

Creative Teaching Methods Impacts Based on Structuralism Approaches in Improving Mathematics Performance

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Abstract: The project purpose is to analysis the impact of creative teaching methods based on Structuralism Approaches in Improving Mathematics Performance of the third and fourth class of elementary schools in Mazandaran province. The project is provided by the unbalanced-control plan with pre-test and post-test in two groups of experiment and control in type of experiment likeness research and its society containing 40537 students of third class and 40136 student of fourth class of elementary school. There were 380 students of third class and also 380 student of fourth class selected by the method of different level bunched-random sampling. The classification of teaching skills of teachers and mathematics performance test questions were the tools of gathering data of criteria form which was planned in four levels of "knowing, meaning usage, usual problem solving and reasoning" within the framework of TIMSS cognitive. The validity of questions were determined by training group experts and test permanent was made 0.79 and 0.82 for each tools by the method of retesting and Pearson correlation statistic analysis. The parametric results showed that creative teaching methods in improving students mathematics performance in the both classes in knowing level had no impact meaningfully, but it had an comprehensive impact on the other levels of meaning usage, usual problem solving and reasoning.

Key words: Active-Methods of Teaching - Oriented Manufacturer - Math Functions - Elementary Students.

INTRODUCTION

Undoubtedly, today everybody has to deal with some subjects like measuring, guess, estimating and mathematics at all in his or her daily life differently. The mathematics and life are so correlated with each other that nobody could separate them. When we take a look at to every angle of our lives and also our jobs, we would see a close relation with them. When, also, we observe the different type of mathematics definitions such as: "Mathematics is the speech of science" Or "Mathematics is the knowledge of life" etc. we would consider the impact of mathematics in our life, so it would be very useful to learn and extend mathematics. Some mathematic experts believe that it is an impressing need to have a creative thought and dynamic way of thinking, today, and learning mathematics will help establishing this thought. Therefore, mathematics is not just the tool of some a few special experts but also the need of teaching and training public. The Analysis of effective elements in improving mathematics has been considered by teaching and training experts in last three decades. The results has showed that mathematics improvement have its effects from science structure, data processing, approaches and motivations. The educational performance of students, in learning and teaching system, is considered as one of the most important elements in analysis and evaluation of teaching-learning procedure. In fact, it is outcome of the system for every year.

Problem Express:

As everybody knows, it is one of the most important duties of teaching system of every country the improvement of student performance and its promotion would be one of the outcomes in teaching and training process as there would not be any need of implementing compliment plans to improve student's performance. Therefore, it is duty of teaching and training custodians to analysis the nature, reasoning and effective elements in mathematics weakness of students. The result of third international research (TIMSS) of mathematics in elementary level performed by international evaluation education show that the performance of Iranian students in third and fourth elementary level in this test was in a lower degree compared with average of other countries in that test, meaningfully. The students of third class ranked in last stand between 24 countries and the students of fourth class stood in 25 ranks in 26 countries. This result is same in TIMSS 1995 and 2003 for Iranian students and shows no promotion and it is also a sign of weakness in mathematics. The main basis of mathematics performance has a fundamental correlation with learning mathematics meanings but it is the most important question that "Now that we observe the weakness of our students in terms of mathematics performance, how we could promote this ability in them and what is the most effective methods of improving mathematics performance".

It is the most important component of teaching and learning system the learning-teaching process. When we take a close look at the approaches of teaching system in our country, we consider that teacher is main axis of the system and that also the science is being transferred by traditional methods. In this method, teacher could have less attention to its students needs in different dimensions and consider their individual abilities as well. In this process, there is a very high conformation on over homogeneity, parrot-memorizing and giving out exactly what teacher said. Teacher skills complex which is called teaches is a mutual effort that from one side teacher helps learner to learn more, better and faster and from the other side, learners learn how to learn by themselves and how they could learn. We call this self-learning as "learning how to learn." Jorge Brown says that if teaching is a difficult job, so learning teaching skills would also be a difficult task

Research Literature:

