Introduction

The environmental changes and rapid technology development, especially in information and communication technology impose crucial effects on all aspects of human life. These changes and developments along with globalization phenomenon bring about some inconveniences for those professional and skillful people who were successful in the earlier traditional world, but not in the present developing world. In the modern progressive world, societies and communities, for their own progression demand individuals with different skills and abilities.

In this article, we are trying to present some principles on the success factors in the modern world according to the standards given by UNESCO. We also take a look at the world educational systems and their contexts, especially mathematical topics in textbooks as well as mathematical competitions.
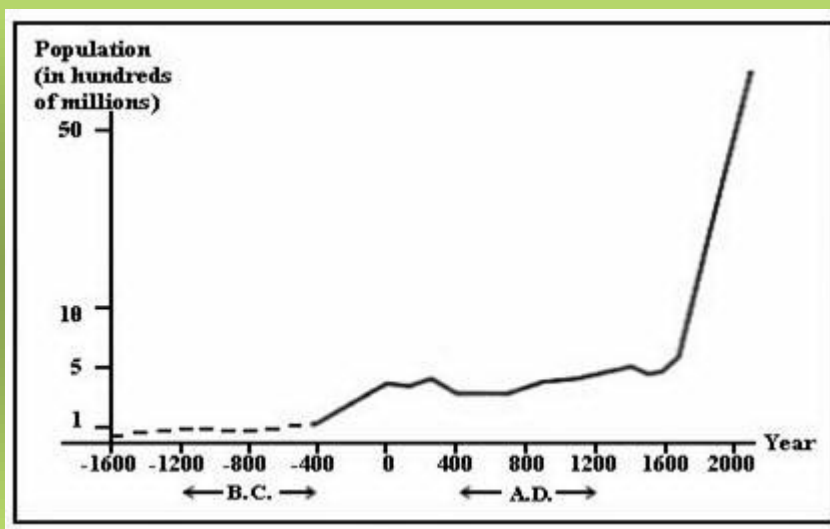
The Changing World

A glance at the statistics of the variation of principal characteristics and the present conditions of human life in different communities, such as population, natural resources, environment, modern technologies and globalization along with their rapid growth have so many things to tell.

Population, Natural Resources, Environment

In every community, population and its rate of growth are the greatest and the most important characteristics for predicting the life situation in the future. The following diagram represents world population growth from 1600 B.C.:

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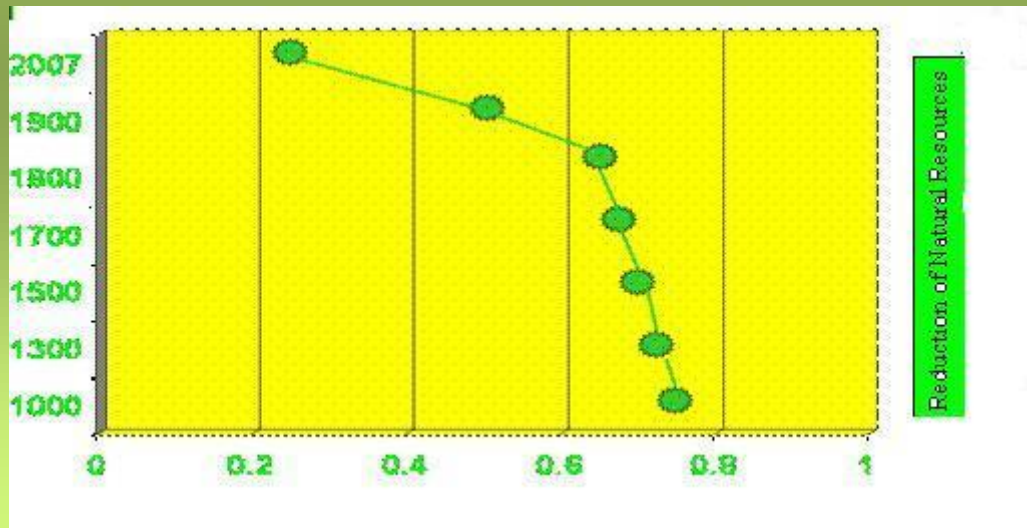

