical to have the opportunity to do all the activities.

4- Class time is divided into equal parts. In each part, each group of students are doing an activity and by finishing time, each groups goes to the next task desk and begin a new activity.

5- The groups with the opportunity they have for combining the results of activity stations, by reading the textbook achieve the main goals of curriculum.

Advantages

1- In modular method, group activities are short, purposeful and along with the aims.

2- In modular method, each task desk is dedicated to a different activity. Thus there is no need to have similar equipments for all the groups and less amenities are provided for all.

3- Modular method saves time for doing activity. Optimized use of time makes teaching efficient.

4- In modular method, the diversity of tests and activities attracts the attention and increases educational attractiveness.
5- In modular method, being familiar with new subjects directs the learners to the activities beyond texts books.

Limitations

In this method, the teacher task is difficult.

This method is used when functional goals are parallel and they are not considered as consecutive pre-requirements. In other words, each of the activity stations independently from the other activities is understood by the students (Adibnia, 2010 b).

Problems solving method

The condition in which the learner by information and the skills on that time cannot react immediately to it and he has not find his way to achieve the goal, this is a problem (Seif, 2001)

Morgan et al (Cited in Adibnia, 2010 a) knows problem as "a conflict or the difference between the current condition and another condition we want to create". Recognition and application of knowledge, previous skill and experience of a person leading into the correct answer of the learner to the condition and finding sequence and order of the ways to achieve the goal is called problem solving (Seif, 2001).

Problem solving steps:

1- Understand the problem: The first expectation we have of the learners is the recognition of the problem. This is called recognition and requirements of the problem.
2- Make a plan: in this method planning the problem solving is the most important action. Creating a series of the required skills for thinking and searching different ways is occurred in this stage.
3- Carry out the plan: After the selection of different solutions an reaching the agreement, the learners should carry out the achievements as individuals and give their activity report to the group and groups members after discussing give the results to other students.
4- Look back at the solution: In this stage the students evaluate all the 3 steps again with the help of their children. All the applied methods are compared, if possible and the probable limitations are discussed.

Advantages

1- It connects school activities with the real life of the students.
2- It is one of the best methods for creating inductive thinking and scientific reason in students.
3- It gives motivation to the students.
4- It increases understanding of science, creating thinking and information analysis.
5- By this method, research method can be taught to children.

Limitations

1- Needing experienced and research knowledgeable teachers.
2- It is time-consuming (Shabani, 2000, p. 349).

REVIEW OF LITERATURE

Various studies are carried out regarding the effectiveness and efficiency of some of educational methods by education researchers. The results of these studies have mostly taken the attention of education system authorizes to improve and modify educational methods. These results depending on the type of research show the desirability of some of the methods in comparison with the other methods. Some examples of the researches carried out in Iran and the world are reviewed in the followings.

Research background of active teaching methods in abroad

Kele & chane, 1988 (Cited in Heidari, 2005) in a research study compared the effectiveness of mastery learning method on academic achievement of reading in weak and strong students. In that study, 180 students of 3rd grade with a wide range of reading capabilities were in 4 conditions randomly, they were considered in one of 4 groups in which a different level of mastering was taught. In each group the students with high and low cognitive entry behavior (CEB) were present. The first group was exposed to mastery learning for each unit, the student performed pre-test post-test and were taught in group after this step, they underwent again pre-test post-test and corrective learning was applied on them to obtained unit mastery on the required criterion. The first group was expected that before entering one stage achieve 90% mastery in the previous unit. While in the second group it was required that to go into the next stage, 70% mastery is obtained. The third groups used the teaching of 3 units- one by one and by traditional method without considering the function level of post-test. The fourth group (control

group) were ignored in learning three units. At the end of the program, 4 groups performed comprehension test to evaluate their summative achievement. The results of comprehension summative test showed that mastery-learning program was mostly in favor of weak students than strong students. It means that strong students in control group and incorrect mastery group like their equivalents were in mastery group of 70% and 90% but regarding the weak students, only the students in group of 90% mastery revealed good achievement.

