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MODERN EDUCATIONAL METHODS IN THE TRAINING OF ADVANCED NUCLEAR TECHNOLOGIES IN THE ENERGY SYSTEM-A GUARANTEE OF EDUCATIONAL EFFICIENCY

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Abstract
In order to increase the effectiveness of education, the article discusses the importance of using modern interactive methods in the educational process, and elaborates comprehensive proposals and recommendations. At present, the introduction of advanced nuclear technologies in the energy system is expected to be a solution to global problems in the era of rapid development. The successful implementation of these new technologies across countries around the world will be successful in eliminating all new infrastructures and gaps. The use of modern educational methods in the teaching of the application of advanced nuclear technologies in the energy system is proposed as concrete steps to increase the effectiveness of quality education.

Keywords: Developed Core, Modern educational methods, Demonstration of technology, Educational efficiency, Location, Work in small groups, Teacher, Student, Environmental justice, Debate, Problem situation, Educational material.

Introduction

In order to ensure that the knowledge, skills and qualifications of students are at a level that meets the requirements of the time, the responsible and difficult tasks assigned to educators are extremely important and responsible. Therefore, in order to fulfill the task in front of them, it is necessary for educators, that is, teachers, regardless of the type of educational institution in which they conduct their activities, to continuously work independently on themselves, improve their skills, and conduct scientific and creative research. From the point of view of the obligation

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to fulfill the requirements of the state educational standards, it is certain that the level of professional competence of the teacher corresponds to the requirements of the time, which ensures a positive solution to the problem. Based on this, there is a need to widely use modern methods of teaching in the educational process by teaching staff. The use of modern methods of teaching leads to the achievement of high-quality education and high efficiency of education in the teaching process.

The main part

When choosing educational methods, it is appropriate to choose based on the didactic task of each lesson. While preserving the traditional form of the lesson, enriching it with various methods that activate the activities of young students will lead to the expected results of raising the level of mastery of young students. For this, the training process should be organized in a reasonable plan, the teacher should increase the interest of the students and encourage their activity in the educational process, divide the educational material into small parts, and open their content intellectually. it is necessary to use methods such as attack, work in small groups, debate, problem situation, guiding text, project, role-playing games, and encourage students to do practical exercises independently [1].

Pedagogical system is now able to deliver huge innovations and changes through the extensive use of various innovative information technologies and interactive methods, and thus in the minds of students, independent thinking, correct acceptance of current changes and rational decision-making. will teach. R.Ishmuhamedov, M.Yuldashev, Yo‘ldoshev J., Ochilov M, Ro‘ziyeva D., Usmonboyeva M., Holiqova Z., Ryjov S. B., Moxov V. A., Vasilchenko I. N., Nikitenko M. P., Maxin V. M., Lapin A. V., Chetverikov A. E., Churkin A. N., Anikeev Yu.A., Shmelev S.V.,N.N, Shukolyukov A. Yu Sodiqov.I.I, Mullaboev K.Yu, iqtisodiy tomonidan N.I.Novikov, V.Vlasenko,V.N.Myasishev, L.M.Fridman's role and contributions are incomparable.

In modern language, these methods are also called interactive or interactive methods. Interactive methods mean methods that activate students and encourage them to think independently, where students are at the center of the educational process. When these methods are used, the teacher invites students to actively participate. Students actively participate in the entire process. The useful aspects of the approach in the educational center are manifested in the following: - study-learning with higher educational efficiency; - high motivation of the learner; - consideration of previously acquired knowledge; - adjustment of the intensity of

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study to the needs of the learner; - support of the learner's initiative and responsibility; - learning by doing; - creation of conditions for two-way opinions. For example, the "Brainstorming" method is a method that collects free opinions and opinions expressed by students of advanced nuclear technologies in the energy system and comes to a certain solution through them. There are written and oral forms of the "Brainstorming" method. Each of the students verbally expresses their opinion to the question given by the teacher in oral form. Young students express their answers clearly and concisely. Students write their answers to the written question on paper cards in a short and visible way. Answers are fixed on the board (using magnets) or on the board (using pins). In the written form of the "Brainstorming" method, there is an opportunity to group the answers by certain characters.

This method, when used correctly and positively, teaches a person to think freely, creatively and non-standardly. When using the "Brainstorming" method, it is possible to involve all students, including the culture of communication and discussion among students. Students develop the ability to express their thoughts not only verbally, but also in writing, as well as the ability to think logically and systematically. The lack of evaluation of the expressed opinions leads to the formation of different ideas among young students.

Result

This method serves to develop creative thinking in young students. The "Brainstorming" method is implemented depending on the goal set by the teacher:

1. When the goal is to determine the basic knowledge of young students, this method is implemented in the introductory part of the lesson.
2. Repetition of a topic or connection of one topic with the next topic is done in the transition to a new topic.
3. When the goal is to strengthen the learned topic, it is carried out in the reinforcement part of the lesson after the topic.
4. Basic rules for using the "Brainstorming" method:
5. Opinions expressed are not discussed and evaluated.
6. Any opinions expressed will be considered, even if they are not correct.
7. Every student must attend.