By the year 2007, the world population would be 6/6 billion people, more than a half of this number are under 25 years old. By the year 2050, every 12 years 1 billion people are added to this population. At present 852 million people suffer from hunger and starving, two billion suffer from malnutrition and the growth of these numbers is almost proportional to the population growth.
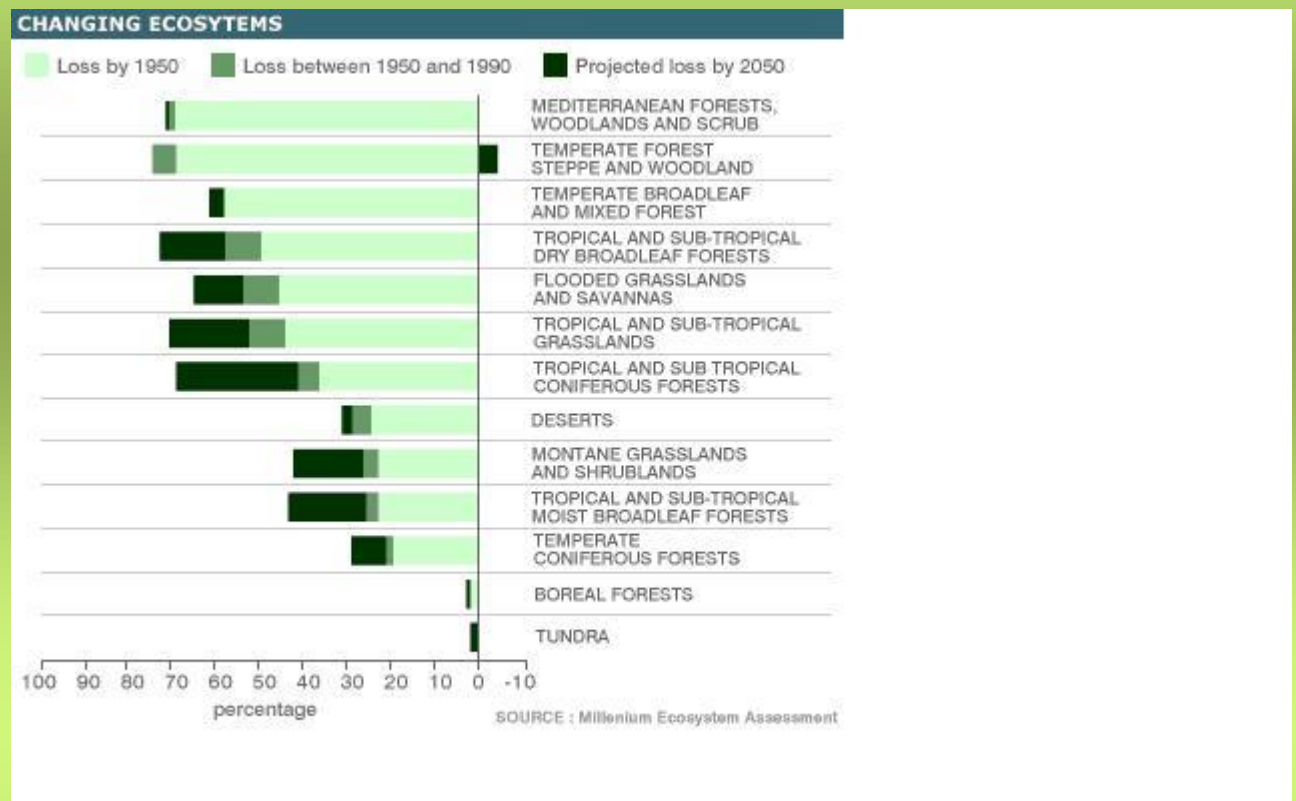*http://www.commondreams.org/headlines06/1020-01.htm*

On the other hand, world natural resources are reducing with a high speed and within the next 300 years all the world natural resources will be finished and the world population would be almost 30 billion people.

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50 percent of the agricultural lands have been destroyed within the last 50 years. In the following diagram you can see the mass destruction of world ecosystem which is programmed by human beings until the year 2050.

