

AYIMI AND THE MAIN GOALS IN EDUCATION

Izadipannah N., Izadipannah D. , Ariaian Young Innovative Minds Institute, Tehran, Iran, info@ayimi.org

ABSTRACT

To find how scientific communities can encourage students to learn science in a friendly atmosphere and then combine scientific fields and arts to show the beauty of different solving problems by the creativity is explained in this report.

ARTICLE INFO

This is about the main scientific activities have been organized in AYIMI

Ariaian Young Innovative Minds Institute, AYIMI

<http://www.ayimi.org> , info@ayimi.org

1 About AYIMI

AYIMI is an international institute which is representing of different international tournaments such as IYPT, IJSO, ICYS and so on. In our experience, you need to be both imaginative and practical in drawing up your research in physics, chemistry, biology and other scientific fields and this institute gives you the opportunity to learn basic sciences practically. This network enables members also to share information and exchange their own ideas on a wide range of topics. National and international awards are given to top participants in several activities from all over the world every year which will bring our young talents even closer together.

AYIMI has been founded about 10 years ago to educate innovative minds , encourage young generation to learn science to enhance their potential in living better on Earth and to use natural resources in a correct way. AYIMI has been the organizer of two different international events in 2011 and 2012 to introduce IJSO and IYPT to young students and also to give the chance to all the participants from around the world to know Iran and its culture much better it is also a way to develop scientific tourism industry.

2 The Main Goals

AYIMI main goals are as follows:

- Building capacity from idea to manufacturing
- Communicating with other national and international institutes
- Organizing and performing different national and international tournaments, conferences and workshops
- Cooperating with different administrative organizations
- Developing scientific tourism

To change some students' beliefs that learning science is difficult and boring, we tried to combine the arts and standard curricula together. By attracting students in different national and international activities which are based on applied sciences, we got to our main goal which Arts in Science Education (ASE) can give students the opportunity to express their thoughts , feelings and their abilities in solving problems and also understand science

through the lens of their creative activity .

In scientific communities we can encourage students to solve problems by finding connections between different scientific fields and arts in different cultures . Students find the beauties of science with its complexities by looking carefully at nature and everything around them in their everyday life. Then by using Art they can illustrate their observations and interpret their main ideas, or analyze real scientific problems using their own creative approaches.

Arts in Science Education (ASE) offers a new model for 21st century teaching to help the shift from human labour to mechanical labour based on human imagination and novelties so it should be considered that:

- Science and Arts can impact to each other
- Problems cannot be solved alone just by Science and Arts can help to find the solution too [1].

Imagination is a key to bringing dreams into reality, and in science education it is necessary to ask students to try to make imagination deeper. Thus, our students should take an active role in both their own development and that of those around them. A way to include project-oriented learning combined with art can help their scientific imagination and strengthen it. By constructing mental images and building models they will overcome difficulties in the construction of long-lasting science knowledge. Students should learn to design their own model related to the scientific concepts and draw from their imaginations.

By adding some ink in water to show circulation and ocean currents , making beautiful lens, making origami in modeling a physics problem and other beautiful experiments students can show their imaginations (Fig. 1) [2].

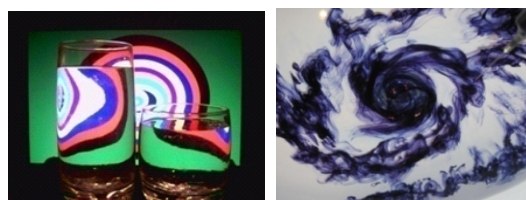


Fig. 1: Imagination in scientific experiments

Origami in Science as ORIGA-SCIE (Was introduced in Birmingham University, ICWIP 2017) as one of AYIMI festivals, asks students to build their own models by using an A3 or smaller sheet paper and investigate some scientific phenomena and measure the most important parameters in solving the proposed problems by these models. Designing and construction a paper model and calculating the factors affect the structure to access the optimal designs in reality, is one of the models in Active Learning by Innovation in Teaching (ALIT) [3] which during several years has caused the improvement of learning physics (adib.ayimi.org).

Students in our institutes have a lot of freedom to move in any direction of interest they would like. While this approach may seem more difficult logistically or pedagogically in our traditional system, a large fraction of students are prepared to study and are more engaged in learning when given the freedom to pursue their interests (such as participating in different national and international activities). Solving open-ended problems in basic sciences through their own models, imaginations, illustrations and learning analog skills in conceptual drawing and prototyping, helps students to learn even more difficult subjects and create new industries in the future too [4].

