IMPORTANCE OF MODERN EDUCATIONAL TECHNOLOGIES IN TEACHING PHYSICS IN PART OF "ELECTRICITY AND MAGNETISM"

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Abstract. *This article reveals the importance of modern educational technologies in improving the quality of education, and the methodology of using STEAM-based educational technology in developing physical knowledge of students is developed.*

Keywords: *interdisciplinary integration, technology, method, STEAM education, electromagnetism, circuit, magnet, magnetic flux, magnetic induction, induction Electric power.*

Physics is the foundation of technical and technological development. The teaching of physics, like all subjects, is constantly improving. The complexity of the science and its large-scale informativeness, the application of modern educational methods and technologies to physics education remains an urgent scientific and methodical problem.

The "Electricity and Magnetism" part of physics is relatively complex and the scope of knowledge and information to be studied is large, so it requires to be studied in a relatively short time on the basis of various methods and methodologies [2.207-211]. That's why in this article, we aimed to study the main processes and events of the module through innovative methods.

It is no secret that in order to achieve great achievements in many fields of science, integration of knowledge from different fields is required.

STEAM technology helps to solve exactly such problems. This method allows to conduct education in a mixed way and to form the skills of applying the acquired theoretical knowledge in everyday life.

Acquiring information, processing and using it in practice is the basis of the STEAM education program. Based on STEAM educational technology design method, it is based on knowledge and creative (and artistic) research. Such a search is carried out in the course of practical activity, in the course of practical activity, in the process of acquiring knowledge, and then reusing it in practice, that is, in research works on acquiring knowledge using the elements of technical creativity, creating constructions in games. STEAM education directly connects the development of students with the outside world.

These directions are the most popular system in the modern world. Therefore, today the STEAM system is developing as one of the main trends. STEAM education is based on the application of a practical approach and the integration of all five areas into a single educational system. [3.67-69.] STEAM technology was developed in America. Some schools take into account the talents of their graduates and integrate subjects such as science, technology, engineering and mathematics, and this is how the STEM system was formed. (Science, Technology, Engineering and Mathematics). Later, Art was added here, and now STEAM was finally formed. Teachers believe that knowledge of these subjects, or more precisely, these subjects, will help students become highly qualified specialists in the future.

In many countries, STEAM education is a priority for several reasons: in the near future, the demand for engineers and high-tech production specialists will be very high in the world, and therefore in Uzbekistan.

In the far future, we will have professions related to technology and high-tech manufacturing together with the natural sciences, especially bio and nanotechnology specialists. Professionals will need extensive training and experience from various fields of technology, natural sciences, and engineering.

Advantages of STEAM education Integrating education by "subjects" rather than academic subjects Application of scientific and technical knowledge in real life Development of critical thinking skills and problem solving; active communication and teamwork; increase in self-confidence; development of interests in technical sciences; creative and innovative approach to projects; a bridge between education and career; preparing students for a technologically innovative life.

The "Electricity and Magnetism" partof physics is relatively complex and the scope of knowledge and information to be studied is large, so it requires to be studied in a relatively short time on the basis of various methods and methodologies [7.163-166]. That's why in this article, we aimed to study the main processes and events of the module through innovative methods.

"Conductors in an electrostatic field" given in the Electricity and Magnetism module of General Physics. After explaining the topic *"Condensers"*, let's consider the method of using the STEAM assignment in order to determine the level of students' mastery of the topic

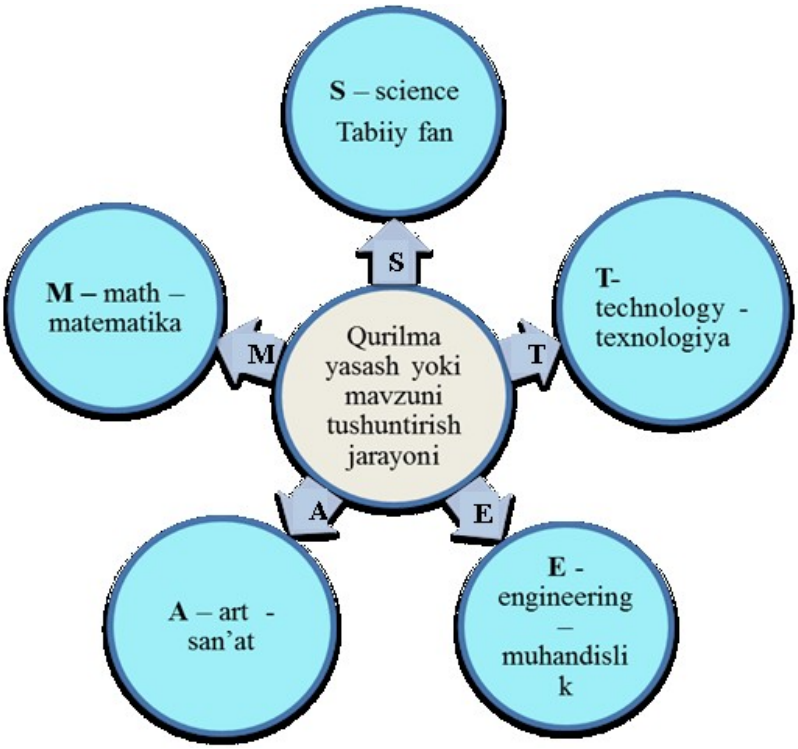

Figure 1. Model of STEAM technology

Each concept included in the "Natural Sciences" section should be related to the topic and based on these, the content of the question or device placed in the middle should be clarified. For example,

chain - represents the sequence of connecting devices to show a physical phenomenon;

coil - a conductor wound on a core;

conductor - a substance that conducts electric current well;

resistance - a quantity depending on the material, length, cross-sectional area of the conductor;

the amount of electricity needed to change the potential of a conductor by one unit is called electric capacity

