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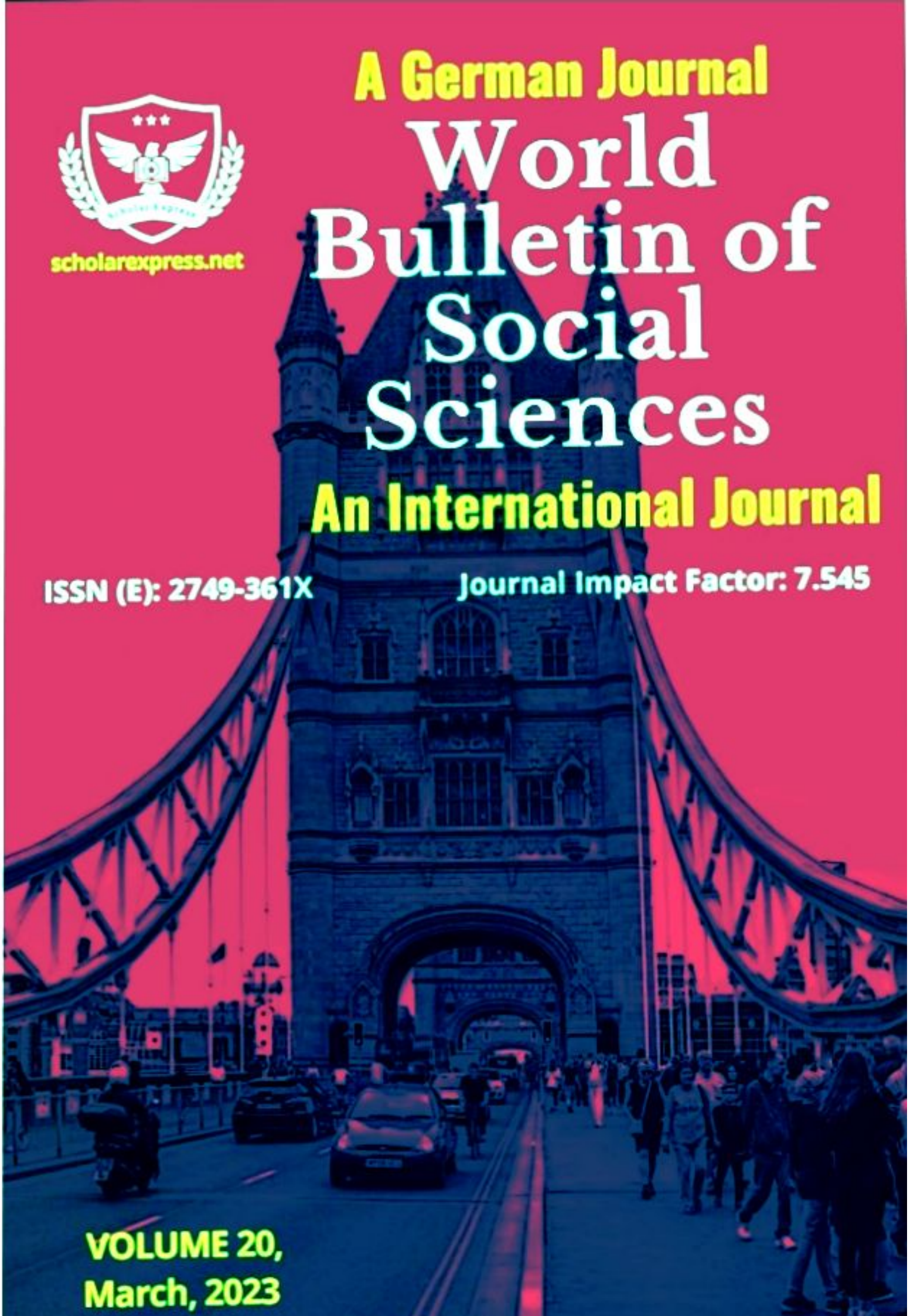

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# DEVELOPMENT OF STUDENTS' COMPETENCE IN WORKING WITH INFORMATION IN PHYSICS LESSONS.

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**Abstract:**

In this article, information is reflected on the issues of developing students' competence in working with information in physics classes, performing laboratory exercises using various software tools, multimedia devices.

**Keywords:** ability to assess the truth of information, information competence, communicative competence, development of competence to work with information, condenser, capacity, charge, voltage.