3 Different Forms of Communication

The enthusiasm for participation in various activities of the Institute in the form of group and individual work is according to the rules in each section. All the participants should pay for international programs include an entrance fee (registration) and training workshops by experienced professors in various fields and also publication of articles in international journals.

Institutes and various scientific centers, cooperate with AYIMI in accordance with the short-term Memorandum of Understanding, which will be renewed by the willingness and consent of the parties.

4 AYIMI and Engaging in Several Activities

4-1 IYPT

The International Young Physicists' Tournament, IYPT, referred to as "Physics World Cup" too, is a theoretical and practical competition involves teams of five high school students from all over the world, preparing solutions to seventeen problems. The official language in IYPT is English, and IYPT is a member of WFPHC (World Federation of Physics Competition). IYPT was initially organized in 80's in Moscow. As the popularity grew, this tournament spread out and different countries started to participate. Now it takes place in different countries each year with more than 30 countries.

The rules for presentation of the results, opposition, reviewing and judgment by the independent jury are fixed in the Regulations of IYPT. During each Physics Fight (PF) students have not only to present their solution to one of the 17 problems as chosen by their opponent but they have to oppose the presentation of other students. The reporter then has to defend his solution against the opponent. The reviewer then summarizes what have been done by reporter and opponent (iypt.org).

AYIMI has been in IYPT from 2007 and in 2011 as the host, organized this event with coordination of Amirkabir university.

Team Iran succeeded to get **Silver medals** in IYPT 2010 and 2011 in Vienna and Tehran, successively, **Gold medal** in IYPT2012 in Germany and **Bronze medal** in IYPT

2019 in Warsaw University of Technology.

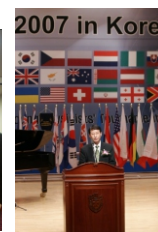


IYPT 2007, Korea

Professor Gunnar Tibell (past IYPT president)



IYPT 2008, Croatia



IYPT 2019, Warsaw

4-2 PYPT

To provide a program of educating and supporting teaching assistants, Persian Young Physicists' Tournament, PYPT, has been organized to develop assessment tools to evaluate student progress in problem solving, technical presentation in English which is not their native language, and team working. The 1st Persian Young Physicists' Tournament (PYPT) was in March 2008 which two selected teams participated in Austria (AYPT) and IYPT to get the first experience from this attractive challenge. Now students from different high schools in Iran are able to request entry into PYPT, which is carried out in a period determined by the PYPT Executive Committee (ECO) every year. The best teams receive rewards but the best students with highest individually scores as the PYPT Regulations are selected and after education, participate in International Young Physicists' Tournament, IYPT.

4-3 IJSO

International Junior Science Olympiad (IJSO) is an annual individual and team competition in the Natural Sciences for students who are fifteen years or younger. It has been established in recognition of the significance of the Natural Sciences in the general education of young

people and in all aspects of their lives.

The aims of the IJSO are:

- to promote and reward the pursuit of excellence in scientific endeavor.
- to challenge and stimulate gifted science students to develop their talents.
- to select the top young science student teams at the annual IJSO.
- to encourage the continued participation in the study of the Natural Sciences.
- to create friendship and relationships among students around the world from an early age.

The 1st and 2nd IJSO was in Indonesia, 2004 and 2005 and then it spread to different countries. Every year about 50 countries participate in this great event.

The competition is divided into three tasks, prepared by the SC and conducted over three days with an interval of at least one day between each task. The time allotted to each task should normally be three to four hours. The OC decides the sequence of the competition days.

The problems consist of three tests. Test One and Two are individual competitions. However Test Three is a team competition, where one team consists of three students of each delegation (each country may have two teams for task three).

Test One is a multi-choice-questionnaire (MCQ). The number of questions should be 30 (thirty). Questions for Test One should include Physics (10 problems), Biology (10 Problems) and Chemistry (10 problems). Each question shall have four possible answers with only one is correct.

Test Two is a theoretical test. The number of tests should be 2 (two) or 3 (three). Test Two should be more complex involving a combination of Physics, Chemistry and Biology.

Test Three is a experimental task. The number of tasks should not exceed 2 (two). Questions for Test Three should be the combination of Physics, Chemistry and Biology and should be in equal proportion.

