



## **The effect of Mathematical realias on spatial Geometry training of grades 2 and 3 math courses on educational progress of female students of Zone 5, Tabriz during 2012-2013 educational year**

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### **ABSTRACT**

*The present study was done with the purpose of the effect of mathematical realias in spatial geometry training of grades 2 and 3 math course on educational progress of geometry lesson. The specific Purposes are: the identification of the relationship between teaching either through the use of realia and teaching without them on educational progress of students. The study hypothesis is that there is a meaningful difference between the performance of grades 2 and 3 math students who have been taught geometry through the use of realias and the performance of those who have been taught through traditional methods. Statistical population of this study are the students of grades 2 and 3 math courses of female students high schools of Tabriz, zone 5. The method of study is somehow half experimental in a way that all the concerned students took a pre-test at the same level and simultaneously. According to their marks and after homogenizing them we divided them into two groups of experiment and proof. The students of experiment and proof groups of grades 2 and 3 respectively 3 and 6 theorem of geometry through the use of realias were taught. At the end of the teaching process, the students were given a test and their performance difference was evaluated.*

*According to the implemented independent t-test and the achieved information, it has shown that a meaningful level of test  $p=0/000$  is below  $0/05$  and  $t= 10/73$ . So the main hypothesis of the study (H1) is proved and the null hypothesis is rejected; that is, there is a meaningful difference between the performance of grades 2 and 3 students of math course who have been taught geometry with the help of realias and those who have been taught through the traditional methods. The performance of grades 3 students (81/49) is more than the performance of grade 2 students (45/82).*

**Key words:** realias – educational progress – Students spatial geometry.

### **INTRODUCTION**

Educational progress of the students is considered as one of the main principle components for the ministry of education in arriving at its goals. From the other hand, the realia are not non effective. In educational progress of students and the realias whether simple or complex ones are used as a means to facilitate teaching –learning process in educational systems. Since these tools have combined theory and practice together and cause learning to last more and give variety to classroom are of great importance. The use of realia by teachers during teaching process causes the proposed materials to be placed in students' constructive defining and the student arrives at a meaningful learning. Unfortunately, the regular and logical use of realias for any reason is forgotten in schools and they justify through lack of time and facilities. It's hoped that the use of realia is stabilized so as to cause activation and dynamic in educational system of our country (1).

The experience has shown that the pitch of a system based on the use of tools and co educational tool depends from one hand on the socio political system of each country and from the other hand depends on the analysis of needs, space, situation and the ability of using means and co educational technology. It's true that most of the teachers fear the use of tools and new technologies, strictness, and inflexibility of the programs and one dimensionless of media do not receive educational technology and easily, but the main reason of their resistance against the use of coeducational tools is their non interference or low interference which they have in all stages of the system of education from the choice to forming, using and testing relies (13).

Different studies and investigations done by researchers and specialists (experts) of this field all confirm that the use of the means and co educational tools have completely useful and unhesitating role in promotion of qualitative level of teaching and improvement of teaching process.

In a holy saying in Kaafi it has been mentioned that Imam Sadegh (pbuh) told to one of his yokefellows that all things in created in nature have a geometrical shape. He asked what the meaning of geometry is. Imam answered, it is the amount and size.

The whole world is size, all the words and ingredients regardless of their entity have been created based on the amount and size .Yeah, mathematics is mixed up with realities of mankind life. In ancient times math was emerged in relation to life needs and generally was turned into a set of different sciences. Like other sciences mathematics is the reflection of nature laws and is used as a powerful weapon to know and overcome the nature. According to Fvryh the deep study of nature is the cultivate source of mathematics exploration and based on Galileo we can't call it the world unless we learn its language and get familiar with the symbols which have been written in it. The world symbols which has been written through math language and its letters are triangle, circle and other geometrical shapes without knowing the meaning of them it's impossible for one to understand a simple word [21].

The source of the liveness of math is that the concepts and their results stem from the reality unlike their being abstract and have more use in other sciences and all fields reflected to human life. And this is the most important thing to understand mathematics [7].

As National Council of Mathematics Teachers (NCTM) (America's Supreme Council of Teachers of Mathematics) and other researchers have declared one of the main goals of mathematics for students is to learn to pay attention to mathematics and be informed of practicality (efficiency) of it in life process and raising things and analyzing reasoning power. In addition, they should make sure (have confidence) in their capabilities and capacities in doing math assignments and different situations of problem solving to the extent that working on math becomes as a satisfactory and happy job rather than a stressful or bothering one [2].

### **Theoretical Bases**

The use of realias plays a positive role in students' learning process. Unlike the traditional education which was teacher -centered and was considered as the only source of learning for students, the modern education has decreases some of this responsibility of the teachers and has placed it on realias through the use of them in teaching process the teachers try to deepen the students' learning.(Ayubi,1379,p:69) .Now, all educational experts of sciences firmly believe that teaching this course, mathematics, will be effective and efficient in case that "the students get knowledge through the first hand experiences, direct experiments and involvement with realias research and problem solving.[9]

The holy prophet (pbuh) says on experience:" Experience is more important than knowledge" ,For this reason ,through the correct and schematic use of realias we can provide more facilities for students to get more experiences.

