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О КОНКУРСНЫХ МЕРОПРИЯТИЯХ ДЛЯ УЧАЩИХСЯ СРЕДНИХ ОБЩЕОБРАЗОВАТЕЛЬНЫХ УЧЕБНЫХ ЗАВЕДЕНИЙ

ABOUT COMPETITIVE EVENTS FOR STUDENTS OF SECONDARY EDUCATIONAL INSTITUTIONS

*Davidenko Andrey, dr. (habil.), prof.,
Chernigov Regional Institute of Postgraduate
Pedagogical Education named after
K. D. Ushinsky, Chernigov, Ukraine,
<https://orcid.org/0000-0003-1542-8475>
davidenko_an@ukr.net*

Rezumat. *Articolul este consacrat problemei organizării de evenimente competitive pentru studenții instituțiilor de învățământ secundar. Pare evident că primul pas ar trebui să fie pregătirea elevilor pentru competiții, dar uneori acest lucru este uitat și competițiile sunt grăbite. Concurența este de dragul concurenței. Autorul se confruntă cu această problemă de mult timp. A efectuat cercetări științifice relevante. Odată puse în practică, produc rezultate tangibile. Articolul va fi de interes pentru organizatorii procesului educațional la discipline naturale și matematice, profesori și lideri de cerc.*

Cuvinte-cheie: *competiție, dezvoltarea abilităților, abilitate de cercetare, creativitate.*

Abstract. *The article is devoted to the problem of holding competitive events for students of secondary educational institutions. It seems obvious that the first step should be to prepare students for competitions, but sometimes this is forgotten and competitions are rushed. Competition is for the sake of competition. The author has been dealing with this problem for a long time. He has carried out relevant scientific research. Once put into practice, they produce tangible results. The article will be of interest to organizers of the educational process in natural and mathematical subjects, teachers and circle leaders.*

Keywords: *competition, ability development, research ability, creativity.*

Introduction

The process of teaching natural and technical disciplines is always accompanied by mass extracurricular events of a competitive nature for students. The scale of their implementation is very different: from those held within the educational institution to international.

Some of them, for example, olympiads and individual competitions, have become mandatory, although according to the documents they should be held on a voluntary basis.

20-30 years ago, commercial competitions began to be actively held: "Kenguru", "Kolosok", "Bober" and the like. In recent years, participation in them has been significantly simplified due to the introduction of information and communication technologies into pedagogical practice. Without leaving home, the child receives an electronic version of the certificate, which allows his teacher to report for "organizing work with gifted students."

International competitions have appeared, in the organization of which serious higher educational institutions and industrial corporations take part. Some are interested in getting a good applicant, while others are interested in a specialist capable of a certain type of activity. An example

of this is the International Intel Tehno and Intel Eko competition. In Ukraine, their national stage is held on the basis of the National Technical University KPI.

As practice shows, students are prepared for participation in competitions in different ways. Some educational institutions offer additional classes for potential competition participants. In others, they are limited to one-time consultations... At the same time, it is not always taken into account that extracurricular work with schoolchildren, the results of which are summed up by competitive events, has significant potential not only for their in-depth education, but also for the development of their inclinations for research and creative activities in appropriate capabilities. One more thing. Are competitions just for the sake of competitions or are they summing up the performance of certain work by students and their teachers? Our article is devoted to this problem.

Results and discussion

What do modern competitive events for students have in common? How are they different from regular olympiads? Isn't this simply an increase in the number of events held to demonstrate the development of education? What is more important: winning the competition or preparing for it? Or both?

However, first of all, why did the author take it upon himself to discuss this problem? While studying at school, I took part in regional and regional physics olympiads. Since 1988, I have been a member of the jury of the All-Ukrainian Olympiad for Young Physicists. Since 1990 - chairman of the jury of the regional olympiad for young physicists. In 1998, on my initiative, the All-Ukrainian Tournament of Young Inventors and Innovators was established. This was the introduction into teaching practice of the research results from my doctoral dissertation (habilitat). I immediately became the chairman of his jury. Tournaments are held annually. At the moment, 23 tournaments have already been held. A few years later, on my own initiative, the All-Ukrainian competition of young researchers and inventors "Edisons of the 21st Century" (for students in grades 5-9) was created. At the same time, I am a member of the jury of the National stage of the International Intel Tehno Competition. That is, these mass competitive events have been familiar to me since my school years. For subsequent analysis, it is important not only to understand the mechanism of their organization and implementation, but also the stages of preparing tasks for them, developing criteria for evaluating completed work, as well as the process of preparing schoolchildren for participation in them.