Below is the structure of the "Brainstorming" method. A problematic question is asked. Thoughts and ideas are heard and collected. Thoughts and ideas are grouped.

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The clear and correct answer will be selected. The structure of the brainstorming method. The stages of the "Brainstorming" method are as follows:

1. Students are asked a question and they are asked to give their answers (opinions, ideas and reasoning) to this question;
2. Young students express their opinion on the question;
3. Students' ideas are collected (recorder, video tape, colored paper or blackboard);
4. Ideas are grouped by certain symbols;
5. A clear and correct answer to the above question will be selected.

“Advantages of the brainstorming method:

– the lack of assessment of results leads to the formation of different ideas among young students; all students participate;
– ideas are visualized;
– there is an opportunity to check the basic knowledge of students;
– the student arouses interest in the subject in young people.
– Disadvantages of the "Brainstorming" method:
– failure of the teacher to ask the question correctly;
– high level of hearing ability is required from the teacher.

The structure of the method "Working in small groups" The stages of the method "Working in small groups" are as follows:

1. The direction of activity is determined. Interrelated issues on the topic of advanced nuclear technologies in the energy system are defined.
2. Small groups are defined. Young students can be divided into groups of 3-6 people.
3. Small groups begin to complete the task.
4. Specific instructions are given and guided by the teacher.
5. Small groups make presentations.
6. Completed tasks are discussed and analyzed.
7. Small groups are evaluated.

The advantage of the "work in small groups" method:

– leads to good mastering of teaching content;
– improves communication skills;
– there is an opportunity to save time;
– All students are involved.

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Small groups are formed. The topic of advanced nuclear technologies in the energy system will be covered. assignment to group 1; assignment to group 2; assignment to group 3; Group 4 will be given a task. Instruction and guidance by the teacher; Discussion and analysis; 1st group presentation, 2nd group presentation, 3rd group presentation, 4th group presentation will be evaluated. This will include: · self- and inter-group assessment. Disadvantages of the "work in small groups" method:

– due to the presence of weak students in some subgroups, there is a possibility that strong students will also receive low grades;
– the ability to control all students and young people will be low;
– negative rivalries between groups may appear;
– a conflict may arise within the group.

"Round discussion" method: "Round discussion" method is a method of teaching conducted by students and young people expressing their opinions on the problems or questions given around the round table. When using the "Round discussion" method, tables and chairs should be arranged in a circle. This helps each learner to make "eye contact" with each other. There are oral and written forms of the roundtable discussion. In an oral roundtable discussion, the teacher introduces the topic of Advanced Nuclear Technologies in the Energy System and asks the students to give their opinions on the question, and each learner in the circle They express their opinions orally. Listens carefully to the learner who is speaking, and if discussion is necessary, all feedback is discussed after listening. This helps students to think independently and develop speech culture. Structure of the round table: Tables and chairs are placed in a circle in a written roundtable discussion, and an envelope is given to each learner. Each learner asks a question on a specific topic in an envelope and writes his answer on one of the "Answer Sheets", puts it in the envelope and marks it. Symbols: 1st student young people 2nd place a round table. After that, he passes the envelope clockwise to the student next to him. The learner who received the envelope writes his answer on one of the "Answer Sheets", puts it in the envelope and passes it to the learner next to him. All envelopes move in a circle. In the final part, all envelopes are collected and analyzed. Below is the structure of the "Round Talk" method.

Structure of the "Round Discussion" method The stages of the "Round Discussion" method are as follows:

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1. The subject of the training will be announced.
2. The teaching student introduces the young people to the procedure of conducting the training.
3. One envelope for each learner and as many learners as there are in the group to write answers, "Answer Sheets" will be distributed, and the time allocated for writing each answer will be determined. The learner writes his name on the envelope and on the "Answer Sheets".
4. The learner writes his question on the topic on the envelope and writes his answer on the "Answer Sheet" and puts it inside the envelope.
5. The learner who wrote a question on the envelope passes the envelope to the learner next to him clockwise. Introduction to the conditions of the interview: Distribution of envelopes and "Answer sheets"; Write questions on envelopes; Write answers to questions; Evaluation and analysis. Write questions to pass the envelope to the student next to him.
6. The learner who received the envelope writes the answer to the question on the envelope on one of the "Answer Sheets" and puts it inside the envelope and passes it to the learner next to him.
7. The envelope goes around the round table and returns to the learner who wrote the question. The learner who wrote the question evaluates the "Answer Sheets" in the envelope.
8. All envelopes are collected and analyzed [2].

The Intergovernmental Panel on Climate Change (IPCC) states that the global energy system must achieve zero emissions by 2050 to avoid the worst impacts of climate change [3].

