Methodology of Improving the Professional Creative Abilities of Future Engineers on the Example of Experimental Training in the Science of Fuels and Lubricants

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ABSTRACT

In the article, the application of the demonstration method of experimental training (TMKM) in the educational process creates a foundation for new education, pedagogical solutions to ensure the consistency of education and the inclusion of "Fuel and lubricants" in educational and scientific programs are highlighted.

Keywords: Demonstration method of experimental training (TMKM), criteria for independent study of training, specific features of experimental training that distinguish it from other subjects.

Mastering the knowledge system as a part of any education, theoretical training is important for professional activity. The process of acquiring knowledge is understood as a system of various actions to understand information, process it and change it. The goal set at the beginning of the lesson is a component of student activity. Generalization of educational material, its connection to the general knowledge system is carried out at the stage of control and evaluation. Analysis of acquired knowledge, skills and qualifications is carried out in the form of a test or technical work.

The application of the proposed method of demonstration of practical exercises (TMKM) in the educational process creates a basis for new education, their adherence ensures the consistency of education and the inclusion of the subject "Fuel and lubricants" in educational and science programs.

In order to increase the possibility of students to expand the process of independent learning of the given tasks, it is necessary to pay attention to the conduct of laboratory exercises in specialized subjects in the form of lessons aimed at forming independent thinking by students.

The following criteria encouraging independent study of experimental training in "Fuel and Lubricants" for students studying in the field of engineering education can be carried out in five stages:

Stage 1. Goal setting (5-10 minutes).

In this case, students should independently achieve the goals based on the task (assignment) given to them, or they should set a specific goal. Students should define their own specific goals, that is, define the purpose of performing experimental work. And the teacher helps the students to determine the set of activities, the necessary materials and the time to set their goals and gives their advice.

Stage 2. Planning (10-15 minutes).

Students determine the necessary steps individually or in groups, that is, they plan how to do the experimental work. In this case, the presence of the necessary equipment,

laboratory equipment, didactic materials for the work is checked. Taking into account the number of laboratory equipment, how many people can do the work at the same time, they develop a work plan, in which the experimental equipment and methodical instructions are the basis for performing experimental work.

Stage 3. Decision making (15-20 minutes).

Students will test their theoretical knowledge to perform an experiment based on their plans, using the experimental equipment and test questions provided in the methodological instructions. When the students make a decision about their plans, they introduce the decision to the teacher.

Step 4. Implementation and monitoring (25-30 minutes).

During the implementation of their work plans and experimental work, the students perform the work in accordance with the procedure for performing the work specified in the experimental equipment and methodical instructions, and monitor their actions and the results they achieve. , students will only be involved if they fail to follow the health and safety rules for the use and operation of electrical measuring instruments, or if they deviate significantly from the prescribed target path.

Step 5. Evaluation (10-15 minutes).

When performing experimental work, students calculate based on the results of the indicators given in the experimental equipment and methodological instructions and draw the necessary graphs, drawings or diagrams, filling in the appropriate tables. In this case, the assignment, that is, the initial assessment of how the experimental work was performed, is first given by the students themselves. To do this, they fill out evaluation forms prepared by the teacher. These evaluations are then analyzed by the teacher and can be modified as necessary. In addition, students prepare a report (presentation) on their work and results and submit it to the teacher individually.

In this way, the efficiency of the lesson increases when experimental training is carried out through lesson stages encouraging independent learning. Therefore, during the lesson, not a single student is left out, and the student's learning rate increases significantly.

It is possible to recommend conducting laboratory exercises in the form of a lesson aimed at forming independent thinking in all subjects where laboratory exercises are planned in the curricula of technical directions.

Demonstration method of practical exercises in the following places (TMKM) is based on the normative rules of the unified system of construction documents used in the study of these subjects. TMKM creates an optimal educational environment for students' interest in the profession and assessment of their knowledge level. As part of the adaptation of the education system of our country to world education standards, the transition to the credit-module system in higher education, the reduction of classroom hours in the newly developed curricula, and the increase of independent study hours of students were observed (order 311-conli of OO'MTV of the last stage of DTS).

In addition, TMKM makes it possible to more accurately diagnose the level of education (determine the level of professional intelligence), control the quality of preparation, validity and meaningfulness (content) of the material presented in science.