The problems must

- be related to the syllabus of IJSO, and cover all content of the syllabus as much as possible.
- be reviewed by the IJSO Scientific Experts (not the local SC, but an ad-hoc Scientific Committee formed by the EC) prior to the problem discussion.
- be created innovatively and the answers must be language independent (IJSO official website).



4-4 IRJSO

AYIMI participated in IJSO 2008, Korea for the 1st time and then Iran Junior Science Olympiad (IRJSO) was organized as a country Olympiad to encourage junior students and to select team Iran for IJSO.

The 9th International Junior Science Olympiad with participants from 32 countries was held by AYIMI on Dec. 1-10, 2012 in Iran. All the problems were provided by

AYIMI Scientific Committee (SC) and they tried to introduce Persian Gulf and one of the most important botanic samples, Mangrove(Avecina Marina) forests to the participants.

4-5 IYNT and PYNT

International Young Naturalists' Tournament (IYNT) is held in order to find and support talented young people, to develop creative abilities of students who show a strong interest in science classes. The initiative group headed by representatives of the Lomonosov Moscow State University, MIPT, Bauman MSTU and the journal "Potential" has decided to develop a special program of extracurricular activities to enhance students grades 6-9 – the program of the Young Naturalists' Tournament. Exactly naturalists, because children of this age don't divide science into certain areas (physics, chemistry, etc.).

IYNT regulations is the same as IYPT but a little difference in some items.

The 1st IYNT was held in Eskisehir, 2013 and every year it is held in different countries (iynt.org).

Persian Young Naturalists' Tournament (PYNT) was organized by AYIMI from 2013 and every year students from several schools participate in PYNT . To encourage young students , AYIMI gives the best teams gold, silver and bronze medals.

Iran has participated in the 1st IYNT 2013 which was held in Eskisehir in Turkey . The science federation of Russia was the organizer of this tournament with cooperation of Osman Gazi University in Turkey and minister of Science & Technology.



IYNT 2016, Shiraz

4-6 IPT and IRPT

International Physicists' Tournament (IPT) was born in Ukraine in 2009 as a continuation of a long tradition of physics competitions in USSR. It brought together 16 teams from the leading universities of Ukraine and neighboring countries. In the following years, the tournament was held in Kiev and Moscow. Over the years, more and more countries took part in this event. In the 2013 edition, the tournament welcomed ten countries:

China, Denmark, France, Poland, Romania, Russia, Singapore, Switzerland, United Kingdom and Ukraine.

A list of 17 problems is created every year for the IPT. and in April, all teams gather to compare their solutions in several rounds of so-called Physics Fights. During each Physics Fight, 3 teams confront each other. Fight after fight, they play the roles of Presenter, Opponent and Reviewer.

The performance of the teams is judged by an experienced jury, and the 3 best teams get into the final . On top of the challenge that the tournament represents, to take part in, it is an amazing experience in which you will learn how to constructively criticize scientific solutions. This is something that you cannot find in any University course, and it is very close to how real science works!

AYIMI participated in IPT 2015 in Poland for the 1st time and IRPT 2015 is the country selection tournament.

4-7 ICYS and IRCYS

International competitions play an important role in the education of highly talented students opening new possibilities to extend their knowledge in sciences. There are many types of competitions, the International Conference of Young Scientists (ICYS) is a special type of individual competition, in physics, mathematics, computer science and ecology for up to 20 years-old students. Every participant has to prepare a research report on a subject chosen by herself/himself from any part of the above mentioned sciences. The language of these ten-minute reports is English and an international jury evaluates and rewards the presentations.

Every year generally 60-70 lectures are delivered in 4 section on the Conference. This kind of competitions has



importance in teaching the students:

- to do research work,
- to present and discuss their own results,
- to formulate research reports,
- to give presentation in foreign languages

The subjects of the presentations must be connected with any topic of physics, Mathematics, Computer Science, Environmental science and Life Science (ICYS Regulations and official website).

The first ICYS was in Visegrad in 1994. Then 70 lectures were presented by students from 5 countries. In 1996 the number of participants increased, 86 lecturers from 9 countries gave their lectures. The Conference has a good reputation not only in the Middle European countries, but outside Europe too and now more than 30 countries participate in ICYS every year.

AYIMI has participated in ICYS from 2010 and Iran teams are selected in IRCYS each year.



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