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FORTSCHRITTLICHE PÄDAGOGISCHE TECHNOLOGIEN ZUR VERBESSERUNG DES UNTERRICHTS IN HALBLEITERPHYSIK IN HOCHSCHULEINRICHTUNGEN

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Abstrakt. In dem Artikel wird dargelegt, dass es notwendig ist, die am besten geeigneten Methoden, Werkzeuge und Methoden auszuwählen, um Studenten die Konzepte und Prozesse der Halbleiterphysik zu erklären, die ausgewählten Methoden sollten Sichtbarkeit bieten und die Methoden sollten kreatives Denken fördern.

Schlüsselwörter: Physik, Halbleiterphysik, Lehrer, Schüler, interaktive Technologien, Integration, Methode, Wissen, Fähigkeit, Kompetenz.

ADVANCED PEDAGOGICAL TECHNOLOGIES FOR IMPROVING TEACHING OF SEMICONDUCTOR PHYSICS IN HIGHER EDUCATION INSTITUTIONS

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Abstract. In the article is stated that it is necessary to choose the most appropriate methods, tools and methods for explaining the concepts and processes of semiconductor physics to students, the selected methods should provide visibility, and the methods should encourage creative thinking.

Keywords: physics, semiconductor physics, teacher, student, interactive technologies, integration, method, knowledge, skill, competence.

Development of the education system in our country, reform of the educational content of higher education institutions aimed at forming practical skills, strengthening of the infrastructure and material and technical base will radically improve the quality and efficiency of education, advance the teaching process. or education is expanding the possibilities of effective implementation of technologies and electronic software.

Research on improving the teaching methodology of the physics course was conducted in our country in the research and methodological works of B.Mirzahmedov, M. Djoraev, G. Karlibaeva, K. Nasraddinov, K. Tursunmetov, M.Qurbanov and others.

M. Bahadirkhanov, Z. Zaynobitdinov, K. Ismaylov, A. Kamalov and others conducted scientific research work in our country on the effective organization of semiconductor physics teaching and training.

Based on the importance of improving the methodology of teaching semiconductor physics in higher education institutions, the state of semiconductor physics teaching was studied and analyzed. Based on the study and analysis, it was

determined that there are problems that are aimed at improving the quality of teaching of semiconductor physics in higher education institutions and are waiting for their solution. For example: the purpose of teaching the subject of semiconductor physics in the higher educational institutions of our country is limited to the educational field, the State educational standard, the content of the educational direction, the content of the qualification requirements, and the goals of the curriculum. lib, the goals of each lesson are not developed, taking into account the basic competence level of students' theoretical knowledge and practical skills, as well as their independent creativity:

- in the curriculum and science program of higher educational institutions, priority is given to the teaching of the subjects of the physics of semiconductors in an unimproved and theorized manner based on the requirements of the time;

- in our country, scientific research works on the methodology of teaching the departments of semiconductor physics in higher education institutions have hardly been carried out.

The use of advanced pedagogical technologies in the formation of knowledge, skills, qualifications and competencies of students in the field of semiconductor physics is effective in the higher education system and prepares the ground for improving the teaching process. Advanced pedagogical technologies are implemented in connection with and in harmony with didactic principles such as scientificity, professional orientation, continuity, coherence, regularity, systematicity, demonstrability, comprehensibility, differentiation [2; 5069-p].

The basis of the interactive teaching process is the interactive educational strategies. Interactive educational strategies mean a set of teaching forms, methods and tools that serve to activate teachers and students at the same time (Fig. 1).