The role and importance of theoretical training in the educational process of educational institutions training engineers is very great. The most common option for lectures and practical training in "Fuels and Lubricants" is to study all relevant topics regularly and sequentially, with a differential approach to the depth and volume of material covered in each topic.

Experimental training in "Fuel and Lubricants" has its own characteristics that distinguish it from other disciplines:

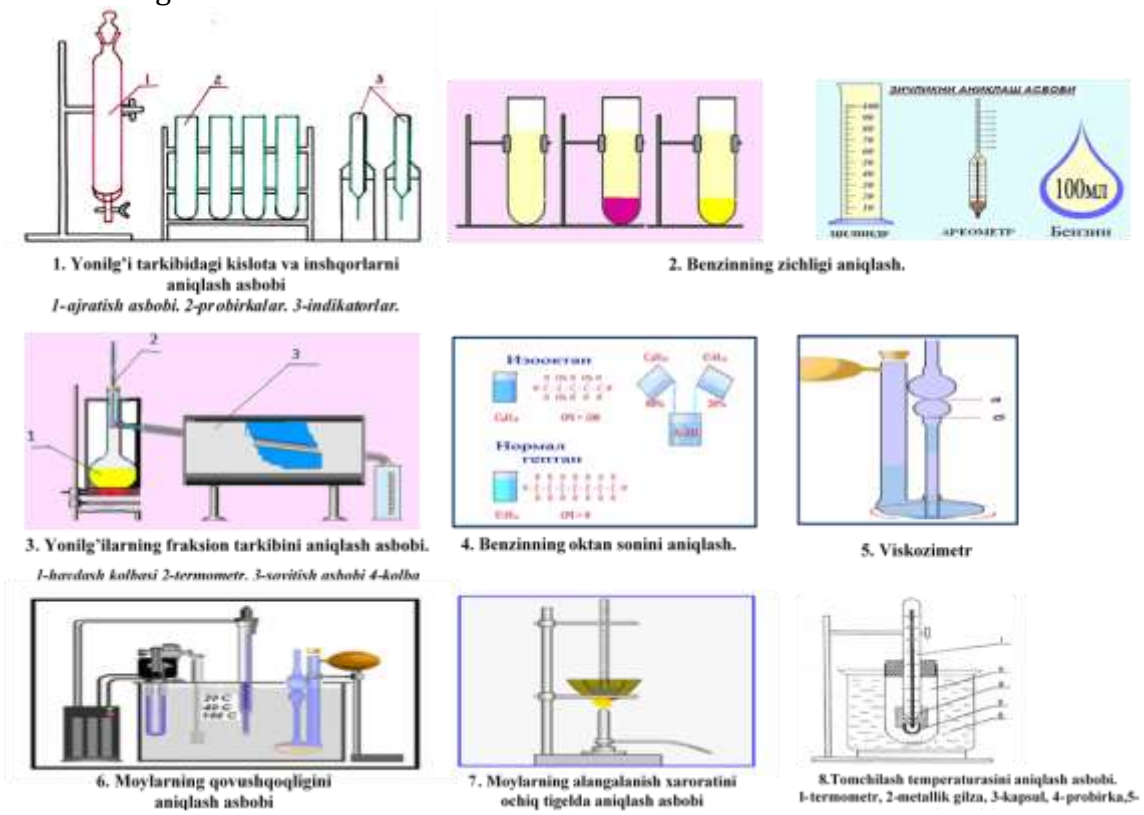
a) The sequence of experimental topics is integrally connected, that is, the new topic is necessarily dependent on the previous topic.

b) Fuels and Lubricants practical training provides a lot of visual information along with explanations and takes a lot of time to understand.

If effective instructional guides are used in the process of educational activities, the result

of education will undoubtedly be significantly improved. As such management manuals, we have proposed a summary of demonstration methods of experimental exercises prepared for the most complex experimental topics of the "Fuel and Lubricants" science (Fig. 1). A schematic map serves as a demonstration device in the training.

Together with the chalk drawings on the board, the TCM is used by students as a methodical guide to the topic. Using a plan map prepared on the basis of a specific theme of the experiment, the teacher presents the main parts of the experiment in a short time in a complete but concise visual way.