It is one of the most important elements of the training plan the learning process. Learning constructs the structure of human behavior. Through learning, everybody would be familiarized with environment. In the past time, teaching meant knowledge transfer but there is a belief, today, that teacher has to learn students the way of learning and not to sufficient formula transferring.. Teaching methods based on structuralism approaches are made based on some believe and theories such as: "Modern learning is like traditional one, learning contains data processing, and meaning depends on relation." The emphasis of structuralism classes is in some criteria such as scientific experiments, individual thought, data processing and group cooperation. Student, in this approach, are not passive learner of science and data but he or she will process data and make sense of them. In structuralism method, learning is an active component that learners use their sensual data to process data. The In structuralism methods are based on "learning-axis that means learner is responsible to learn. The advantage of this method is that whenever learner found a scientific method to solve problem, it would be a part of her or himself and that is permanent learning. Structuralism approaches consider students instead of teachers. Teachers are trainer and make the students to pass the way easier than before and students have the main role in learning. Therefore, creativity acts and efforts would be parts of learners to be able to recognize environment and relation between phenomena and objects. Davie emphasizes on extensive experiments through learning. He believes that teacher has to be a mental trainer and he or she should create thinking in students. Pirajeh is one of those people who found important role of creative methods and said," when students are passive in learning, he or she would not learn just by listening to teacher. Students would not learn something unless they get them in themselves. " Broner says: "When teachers put the answer at student's disposal, they would efficient on that book and text and will not have any effort by themselves. Therefore, they would not be satisfied from learning and will lose their motivation" . Researches showed that creative methods of teaching have always been effective than the other, totally. There were some researches caring out by Tobin (1988) that show reasoning ability, satisfying individual needs of students and learning motivation would only be accomplished by creative methods of teaching. Kent Jones and Elizgie (1984) proved that creative methods will causes cooperation between students and make class management easier. Torman says: "It is surprising for me that we always expect our students to learn but rarely do we teach them how to learn something". There are also some researches doing by Iranian experts in our countries. Abbasian (1998) made this result that those students who were teacher by creative methods were tottally more succesfull than the other group teaching by traditional methods. Fazlie and Javadie (2007) have also made a research that cleared this point: Creative teaching methods would promote student ability in knowing, skills and approaches. Hajie Hosein Nejad (2008) proved the theory of Gardner through a research that it was higher the average performance of students who were teacher through Gardner theory in comparison with students teaching by traditional methods. Through this point of view, researchers have been looking for, in this research, the impact of active teaching methods in improvement of mathematics performance of third and forth classes of elementary school in Mazandaran province and is also about to investigate students performance in four levels of "knowing, meaning usage, usual problem solving and reasoning".

Research Theories:

- a) Active teaching methods based on stracturalist approaches have an exprehensive effect on improvement of mathematics performance of the knowing level.
- b) Active teaching methods based on stracturalist approaches have an exprehensive effect on improvement of mathematics performance of the meaning usage level.
- c) Active teaching methods based on stracturalist approaches have an exprehensive effect on improvement of mathematics performance of the usual problem solving level.
- d) Active teaching methods based on stracturalist approaches have an exprehensive effect on improvement of mathematics performance of the reasoning level.

Research Method:

This research is made of a group of unbalanced control with pre-test and post-test and contains two group of test examination and control which have been examined two times. The first measure had been done by a pre-

test and the second measure had been done by a post-test. To analysis data, there had been a t-parametric test to commit. The statistic society was 40537 students of third class and 40136 students of forth class of Mazandaran elementary school. The society had been selected through method of different level bunched-random sampling from 5 provinces and 40 classes based on Kerjesy and Morgan table (1970) in amount of 380 students of third class and 380 students of forth class in two groups of test and witness. There were also two tools for gathering data: 1-ranking teacher’s skills criteria and 2-questions of mathematics performance test contain 10 quiz test and 10 extend test. The validity of the tools have been confirmed by the experts and test permanent determined 0.79 for teachers skills ranking criteria and 0.82 for question of mathematics performance test which is acceptable at all.

Research Results:

Analyzing Teachers Skills Based on Creative Methods:

Informing the amount of independent variance interfere, there was ranking skills criteria to use by means of school managers. The results show that teachers skills in witness group, averagely, is 47/96 in the level of attempt going and 64/39 for teachers of test group in the level of waiting group. There was also t-independent test to analysis data and result is as below :

Table 1: Statistical result of teachers skills in comparison with two group of test and witness.

Test Type	Volume Type	Group Variance	df	F Calculated	T Calculated
T Independent	$n_1 = 20$	$s_1^2 = 46.52$	38	1/921	6/126
	$n_2 = 20$	$s_2^2 = 38.27$			

Since F calculated 1/921nis smaller than F critical table 2/21, so the assumption of equal variances is correct. Assuming we have equal variance, according to above table, since T calculated 6/127 is bigger than the T amount of critical table 2/042, so there is a meaningful different between teacher average skills of two groups. It means test group teachers in comparison with witness group have more teaching ability based on creative methods in statistical approaches, meaningfully.

Analyzing Signify Impacts of Creative Teaching Methods Based on Statistical Approaches in Improvement of Mathematics Performance:

To analyzing difference signification of mathematics performance improvement in the two groups by comparison purpose of average marks of pre-test and post-test in assuring level of 95% and error measure of 5%, they have used t-parametric independent test. Here are the results in tables no. (2) and (3).

