ISSN NO: 2770-2367
December 2024

Organization Of Practical Processes In The Development Of Physics Laboratories, Problems And Solutions Of Research Direction For Students.

Turdiyev Urol Shokir o'g'li
Yangiyer branch of the Tashkent
Institute of Chemical Technology.
E-mail: turdiyevurol5@gmail.com

Abstract. In our country, education and science have been taught with limited theoretical knowledge, while the cluster approach is based on the initiative of institutions or organizations, as a form of their social cooperation, the creation of a unified education system is underway. There is a need to combine the resources and capabilities of organizations that are part of the educational cluster to improve the quality and competence of graduates, to introduce new technologies for teaching and training.

Key words: "Competence", intellectual potential, multimedia, virtual labora-tory, professional competence, didactic support, visual model.

Transforming the educational system into a qualitatively new educational system is one of the urgent issues of educating an independent-thinking, competent, competitive person who is adapted to the new conditions of society [1].

In order to improve the methods of teaching physics in our republic, starting from the 2021/2022 academic year, taking measures to implement the "Laboratory cluster" project in the educational process in 3 higher educational institutions as an experiment, based on the results of the experiment, the laboratory cluster proposals were made for its introduction into the educational process of higher education institutions [2]. The main advantage of this technology is that it can be adapted to any lesson, effectively helps the teacher and the student. Another important situation is that there are some processes or phenomena that cannot be observed visually in laboratory conditions, for example, studying the ability of living organisms to see. In this case, computer simulations are invaluable, as they allow us to observe the optical processes occurring in the eye and at the same time obtain realistic results and draw conclusions.

The analysis of scientific researches and sources in the academic year 2021/2022 presented above showed that education and science in our country are limited to theoretical knowledge, while the cluster approach is based on the initiative of institutions or organizations and their social cooperation. A unified education system is being created as a form. There is a need to combine the resources and capabilities of organizations that are part of the educational cluster to improve the quality and competence of graduates, to introduce new technologies for teaching and training.

As stated in the decision of the President of the Republic of Uzbekistan dated August 31, 2021, PQ-5241, "In order to integrate the educational process of professional and higher education organizations with the activities of production enterprises, scientific projects and the right to organize laboratories, training grounds and other structures necessary for the implementation of educational programs was given."

During these studies, scientists of our country B.M.Mirzahmedov, M.Djoraev, O.N.Ahmadjonov, D.A.Begmatova and others studied the theoretical foundations of science in the field of physics, the problems of developing specific methodological aspects of developing the scientific outlook of students.

Let's try to find a solution to the given problem by explaining the following 2 main tasks of our research.

ISSN NO: 2770-2367
December 2024

- Revealing the theoretical aspects of the formation of research competence in students based on the laboratory cluster.
-Determining the didactic possibilities of the physics laboratory cluster in the formation of students' research competence.

The first task of our study is to reveal the theoretical aspects of the formation of research competence in students based on the laboratory cluster.

Laboratory cluster - includes educational and research organizations, network enterprises and companies, suppliers of infrastructure, resources and specialized services, and the entire cluster association, which are united on the basis of territorial proximity, complement each other and strengthen their competitive advantages.

The cluster of laboratories is aimed at unifying the activities of various educational institutions interconnected with industrial enterprises in a single space. The creation of laboratory clusters and their activities directly affect the competitiveness of educational organizations, as well as help the integration of educational institutions, finance, scientific research, educational institutions and enterprises.

N.Z. Aytimbetov said that the laboratory cluster will be the solution to practical understanding of the relationship between fundamental knowledge and the results of practical work in developing the skills and competencies of future physics teachers to perform laboratory work.

Research activity of students is a type of creative cognitive activity that directs them to acquire independent theoretical and experimental work with the help of modern research methods and experimental techniques. Research activities of students include the following stages: setting the goal, formulating the problem, studying the theory of the formulated problem, choosing the research methodology and mastering it in practical terms, collecting materials, analyzing and summarizing it, drawing conclusions.

I.B. According to Askarov, research activity is an activity aimed at obtaining new knowledge about the basic laws of the structure, functioning and development of a person, society, and the environment and applying them to achieve a practical goal.

According to N.N. Narzieva, "Competence" is the effective use of knowledge, skills and abilities; "competence" is an existing and possible ability to perform a certain activity. A competent approach to education envisages teaching students to effectively use the competences formed in various situations in personal, professional and social life.

Innovative competence of students is a part of his professional competence. The formation of innovative competence of students is natural and is carried out under the influence of external factors. It should be emphasized that the improvement of personal, theoretical and practical preparation of students for purposeful introduction of innovations into the higher education system is a continuous process.

A review of approaches to the formation of innovative competence of students made it possible to identify the following problems:
- determining the bases of formation of methodological innovation competence;
- to formalize the goals and contents of the process of formation of pedagogical innovative competence;
- to clarify the features of the process of motivational preparation for psychological innovative activity;
creation of forms and means of organizing the process of formation of innovative competence of activity.

