USE OF GRAPHIC ORGANIZERS AND EVALUATION OF EFFICIENCY IN PHYSICS TEACHING

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Abstract: The article discusses the use of Venn diagrams in teaching physics lectures.In this case, the analysis of the properties of the electric and magnetic fields is explained on the basis of the Venn diagram and the efficiency coefficient is determined.

Key words: interactive methods, Venn diagram, electric and magnetic field, electromagnetic wave, confidence interval, average value, efficiency coefficient.

FIZIKA O‘QITISHDA GRAFIKLI ORGANAYZERLARDAN FOYDALANISH VA SAMARADORLIGINI BAHOLASH

Annotasiya: Maqolada fizikadan ma’ruza mashg‘ulotlarini o‘qitishda Venn diagrammasidan foydalanish tadbig‘i keltirilgan. Bunda elektr va magnit maydonga xos xususiyatlar tahlili Venn diagrammasi asosida tushuntirilgan va samaradorlik koeffisiyenti aniqlangan.

Kalit so‘zlar: interfaol metodlar, Venn diagrammasi, elektr va magnit maydon, elektromagnit to‘lqin, ishonchlilik oralig‘i, o‘rta qiymat, samaradorlik koeffitsiyenti.

Today, there are more than 100 types of interactive methods, each of which can be used effectively in the educational process, depending on the nature of the educational material, the age and psychological characteristics of students. Interactive methods are methods that help to organize the interaction of students in the acquisition of knowledge, skills, competencies and certain ethical qualities, as well as their

interaction with the teacher [1]. The essence of the interactive method is to rely on the creativity of students and create an atmosphere of free discussion in the classroom [2].The use of interactive methods of pedagogical technology in the teaching of lectures in physics serves to increase the effectiveness of the quality of education. To date, the Venn diagram has been used in the teaching process in the teaching of English [3], in the teaching of teachers [4], and in the teaching of mathematics [5]. However, this method has not been sufficiently studied in the teaching of lectures in physics.In this paper, we use the Venn diagram, a graphic organizer, to teach topics related to the electric and magnetic field.

The purpose of using the method of "Venn diagram": to develop students' ability to compare two or more objects and concepts, to identify their differences and commonalities.

In this method, the teacher can explain the lectures directly on the topic or the students can fill in the Vennas independently in groups.This, in turn, allows students to actively participate in the lesson.

During the training, the experimental groups were given lectures on the topics of electric and magnetic fields using Venn diagrams.The control groups were trained without the use of Venn diagrams.The application of the Venn diagram to the physics lectures is shown in Figure 1.

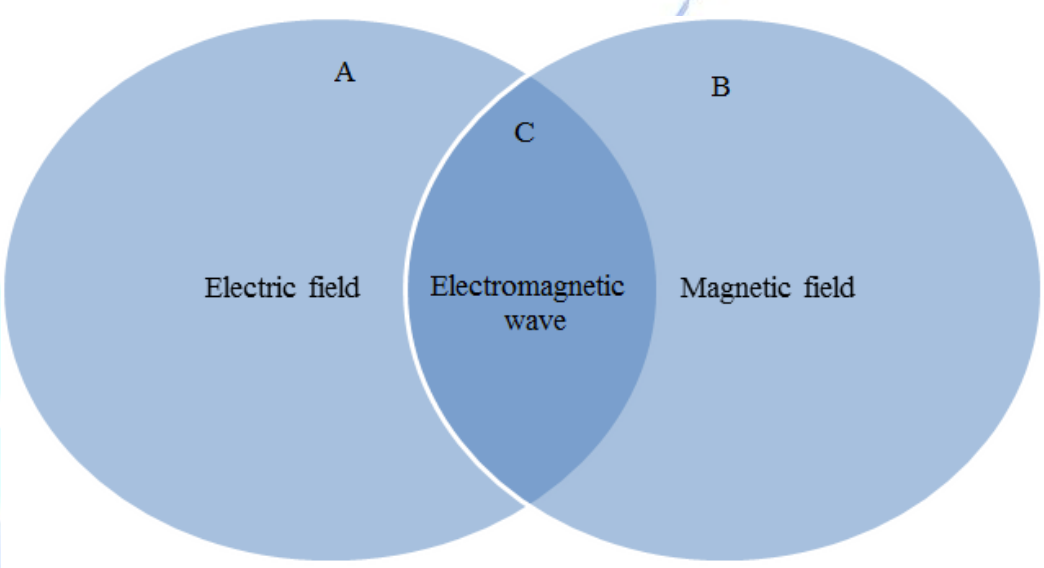

Figure 1. Comparison of electric and magnetic fields.

