Investigating the Problems in Teaching Mathematics and Strategies to Enhance it According to the Experiences of other Countries (A comparative study of information Technology in the Iranian’s Curriculum and Solutions to Enhance it Based on the Experience of other countries)

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**Abstract**

Without doubt Mathematics is one of the most important lessons that students at all levels of education need to know and understand it. There are many factors in shaping the correct understanding of mathematical concepts; there are also disruptive and preventive factors of active teaching and learning of mathematics among students. The most important preventive factors in active learning of mathematics, lack of motivation in learning mathematics which prevent students from learning necessary skills in mathematics, economic factors and anxiety, and fear of mathematics, imbalance in mathematical concepts and primary mathematics training to solve problems in different situations, excessive attention to the final exam and descriptive evaluation score in order to a qualitative teaching and learning of mathematics, lack of understanding and attention to students “account insufficiency”, lack of attention to individual differences to create Learning associated with creativity and understanding can be mentioned. Training Mathematics teachers and keeping their scientific information up to date is one of the main and necessary factors for developing their qualitative professional performance. Active teachers can use the world’s latest technology to enhance the power of good reasoning, good thinking, guiding, imagination and decision making in students and finally the students are fluent in the various methods of problem solving and strengthen their problem solving ability and finally achieve higher levels and promotions scientifically and especially in mathematics.

**Keywords:**
Math anxiety, transferring motivation, account insufficiency, active learning, Mathematical concepts

**INTRODUCTION**

One of the factors which is effective in the process of learning and as a result in teaching state of mathematics, are teaching and learning methods. Nowadays science’s growth rate is increasing every second and accordingly the educational methods change due to the technology transformation and growth, as well as changing the tastes, needs and the expectations of students. Therefore, in today's age, a teacher must teach students the methods for learning and experience, instead of the transferring information and relationships between himself and them. So some new modern methods must be established on this basis “The first task of Mathematics is to make and give something to the community, which nowadays a few people ask for, which is human being, a thinking human, a human who recognizes false from right, a human who the cognition and propagation of truth is more important for him than many things such as a TV, a free man, not a steel robot similar to humans» Says Roger Gorsani about mathematics (George polia, creativity in mathematics). Mathematics is a science with mental and abstract concepts which means that most of mathematical concepts are imagination of things that their interpretation is not possible as in the real world. Being Abstract makes this science difficult to feel mathematical concepts and therefore its education and learning becomes hard so that the particular methods are required. Considering the studies it may be said that there is a serious dependency between learning processes and teaching methods but precisely it could not be determined how math can be learned. The future world of the teaching and learning is a world that the role of the teacher in teaching and learning process is being less and the role of the student in learning and choosing is getting much more obvious. In the current age of education the teacher must prepare the situation so that a student chooses from among a
variety of different ways. In the new education system teacher underlie the creation of training using new educational technologies and new equipment And student’s duty should be content selection. To create such a student, strategies should be brought that the training operator which make it possible for us to achieve such goals and cause advanced training. In this article we try to investigate the factors that can make the mind and creativity more active and enable better math learning as well as to recognize the factors which prevent a better mathematical education and factors to upgrade and improve the math education by taking advantage of training methods of other countries.

Methods:
Before we enter the main discussion i.e. dealing with causes of the weakness of education, first the aim of mathematics teaching in schools should be identifies, then the weaknesses should be reviewed regarding the goals and whether they are close or distant and solutions should be provided with respect to the problems and shortcomings. From the concept of teaching mathematics, the first question is: how can we teach mathematics? When we speak of the method, surely this question will come to mind that what is the purpose of this Action? And then the target should also be specified in teaching math. The purpose of teaching mathematics vary according to the mathematics culture level in community, and its content and also regarding different sections of the academic community and it changes from one community than other. But the main purpose of teaching mathematics, is as follows: "the development of the power of understanding and reasoning, establishing the correct manner of thinking, establishing logical thinking and reasoning method, and the creation of intellectual creation in the learner (mathematical teaching method, m. behravesh)

Mathematical education goals in General are divided into four categories of rearing, educational, cultural, and emotional:

A) The rearing purpose:
The rearing goals of teaching mathematics are undoubtedly the most important objectives of this process. The main task of teaching Mathematics is educating students so that they can think about their issues, find solutions and solve their problems.