It seems to me that if we add to the mass extracurricular events listed above the All-Ukrainian and International Tournaments of Young Physicists, All-Ukrainian Tournaments of Young Mathematicians, Computer Scientists, Geographers, Historians, Chemists, Biologists, Journalists, as well as national competitions of individual countries, for example, the Competition of Young Inventors, which is held within the framework of the International Salon of Inventors and Commercial Entrepreneurship (Republic of Moldova), then this will also be sufficient to analyze the problem raised. If we can do without details, then for simplicity of presentation we will call all the listed events the generalized word *competition*.

I would like to immediately draw your attention to the difference between subject olympiads and all other competitive events. Olympiad assignments contain tasks that are used in the educational process. Their content does not go beyond the topics of the curriculum. They differ from those that are solved in class and used as homework only in their increased complexity. In order to successfully perform at an olympiad, for example, in physics, you need good knowledge of this academic subject, a good command of mathematics and certain practical skills in solving such problems. Sometimes the thought creeps in that it is not as important to master physics as mathematics. Understanding the phenomenon or process described in the problem statement will allow you to select the appropriate

formulas, and then everything depends on your mastery of the mathematical apparatus. The famous physics teacher Anatoly Izrailevich Shapiro (now deceased) has repeatedly said that at physics olympiads we often invite students to solve mathematical problems on physical topics.

But what about various competitions?

First of all, we need to abandon the existing practice, which can be described in several theses. Competition is for the sake of competition. Knowledge to create a technical device (an exhibition exhibit) is not always needed. The olympics are for the head, but for the competition the hands are enough. This can be continued, but let's not rush...

Let us turn to what we have a right to expect from what we call the educational process at school. The answer is simple - the educational process involves teaching, that is, transferring knowledge to students in certain subjects (astronomy, physics, chemistry, etc.). It has always been this way.

What if we replace the phrase *educational process* with the phrase *educational formational process*? The synonyms of the word *form* are *shape, create...* *Educational formational*, in this case, should be understood as *shaping, creating...* Isn't that correct? As we can see, the phrase *educational formational process* encompasses a wider range of activities, which can involve the student.

However, without claiming the right to participate in the discussion of issues of pedagogical theory, I will descend to the psychology of the development of the child's inherited inclinations for a certain type of activity into the corresponding abilities. If we keep in mind the subjects of the natural and mathematical cycle, then, first of all, we need to talk about the development of research and creative abilities. This is simultaneously with the acquisition of new knowledge.

It should be borne in mind that research activity consists of a comprehensive study by a person of a certain phenomenon or process, during which new knowledge appears (a discovery is made). Creative activity consists of creating a new ideal or material product. For example, a Phillips head screwdriver, a new measuring instrument, a new type of ladder, etc. Here something that has not yet existed is created. And in the course of research work, a person discovers something that already existed and was not known. For example, a person discovered that dew drops "burn" holes in the leaves of plants (fig. 1). And the picture (fig. 2) shows the washer that Grover invented.

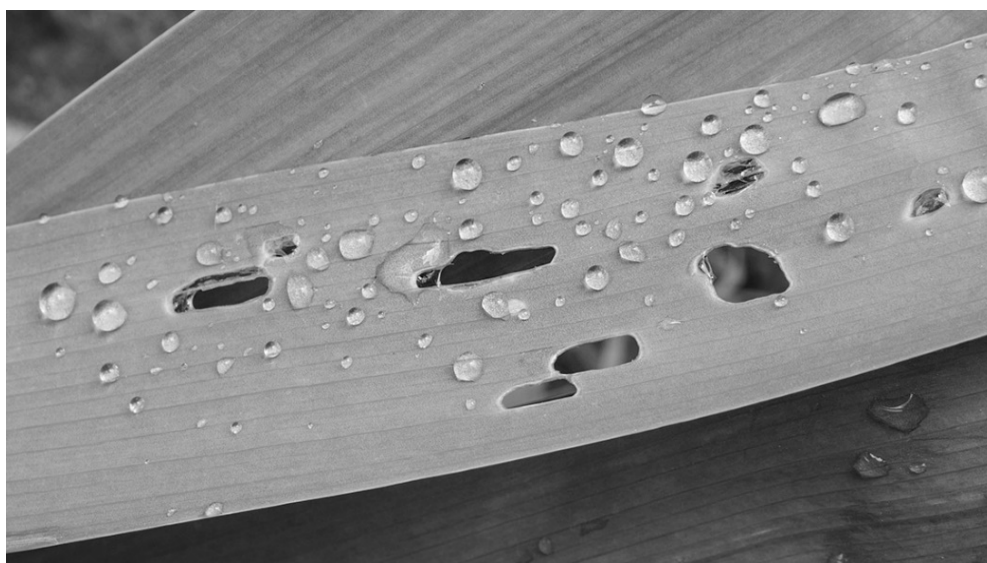


Fig. 1. The effect of dew drops on plant leaves

If we return to the educational process in natural and mathematical disciplines, we should pay attention to the concepts of objective and subjective novelty. Even V. G. Razumovsky noted that for the development, for example, of creative abilities, the fact that a student makes a discovery of a long-known phenomenon, or creates an already existing technical device, does not have any significance [8, P.38]. Let the student develop his abilities to discover and create. And, as the research of the author of the article shows, a child is sometimes even pleased that he has discovered what famous scientists have already done before him. This creates positive motivation for his further activities, convinces him that he is capable of what Great Minds have done. It is very important!