Based on the formation of a laboratory cluster in physics using these criteria, through the formation of research activities, students will acquire research skills such as problem solving, defining goals and tasks, developing hypotheses about the solution, algorithmizing them, choosing the optimal solution, and concluding. .
The effectiveness of the laboratory cluster depends on the coordinated relations between the main subjects of the "education - science - production" integration system.

Ensuring the integration of science and education through the use of a laboratory cluster, thereby strengthening cooperation with geographically neighboring industrial production

ISSN NO: 2770-2367
December 2024

enterprises without leaving experimental work in the course of the laboratory in the form of theoretical knowledge, and connecting the laboratory topics with the production process We can see the integration and elimination of process defects. As a result, it is possible to train qualified personnel who can analyze the process and find solutions for the interested parties, that is, graduate students, and supply competitive personnel to production enterprises.

The first task of our research, as a result of our studies, we came to the following conclusion.

The theoretical aspects of the formation of research competence in students based on the laboratory cluster allow to reveal the principles of consistency, stability, synergy that ensure the integration of science and education, based on the application of the problem-setting and cause-and-effect relationship in the learning process.

The second task of our study is to determine the didactic possibilities of the physics laboratory cluster in the formation of students' research competence.

Laboratory work is a form of training aimed at forming necessary professional skills. It is one of the types of formation of research competence of students based on the organization of a cluster of physics laboratories during laboratory training.

In the research work of N.Z. Aytimbetov, in the performance of laboratory works in physics, the organization of the educational process with the help of modern information technologies, the study of tasks and assignments using computer technology, the practical observation and observation of physics is impossible or difficult. teaching events without changing the curriculum plan, he emphasized that the learners themselves can learn independently and perform practical tasks, which allows them to be implemented.

Development of independent work guidelines, educational and didactic support and methodology for organizing independent creative activity aimed at the organization of independent creative activity by improving the model of improving the independent creative activity of students in higher education institutions based on the study of the requirements of the competency approach and based on the competence approach, it is necessary to apply the criteria for determining the improvement levels of students' independent creative activities.

Research activities of students outside of academic activities are carried out by ensuring their participation in scientific-practical conferences, competitions of scientific works in various directions, Olympiads of various levels.

According to F.M. Sadikova, "Scientific activity is a research activity aimed at the implementation and popularization of new ideas and solutions in pedagogical cooperation, and on the basis of information and communication technologies, the selected ideas are completely qualitatively new elements, constituent factors acceptance as a pedagogical system and practical testing and comparison of results is an activity aimed at eliminating inconsistencies and conflicts in solutions.

During laboratory sessions, on the basis of the organization of a cluster of laboratories in physics, by forming the research competence of students, it is possible to explain the essence of laboratory work and get deeper into the practical process. will be

We came to the following conclusion as a solution to the problem related to the second task of our research.

In order to ensure the optimal use of physical educational resources in the laboratory, it is based on the proposal to optimize the operation of the laboratory by directing independent educational control work to scientific activity;

Recommendations.

-Improving the methodological support that forms the research competence of students of technical higher education institutions;

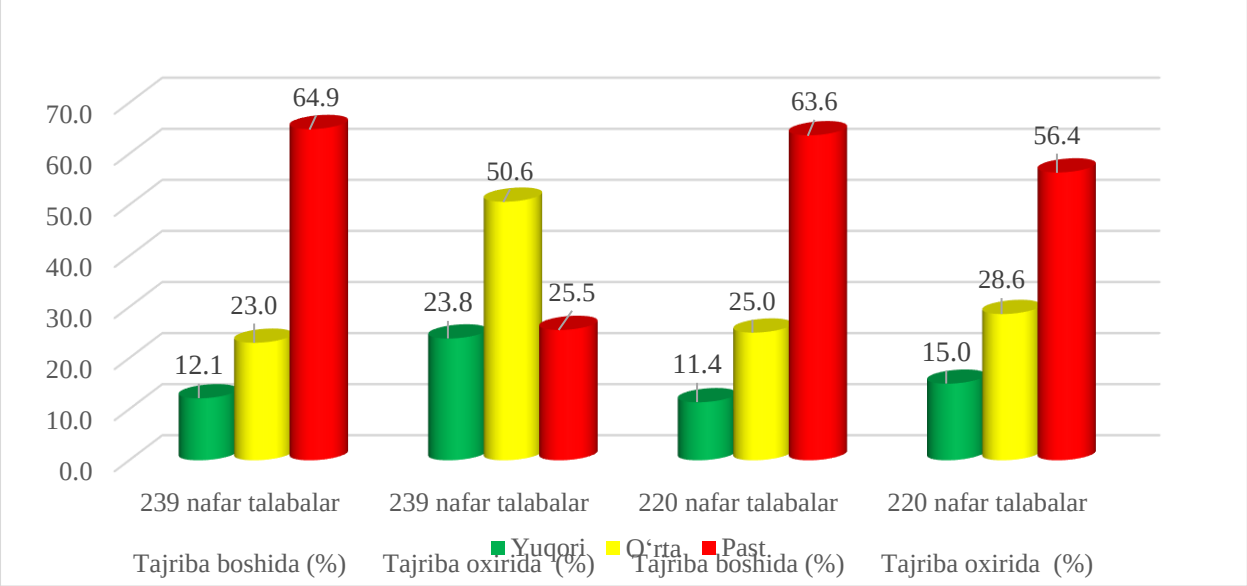
- Application of software tools that allow visualization of physical phenomena and processes to physics education;

- Improving the methodology of collective development of students' preparation for professional activities (design-construction, organizational-management, scientific-research, pedagogical,

ISSN NO: 2770-2367
December 2024

spiritual-educational, production and adjustment, consulting service, service service) through physics teaching.