Table 2: Independent t-test, comparison of pre-test and post-test average marks of the two groups in mathematics course.

Level	Group	Volume Type	Average	Average Variance	Standard Deviation	df	Error Calculated	T Calculated
Two groups pre-test analysis	test	190	$= \frac{8}{55}$ \bar{X}_1	+ 0.18	3.695	378	0.687	0.704
	witness	190	$= \frac{8}{37}$ \bar{Y}_1					
Two groups post-test analysis	test	190	$= \frac{12}{44}$ \bar{X}_2	+ 3.28	3.086		0.000	6.527
	witness	190	$= \frac{9}{16}$ \bar{Y}_2					

Pre-Test Average Marks Analysis:

According to table No. (2), since calculated t 0.704 is smaller than critical table t 2.576, so there is a meaningful difference between averages of the two groups pre-test . From this result we can say that the two groups have needed pre-knowledge to carry out the test and there is a meaningful difference between these two groups from this point of view.

Analyzing Main Theory of the Research:

Since, according to table no. (2), calculated t 6.527 is bigger than critical t table 2.576, so there is a meaningful difference between averages of the two groups post-test. Therefore, main theory of the research would be conformed and we can say: “Creative teaching methods based on structuralism approaches are effective in improving students mathematics performance .

Analyzing of Hypothesis 1:

According to table 3, in the experimental group score difference between average scores before and after testing is +3/39. In addition, in after scores of both deponent and experimental group is +0/55. But since the calculated t equaled to 1/629 is smaller than the crisis table t equaled to 2/576, so there is no statistical meaningful difference between the mean of after testing question. Therefore hypothesis 1 is rejected and we can say that actives methods for teaching based on structuralism approach have no impact on improving student's knowledge in mathematics .

Analyzing of Hypothesis 2,3 and 4:

According to table 3, because the difference of a mean between deponent and experimental groups in these hypothesis is (+4/89, +4/51, +3/03) and the calculated t for these hypothesis is (5/61, 8/950/11/679) more than crisis table t equaled to 2/576. So we can conclude that there is a statistical meaningful difference between the mean of after testing questions and argument in deponent and experimental groups. Therefore hypothesis 2, 3, 4 are approved and we can say: active teaching methods based on structuralism approach are effective on improving in applying concepts, common problems resolving and argument .

Conclusion:

As different researches have shown that active teaching methods have effects on students' educational improvement and permanently learning. So the researchers for studying the active teaching methods effect on the students mathematical action and by considering the structuralism approach which emphasis on information processing and learners team working, learned active teaching methods to the teachers in the experimental group. According to research finding in hypothesis 1, the effect of active teaching methods based on structuralism approach on students mathematical action at knowledge level have not been approved but in hypothesis(2,3,4) this effect in applying concepts, common problems resolving and argument have approved. Based on the information about the cause of students more improvement in applying concepts and common problem resolving, we can say that the Iranian students with regarded to the common learning procedures learning and traditional evaluating systems are seeking to memorizing the issues and achieving information at knowledge level. The teachers are also giving concepts and issues, but personal creative and mental reproduction and the ability for resolving problems, insignificant increase. Times researchers (1995, 2003) show this. As the results show, Zambians students average action at knowledge level(30%,38%), the level of applying common methods was(27% and 36%),but this data for the other participant at knowledge was(54% and 59%), the level of applying common methods was (54% and 69%) and problem surviving and solving was(46% and 57%)(28%),since soleymanpour (2006) approved that the teachers have <relatively optimized> competence in applying active teaching methods . apparently, increase in teachers knowledge and professional competence and achieving, optimized level. Could be effective on students improvements in education, action, etc. as the results from hypothesis showed that the improvement in teachers and teaching from, effecting level to waiting level enforced learners skills in processing and information analysis and it has added+3/28 point to their mathematical action. This research results are as same as the research conducted by jone and elizgi(1984),gaje and Berliner(1984), tobin(1988),estraham, sami and bolz(29), metical, Jordan and hamper(30) and compel and compel(31) and.... In outside and abbasian (1998),haji hossein nejad and Baleghzade(2006),fazli and javadi(2005) and razaviye, self and taheri(2007) and Inside the country and it includes the effect of active teaching methods on mathematical action of students in elementary school.

This scheme showed that using active teaching methods based on structuralism approach and its component could have an impact on improving the students mathematical action at firth an forth level an elementary school and using that as effective tool for increasing the students mathematical action at levels such as,knowledge, applying concepts, common problems solving and argument and especially the two components applying concepts and common problems resolving and achieving the goals at elementary level, making changes in present situation is necessary.

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