B) The educational purpose:
(With calculative techniques needed for students in school and out of school)
In this objective students must be prepared in relation with other courses and the required calculations and computing courses related to everyday life.

C) The cultural purpose:
(introducing mathematics to students as a part of human thought and culture)
Mathematical science is an important part of the culture. Referring to the history of mathematics of a nation can give the feeling of honor and pride in mathematics, increase the confidence in students and relate the lessons to history and the national traditions.

D) The emotional purpose:
The joy that can be followed by mental activities and the love to obtain knowledge, makes our mathematics versed, stimulates the intellectual curiosity and a sense of elegance and perception. Morris Klein says: "Mathematics is the highest intellectual achievement and the noblest invention of man's mind" (Journal of Mathematics)
The goal of mathematics education from the viewpoint of George Polya and Plato:
In the George Polya’s point of view, the main aims of mathematics education are 'thinking' and it recommends to teachers to enhance the abilities and thinking in students.
Mathematical education purposes quoted by Plato: 1- general culture, 2- Rules of thought, 3- ability to think 4- sense and intellectual growth, 5- obtaining a balanced personality. (George polia, creativity in mathematics)
The main objective of the mathematics education in the 21st century are the creation of math/reasoning, sense of communication and integration of the mathematical concepts and their relationships with other categories.
According to the mathematical goals expressed, it can be said that what problems and shortcomings there are that will prevent us to achieve the goals of teaching mathematics and makes students unwilling to this sweet course. We mention some of them as follows:
Mathematical education weakness factors and related problems

1) Lack of motivation to learn:
Motivating is defined as the driving force of students to learn and is an internal state or a condition that activates behavior and orients it. Lack of motivation in students causes these students remain at the basic levels
of math due to lack of effort to obtain skills in mathematical knowledge and they will not be able to pass advanced math courses. Teachers have to put the important factor of motivation in their educational program and create the required internal motivation for active learning in students with different and appropriate feedback and various methods in various hours.

2) Lack of initiation in teacher and Arid math classes:

Arid mathematics classes, lack of variety in teaching methods, difficult mathematical relations and not understanding their real concept, lack of teaching time, lack of communication between teacher and student, lack of collaboration and group activities among the students, not encouraging students to participate in the discussions, lack of respect to weak students, not understanding the individual differences of students, being the education objectives superficial, the traditional method of teacher-orientation, relying too much on teacher handouts when studying, are the main problems of teaching mathematics that an active teacher should consider them in the class so that his/her training to be enjoyable and the learning to be a permanent and active [10].

In General, the following factors can create an enjoyable teaching: a) teaching method and the teachers role and how can he/she make all students participate in learning and create the Mirthfulness during the hours of teaching in the classroom. (b) The role of the educational system, school, programs and tools that school shall provide for the teacher to be enable him create a pleasant teaching environment and attract students toward scientific activities. Some active principles used in teaching math: teaching mathematics: student should be given the opportunity to “experience personally” and no specific experience should be done instead of student [7].

3) Economic factors and teacher’s fatigue:

Among effective factors on educational problems low levels of the tuition of teachers can be mentioned. This causes the teachers to take more hours for teaching to earn more. Then the teacher will be have less and less power and energy at the latest times of teaching day, therefore it will have an undesirable effect on the teaching quality. Teaching mathematics is a really hard and complex work that a few people can do it. Factors related to respectful and thoughtful teachers in teaching: 1) familiarity of teacher with new training approaches and accepting them as appropriate pattern 2) selecting suitable methods and patterns for teaching [6].

4) Anxiety and fear of mathematics:

Mathematical anxiety causes weakness in mental operations for mathematical processes, negative orientation and Confusion of students. This group refuses learning this lesson by avoiding mathematics classes, disability in doing mathematical tests and a lot of anxiety. This thought that Mathematical talent is inborn or boys have better performance than girls or the mathematics is a logical lesson, not creativity lesson, causes a retreat and resistance of some students from dealing with learning mathematics.

