

CREATION OF MULTIMEDIA DIDACTICAL TOOLS FOR THE DEVELOPMENT OF STUDENTS' RESEARCH ABILITIES

Pavel DAVIDENKO, senior lecturer

<https://orcid.org/0000-0003-0680-8302>

K.D. Ushinskyi Chernihiv Regional Institute of Postgraduate Pedagogical Education

Abstract. The article is devoted to the problem of creating multimedia didactic tools for organizing training sessions to develop students' research abilities. The author is interested in photography and video shooting. Together with Andrey Davidenko, they created a large collection of such funds. This article draws attention to the advisability of using them both in lessons and in extracurricular work in physics. An idea is expressed regarding the involvement of students in the activities of creating multimedia.

Keywords: training, development, research abilities, multimedia didactic tools.

Rezumat. Articolul este consacrat problemei creării de instrumente didactice multimedia pentru organizarea de sesiuni de formare pentru dezvoltarea abilităților de cercetare ale studenților. Autorul este interesat de fotografie și filmări video. Împreună cu Andrey Davidenko, au creat o colecție mare de astfel de fonduri. Acest articol atrage atenția asupra oportunității utilizării lor atât la lecții, cât și la lucrările extracurriculare de fizică. Se exprimă o idee cu privire la implicarea elevilor în activitățile de creare multimedia.

Cuvinte cheie: formare, dezvoltare, abilități de cercetare, instrumente didactice multimedia.

Developing students' research abilities is one of the main tasks of a modern school. All science is based on research. Therefore, it is not surprising that attention is paid to this issue in STEM education [2]. The need to develop research abilities in students is also emphasized in the physics curricula of Ukrainian [6] and Moldavian [7] schools. And we already have experience in implementing these programs. For example, physics textbooks for students in the Republic of Moldova contain instructions for performing research laboratory work [1]. And in the methodological manual “Proiecte STEM/STEAM la fizica. Ghid methodic”, published in 2022 [2] contains specific proposals for students to carry out research projects.

The process of learning and human development necessarily includes its content, didactic means, methods and organizational forms of working with students. We will try to consider only the tools used, in particular, multimedia didactic tools that allow us to solve the problem of developing the research abilities of schoolchildren. Especially in the first stages of working with them. Although, as is known, this cannot be implemented “in its pure form,” that is, without the applied methods and organizational forms of working with them. As well as without affecting the content of the concepts of research and human research abilities.

It should be noted that the problem of creating multimedia didactic tools has already been considered in a number of publications, in particular in articles by Andrey Davidenko and Evgeniy Korshak [3, 4, 5] and other authors. However, our article will focus specifically on the independent creation of such multimedia didactic tools that can be used in classes to develop the research abilities of schoolchildren. For this we have digital cameras. In most cases, you can use cameras that are built into smartphones. They have sensors and optics that allow you to obtain high-quality images of certain moments of physical phenomena and processes. Learning to take photographs is not difficult. However, in order to receive the materials necessary for the development of students' research abilities, this is not enough.



Figure 1. Unusual placement of snow on a tree branch

First of all, you need to learn to see the unusual in the ordinary. For example, the first image (figure 1) shows an unusual placement of snow. Why not be surprised by this and formulate a problem for further reasoning that can lead to certain conclusions, which is how each specific study ends?

The next photo (figure 2) shows the most interesting phenomenon of the formation of dew drops on the grass. The photo is taken from the archive of Andrey Davidenko. It was made on reversible color film, and then, by scanning and subsequent processing, turned into an electronic version. This, of course, led to a decrease in its quality, but, as happens in real studies, it allows us to draw certain conclusions. It should be noted that first the steam condenses at the top of the blade of grass, and then, after reaching a certain size, the droplets flow down. Doesn't there be a question about what we see? Isn't this enough to warrant serious research?



Figure 2. Formation of dew drops on a blade of grass

It is much easier for a young researcher to understand the reasons for the formation of holes on a plant leaf (figure 3). This is the work of drop lenses. The holes in the leaves were created by focused sunlight.

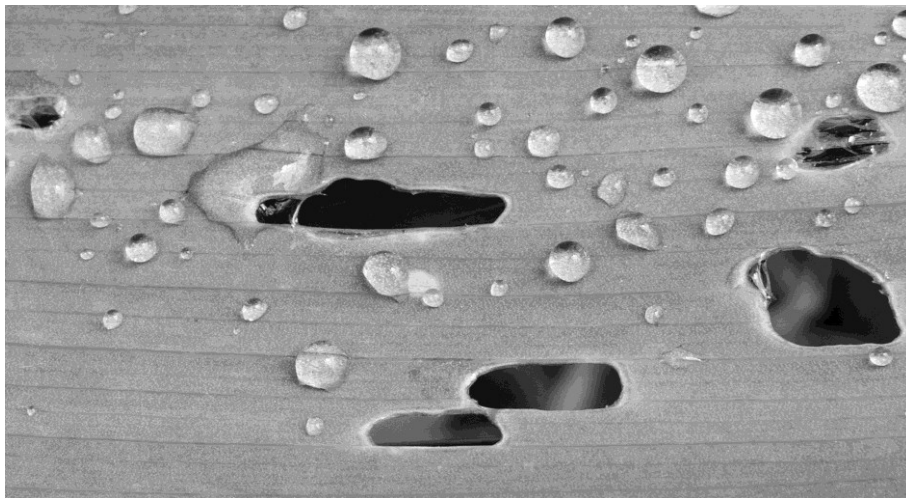


Figure 3. The result of the action of drop lenses

Multimedia didactic tools in the form of photographs of interesting moments of physical phenomena can be used both in lessons and in extracurricular activities. And, as you can see, they can become the basis for serious research activities. Its results can be reflected in descriptions of student projects, as well as in the texts of works that must be submitted to participate in serious competitions for young researchers.

Our pedagogical experience has shown that it is advisable to involve the students themselves in the process of creating the multimedia teaching tools described above. By

receiving interesting photographs, they themselves determine the subject of their future research, which is much more valuable than using ready-made materials made by us. And this reflects the actual research process. After all, the researcher independently finds the appropriate topic and “comes” with it to science. As the research progresses, he independently creates various conditions for conducting the experiment, which will allow him to draw certain conclusions.

The competitions held at school for images produced by students have proven themselves to be quite good. In our country, they logically fit into the All-Ukrainian competitions for young researchers and inventors “Edisons of the 21st Century”.

As we see, we are already moving on to the creative activities of schoolchildren. This will be discussed more broadly in the author's subsequent articles.

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