Williams (1992) in a study reviewed the effect of collaborative and individual learning in students' academic achievement. The results of this general study showed that: There is significant difference in terms of academic achievement between the subjects being taught using collaborative learning in comparison with the subjects being taught individually. It means that the subjects being taught as actively had high academic achievement level.

Thompson (1997) in a study reviewed the effect of active learning on academic achievement. The research divided the subjects- in elementary school- as randomly into two groups. One group learning collaboratively and another group were exposed to traditional teaching. The results showed that there is no significant difference in terms of academic achievement between two groups.

Jecklin (2007) in a research called as the effect of active-collaboration learning in the priority of learning strategies in nurse students as a semi- empirical research to identify the effect of the combination of active and collaboration method in classrooms and the priority of students activities based on active teaching method divided nurse students in Virginia university as randomly. In one section receiving was in the first priority of active learning while in another section, receive was in the second priority and it was taught by traditional method based on lecture. The results of this research showed that the students being taught by active method after one semester give more importance to active learning method and the students being exposed to traditional education, gave less importance to traditional methods. In addition, the students of active learning classes were increased.

Dinescu et al (2010) in a research called " Necessities of active teaching in teaching science in high school asked for the opinion of teachers about selecting criterions for teaching method as these methods are important in teaching process. The results of this study showed that for math and science teachers, doing active teaching method was not in the priority. Also in another study he studied the effect of some of collaborative active strategies in students' academic achievement in physic and found that by active methods considerable academic achievement in physic will be achieved.

Review of literature of active teaching methods in Iran

In our country regarding the there is not research about the comparison of the effect of modular teaching method and problem solving method on academic achievement of the students in science text book of elementary grade. Here, we only mention some examples of the research in which active teaching methods are compared with traditional teaching methods.

Kanani (1999) in a research called "The comparison of the effect of collaborative teaching method with traditional method (lecture) on academic achievement of girl and boy students of first of high school in Rasht "compared strong, moderate and weak students academic achievement in collaborative and traditional methods and compared the effect of collaborative teaching method on academic achievement of girls and boys. To do this, he divided 100 people (50 girls and 50 boys) randomly into 4 classes of 25 and in two classes, collaborative method and in the other 2calsses, traditional method was used. The studied topic was geometry (1).The results showed that collaborative learning in comparison with traditional learning increased academic achievement of the students. Also, collaborative learning had equal effect on academic achievement of girls and boys. In additional strong, moderate and weak students benefit collaborative learning equally.

Ansari (2000) in a research titled "The effective of metacognitive strategies on academic achievement and self-control of girl students in first of high school of region 19 in biology textbook". He evaluated the effectiveness of metacognitive strategies as group work by traditional method (lecture) in academic achievement of strong, moderate and weak students. To do this, he selected a school randomly among the schools and among first of high school classrooms randomly selected two classes and grouped them randomly in experimental and control group. Both groups performed research-based pre-test and then in experimental group, metacognitive strategies learning method and in control group traditional method (lecture) were preformed for 6 weeks and then a researcher-based post-test was done in both classes. The results showed that in terms of academic achievement there is no significant difference between using metacognitive strategies method in group work and lecture method in all the students and subgroups of strong, moderate and weak.

Heidari (2005) in a research titled "The comparison of the effect of two teaching methods 5E and traditional in academic achievement of fifth grade of elementary students in natural science in Ghaemshahr in academic year 2004-2005 found that there was significant difference between average of academic achievement of

the students exposed to 5E method and the students exposed to traditional teaching. Also the academic achievement of moderate students exposed to 5 E teaching methods is more than that of moderate students being taught by traditional method. But there was not significant different between average of academic achievement of strong and weak students exposed to 5E teaching method and strong and weak students exposed to traditional methods. This research was practical and semi-experimental. This design of this research is pre-test – post test with experimental group 1, 2. Sampling method in this research is two-stage cluster random method.

Abiri (2010) carried out research titled "The comparison of the effect of collaborative, explorative and lecture teaching method on academic achievement and attitude toward physic in girl students of first of high school in Sangar region in Gilan. Statistical population of this research was all the girl students of first of high school in Sangar region. The findings of this research showed that there was significant difference between collaborative and explorative teaching method in academic achievement of physic and the average of added scores of collaborative groups was more than explorative group but there was no significant different between two other groups two-by –two.