5) In-service courses:

Education and keeping scientific information of math teachers up to date is one of the main factors in the development of their professional performance quality. One of the main components of the mathematics teaching system is Math teacher. Experiences have shown that no matter how careful and practical the curriculum is and the methods and findings are based on researches of the research, it will be doomed to failure if it is not welcomed by mathematics teachers [13].

The proposed content to be presented during in-service courses:

1) Introduction to the basis and foundations of math teaching methods reform efforts. 2) Analysis of common math education programs. 3) To describe various types of experiences taken place to upgrade students' math learning. 4) To identify and deliver educational methods tailored to mathematics in different academic levels 5) proper use of technology group study of mathematical 6) To offer a lesson plan to successful authenticated teaching methods 7) To expand knowledge of field of teaching mathematics 8) To report and reflect the effectiveness of math teaching training courses for teachers and students 9) introduction to different tools and concepts which can evaluate the students understanding of math.

6) Lack of proper use of information and communication technologies in education system

Due to the growing trend of science in the world, the use of information and communications technology of education is raised as a serious concern. E-learning is a special kind of distant education that provides education in an interactive virtual environment using Web-based technologies and transmission media such as the Internet using and using tools like animation and simulators. In a study of TIMSS 2003-- (international study on the process of teaching math and sciences in the use of information and communication technology) that is done in Iran, 4 Islamic countries, 6 Asian countries and 26 other countries in the world. The status of information technology in schools, support of the use of technology at the fourth grade of elementary schools is studied statistically. The results show that Iranian students have less access to computers at home and especially at their
school. And the amount of their access to the Internet is also less than that and also of Iranian have less usage of computers in education-related purposes such as discovering concepts, practicing skills and teaching methods. Iranian teachers also had also been trained less in the field of the using information technology in teaching. Generally information and communication technology has not grown yet appropriately in the education system of our country [14].

7) Disproportion of concepts and exercises of teaching basic math in order to solve problems in other situations:
Mathematics is the key to achieve success in higher levels of education as one of the important lessons of elementary and high school courses. Teaching mathematics in school of Iran does not have major difference in terms of content and advanced math problems, but the math books in that countries are much richer than in Iran in terms of their choice of goals and objectives, approaches, strategies, methods and teaching techniques.

8) Excessive attention to the final exam scores:
The phenomenon of test anxiety is quite common phenomenon in schools. The exam, especially final form causes anxiety. Undoubtedly creation of qualitative descriptive evaluation and reducing the value of the final exam will decrease this fear and the child will try to not to learn not to success in the exam the student tries to fix his problems. Here if the teacher ask the student for his problems, he means to fix them, not to prosecute to interrogate him, and anxiety has no place in such an environment [3]. whenever a teacher noticed that some students have not learnt some curriculum materials, he immediately relegates the result to the students. But in today's developed world's educational strategy, he should describe and evaluate his/her behavior using new continues methods of quality evaluation and his to the space from scratch. He shall grow and develop the capabilities of his mind, So that the student do creative things practically and not just in his mind [1].

9) Lack of understanding and consideration toward the students “account insufficiency”:
The account insufficiency is defined as an especial problem which involves approximately 3 to 6 % of students’ population. This inability in math with other disorders sometimes effect on reading, written expression, harmony or understanding and expressive language. “Account insufficiency” or “Discoleolia” is defined as a condition that affects the Attainment ability of mathematical skills. An account insufficient is a person who may have trouble in the perception of the simple numeric concepts or in learning numeric data and learning methods. Even with the correct answer, he/she may not have the required self-confidence to express it [11].

Generally, the failure in learning mathematics is divided into two parts:
1. According to existing research, insufficiency in accounting and also in mathematics is sometimes like a failure in relationships such as receiving audio, speech, and visuals and etc.
2. Insufficiency in quantitative thinking: failure to account and mathematics may cause by problems in quantitative thinking. In other words these students are not able to understand mathematics. Usually in such cases, the children can read and write but they have difficulties in solving math problems. Such problems may be caused in understanding space relations, learning concepts such as top and bottom and left and right, the relationships of the values and sizes and figures [16].