### **Realias**

Realias consist of objects, tools and means which are used during teaching. As its title implies, these means help teaching and training process. The richer the use of co educational means, the shorter the duration of teaching/learning will be and the training of lessons will be more practical, and will be effective in blossoming Creativity, innovation and talent of the students. The study of the experts of education has shown that the large amount of learning takes place if more senses are used and certainly with the help of media use and realias this issue will be accessible. In addition, coeducational materials have a vital role in forming first hand experiences or something like them, saving the time of education and forming more consistency deeper and faster learning. This issue causes the stability of learning and remaining learning materials for a long time. Realias as realias which are sometimes called audio visual will have positive effect and uses if they are used correctly and on time such as:

They clarify the problems of learning materials and cause careful concentration of students on the regarded issue of the teacher. The use of educational realias manifolds the possibility of correct understanding of the learning materials.

Realias are active factors for motivating students' activities, because they stimulate them to learn and increase their experiences.

In addition to explaining the problems and ambiguous educational points, they help their activation in students' minds and the easiness of recalling in required circumstances in case of need. Therefore, the use of realias can increase the learning level instead of learning abstract mathematical concepts just through studying a book or at most with the help of some diagrams [5].

### **The characteristics of a proper mathematical realia [11]**

1. Increasing the pace of learning: It decreases the average learning time in learning process.
2. Increasing the depth of learning: It causes the learning to be more accurate and correct.
3. The capability of availability and easy use: Its formation is possible for all and its use is simple in particular.

4. The capability of repeated reference: realia should not be used once. It must be made so as to be used many times.

#### **For which materials one can make realias?**

For materials such as theorem, definition, problems, or characteristics which include diagrams or definite geometrical interpretation, one can make realias for if any material has a geometrical interpretation. so there will be a show for it. Geometrical problems and materials are classified into three groups based on having diagram or geometrical interpretation.

The materials which have definite diagram or geometrical interpretation such as derivation, function or geometrical theorems.

The materials which lack definite diagram or geometrical interpretation such as sets or Determinant.

The materials which lack artificial or geometrical interpretation and finding physical or geometrical interpretation for them is difficult such as prime numbers or Hospital rule.

#### **The stages of making a realia**

It's better to make realias for the materials which have geometrical interpretation.

Dominating the subject of the lesson and the relationship among the concepts related to realias.

Preparing a map to make realia and complete applying of the map.

#### **Teaching method**

It's a special framework within which the main elements of teaching is capable of being studied, and recognizing and getting familiar with the above mentioned elements and factors can help the teacher in adopting proper teaching methods, or the teacher can choose a framework of teaching process as a pattern and analyze and recognize it so as to organize them in a proper situation in the range of his teaching activity framework and then choose the suitable teaching methods.

#### **Learning:**

It's one of the most important fields of today's psychology and even is one of the most difficult concepts to define. In recent years most of psychologists have defined learning as a rather stable change in potential behavior happening as a result of reinforcing practice (exercise), and can't attribute it to temporary forms of body as what created as the result of illness, tiredness, or medicine. From the viewpoint of Gestalt, learning is "achieving new viewpoints or change in the past viewpoints." Through challenging conditioning we learn how to get the desirable things and how to avoid undesirable things. Learning process helps the organism to adapt itself with the changing situation.[7]

#### **The evaluation of previous findings (experimental studies)**

Edgordill (quoted by Teymoori) believes that in an educational experience as we go ahead from symbols ,numbers,dialoges,fixeditimages,educationalTv,fairs,scientifictour,and show towards artificial and direct experiences, the learning level goes up because learning becomes more objective and vice versa. A group of the philosophers of education (quoted by Al-Ishagh,1386) believes that dominating teaching with the help of educational realias is more important than the teacher's scientific knowledge and information. The teachers who have taught mathematics either the help of educational realias have been more successful in proportion to their colleagues who depended just on their scientific knowledge and fixed formula. Therefore, we can certainly say that if educational program or educational sources or even a simple tool related to a simple practical image is accessible for those teachers because of complete familiarity with educational methods and techniques they would get more success in teaching/learning process. With these explanations and since the traditional teaching methods especially lecturing methods possessing many limitations would not be able to direct the society and its people to change and revolution in learning which is the necessity of developed societies, the need for change and presenting new teaching methods in classrooms or learning-teaching strategies is felt more than before.