But now we will return directly to the competitions. Participation in them will allow the child to demonstrate the level of development of his research and creative abilities. Here, however, we must agree that only those objects that have objective novelty should be submitted to competitions.

Sometimes teachers allow their students to submit already known discoveries or technical devices to the competition. This indicates their lack of understanding of the essence of research or creative activity. As it turns out later, they identify it with cognitive activity and these mislead their students. We, of course, have no right to expect serious discoveries from students, but we should accept with pleasure that he, for example, paid attention to the distribution of light brightness in different parts of the sky during a rainbow (fig. 1).



Fig. 2. Grover's washer

The same can be said regarding creativity. We should, for example, positively evaluate a child's proposal to combine an exercise bike with an electric generator. Such a simulator will not only contribute to the physical development of a person, but will also produce electricity. This example is taken from the author's real teaching practice and has been used in gyms for more than ten years.

How and when to develop these abilities in schoolchildren? Always! In lessons and in extracurricular work with them. On excursions, during hiking trips... This activity should not be separated from ordinary activities aimed at gaining new knowledge. On the contrary, it is necessary to strive for them to gain knowledge through their own research activities. Research laboratory work is suitable for this like nothing else.

The same can be said regarding creative activity. Ideas for improving existing things, as well as creating new ones, can appear at any time. If in a lesson, then students must be involved in

preparing and conducting a physical experiment or equipment for it. My students, for example, suggested placing a millimeter scale on the dynamometer scale, which simplified one of the laboratory tasks (fig. 3).

In the methodological literature you can find already formulated tasks for students' research activities [1, 2, 3, 4, 5, 8]. All of them are adapted to the development level of students in secondary

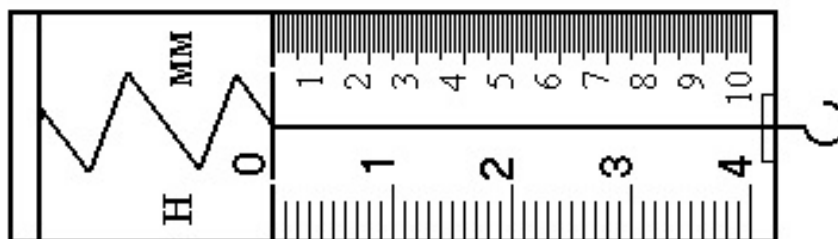


Fig. 3. Dynamometer with additional scale

general education institutions, that is, they do not require special knowledge to complete them. In many cases, their formulations contain analogs or prototypes of potential inventions. There are problems with solutions or hints for them [3]. However, the main thing is that the student will be able to propose a completely different solution, and also that based on the analysis of the text, the conditions of a certain problem or its solution, ideas for new problems may arise.

It should be noted that the solution to any research or creative problem can be easily presented in the form of a completed educational project, thereby implementing the research or creative components of STEM [4].

With this approach to the educational process, we have not just the opportunity, but the need to participate in various competitions. Students will be required to demonstrate their level of achievement in developing research and creative abilities. Our task will be to organize relevant competitions.

It is interesting to note that, much to our surprise, there are not many manuals that would allow organizing a beautiful, educational competition [2, 3, 5, 6, 7]. But, even more interesting is that with a small number of such manuals, one of them was written by first-year students of the Karazin Kharkiv State University [2]. It has everything: preparation for participation in the tournament, choice of report tactics, how to behave in controversy, etc.

We feel the need to establish the International Competition for Young Researchers and Inventors "Edisons of the 21st Century". We have already developed the Regulations for this competition and the criteria for evaluating the works of participants. The tasks for the first competition are ready. The work on forming the organizing committee, jury, and so forth continues.

Based on the above, the following **conclusions** can be drawn.

Competitions and olympiads have significant differences.

Completing tasks in subject olympiads requires students to have knowledge and the ability to apply it to solve problems similar to those used in the educational process.

Competition participants present the results of their research and creative activities for evaluation by the jury.

To prepare for participation in competitions, teachers need to work hard to develop the research and creative abilities of students. Competitions should be held when the results of this work appear.

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