10) Lack of attention to Individual differences to create learning along with the thinking and creativity:
"The learning" is a process that is not achievable for students without attention to the “time” factor and without the teacher having the "Patience" behavior. «One of the most important features of modern education is paying attention to the individual differences between the students; Something which is not considered in the attitude of traditional education, so that the traditional education follows the process of "unification" of all learners in the training environment»» [7].

Various students on the basis of individual differences make their own pattern in order to a conceptual understanding of each unit. This pattern and model is different for different people. In this case the important issue is that the teacher should not replace his pattern with the model of the student in case of being “impatience”. The teacher should advise the student to change his model properly in case of not being scientific.

11) Lack of freshness to provide creativity and active learning in math class:
The best environment to grow and rear the creativity of students is the classroom and the best person who can have an essential role in this development process is teacher, because he can plan and prepare them to create innovation and creativity via the recognition of the individual characteristics of students, proportional to their capabilities. If the right atmosphere is created and the new innovative creations were encouraged properly, creativities can reach the maximum grade of prosperity [2].
12) The weakness factors of the math training methods related to teaching methods:

Mathematics course is hard because is not presented by its own language, but is restricted in the contexts and teaching methods of teachers and due to high-volume books, the teacher cannot provide the necessary explanations and interesting content about the way to use and the history of teaching content in life.

We should note that even if the teacher is a mathematician, he cannot claims that his method in teaching is the best; because the knowing mathematics and its teaching are different things. If the method is better according to the logic of adults, it is not clear to be more appropriate and suitable for students who their logical processes are still in change.

Professor Vertimer researched the Children's thinking and studied it in different classes, the results of his studies was that most of teaching methods are Blindly and causes intellectual Insanition in children, and recurring exercises and expecting machinery answers from children will not create the flexibility which a healthy mind requires. Exaggeration in the repetition can also be detrimental. This type of training is dangerous, because it forces students to say or do things with closed eyes, without making them think (Proceedings of the fifth National Conference on mathematical education).

Although unfortunately none of training methods of lesson materials in our country are investigated scientifically, but the evidences show that teaching methods of mathematics is systemized from teaching method of for example Persian language, geography. However I believe the history of the education of mathematics in General is not satisfactory. Not only the efficiency of training efforts in this area is minimal, but also contrary to expectation, learning mathematics does not help the intellectual growth of students.

In Piagheht’s perspective, the Logical imagination of mind and generally the human intelligence is born from internalization of his actions and he says: Describing mathematical facts and concepts so that is usual in the method of “teaching time” is not enough for a child. To view images and forms and sets that include mathematical facts and relationships is not commonly useful as is usual in discovery methods. For imagination resulting precise concepts, the student should personally experience and experiment, manipulate things from close view to understand directly the relationships of quantity.

Comparison of the educational system with other countries:

The results of the third International Mathematics and Science study and its repetition hold by the international community of development evaluation showed that the performance of Iranian students are very weak in comparison to students from other countries and have a quiet far distance from the universal mean value. This study was the most important and largest study of this forum in 90′s. Anyway, there should be looking for ways to improve the General level of math education course in the country. of course these procedures shall be based on the original research work to have appropriate results for public education in the country. According to Guyaa in educational developments, at least ten years of continuous public efforts are needed to achieve the desired results. Then it is necessary spend the appropriate time in order to create suitable and useful change in education [17]. Many teachers and some math teachers believe that the cause of these poor results are deficiencies in the educational system, crowded classes, concentrated educational system and etc. while many factors are overlooked. 4 different countries from different continents of the world and with diverse educational systems such as semi-concentrated and concentrated have been selected, so that perhaps besides getting familiar with them and how they plan their curriculum, we can gain experience from methods of their success or failure. To this purpose, countries of Singapore, South Korea and Japan, which had a very good performance relative to other countries of the world as well as England and Canada, included in industrial countries that didn’t have good results in this study were selected. It should be noted that the country of South Korea, started the five-year development plans at the same time as Iran and also the classrooms in South Korea are crowded such as Iran even in some cases, is also more crowded.