Deriscole (1999) (quoted by Seif,1381) believes that teachers can make changes in students by involving them in challenging and realistic situations, and this is the best and most proper chance for teachers to play their constitutive role well and help the students in finding the required sources. Kerry Santo (2008, quoted by Williams and Ething wood, 2004) mentions that the use of technology in teaching geometry helps the discovery of new idea in mathematics and geometry. Teacher training agency declared that using technology in learning mathematical causes them to experience geometrical and digital experiences and tighten them and through investigation interpretation of symbol and present realias pave the next steps for modeling mathematics. They make relationships out and within the real and develop the mental portraying. The national council of mathematic teachers (2000) have considered technology as one of the six mathematical standards of school and have emphasized that technology has a vital role in teaching and learning of mathematics. Mathematics influences the learning subject (material) and promotes their learning. (Remmi and Pipper (1974 and Sulivan 1974) discovered that the space of open or dynamic classes was suitable for improving the conditions of research, curiosity, meddling, self acting and learning.

But traditional classes which were followed strictly in test giving, gradation and powerful teaching, produced less changes in their educational program. Sullivan (1974) also found that the students of open classes in proportion to students of traditional classes got meaningful and better marks in 2 out of 4 Geliford tests. Providing the background and conditions which results in creative thinking in schools has a vast range which stretches from changes in outlooks to teaching methods.

Chamberz (1973) concluded that the teachers who cause the development of creativity in students had tendency in formal methods of managing and directing classes. They allow the students to choose the subjects they want, they receive their unusual view points. They give rewards to creativity. They interact with students out of class and consider encouraging students' independence and positive performance as the effective role of creativity pattern. In contrast, opposite behaviors which decrease creativity include: disappointing the students' beliefs, emphasizing learning repetition, insecurity, strictness and applying traditional methods which decrease creativity.[19] The national social committee for studying education in America concluded that the educational means and materials provide a touchable basis for thinking and creating concepts. They make learning faster, more effective and more stable. They present real, factual, and objective experiences for learners. They present circumstances the gain of which is not possible through other methods. They cause the continuity of the thoughts. They teach a skill effectively and completely to students. They influence the growth and development of meaning in the mind of the students and help a lot to the range of the students' vocal source [14. Sefidgar showed that the use of educational means ,laboratory ,attending in service classes on cooperative and active methods ,specializing teaching methods of teachers, determining the objectives of teaching and evaluation cause the better use of active teaching methods. He also found that there is a meaningful relationship between teachers 'use of active teaching methods and the efficiency of the quality of teaching [8].

### Test of Hypotheses:

The main hypothesis of the research: There is a meaningful difference between the performance of the grades 2 & 3 students of math course who have been taught geometry through the use of realia and that of those who have been taught through traditional methods. Based on the implemented independent t-test and the information of table (2) one can observe that the meaningful level of the test  $P = ./....$ , below  $. /05$  and  $t = 3.6$ . Therefore, the main hypothesis of the research (H1) is proved and the null hypothesis (H0) is rejected. that is; there is a meaningful difference between the performance of grades 2 & 3 students of math course who have been taught geometry through the use of realias and that of those who have been taught through traditional method. Considering the table (1) that the performance of the students of experiment group (71.64) is more than that of the proof group (55.67).

Table (1) : The results of the average difference test for the students; performance variant in experiment and proof groups

Standard deviation	Mean	The number of the students	Group	Variance
25.32	71.64	60	Experiment	The performance of students
23.20	55.67	60	proof	

Table (2) :The results of consistent test of variances for students' performance

P	Df	T	P	F	Group	Variant
./...	118	3.6	./12	2.44	Experiment Proof	The performance of students

### The suggestions of the research:

A: Practical suggestions:

Since the performance of the students who are studied in this research has improved because of the use of realias in teaching geometry and it shows their educational progress. So, it's necessary to present some suggestions to authorities of educational planning.

1. It's better to make students' realia accessible by all the students because through this we direct students to raising some questions.
2. It's better the teachers teach and help the students in planning and building some tools.
3. Management should be done in a way that the work of the students is paid attention because their encouragement is more effective.

4. In service classes should be held for basic sciences teachers on using realias in teaching so as to get familiar with how to work with these tools and manage time during teaching with these tools.
5. Holding educational workshops to increase professional capabilities of teachers on how to use tools and educational materials in interactive teaching method.
6. The teachers who use co educational tools must be encouraged and supported.
7. Paying attention to the importance of the use of co educational tools in training and reinforcing the innovative spirit of teachers in building new tools based on the nature of the subject of math courses.

#### **Research Suggestions:**

To improve the performance of students for the future researches the followings are suggested:

1. In future researches, the performance of students of male and female schools after teaching with the help of co educational tools should be compared.
2. The future researchers should study and evaluate the new methods of teaching through the use of new tools and materials in two different subjects on students.
3. The other interactive teaching methods should be studied and the viewpoints of the students should be evaluated and assessed.

#### **CONCLUSION**

The evaluation of the marks of the post-test shows that the performance of grades 3 students of math course of two high schools (Fatemieh and Zeinab e Kobra) is more than that of grade 2 students. The performance of the students of experiment group is higher than that of proof group in these 2 high schools. But the interactive impact of these groups and the kind of high school on performance of school is more meaningful. That's; the performance of experiment and proof groups of 2 high schools is not different. In all, teaching mathematics through the use of realia tools and objective in teaching mathematical content helps the effectiveness of teaching and results in the improvement of students' performance in this lesson.

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