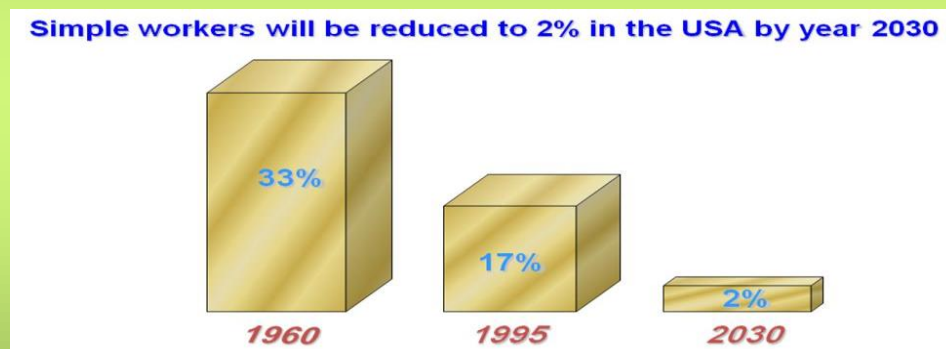http://news.bbc.co.uk/2/hi/science/nature/4391835.stm

The present and future situations has made the authorities in all countries to be concerned and worried. The most elementary needs of a community such as nutrition and employment, for this ever increasing population in one hand and the decrease of natural and agricultural resources on the other hand are the most problematic concerns of politicians.
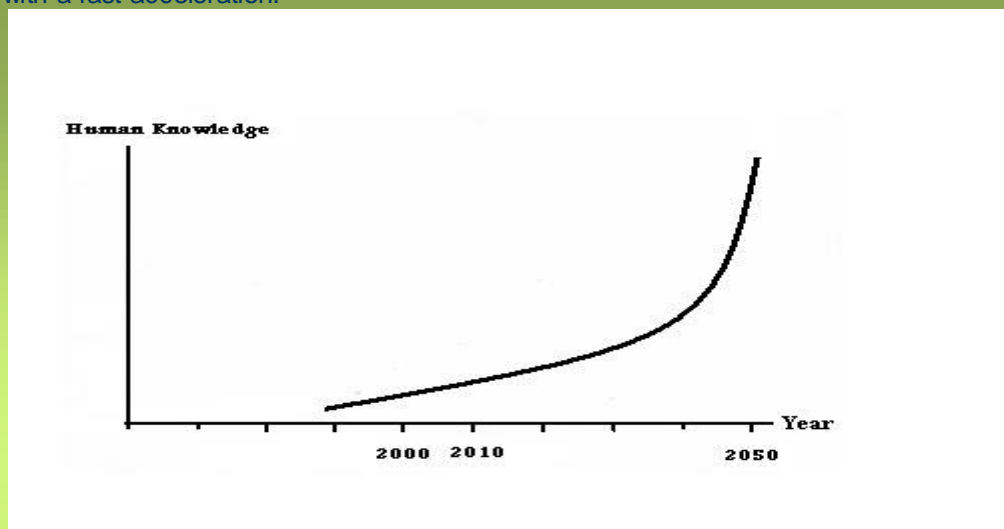
Information and Communication Technology

Information technology is another important factor influencing these changes. This powerful device has a great influence on almost all aspects of human life, such as different scientific areas, employment opportunities and even the general life in as much as it has led man towards a virtual world. People can do almost all their job activities without having physical presence in the workplace. Consumers can purchase on line, companies and social services, whether private or non-private provide home delivery services so that people can get what they want without spending so much time. Social security and controlling forces do their jobs in a precise and effective manner. Individuals and community have interactive activities without being physically involved. All the social activities and services can be done from home, simply by a digital connection; getting into touch with family and friends, buying and selling, bank services, education, insurance, health services and even consulting a doctor.

The following diagram estimates the reduction of physical activities of people in near future.

http://www.cs.wvu.edu/~jalali/semidown/4th_wave%20oct%2023_02_part1.ppt

On the other hand, information and communication technology has had an effective role in the development of human knowledge, through using this technology, scientists and experts can exchange their findings and research results. According to a report delivered by UNESCO, every 2 or 3 years, human knowledge increases twice as much as before. And this happens with a fast acceleration:

Globalization

Another faculty of principal changes in communities is the globalization phenomenon in all its aspects i.e. creation of organizations and international unions, providing international standards for optimization use of natural resources, environment and ecosystem protection, international penalty and punishment laws for crimes and immoral actions, practicing human rights at all levels, establishment of international peace, giving standards for production facilities and their deliverance, and other services around the world. These facts on one hand and the growth of clients and purchasers for different productions and facilities, regardless of geographical borders, on the other hand, obliges all countries to obey specified international rules for their own world wide progression, recognition and respect.

Success Factors

The world we live in, as has been noted above is full of principal and rapid changes. Evidently the faculties and factors for success depend on circumstances and are not fixed or permanent.
As it is said in "Strategic Management" by Fred David quoting from Professor Henderson:
 "The astronomical changes in the world have resulted in a world full of complexities, therefore the usual and traditional methods of management fail to succeed. The societies and communities need active, creative, analyzer individuals well equipped with information technology and well-informed of how to use it."