Iran:

Math curriculum in Iran, are designed at the national level, so that all schools are asked to follow it. Curriculum objectives are prepared by Math Council of the planning and authoring textbooks Office, and are approved by higher education Council. For example, the goals of base of a math curriculum from first to eighth grade are as follows:

-Development of ways of systemized thinking so that students to be able to use them in conclusion and experience; the development of the ability to perform mental calculations such as numerical estimates and sizes;
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familiarizing students with aspects of teaching content in life.
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the development of problem-solving ability; -the development of an understanding of math concepts on each question and the ability to explain them in any format. At present, there is no program to guide curriculum for the textbooks and change the curriculum.
UK:

England and Velz since 1959, are the members of the Educational growth academic Association. The United Kingdom alone or along with Wales have accompanied in studies. Currently, the attitude of the students is negative towards math and this makes them not to pursue studying math in higher levels. In higher levels, the proportion of girls to study math is less than the boys, and this creates the concern that a way is should be found to encourage more girls to study math. Textbooks are naturally produced by commercial companies. However, many of the books are old, because they have changed in their curriculum, but textbooks have not changed [9].

Singapore:

Due to the Angh, Tung and tooh words, it can be said that the Singapore education system in some cases is similar to Iran’s. For example, the people of Singapore speak in Chinese, Malay and Hindi languages while the country's official language is one. The students’ young population is also like Iran’s and the educational system, concentrated.

New curriculum has more emphasis on the concepts of math and the ability to apply them to solve math problems and effective teaching methods has been emphasized. These methods are as follows: The development of mathematical concepts through meaningful activities; the use of mathematical thinking, problem solving and mathematical communication; the use of computer technology in teaching and learning of mathematics. The Ministry of education of Singapore has provided a list of appropriate textbooks and helpful educational materials and has given them to public. It is necessary to explain that textbooks of this list are prepared commercially.

Canada:

Many schools use new technologies in the curriculum so that they can use software programs and international databases. The curriculum focuses on teaching concepts; more than learning like parrots. Using the calculator at all levels is recommended. Especially in population, the use of computers is strongly recommended, as well. The method of active learning, collaborative learning and open answer curriculum in all the courses, are expected. The teachers use written test, class projects and individual evaluation in order to evaluate students.

South Korea:

The overall objectives of the math education in Korea, are introduced as follows: -understanding concepts and basic principles and geometric forms through the use of mathematical approach, in view and organization of various phenomena that happen in everyday life; - resolving differing logical issues by practicing basic math skills and applying them in everyday life; -increasing the abilities and functionality required by the applied mathematics and solving skills for Different issues. In Korea, there is no specific policy on the use of educational tools such as computers and calculators in the classroom, and it just depends on the interests of the teacher. But the use of these tools in the future is inevitable. Although the mathematical curriculum approach have changed towards active methods, but the change in teaching methods are very slow. Although math educators recommend using different teaching methods, but teachers suggest the use of lecture method.

Solutions provided for the factors of students’ weakness in math are:

1. Encouraging students while teaching mathematics to them in order to improve their motivation.
2. The use of consultants in the primary school and determining students who really have problem in learning mathematical and are afraid of numbers.
3. Identifying the mathematical learning difficulties of children (which a student may have problem in understanding the space relations problems or understanding numerical concepts) that the teacher should try to reduce them by doing extracurricular programs.

   (B) Solutions which are provided with respect the factors of the weakness of training mathematics relevant to the education methods:
1. Choosing the right teaching method, that forces students to think.
2. When teaching method does not obtain success in the classroom, the methods should be changed and a few imperfect method of composition.
3. Providing new methods of teaching to other coworkers through mathematics magazines or journals in the training areas.
4. providing a mathematical education workshops and discussion regarding how to present different content based on the different parts of the mathematics lesson.
5. Welcoming the innovative methods for any concept or part of mathematics in different grades and trying to publish it for the use of other coworkers.
6. Active method should be trained in all mathematics classes because this is the best teaching method of mathematics which is less condemned in its value.
7. Education research present convincing evidence which the students learn mathematics when they just build their own understanding of mathematics, work in groups, participate in the discussions, they offer their ideas, and on the other hand, be responsible for their own learning.