Part A of the diagram illustrates the characteristics of the electric field. Students create an electric field around the electric charge, the electric field is proportional to the electric charge, the electric field is perpendicular to the magnetic field, the electric field is measured using an electrometer, the magnetic field around the current Ersted experience and other features complement the presence.

Part B of the diagram highlights the characteristics of the magnetic field. Students will learn about the formation of a magnetic field around moving charges, the magnetic field is measured on a teslameter (magnetometer), the magnetic field is proportional to the speed of an electric charge, the magnetic field is perpendicular to the electric field, Faraday's experiment on the formation of induction current complement the features.

Part C of the diagram analyzes the characteristics of the electromagnetic wave, the differences and commonalities of the electric and magnetic fields.According to Maxwell's theory of a single electromagnetic field, an alternating electric field creates an alternating magnetic field, and an alternating magnetic field creates an alternating electric field.These two variable fields are of a circular nature, i.e., the lines of force of the generating field are concentrically surrounded by the lines of force of the emerging field. The result is a system of interconnected electric and magnetic fields.Electromagnetic waves are the sum of waves in electric and magnetic fields created by moving charges. Electromagnetic waves are transverse waves.They move in a vacuum at a speed $c = 3 \cdot 10^8$ m / s equal to the speed of light in a vacuum.The speed of electromagnetic waves depends on the characteristics of the medium of the wavelength.The frequency of an electromagnetic wave is the same for all environments.It also returns from the barrier like light waves, breaks down at the boundaries of environments, and interferes. In other words, all the properties of electromagnetic waves are similar to those of light.So the conclusion is that light is made up of electromagnetic waves. Not only light, but also infrared, ultraviolet, X-ray and gamma, radio and microwave radiation are electromagnetic.

Here is an analysis of the experimental work.In this study, an experimental test group and a control group were formed.116 students were selected for the experimental

group and 120 for the control group. The results of the experiments on the topics of the electric and magnetic fields are shown in the form of a diagram in Figure 2.

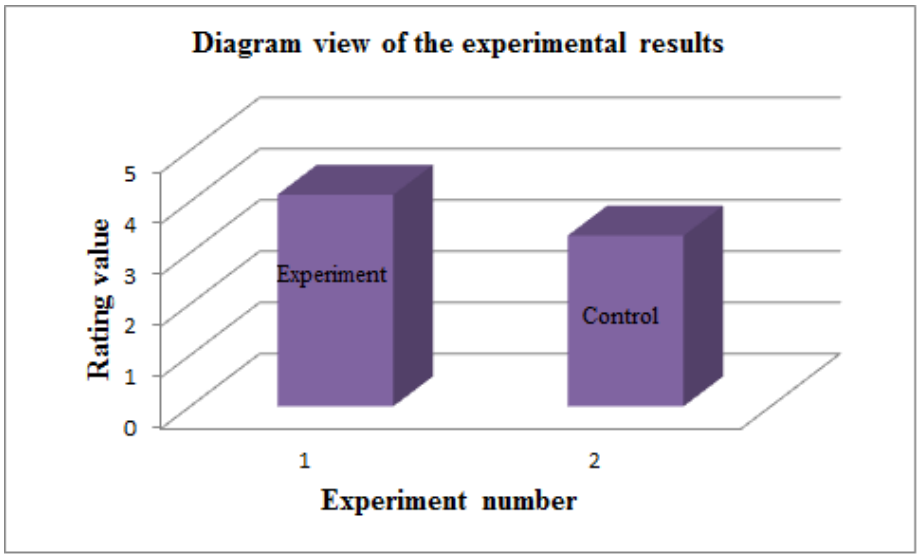

Figure 2. Diagram view of the experimental results.

In summary, according to the Student's Criteria for the Department of Electric and Magnetic Fields, the confidence interval of the grade was determined with a probability of 0.95.The coefficient of efficiency in teaching the subjects of the department of electric and magnetic fields is 1.24. It can be seen that the effectiveness of the use of Venn diagrams in the teaching of physics is high in the experimental group.

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