Successful Societies, Successful Individuals

From a universal point of view, those societies that are concerned with "development" are called successful, i.e. in which such characteristics as: economics, culture, social facilities and life quality are developed. The individuals of a developing society are required to be both personally and socially safe and sane. In the workplace they should be leading models for the progression of their own community.

IQ & EQ Two Fundamental Success Factors

 IQ or intelligent quotient is a score measuring the ability of comprehension and reasoning of an individual based on his or her own earlier knowledge. EQ or emotional intelligence quotient is a score measuring the ability of using one's emotions and knowledge at the same time, in managing problems. EQ is related to such characteristics as intuition, creativity, flexibility and suppleness, social intelligence, personality and so on. IQ is almost intrinsic while EQ is acquisitive and could be attained through proper education. In fact, as the psychologists agree, among the success factors, IQ counts for only about 2o percent and the rest depends on EQ. Therefore 80 percent of success factors of a community could be developed through appropriate education.
http://en.wikipedia.org/wiki/Emotional_intelligenc
 Thanks goodness, Iran is among those regions with high IQ scores. But what about EQ faculty which mainly depends on education?

Success Factors in the Modern World, UNESCO

  In the 17th Study of International Commission of Mathematics Instruction (ICMI), in December 2006, held in Vietnam, UNESCO representative delivered a documental speech in which some of the characteristics of successful people in the modern world were specified. These aspects take into consideration the present fundamental changes that are happening all the time. This document has been made a basis for essential changes in educational systems in the modern schools around the world. Some of these characteristics are as follows:

- **Positive thinking**: Thinking for humanistic purposes, charitable and moralistic communication, having friendly behaviors towards environment, protecting natural resources, these are some of the main characteristics of successful people. These characteristics bring about social trust and confidence.

- **Sense of responsibility**: Hard working, being on time, having sense of consciousness in doing responsibilities in a complete and precise way. These characteristics depend mostly on culture and social instructions but may as well be affected by some other causes. For example people of East Asia who are deprived of natural resources, are content people and do not expect much for a living. They are hard working people with a strong sense of responsibility. In Japan, people who spend all their work leaves are rewarded.

- **Good communication and cooperation skills**: In the modern world, most of activities within organizations and institutions, even scientific research projects are implemented in groups or teams. Therefore communication skills such as respecting others and their opinions, even if opponent, listening completely to what is said by other colleagues, being able to defend one's opinion logically and reasonably, being just in discussions… etc are important skills that one is required to be practiced in a team work.

- **Sense of research**: In the modern world human knowledge is increasing day by day, this implies not only a sense of investigation and study but at the same time making up to date what one already knows. Otherwise one's knowledge would loose its validity and recognition; consequently those who can find and learn what is required are more successful; thus studying permanently, learning methods of effective reading and listening are of fundamental importance in modern educational systems.

- **Critical thinking**: Learning skills and enrichment of studying are not by themselves effective and useful; one who confines oneself only to obtain information is like a machine with some abilities for itself but not capable of helping and improving the world around it. Learning and getting information is required to be accompanied with a critical and active mind in order to be able to manage all the information together. Summarizing the obtained information, discussing, reasoning and making conclusions in an analytic way are required. People with critical and analytic mind are not generally indifferent in facing social problems and inconveniences; challenging their minds, they look at problems in a different way, consider them from different angles looking for solutions. Co management is one of the most effective methods of administration in the world; the Japanese were the first to achieve it successfully. In this method everybody is involved in management, from the head of administration down to the employees and clients; everybody can put forward suggestions for the improvement of the group. These suggestions are examined in a committee and in case of approval are rewarded according to the improvement they create. The proposition givers are individuals with an analytic mind who can recognize the inconveniences around them and try to improve them.