By definition,

the electrical capacity of a conductor whose potential changes by one volt when the amount of electricity in the conductor changes by one coulomb is taken as [F] in one faraday,

the capacity of the ball depends on its size and the dielectric strength of the medium in which the ball is located;

devices that collect a large amount of electric charges are called capacitors;

a capacitor consists of two closely spaced conductors that are insulated from each other and collect equal amounts of oppositely charged charges

In the case of "Technology", it is necessary to show the assembly of the set of equipment needed to explain the phenomenon or make the device (Fig. 2).

And in the "engineering" part, it is revealed that it is possible to explain a physical phenomenon or make a device in various ways, with various devices. For example,

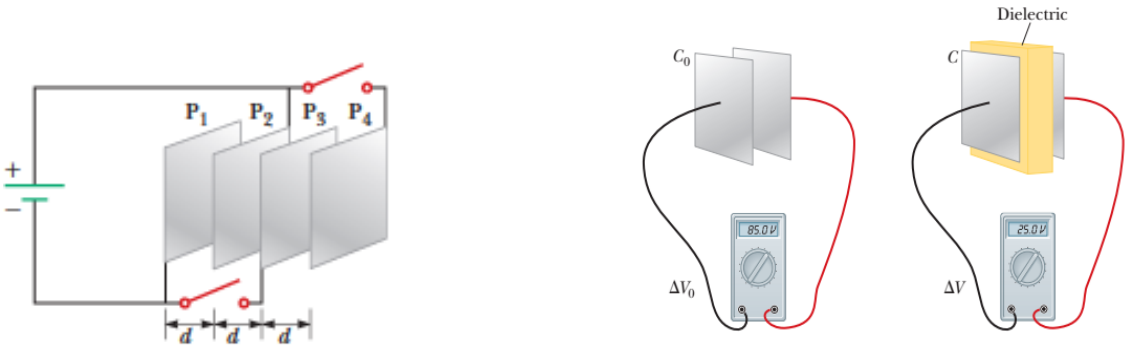

Figure 2. Parallel connection of flat capacitors

In "Capacitors" there are different types of capacitors, i.e. flat, spherical and cylindrical capacitors, which can store a large amount of charge when connected in series or parallel in a circuit. It is possible to develop an optimizing project or prototype through the possibility of creation and reconstruction

In "Art" section lies the mechanism for visualizing capacitors and their use and conductors in various forms corresponding to the given data.

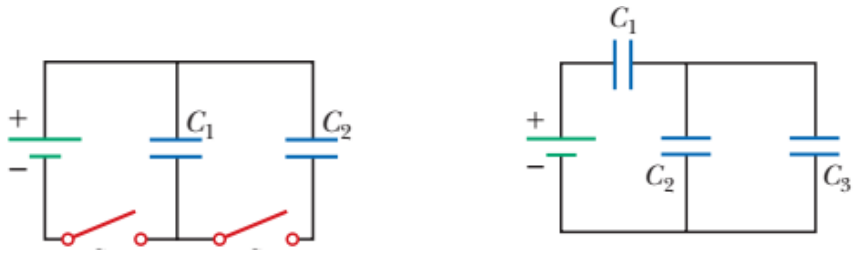

Figure 3. Electric circuit of the connection of capacitors.

On the page dedicated to "Mathematics", it is required to write the mathematical research carried out to achieve the set goal. For example,

The quantity measured by the ratio of the charge of the capacitor to the potential difference between its covers is called the capacity of the capacitor: C=q/Δφ

The electric field of charges is embodied in the space between the layers and is like the field of a point charge located in the center of a sphere. Therefore, the potential of coatings is expressed as follows:

$$\varphi_1 = \frac{q}{4\pi\varepsilon_0\varepsilon r} \qquad \varphi_2 = \frac{q}{4\pi\varepsilon_0\varepsilon R}$$

when the distance d between the spherical covers is very small compared to the radius of the spheres, the capacitance formula of the spherical capacitor coincides with the capacitance formula of the flat capacitor.

In parallel connection, the capacity of the battery of capacitors is equal to the sum of the capacities of individual capacitors. magnetic field induction:

$$C = C_1 + C_2 + C_3 + \cdots \ldots C_n = \sum_{k=1}^{n} C_k;$$

when capacitors are connected in series, all capacitors have the same charge

when capacitors are connected in series, the inverse of the capacity of the capacitor bank is equal to the sum of the inverse of the capacities of the capacitors taken separately.

$$\frac{q}{C} = \frac{1}{C_1} + \frac{1}{C_2} + \frac{1}{C_3} + \cdots \ldots \frac{1}{C_k} = \sum_{k=1}^{n} \frac{1}{C_k}$$

In conclusion, we can say that the STEAM approach is changing the way we approach learning and education. By focusing on practical skills, students develop willpower, creativity, flexibility, and learn to cooperate with others. These skills and knowledge constitute the main educational task, that is, it is the main goal of the educational system. STEAM helps students develop important characteristics and skills in learning.

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