



Influence of IYPT on participating students

Comparing to most other science competition, IYPT has a rich cycle every year. In September, when students in most countries arrive to schools after main holidays, selection of competition problems is already published. During October to December, in many cases preparation meetings and seminars are organized, where interested students have the opportunity to listen to lectures and discuss the understanding of the problems and possible solutions not only with lecturers and tutors, but also with colleagues from other teams.

In early spring, different selection competition rounds are organized in different countries, from simple presentation of solutions by individual students, through IYPT-like fights with limited number of problems up to full IYPT competitions in regions. Most countries run a national competition with full set of IYPT problems and rules in late spring or early summer, to select a national team of students to represent the country in regional and the worldwide IYPT competition.

Such a cycle is pretty similar not only to a life-cycle of a research problem, but in a more general sense to any project oriented task in any sphere of life. Problems appearing in IYPT are general and open; they do not have a closed and well defined solution. Whereas it is very easy to judge about a clearly wrong solution, it is extremely hard (if not impossible) to order in quality any set of “good” solutions.

At the very beginning, students do have to balance their effort between the number of problems they deal with and the quality of solutions. Neither is the best strategy to perfectly solve one or two problems, nor it is to try to solve all the problems (and fail due to lack of time and energy to finalize anything). In this stage a well balanced teamwork is the key to success – different roles have to be fulfilled during the preparation stage, from gathering information, performing experiments, solving mathematically hard problems to preparing presentations.

Many students new to IYPT learn their lessons from not being able to sell results of their research. Even with a nice and correct solution they might end up with low evaluation, if they were not able to explain it clearly enough in the limited time given.

During the final stages of the competition, students meet the best colleagues of their age from

their country and abroad. The benefits and assets for students can be summarized as follows:

Team work

The character of the activities and assigned tasks requires intensive team cooperation. Already during preparation of the solutions, several students often have to cooperate on conducting experiments. Each of them has talent for a specific activity: some devote themselves to experimental work, others elaborate upon theory or gather and consult acquired information and observations. During the competition itself, each student has his role in the team – some are very good at presenting prepared solutions, others excel in discussions and assessments of other teams' presentations.

Work similar to a work of professional scientist

Distinct from many other scientific competitions for young people which are based on solving the assigned tasks and exercises on a short-term basis, in IYPT students have to work on the tasks for several months. This course of work precisely corresponds with the real method followed by a scientist - from defining and understanding the problem, through gathering information, studying theory, suggesting and performing an experiment up to preparing and giving a presentation. The discussion about the presentation, which is probably the most important aspect of IYPT, will teach young people how to give arguments as well as admit their mistakes and accept their colleagues' suggestions for improvement.

Cooperation with scientists

Finding an effective solution to the problems requires the students and their teachers to make use of contacts, meetings and consultations with scientists. Mere information gathering (which is nowadays done very easily and effectively by means of the internet) is far from enough for finding a proper solution to a problem. Only consultations with people who really understand the theory and can explain it to a secondary school student lead to a full understanding of the problem to such an extent that the student is able to present the solution to his colleagues and an expert jury. A separate issue is access to laboratories. Secondary schools often provide very limited possibilities for conducting experiments. Solving the assigned tasks on level expected on international competition, however, requires conducting experiments at a very high level, which, again, requires good cooperation with universities and research institutes.

National and international contacts and a comparison

Experience shows that in many cases, students (and teachers) achieving excellent results appear at secondary schools that are not ranked as the best region-wide or national-wide. IYPT provides an

excellent way to motivate them for further work. And if their team succeeds and works its way to an international competition, students, teachers as well as the school itself win enormous prestige.

Scientific problem solving

All students conducting research into IYPT problems learn to solve those problems with the application of scientific methods and tools. These problem solving skills are not limited to IYPT and transfer to students' everyday problem solving, including social or personal problems.

Increased enjoyment in physics and hard sciences

Most students who conduct IYPT research will not take part in the competition itself. Nevertheless, the change of the method of teaching can make great differences in their enjoyment and understanding of the subject. Instead of sitting on a class or in a lab and solving boring artificial problems, they will have to make own research, work with their classmates, search for information, consult the teacher or other scientists etc.

In Slovakia, we try to keep contact with students representing the country in IYPT since about 1998. We are tracing their careers and interviewing some of them to get further information both about facts (as what they are doing and how good they are in their positions) as well as about impressions (as how do they judge their investment of time and energy into IYPT after years).

First of all one might conclude that most of successful IYPT students start a successful career whatever they are doing. Not all former IYPT participants stayed in academia after finishing their studies. But most of them became very successful in the career path their chose – investment banker in London city, lawyer in international affairs acting for government in international arbitrage, founder of several successful start-ups obtaining the prize for best young entrepreneur in Slovakia etc. Former IYPT participants working in science do also belong to the elite in the field – they became laureates of prestigious prizes (e.g. member of the best research group in Slovakia) and stipends.

An important aspect is also the fact that IYPT is by many former participants considered as an important piece of both their education and life experience. This is doubtless conditioned by the fact that they have had to invest so much effort into the competition that it become an important part of their lives at least for a couple of months. A few weeks before each round of the competition they woke up and went to sleep with thoughts devoted to IYPT problems. They learned and experienced how to work with passion and that this is actually the only way to achieve the best results. Indeed, what else as a passion could it be that brings someone to throw a coin for 10000 times just to see that it is unbiased?

However IYPT is also for many of the former participants connected with gain of another

experience – that the life is simply unfair. Hours in laboratory became wasted if the specific problem was not challenged by the opponent. A beautiful solution was criticized hard by an assertive opponent and then badly judged by an imperfect (at least from the point of the student) jury. Curiously, after years specifically this experience is perceived as very important by the former participants. As any defeat in IYPT, whatever harmful and sad, was still only a part of a game without any further consequences.

I would like to conclude with a thought of a member of the IYPT 2001 winning team from Slovakia: It was completely crazy, but I am so glad I was there...