- **Creativity**: Creativity and innovations along with learning and analyzing circumstances bring about new thoughts and ideas; hence lead to present effective, fair and suitable resolution. Within a collection, these thoughts and ideas may lead to taking decisions that give rise to remarkable changes for the development of the group. Modern societies need individuals with active and creative mind who can analyze problems and complexities in society, hence using their own creativity, give constructive ideas and appropriate solutions. Generally, those who provide entrepreneurship situations in the society are creative people; they can make best of the current situations for creating job opportunities, challenging unemployment which is one of the most disturbing problems of the time. Here are two examples of creativity in solving disturbing social problems. In Germany a creative mind founded a museum of handy crafts by using worn out tires, in this way, in addition to profiting himself he contributed to his colleagues and his government to earn a remarkable source of income. Similarly, in France another creative mind put forward an idea about the beggars, who were a major problem for the government and disturbed the tourists by begging; they were trained to perform comic and puppet shows, which was of course costly, to entertain tourists; in this way, these people earned more income for themselves and also made a source of tax for the government, putting an end to tourists disturbance.

- **Flexibility**: Rapid changes are the essence of the modern world; these floods of changes overshadow all humans and their mode of living; if one lacks flexibility in confronting new changes and could not find ways of adaptation and adjustment with these alterations, one would not succeed in one's professional activities and even may be hurt personally. In some countries employees are trained to practice adaptable policies, i.e. they learn how to adjust strategies and processes according to circumstances. Self adaptation ability is a good quality but not a sufficient one; since it does not lead to development. People of the East Asia are adaptable, for example having this quality India has succeeded to be the greatest country to

outsource software projects proposed by the USA and some European countries, leading to billions of dollars of income for this country.

- **Self-confidence in facing new problems:** A community with individuals who lack confidence in dealing with new problems and challenge to find solutions is subjected to destruction. The first trouble for this community is individual and familial crisis; since these problems have not been experienced previously, lack of confidence might lead to mental disorder and finally health problems. This may also happen in workplaces, due to rapid changes and complexities in unions and human activities; therefore lacking sense of challenge to face the problems and seeking for solution is an obstacle for the development within the union.

- **Time and activity management:** In the modern world, individuals are required to have objectives and plans for their professional and even personal lives; all activities should be put into practice with a timetable and evaluated while practicing and modified. This skill is somehow acquisitive and needs to be trained. In modern societies this skill is being practiced from early childhood, children learn how arrange their affaires; they learn how to plan according to a timetable for different tasks that they are supposed to do, e.g. cleaning their room and stuff, watching TV and working with computer. When they get older they learn how to program for studying, working on projects, having entertainment and scientific camps… etc., furthermore they learn how to improve all these activities and tasks at the same time.

- **Providing documentation:** Successful people are required with writing skills; they are supposed to write down all the steps of their activities such as: objectives and plans, data gathering, analytic discussions, experiences and finally conclusions. A good presentation requires authentic, coherent and consistent documentation.

The Conventional Education Systems

As you can see, all the factors mentioned above are related to EQ abilities, and could be achieved through appropriate training. Unfortunately in conventional education systems these skills are generally ignored. The students have to learn some prescribed materials in a limited period of time and give them back in a traditional, systematic exam. No time and space for creativity and self management. The students work and compete as individuals with no sense of cooperation and helping others. The IQ faculty is well supported whilst trainable faculties are being ignored.

Modern Educational Systems

Summing up, in modern educational policies which are being practiced in modern schools, latest educational strategies are defined as follows:

I. Self accessed: That is, along with his/her own group, every student has access to a supply of different resources such as books, papers, cds, internet and so on which have been selected by himself/herself.

II. Self paced: That is the student learns subject materials according to his/her own ability and aptitude and is involved nor in competitive situations, neither in topics out of his/her capability.

III. Within their own groups, students are allowed to be involved in the topics that they are more interested in, and not forcing themselves to get deep into subjects that they do not like. Confining students to a closed, prescribed education system is avoided.

Therefore an educational system with the above characteristics, if well organized and well performed, develops such skills as: effective studying, time and activity management and likewise the spirit of cooperation and friendship. Furthermore, it discovers students with different skills and abilities and provides an opportunity for the progression of every individual within his/her own interests.

A Glance at High School Mathematics

To have a critical discussion about mathematics education in different levels of high school needs quite a lot of information and knowledge; thus let us confine ourselves to what professor Peter Taylor, the head of Australian Mathematics Foundation and the director of the Mathematics Olympiad for 15 years, says in this connection:

"Often we overlook the fact what we are teaching students is 'how to think' … It is time to address this issue various aspects of enriching mathematics education to graduate students who are well equipped to encounter real issues".