1. Yonilg'i tarkibidagi kislota va inshqorlarni aniqlash asbobi
1-ajratish asbobi. 2-probirkalar. 3-indikatorlar.

2. Benzinning zichligi aniqlash.

3. Yonilg'ilarning fraksion tarkibini aniqlash asbobi.
1-haydash kolbasi 2-termometr. 3-sovitish asbobi 4-kolba

4. Benzinning oktan sonini aniqlash.

5. Viskozimetr

6. Moylarning qovushqoqligini aniqlash asbobi

7. Moylarning alangalanish xaroratini ochiq tigelda aniqlash asbobi

8.Tomchilash temperaturasini aniqlash asbobi.
1-termometr, 2-metallik gilza, 3-kapsul, 4-probirka,5-

Figure 1. Demonstration method of experimental training in "Fuel and lubricants".

At the main stage of training (the main and final part of the experimental training) the map of the experimental training has a two-way (double-sided) role. On the one hand, it is the basis of a deep, systematic review of each issue of the training, and on the other hand, it plays the role of an indispensable express form of the material under consideration. the first of these functions of the demonstration method of experimental training is performed in the main part of the training, and the second in the final part.

The considered experience helps to match the specific rules of the training material with the general ones. the introduction of demonstration methods of experimental training as a training manual is included in the actual training process and has been tested. Training in the experimental stream is aimed at the following goals.

1. Activation of independent learning process.
2. Recovery of previously acquired knowledge.
3. Independent examination of the level of personal training.
4. Determination of abilities for educational and research activities.

Each of these objectives can be implemented independently in a separate lesson or together with each of them.

All this contributes to the evidence-based consideration of the content of each individual issue of the experimental exercise and its appearance in the minds of students as an integral, logically complete basic block - an

integrated component of the studied material. At the end of the presentation of the content of the subject of the experiment, the teacher can turn to the corresponding main block of the schematic map, make the necessary generalizations and complete the consideration of a particular problem.

Also, it is important that the classification exercises used at the stage of summarizing the results of educational issues help to keep in the minds of students the path taken to achieve the final goal and justify the transition to the next questions of the topic.

The application of the demonstration method of experimental training in the educational process requires the teacher to move away from traditionalism, to introduce innovative technologies specific to the new teaching method, and through his speech, to explain the main rules of the subject in the plan maps, to establish feedback with students, to think independently and to draw conclusions.

The demonstrative method of experimental training helps the student to independently build a knowledge system. The student complements previously acquired knowledge with new knowledge.

The use of TMKM in the practical lesson reveals the diversity of its functions:

1. The ability to reveal the essence of all studied experiences at a high-quality level.

2. Elimination of difficulties in reading complex graphic images from the board.

3. Creation of conditions for educational research problems.

4. The basis of practical activities in the performance of homework is prepared and skills are sharpened.

The practical training is an educational process organized in the auditorium, which develops the knowledge acquired by the students in the lecture classes, and teaches them to perform independently assigned tasks.

In practice sessions, there is no opportunity to organize the educational process in an environment of effective and creative activity of students; In the educational process, the important issue of regulation of students' acquisition of individual knowledge has not been paid enough attention. The part of students' self-assessment of the results of the experimental lesson was not studied.

In our opinion, the following is necessary for the effective organization of the educational process in the experimental session:

1. Choosing the most appropriate teaching method for any experimental training.

2. Development of necessary knowledge and skills of students through specially developed methods of solving educational problems.

3. Development of a new method of presenting didactic materials using special textbooks.

4. Improving the process of checking homework in the practice session.

These indicated items contribute enough to the improvement of the training system.

In conclusion, in accordance with the stated principles, we determined the following goals for using the demonstration method of experimental training in the experimental lesson:

1. Management of students' educational activities during the experimental training.

2. Improving the method of presenting new educational materials:

- to ensure the possibility of bringing knowledge on certain subjects to the level of the requirements of the state educational standard;

- creation of conditions for simultaneous use of various information.

3. Systematization of students' knowledge not only in one subject, but in the whole subject.

Taking into account the above, it can be concluded that the traditional method of practical training is an insufficiently regulated part of the educational process in HEIs and requires qualitative changes.

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