Dehqanpour (2010) did a research titled "teaching geometry by educational hand-made tools and its comparison with traditional teaching method in girls' guidance schools of Kerman in academic year 2009-2010. In this research, two experimental and control group were selected by cluster sampling method including 40 girl students. In one group by educational hand-made tools and in another group it was being taught by traditional method. Then, to review research hypotheses, Thales' theorem and similar figures were selected for doing the tests. Different questionnaires and tests are provided for students. Attitude of teachers about the effect of learning hand-made tools on students was measured by researcher-built questionnaire. In this research in addition to descriptive statistics such as mean and variance, T-test of independent groups was used. After data analysis, these results were achieved: Applying hand-made tools in math teaching in comparison with traditional teaching method are effective on increasing learning level, improving positive attitude in students about the required textbook, enjoying more of math, less fear and anxiety of this book, increasing motivation, increasing importance of math, increasing the capability of math problem solving and increasing the amount of metacognition in students and teachers have positive view about educational hand-made tools.

Research design

Research design of this research is of quasi-experimental designs with equal pretest-posttest that is performed by two-group method. Its model is as the followings:

Table 1- Two-group research design

pre-test	Independent variable	Post-test
O1	X1	O2
O1	X2	O2

Statistical population

Statistical population in this study is including all girl students of fifth grade of elementary school studying in academic year 2010-2011 in elementary schools of Dezful city.

Statistical sample, sampling method and sample volume

In this aspect of research related to empirical design, sampling unit is class (group). For sampling of target population, two-stage cluster random sampling method was used. As in urban schools for sampling clusters, two girls' schools and from the mentioned schools two classes (group) of fifth grade of elementary school were selected and were tested. The tested classes were including 36 students. Experimental groups in this research are including students of 2 selected classes.

Research instruments

In this research natural science text book of fifth grade of elementary school published in 2008 was used and during research work sessions, learners were exposed to teaching. The exact properties of textbooks used in this research are presented in table (2).

Table 2- The properties of teaching texts

subject	Text
Natural science	Materials structure, materials changes, machines, light and color of section 1, earth history of section 2

To study the academic achievement to evaluate research variable, research-built tests (multiple- choice) in pre-test and post-test were used. The questions of this test (pre-test and post-test) were similar and they were designed based on Bloom's Taxonomy for Cognitive Learning. Thus, the required data was obtained of reviewing academic achievement tests.

Reliability and validity of data collection

In this research to be sure of content validity of the test, two dimensional table (properties table) and opinion of some of teachers and natural science experts and education science teachers are asked. The results indicate high validity of the questions.

Consistency of a test in measuring the required subject during different periods is called reliability. Among different methods used for determining reliability of a test, cronbach's alpha method is used to determine internal consistency of a test (Moemeni, 2008). In this study cronbach's alpha is used for reliability of test that indicates good reliability of the test (Table 3).

Table 3- Reliability of test questions

Number of items	Cronbach's Alpha
43	0.713

RESEARCH METHOD

In this research the subjects cooperated for learning natural science of fifth grade of elementary school in the form of two experimental groups. In research method, the program was performed as the followings according to a regular pre-designed program and by considering all the unwanted factors interfering with the design performance.

After determining statistical sample volume and the required text by considering the conditions, pre-test was done for the groups to have a criterion to compare with post-test. Then, the current research was done during 40 sessions taking 50 minutes in experimental classes. Experimental group 1 was being taught by modular method during 20 sessions and experimental group 2 was exposed to problem solving method during 20 sessions. After finishing the mentioned teaching period, learning of experimental groups was evaluated by post-test.

Research analysis

Main hypothesis: There is difference between average scores of academic achievement of the students being taught by problem solving method and the students exposed to modular teaching method.