Using a computer as an effective tool in teaching physics significantly expands the possibilities of pedagogical technologies. Personal computer encyclopedias, interactive courses, various programs, virtual experiments and multimedia laboratory works increase students' interest in learning physics.

The pedagogical necessity of developing the competence of working with information in students is that the general essence of the process of formation of basic competences is that working with information is a priority in the process of formation and development of competences related to basic and science:

1) Working with information in the process of forming communicative competence:
   - assimilation of necessary information for entering into communication processes and its development;
   - while learning information about physics from information sources, being able to describe them in our daily life.
2) Working with information in the process of forming the competence of working with information:
   - getting the necessary information about physics from sources, being able to transfer information to different forms (graphic, text, table, scheme, etc.);
   - to be able to transfer information from one type of statistical data presentation (bar, line and pie charts, tables, schemes, drawings) to another presentation.

Information competence "the ability to act in the flow of information; the ability to search for information and obtain it, use reasonable methods of changing, systematizing and storing information; the ability to actualize it in the necessary situations of intellectual and cognitive activity; the ability to critically evaluate the received information; computer literacy, new to have information and multimedia technologies (electronic educational resources); the ability to use reasonable search methods, information selection, systematization and their use, educational profile and use of methodological and scientific literature on related issues.

As we all know, physics laboratories in all schools in our republic do not have sufficient material and technical base to fully perform these laboratory works. But we must not allow the quality of education to decrease and try to make the lesson achieve its goal. In such cases, the teaching of information technology can be used to improve the quality of the lesson. Examples of such resources include programs such as "Physics at school", "Physics virtual laboratory", "Physics application". Among these programs, the "Physics at school" program has a convenient interface and a wide database. The founder of the program is Vladimir Vascak, a teacher of physics and mathematics from the Czech Republic, who launched the program on August 26, 2019. In the "Physics at school" software, there are animated questions related to all sections of the school physics course, including 51 questions related to the "Electricity and magnetism" section.

Students can be explained clearly and easily by using this software in teaching electrical department. The topic "Electric capacitor" in the 8th grade physics curriculum can be revealed through section 5, item 5 of the "Physics at school" software tool.

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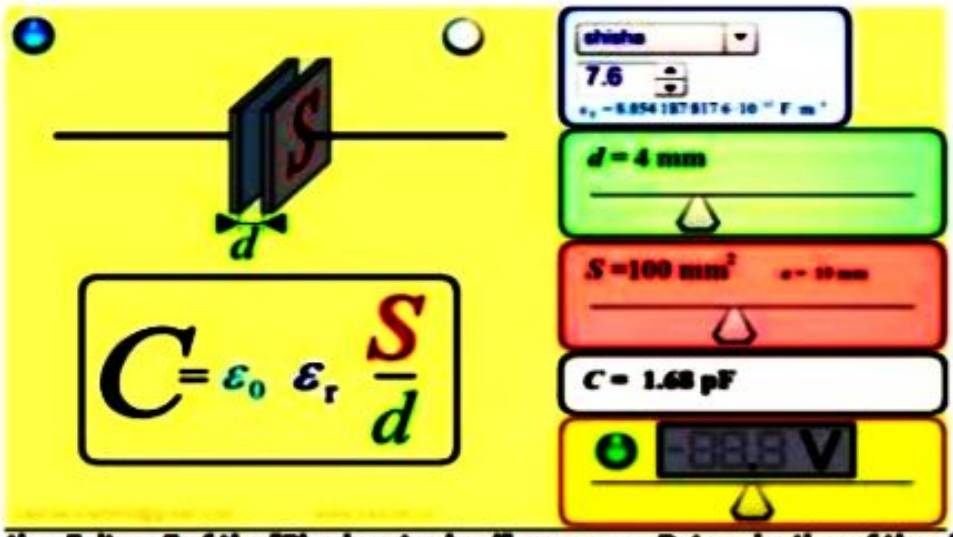


**Figure 1. a) Section 5, item 5 of the "Physics at school" program - Determination of the electric capacity of a flat capacitor.**

Figure 1. In paragraph a), the capacitance was found using the formula of the electric capacity of a flat capacitor, the distance d between the capacitor plates and the value of the surface of the capacitor plates S. The problem is given from the table in the picture.