Looking at quantitative benchmarks,



We can see the results of the pedagogical experiments conducted at the Yangier branch of the Tashkent Institute of Chemistry and Technology, the Shahrisabz branch of the Tashkent Institute of Chemistry and Technology, and the Tashkent Institute of Chemistry and Technology. 11% increase was determined using mathematical statistical methods.

Conclusions

Improving the methodology of forming research competence of students based on the organization of a cluster of physics laboratories allowed us to solve the theoretical and practical problems of the research and based on them, made the following conclusions:

Pedagogical, psychological, philosophical, scientific and scientific-research works were analyzed on the basis of the organization of a cluster of physics laboratories on the formation of research competence of students. Methodical works and research works dedicated to physics teaching methodology were studied. Based on the analysis of the research work of our country's scientists on physics education, problems were identified and suggestions and recommendations were developed for their solution.

The cluster of laboratories is aimed at unifying the activities of higher education institutions interconnected with industrial enterprises in a single space. The main task of the laboratory cluster is to bring the educational process closer to the enterprise - the customer of qualified personnel, as well as to increase the competitiveness of the entire system of higher education, and the relations between the subjects of the laboratory cluster are related to the movement of information and financial flows;

Pedagogical conditions are aimed at forming functions such as analysis, synthesis, generalization, evaluation in students; should contribute to the formation of students' ability to apply the acquired physical knowledge in practice and perform generalized intellectual actions. In a general sense, pedagogical conditions can be divided into three large groups: organizational pedagogical, pedagogical-psychological, subject-didactic;

Literature.

1. "On the strategy of Uzbekistan - 2030". Decree of the President of the Republic of Uzbekistan dated 11.09.2023 No. PF-158. - T.: National database of legislative information, 12.09.2023, No. 06/23/158/0694; 29.12.2023, No. 06/23/214/0984
2. "On measures to improve the quality of education in the field of physics and develop scientific research." Decision of the President of the Republic of Uzbekistan No. PQ-5032 dated 19.03.2021, - T.: National database of legal documents, 19.03.2021, No. 07/21/5032/0226

ISSN NO: 2770-2367
December 2024

3. А. Ф. Кавтрев “Опыт исползования компютерных моделей на уроках физики в школе “Дипломат”, Сб. РГПУ им. А. И. Герсена “Физика в школе И вузе”, Санкт-Петербург, Образование, 1998 , с. 102-105.

4. National энcyclopedia of Uzbekistan. [Electronic resource] URL:https://dokumen.tips/documents/ozbekiston-milliy-ensiklopediyasi-e-harfipdf.html
5.Азариашвили С.Г. Научно-методическая работа педагогов в совершенствовании образовательной системы в условиях малого города: дис. ... канд. пед. наук: 13.00.01 / Азариашвили Светлана Григоревна. - Чебоксары, 2000. - 212 с.
6. Aytimbetov N.Z. Methodology of improving physics laboratory work based on an integrative approach (in the example of higher education institutions) // p.f.f.d. (PhD) diss...abstract. Defect. 2021. 52 p.
7.Toshkinboev, S. (2022). The Use of English Cartoons to Improve English Competence for A2. International Journal of Formal Education, 1(8), 56-62.
8.Ананина Ю.В. Формирование среды профессионально-личностного развития студентов колледжа в условиях сетевой кластерной интегратсии: дис. ... канд. пед. наук: 13.00.08 / Ананина Юлия Владимировна. - М., 2013. - 241 с.
9.Андреев В.И. Педагогика: Учебный курс для творческого саморазвития. – 3-еизд. – Казан: сентр инновационных технологий, 2006. – 608 с.
10.Арутюнов Ю.А. Электронный ресурс / Режим доступа: ҳттп://www.коет. сйктсу .ру/вестник/2008/2008-4/1/1.ҳтм
11.Toshkinboev, S. (2023). Teaching School Children to Become Fluent and Accurate Speakers.
12. Askarov I.B. Methodology of training future vocational education teachers for research activities // p.f.f.d. (PhD) diss...author abstract.T.2018. 26 p.
13. Atakulova M.N. Improving the methodology of research activity development among students of higher educational institutions of pedagogy (in the example of biology teaching methodology) p.f.f.d. (PhD) diss...author abstract. Samarkand. 2021. 46 p.
14. Suyarov K.T. Development of educational and research skills in students based on physical experiments (in the example of academic lyceums). Ph.D. Ph.D. (PhD) dis...auto. Rotten. 2019.-41 p.