For learning mathematics it is recommended to set up laboratories in schools for following reasons:
7-1- students involve in their learning with practical activities in laboratories.
7-2- they experience an application for each learning.
7-3- student is learnt well when he feel the usefulness of content and it is possible in mathematics laboratories.
7-4- students understand the results of the application of mathematics on their surrounding environment.
7-5- it will make mathematics lessons more attractive for kids.
7-6- at each stage of learning students will be encouraged to learn mathematics and the children will be away from of impatience and confusion.
7-7- it improves the power of Inference and applying mathematical knowledge gradually.
(C) Providing some other strategies in different areas:
1. Paying attention to the educational environment; teachers should create a friendly and happy environment in classrooms for kids so that they can present their proposed solution whether correct or incorrect without fear and apprehension in mathematical classes.
2-the use of computers in mathematics classes with respect to the variety of computer programs so that undoubtedly it will help the primary school students in learning mathematical concepts.
3-equipping schools with appropriate training tools; but some tools are better to be built by teachers during working with students and of course some of the necessary means are necessary to be available in the course of mathematics.
4- Justification of parents to help students to solve problems while being more coordinated with school programs.
5- Do not encourage students to participate in private classes because they will not concentrate to learn the lessons in the class during education the lesson because they hope to learn in other course.
6- Attention of teachers to requirements of the teaching material; which means that they make sure that students are well aware of requirements of what teacher is going to teach.
7- It should be prevented to give out very difficult assignments and exercises to students.
8- In primary mathematics it is better issues to provide the material objectively and subjective issues are better to be provided less because Intuitive methods make students closer to solution of the issue and prevent him from being confused.

The Last Word: Astiz says: teaching math may need comprehensive approaches and super theories which are formed from a good mathematics philosophy; a good mathematics philosophy should see the mathematics itself as a system from the viewpoint of cooperation activities and the relationship between human beings and mathematical objects and social interaction».

The conclusion:

Now, mathematics has been tangible more than any other time and has a vital role. In the last quarter century, mathematics and mathematical methods have changed to an inseparable, comprehensive and fundamental component of the science and technology and economy, which the disability in understanding and the applications of mathematics is representative of an educational gap on the verge of the 21st century. One of the concerns of students and their parents is to learn math and math score has a great importance for everyone and it is more sensitive than other courses. There are some factors that can hinder growth of thinking in class and as a result, eliminate creativity of education via permanent learning and thinking especially in the math lesson. the most important of these factors are Soulless classroom environment, lack of diversity in the teaching methods, disability of understanding the true concept of taught lessons, lack of time, lack of communication between teacher and student, lack of collaboration and group activities among students. The high density of the student in the class, Lack of the necessary tools to educate, not encouraging students to participate in the discussion, lack of respect for weak students, Lack of understanding the individual differences of students, teacher’s not being patient in discussions, Superficial education objectives, the traditional method of teacher-orientation, relying too much on teacher’s handout and the use of prepared books with problem-solving while studying by weak students can be pointed out that an activate teacher must consider them in the classroom and try to reduce that preventing factors as much as possible, to achieve an enjoyable training and active learning along with permanent thinking and creativity. So we can conclude that the causes of the weakness of teaching mathematics in the primary schools are not dedicated to one specific group. It means that we should not consider the teachers or the curriculum books designers as causes of weakness of educating mathematics, but of course each one has its own contribution in this Problem, which the least factor of weakness of students is for the math lesson in these courses. But due to the Defects or imperfect job of one sector difficulties may be caused in the way of teaching mathematics. In many cases unknown causes or considering everything perfect and excellent may lead to no discussion and thought about weakness factors and problems or even not recognizing the
problem itself so that no effort will be done to answer. So in this article, we tried to at least reduce the weaknesses by presenting educational problems and weakness factors of teaching mathematic.

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