Table 4- Frequency distribution of academic achievement of experimental groups 1, 2

Academic achievement	Frequency		Frequency percent	
	Experimental group 1	Experimental group 2	Experimental group 1	Experimental group 2
2-3	3	14	16.66	**77.77**
4-5	7	4	38.88	**22.22**
6-7	5	0	27.77	**0**
8-9	1	0	5.55	**0**
10-11	1	0	5.55	**0**
12-13	1	0	5.55	**0**
Total	**18**	**18**	**100**	**100**

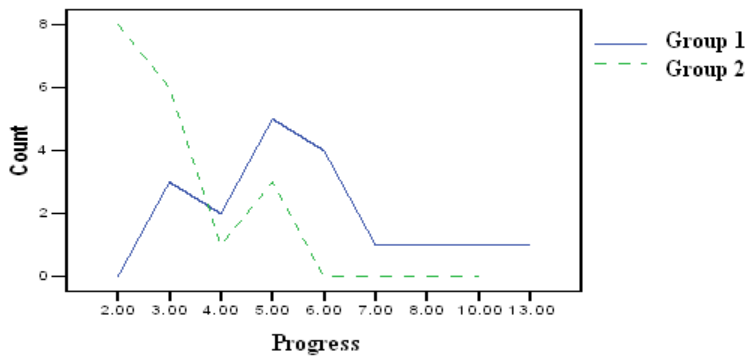

Chart 1: Polygonal chart of academic achievement of experimental groups 1, 2

Table 5- The table of independent main hypothesis T-test results

Experimental groups	Teaching method	Number of subjects	M	SD	SE	df	Confidence level	Observed T	T table
Experimental group 1	Modular	18	5.77	2.53	0.59	34	0.05	4.34	**2.04**
Experimental group 2	**Problem solving**	**18**	**2.94**	**1.10**	**0.26**				

As the value of observed T (4.34) in confidence level 0.05 and with degree of freedom of 34 is bigger than T value of table (2.04), null hypothesis is rejected and it can be concluded that the difference between two averages is significant. In other words, adequate evidence show that there is difference between the effect of two methods on academic achievement and the effect of modular teaching method on academic achievement is more than the effect of problem solving method.

Sub-hypothesis 1: There is difference between academic achievements of strong students exposed to modular method teaching in comparison with strong students exposed to problem solving method.

Table 6- Frequency distribution of academic achievement of strong students of groups 1, 2

Academic achievement	Frequency		Frequency percent	
	Experimental group 1	Experimental group 2	Experimental group 1	**Experimental group 2**
2-4	0	3	0	**100**
5-7	3	0	100	**0**
Total	**3**	**3**	**100**	**100**

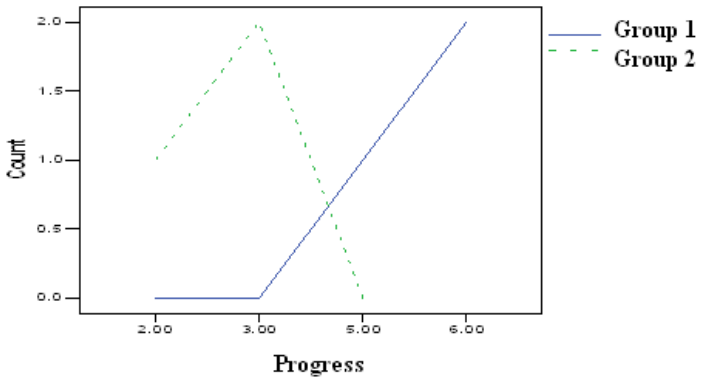

Chart 2: Polygonal chart of academic achievement of strong students of groups 1, 2

Table 7- The table of independent sub-hypothesis T-test results

Experimental groups	Teaching method	Number of subjects	M	SD	SE	df	Confidence level	Observed T	T table
Experimental group 1	Modular	3	5.66	0.67	0.43				
Experimental group 2	**Problem solving**	**3**	**2.66**	**0.57**	**0.33**	4	0.05	6.36	2.77

As the value of observed T (6.36) in confidence level 0.05 and with degree of freedom of 4 is bigger than T value of table (2.77), null hypothesis is rejected and it can be concluded that the difference between two averages is significant. In other words, there is difference between academic achievement of strong students exposed to modular method teaching in comparison with strong students exposed to problem solving method. It means that the strong students being taught by modular teaching method have higher academic achievement in comparison with the strong students being taught by problem solving method

Sub-hypothesis 2: There is difference between academic achievements of moderate students exposed to modular method teaching in comparison with moderate students exposed to problem solving method.