| Given | Formula | Solving |
|---|---|---|
| d=4 mm<br>S=100 mm²<br>$\varepsilon_0$=8,85×10⁻¹² Fm⁻¹<br>ε=7,6<br>C=? | $C = \frac{\varepsilon\varepsilon_0 S}{d}$ | $C = \frac{7{,}6 \cdot 8{,}85 \cdot 10^{-12}\ F\,m^{-1} \cdot 100\ mm^2}{4\ mm}$<br>$= 16{,}8 \cdot 10^{-13} = 16{,}8\ pF$ |

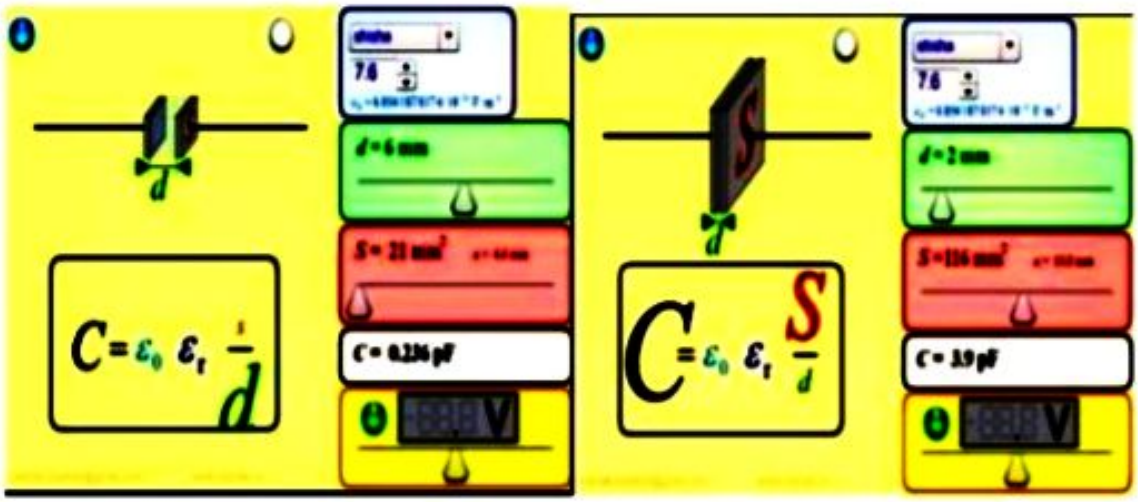


**Figure 1. b) Section 5, paragraph 5 of the "Physics at school" program - Determination of the electric capacity of a flat condenser.**

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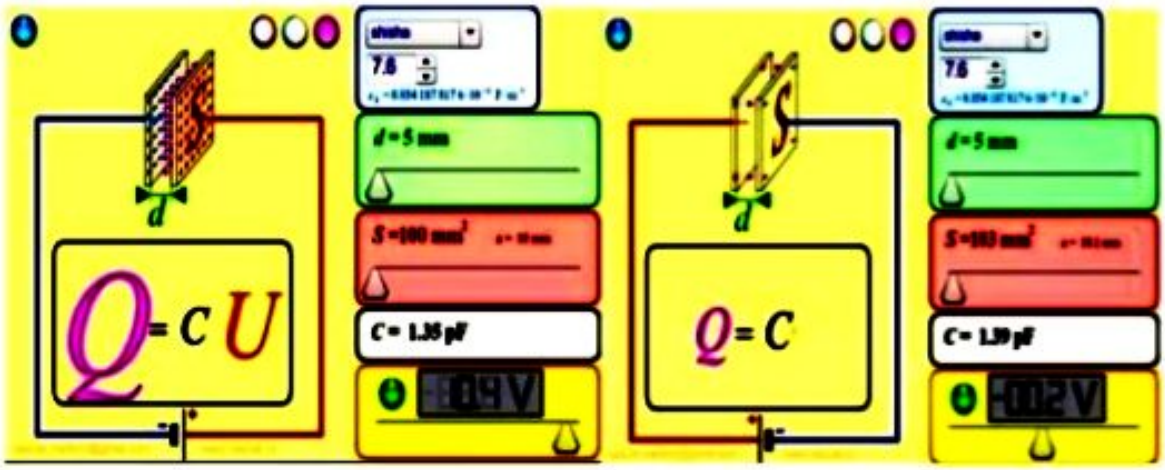
Figure 1. In paragraph b), the capacitance is found by using the formula for the electric capacity of a flat capacitor, increasing the value of the distance d between the capacitor plates and decreasing the value of the surface of the capacitor plates. It can be seen that the capacity of the flat capacitor decreases. On the contrary, it can be seen that the distance between the plates decreases the value of d, the surface of the plates increases the value of S, and the capacity of the capacitor increases.