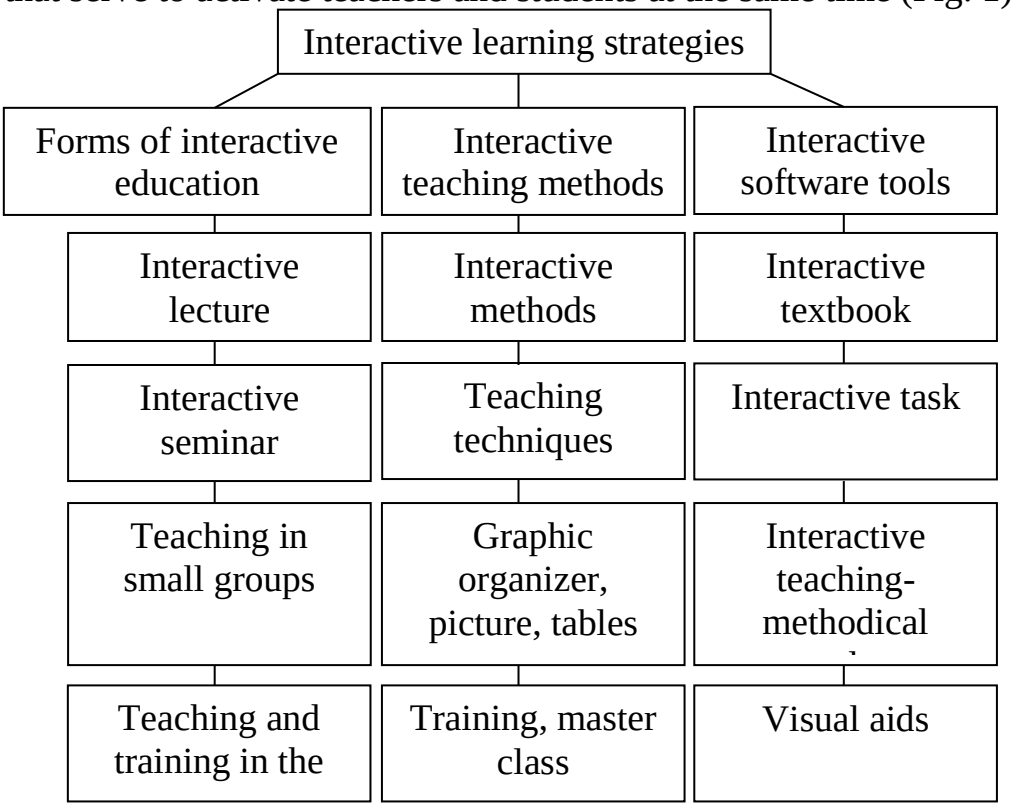

Figure 1. Didactic system of introducing interactive educational strategies

The fully effective use of an integrative approach in teaching serves as a pump for the design and implementation of integrative approach activities by teachers and students at all stages of the educational process.

The methodology of teaching students to use interdisciplinary communication in educational activities consists of the following stages [4; 105-b]:

Stage 1: Organization of the process of repetition by the students of the necessary information from the relevant subjects (physics, chemistry, mathematics) by the teacher.

Stage 2: Explanation of new learning material by the teacher, using facts and concepts from any academic subject to confirm the theoretical information covered.

Stage 3: Presentation of new material in which the teacher uses the theory of concrete and natural sciences of the relevant science to explain the phenomena and processes under consideration.

Stage 4: It requires students to independently repeat certain knowledge of the relevant subject in a topical or theoretical description. This requirement helps to determine the level of readiness of students to apply their theoretical knowledge of a new educational situation. It also helps to overcome their known psychological barriers. For example, the content of the course material in the relevant subject classes.

Stage 5: The teacher does not need to re-develop the theoretical knowledge acquired in the physics, chemistry, mathematics lessons, but to involve the students in the facts and concepts learned in the semiconductor physics lessons, to confirm the newly acquired theoretical knowledge in the group.

Stage 6: Students are required to independently use some of the theories learned in physics classes, to explain the processes and phenomena studied in the course, for example, in relation to physics.

Stage 7: The teacher explains that the general laws of dialectics are manifested in the processes and events studied in the classes.

Step 8: The teacher explains the natural scenery of the studied processes and phenomena.

Stage 9: Uses the general laws of dialectics to explain the processes and phenomena studied in the lessons.

On the other hand, the integrative approach, like other didactic principles, never gives the teacher a ready-made teaching technology, but determines the solution of didactic and methodical problems using it.

Today, in developed countries, including the United States, students come to a practical training based on the technology of "flipped learning" with a certain vision of a new topic. During the practical session, the concepts, theorems, methods of their proof, examples and student proposals for solving the problems are discussed in detail, as well as possible methodological approaches to the interpretation of these concepts were determined. The teacher controls the discussion process and directs it to the goal, and the students react to the critical opinions expressed to their own or others' ideas [3; p. 29].

In the implementation of this technology, students are given tasks of various content: preparing a presentation or critically analyzing it; Processing, improvement or planning of textual theoretical information, practical tasks, examples, development of test questions, crosswords, creative solution of a physical problem based on a graphic organizer are assigned [1 ; 34-p].

As a result of the research, the formation and development of the following competencies during the use of advanced pedagogical technologies in the teaching of semiconductor physics was determined:

- on applying the theory to practice - to acquire theoretical knowledge of semiconductor physics, to identify the current issues of the field and to be able to convey them to students;

- on the application of methods and technologies to the educational process - to be able to use non-traditional methods, advanced educational technologies during the teaching of the topics of semiconductor physics, to be able to creatively use the methods and technologies related to the topics, to be able to analyze facts, generalize, draw conclusions based on this;

- to know the types and types of lessons on the organization and management of the educational process and organize them accordingly.

In short, advanced pedagogical technologies not only change the effectiveness of the teaching process, but also attract the student, allow a better understanding of the process and phenomenon that they demonstrate. It is known that a person who is interested in the end result will succeed. Thus, in this case, we arouse the thirst for knowledge, by making the student interested in training based on advanced pedagogical technologies. The use of advanced pedagogical technologies helps to develop interest in the study of semiconductor physics, expand and deepen students' theoretical knowledge. They also develop interest in science, promote cooperation, activity and independence. A teacher should never forget Plutarch's famous words: "The learner is not a vessel to be filled, but a torch to be lit".

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