Table 8- Frequency distribution of academic achievement of moderate students of groups 1, 2

Academic achievement	Frequency		Frequency percent	
	Experimental group 1	Experimental group 2	Experimental group 1	Experimental group 2
2-4	4	10	33.33	**83.33**
5-7	7	2	58.33	**16.66**
8-10	1	0	8.33	**0**
11-13	0	0	0	**0**
Total	**12**	**12**	**100**	**100**

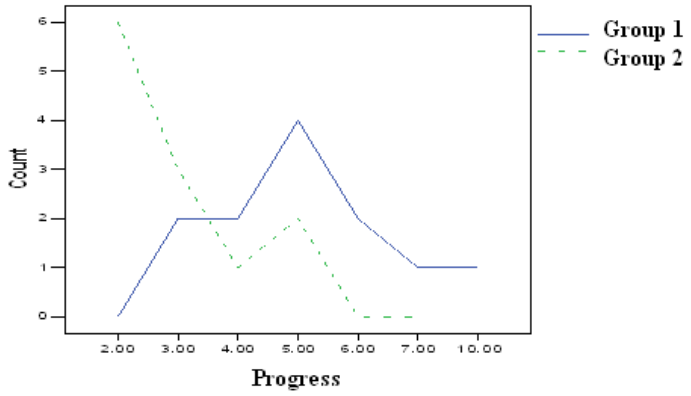

Chart 3: Polygonal chart of academic achievement of moderate students of groups 1, 2

Table 9- The table of independent sub-hypothesis 2 T-test results

Experimental groups	Teaching method	Number of subjects	M	SD	SE	df	Confidence level	Observed T	T table
Experimental group 1	Modular	12	5.25	1.91	0.55				
Experimental group 2	**Problem solving**	**12**	**2.91**	**1.16**	**0.33**	22	0.05	3.60	2.07

As the value of observed T (3.60) in confidence level 0.05 and with degree of freedom of 22 is bigger than T value of table (2.07), null hypothesis is rejected and it can be concluded that the difference between two averages is significant. In other words, there is difference between academic achievements of moderate students exposed to modular method teaching in comparison with moderate students exposed to problem solving method. It means that the moderate students being taught by modular teaching method have higher academic achievement in comparison with the moderate students being taught by problem solving method.

Sub-hypothesis 3: There is difference between academic achievement of weak students exposed to modular method teaching in comparison with weak students exposed to problem solving method.

Table 10- Frequency distribution of academic achievement of weak students of groups 1, 2

Academic achievement	Frequency		Frequency percent	
	Experimental group 1	Experimental group 2	Experimental group 1	Experimental group 2
2-7	1	3	33.33	**100**
8-13	2	0	66.66	**0**
Total	**3**	**3**	**100**	**100**

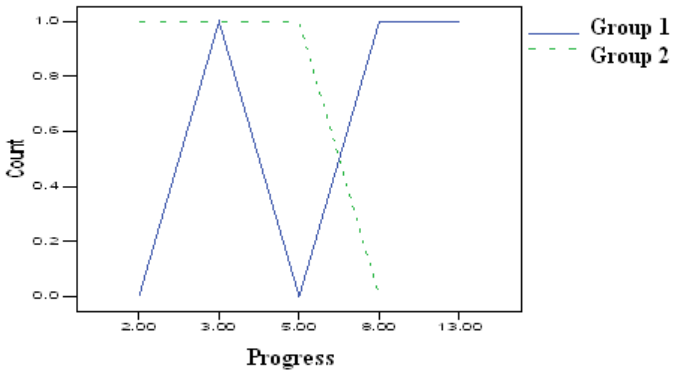

Chart 4: Polygonal chart of academic achievement of weak students of groups 1, 2

Table 11- The table of independent sub-hypothesis 3 T-test results

Experimental groups	Teaching method	Number of subjects	M	SD	SE	df	Confidence level	Observed T	T table
Experimental group 1	Modular	3	3	5	2.88				
Experimental group 2	**Problem solving**	**3**	**3.33**	**1.52**	**0.88**	4	0.05	1.54	2.77

As the value of observed T (1.54) in confidence level 0.05 and with degree of freedom of 4 is bigger than T value of table (2.77), null hypothesis is supported and it can be concluded that the difference between two averages is not significant. In other words, there is no difference between academic achievement of weak students exposed to modular method teaching in comparison with weak students exposed to problem solving method. It means that both methods didn't influence weak students.