**2-figure. Section 5, item 5 of the "Physics at school" program - Determining the electric charge of a flat capacitor.**

Figure 2 shows the dependence of the flat capacitor charge on the voltage. It can be seen that when the value of the capacitor voltage is increased, the capacity decreases, and when the voltage is decreased, the capacity increases.

In the teaching of physics, teaching using ready-made models in electronic textbooks is appropriate. However, in order to strengthen the topic, the student should find answers to the questions on the topic and fill in the following table so that he is not only related to the information system.

| № | Question | Objects compared | | |
|---|---|---|---|---|
| | | Capacity | Tension | Charge |
| 1 | Is it a vector or a scalar physical quantity? | | | |
| 2 | What does this physical quantity describe? | | | |
| 3 | How is this physical quantity defined? | | | |
| 4 | In what unit is this physical quantity measured? | | | |
| 5 | The relationship between these physical quantities? | | | |

If it is not possible to perform some laboratory exercises in the teaching of physics, they will get full information about laboratory exercises through virtual laboratory exercises using information competence. Computer simulation of physical processes in laboratory training allows to successfully solve the problems of professional education. In modern conditions, with high computerization of universities,

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any virtual physical processes can be carried out without using an expensive experimental base. The installation of multimedia laboratories allows not only to expand the time interval, but also to arbitrarily speed up or slow down physical processes, for example, in the laboratory "studying the movement of electrons in electrostatic fields", see in the picture that the movement of electrons is shown in a modeled way possible.

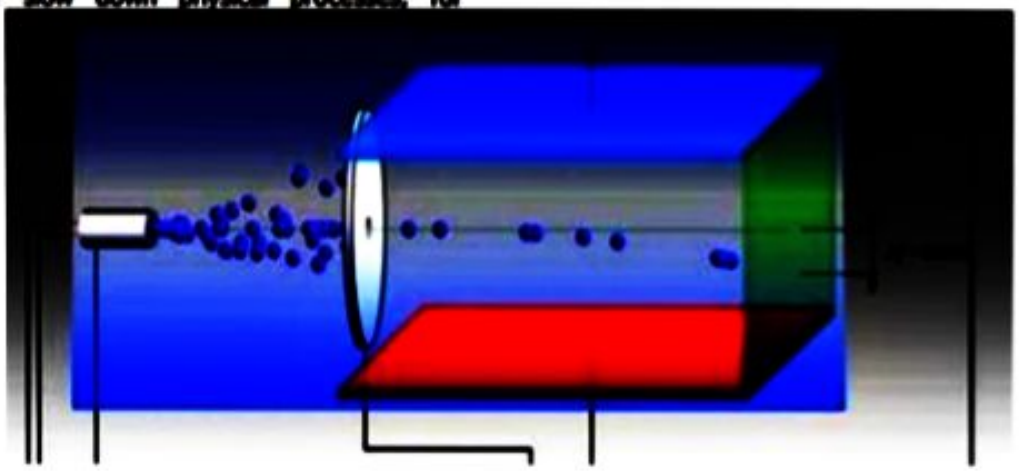

**Figure 3. "Study of the movement of electrons in electrostatic fields" is a multimedia device as a laboratory work.**

It is difficult for students to imagine the movement of an electron in an electrostatic field. In this multimedia lab, the student can learn and visualize the acceleration and deceleration of electrons in an electrostatic field.

Completion of laboratory and calculation-graphic work with the help of a computer, firstly, helps students to master the essence of the considered process, phenomenon or law; secondly, it forms in the mind of the student the concept that physics is the basis of natural science on which technical sciences are based; thirdly, it saves time in calculations; fourthly, it improves the skills of communicating with computer technology, in particular, of acquiring the skills of graphing the functional relationships of several quantities, and fifthly, it helps to deepen the mastery of physical material, to strengthen physical knowledge in general, and to develop physical thinking.

So, in the development of basic competencies in physics lessons, students' basic competencies are formed and developed in the context of working with information.

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