In fact, one who does not possess thinking ability and a critical mind, is not capable of confronting personal and social problems reasonably in the real life. As Professor Taylor points out "We must provide students with those topics in mathematics that are concrete and challenge the mind in the real life"; for example topics involving finite or infinite processes, unchangeability, pairing and coloring should be included in textbooks and somehow replace the abstract themes. This may refer to problem solving techniques in mathematics Olympiad or Tournament of towns as well. Let's have a look at two of these problems and their challenging resolution:

- A 0's, B 1's and C 2's are written on a board. Each time we efface two unequal numbers and replace them by the third number (e.g. we efface one 0 and one 1 and write a 2 on the board instead). We do this process repeatedly. In what cases for A, B and C we will not end up with a single number? (Isfahan Tournament of Towns, 2003 first round).

This is a sample of a beautiful problem involving pairing and unchangeability. In every step one unit is subtracted from two of the numbers A, B or C and added to the third one. Thus in every step the pairing of all three numbers is changed, (i.e. each number is replaced by an even number if odd and if even by an odd number). If at first all these three numbers are even or odd in each step of this process they remain the same in pairing. In this case we will not end up with one number since this means 2 evens and 1 odd which is impossible.

- 13 red, 14 green and 15 brown shrimps are in a lake. Every time two shrimps of different colors collide and their colors are transformed into the third one. After a period of time, is it possible that all the shrimps be transformed into the same color? (To the reader)

Challenging the mind with problems of this kind develops thinking ability and creativity which in turn brings about courage for facing new problems. This kind of problems needs creativity and new thoughts. By organizing tournament of towns with teams (consisting of 3 members), IMH aims to develop team skills among students as well.

New Tournaments

In this part, we want to introduce a new competition which considers the development of more success factors in students' progress. This competition namely Mathematics A-Lympiad is being organized in more than 90 schools in the Netherlands by Freudenthal Institute. According to cooperation agreement between this institution and IMH, this competition is planed to be organized in Isfahan schools from now on. Mathematics A-Lympiad has some special distinctiveness which worth noting; in the following we take a look at some of these features:

· This competition is between groups of students and not individuals.
· The questions are real problems that are posed by societies, industries, companies, research centers or even a public problem.
· To solve the problem, a mathematical model is presented by the students then a particular idea follows for discussion.
· These ideas might be different and cover a variety of approaches and have problems; it may happen that none of these thoughts solve the problem completely. These ideas are evaluated according to their effectiveness and way of approach; e.g. a very good idea might have some weaknesses and be evaluated 80 percent, another idea 70 percent and they have nothing in common.
· In general the assumptions are too long and it may happen that one solution does not use all the assumptions.
· The solutions are not short and generally need critical argumentations; this improves writing ability and the ways of how to organize findings and thoughts in a text. The reasoning ability is also improved, since every claim must be supported by evidences; these skills are significant in evaluation.

· Some questions only require effective reading of the assumptions followed by data management, reasoning and then analytic details of the assumptions in a final report.

Let's have a critical look at A-Lympiad competition and former traditional competitions like Tournament of Towns and Olympiad, considering the success factors mentioned at the beginning of this essay.

1. In competitions like Olympiad, we often confront with problems that do not happen in the real world and sometimes even impossible to happen. This, however, reduces the motivation of thinking. How is it possible that two shrimps collide and change color?!! On the other hand what is it good for to solve this problem?

2. Since in A-Lympiad competition, the questions are real problems, the students enjoy challenging to solve them. The fact that questions are real problems brings about a sense of responsibility towards society and evokes students to look for a solution, wherever they meet inconveniences in the environment, which in turn keeps their minds active and creative.

3. The contexts of questions are long, and within each group, the students are required to read problem effectively in a reasonable time period. This develops the effective and cooperative reading skill, furthermore they practice data management, reasoning and analyzing the given presumptions, to find appropriate ideas for solution. All these activities develop creativity, critical thinking and mind activeness.

4. Since the problems cover a variety of topics, a more extensive variety of ideas for solution are presented by students, each one from a different aspect which makes students to develop a multi aspect mind.

5. Every individual can put forward his own idea and defend it in his own group and makes improvements if criticized, in this way team work skills such as good behavior and communication, respecting others' views, ways of argumentation and reasoning, methods of analyzing, critics and suggestions and finally being fair with others are developed.

6. The fact that this competition evaluates a great deal the writing skill and documentation methods, encourages students to practice their inscription ability in writing down what they have in mind.

Keeping in mind the facts just mentioned, IMH believes that this competition, by reinforcing effective components of students' success in this complicated modern world helps them to develop their understanding and reasoning.