DISCUSSION AND CONCLUSION

Conclusion of main hypothesis: This hypothesis shows that there is difference between average scores of academic achievement of the students being taught by problem solving method and the students exposed to modular teaching method. This hypothesis was supported. In other words, data analysis showed that there is difference between the effect of modular teaching method on academic achievement and problem solving method and considering the averages, the effect of modular method on academic achievement is more than problem solving method.

The results of this research are consistent with the research results of Heidari (2005), Abiri (2010), Dehqanpur (2010), Willams (1992), Jecklin (2007) and Dinescu (2010) because in all the researches it is shown that active teaching methods influence academic achievements and teaching –centered method is more effective than teacher-centered teaching method.

Also the finginds of this research are not consistent with the results of Ansari (2000) and Thompson (1997) because in these researches there is no significant difference between students academic achievement by active teaching methods in comparison with other methods.

Conclusion of sub hypothesis 1: This hypothesis shows there is difference between academic achievement of strong students exposed to modular method teaching in comparison with strong students exposed to problem solving method. This hypothesis was supported. In other words, data analysis showed that the effect of modular method on academic achievement of strong students is more than that of problem solving method. The results of this research are consistent with the research results of Kanani research (1999) because this researcher found that teaching active methods influence strong students. Also, the findings of this research are not consistent with the results of Ansari (2000), Heidari (2005) and Kele & chane (1998) because these researches didn't find significant difference between academic achievement of strong students with different teaching methods.

Conclusion of sub hypothesis 2: This hypothesis shows there is difference between academic achievement of moderate students exposed to modular method teaching in comparison with moderate students exposed to problem solving method. This hypothesis was supported. In other words, data analysis showed that the effect of modular method on academic achievement of moderate students is higher that of problem solving method. In other words

there is significant difference between academic achievement of moderate students exposed to modular method teaching in comparison with moderate students exposed to problem solving method.

The results of this research are consistent with the results of Kanani (1999) and Heidari (2005) because in this research it is shown that active collaborative teaching method has positive effect on learning amount and academic achievement of moderate students.

Also, these results are not consistent with Ansari (2000) because this researcher from the aspect of academic achievement didn't find significant difference between two methods of using metacognitive strategies in the form of group and lecture method in moderate students.

Conclusion of sub hypothesis 3: This hypothesis shows there is difference between academic achievement of weak students exposed to modular method teaching in comparison with weak students exposed to problem solving method. This hypothesis was not supported. In other words, data analysis showed that the effect of both methods on academic achievement of weak students is equal. In other words, there is no significant difference between academic achievement of weak students exposed to modular teaching method and weak students being taught by using problem solving method. Findings of this research are consistent with the results of Ansari (2000), Heidari (2005) because these researchers from the aspect of academic achievement didn't find significant difference between active teaching methods and lecture method in weak students. Also, the findings of this research are not consistent with the results of Kele & chane (1998) because they found that effectiveness of teaching method is better for scientifically weak students.

Recommendations

Applied recommendations

1. Equipping school environment from the aspect of teaching facilities for the use of teachers in active teaching process.
2. Enhancing responsibility and acceptance of students about team work to prepare them for cooperation with the teacher in active teaching process.
3. Teachers' familiarity with different kinds of active teaching methods and the method of using these methods in elementary period.
4. Creating motivation in teachers to use new teaching methods and learning.
5. The content of textbooks should be arranged in a way to use active teaching methods. It means that consistency of books volume for using these methods, high volume of the books decreases more productivity of these methods.
6. Giving more attention to evaluations considering high importance for skill learning.

Research recommendations

1. Similar researches should be done in other academic years.
2. These researches can be done for boys.
3. It is recommended that these researches can be carried out in other cities.
4. Other active methods can be compared to define affectivity of each of them in relation to the other and in different lessons.

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