Although traditional approaches have focused on energy conservation, efficiency and reducing the footprint of the energy system, there is a growing realization among scientists and policymakers that deep decarbonization will require a significant expansion of infrastructure. Not only will the world need to replace or retrofit existing fossil fuel energy infrastructure, but overall energy consumption will increase significantly. Even without clear climate policies, electricity demand will at least double by 2050 based on projected economic growth alone. 90% of the growth in electricity demand will occur outside of high-income countries [4]. With the focus on deep decarbonization and growing needs for transport, industry and residential heating, electricity demand will triple or quadruple by the year mentioned above. Some argue that such large-scale construction of clean energy infrastructure will create huge opportunities, including high-paying jobs and new

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industries, to revitalize economically depressed areas. At the same time, there are serious problems, especially with the deployment of new energy infrastructures. For example, in the 2012 Renewable Electricity Futures study by the National Renewable Energy Laboratory (NREL), they found that the size of the US transmission grid would need to double to meet a 90% renewable energy scenario [5]. A recent study by Princeton University, Net-Zero America, modeled five different scenarios for the US to reach net zero carbon emissions by 2050 [6]. In the High Electrification scenario, US transmission infrastructure would need to increase 3.2–3.5 times by 2050; in the high electrification and high renewables scenario, transmission should be increased by a factor of 5.3. A Net Zero America study of their scenarios found that wind farms would occupy between 93,000 and 400,000 square miles. In a limited renewables scenario, they estimated that up to 250 new 1 GVt nuclear power plants or 3,800 small modular reactors would need to be built. Even though nuclear occupies significantly less land, it is still a significant location problem. While technocratic models like these can tell us how much energy infrastructure to build and even where to build it, they provide little insight into how things actually get built in the real world. There is a growing need for specialists in other disciplines such as public policy, sociology, science and technology studies. Historically, policies to reduce greenhouse gas (or any other pollutant) emissions have primarily relied on simplistic economic solutions such as a carbon tax or a cap-and-trade system. While such programs are highly effective, they produce only incremental improvements at the margins, not the kind of rapid and deep reductions in global greenhouse gas emissions needed today. Countries that have succeeded in building large energy infrastructures, such as France or Japan, have relied on centralized industrial policies in which top-down organizations give mandates or targets to mostly state-controlled utilities or industries. While this has been very effective—for example, in rapidly building large amounts of nuclear power — it would be difficult to reproduce in a country like the United States, which regulates energy markets with numerous and diverse utilities [7].

The siting of conventional nuclear power plants has a long and storied history in the United States. Beginning in the 1960s and continuing into the early 1970s, the Atomic Energy Commission served the dual purpose of promoting and regulating nuclear power, creating conflicts of interest in the implementation of projects.

At this point, the process of siting nuclear plants during this period began to be nicknamed "decision and announcement". The situation was to change when the National Environmental Policy Act (NEPA) was passed in 1970 and in 1974, the

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AEC was split up and the regulatory function transferred to a new, independent Nuclear Regulatory Commission. NEPA required federal agencies to conduct environmental assessments for potential projects and had the potential to make the nuclear plant siting process more democratic and transparent. Instead, project developers have largely adapted to the "decide-declare-defend" model, with large resources now fighting the claims of local groups who are using NEPA to stop projects [7]. Due to a confluence of events, including growing opposition after Three Mile Island, rising prices, and stagnant demand for electricity, no new nuclear power plants were built in the United States for more than three decades. This gives the industry the opportunity to start anew with more equitable processes with a suite of advanced reactor designs that will become commercially available over the next decade. Historically, public opinion about nuclear power has been driven by concerns about energy security and major accidents [8].

Gupta et al. (2019) found that support for nuclear power is low, averaging 49% over the past few years. Nevertheless, research by the same group showed that support for new nuclear technologies, in particular Small Module Reactors, was higher than for conventional large-scale nuclear, and that support for new facilities at existing nuclear sites was greater than for new sites. was higher than [9]. However, high public support does not mitigate local opposition to the projects. For example, in the US, wind energy has consistently received high government support (often above 80%), but similar large-scale wind projects face local opposition [10].

Conclusion

Through this method, young students can briefly and clearly express their knowledge on the given topic "Advanced nuclear technologies in the energy system". In addition, this method provides an opportunity to evaluate young students on the topic "Advanced nuclear technologies in the energy system". In this case, young students can evaluate the answers given by other young students in the group to the questions they asked, and the teacher can objectively evaluate the young students. At this point, the Department of Energy's Office of Nuclear Energy must create and fund a social science agenda to achieve more equitable adoption of advanced reactor technologies. Such a program should focus on addressing historic inequities in the use of nuclear technology, accelerating legacy cleanup efforts, ensuring public participation in the development of advanced nuclear projects, and fulfilling the federal government's nuclear waste responsibilities.

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