

Teaching Specialty Subjects Improvement Methodology

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Abstract: This article emphasizes that the clear formulation of teaching methods is a key factor in improving the quality of teaching. It was noted that the combination of state educational technologies with practical training on the basis of a clear plan will serve to improve the quality of education. Tariffs of foreign and domestic scientists on pedagogical technologies, comparative analysis of research work. The main purpose of the research is to completely get rid of the learning process from a homogeneous system, to process the technology. The main task of the research work is to train future teachers of engineering education using modern teaching methods and experience of their introduction into the educational process, to constantly improve their professional skills and to master effective innovative methods and implement them in practice. Independent work with advanced pedagogical technologies is guaranteed, along with independent work on the effective mastering of teaching materials within the framework of scientific programs. Because no one can achieve an agreed goal without independent action. It is therefore justified to consider independent activity as a means of learning and as a result. The source of students' knowledge is not only the knowledge imparted in the teacher's lectures, but also the student's own perceptions and actions, and the teacher, in turn, should motivate the student to develop research skills, additional search skills. The main task of the article is to develop a new generation of state educational standards, curricula and scientific programs, to determine the qualification requirements, to introduce and develop energy education and to further improve this process. Based on the advanced technology education model, it is planned to develop students' creative skills by organizing new pedagogical games, using visual methods to explain practical topics, creating problem situations, organizing discussions, sharing students' ideas, increasing creative activity, forming independent thinking. The main novelty of the research is the pedagogical technology of teaching processes, organized in two traditional and non-traditional forms, and experimental work. The results of experimental work have shown on the basis of statistical analysis that the effectiveness of students' learning has increased.

Key words: method, mastery, innovation, standard, monitoring, principle, authoritarian, didactic, "DEBATE" method, interactive, "case study" method.

I. Introduction

The ever-evolving technical complexity of the means of production in the world places great demands on the professional intellectual qualities of the engineer and his creative abilities. Being able to think technically is an professionally important quality of engineering thinking. The development of this type of thinking ability and the future success of the engineer is largely determined by the quality of the educational process at the stage of professional training in higher education. In particular, the educational systems of the leading research centers of developed countries, such as P. Debrai - Retzen "Talented Student Teacher Model" (France), USA <<Merit>> (USA), are working effectively in this direction. Therefore, the integrated use of non-standard forms, methods and tools for the development of technical thinking in the preparation of technical students for professional activities plays an important role.

In the world practice, the scope of research conducted on the basis of innovative-integrated and differential approaches to strengthen the technical thinking skills of students, increase their intellectual potential, skills in working with information is growing. In particular, the development of students' technical thinking is a priority in the training of future engineers as qualified specialists in line with international trends. Therefore, in the process of preparing future engineers for professional activities in technical higher education institutions, opportunities to study the methods of professional development of the individual, in particular, to develop a professionally important way of thinking for future engineers are becoming increasingly important. In particular, the development of technical thinking of future engineers in the field of technical education on the basis of modern approaches is an important factor in raising the quality of higher education to a new level.

In order to modernize the educational process in the country, branches of foreign higher education institutions, joint faculties and educational programs have been introduced. The Action Strategy for the Further Development of the Republic of Uzbekistan sets the following tasks: "Further improvement of continuing education, continuation of the policy of training highly qualified personnel in line with modern needs of the labor market" and "Improving the quality and efficiency of higher education institutions based on international standards"¹ given. Important tasks in the implementation of these tasks include, among other things, the description of the training of future engineers, increasing access to modular and programmed learning technologies in the e-learning environment and improving the process of training qualified specialists based on natural sciences. In the current context of globalization, the subject "Electrical Equipment" is the development of a new generation of state educational standards, curricula and science programs, the definition of qualification requirements, the implementation and development of energy education, as well as the further development of

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this process, improvement is the main task. Today, one of the requirements of the "National Training Program" is to accelerate the training of students in the educational process with the use of new pedagogical technologies and information technology.

It also requires research in this area to address issues such as the use of effective forms and methods of teaching in the existing educational process in engineering education, strengthening the educational and methodological training of students, the formation of conditions for professional and pedagogical skills. On this basis, there is a need to increase the level of professional and pedagogical training of future technology teachers, to develop a methodological framework for modern education based on advanced pedagogical technologies. This, in turn, in the process of training future engineering teachers on the basis of new pedagogical technologies, first of all, substantiates the essence of pedagogical technology, identifies the features of the technological approach, the main characteristics (structure and functions), the factors influencing them [2]. The implementation of this innovative approach requires the formation of educational goals and methods, the identification of the elements of the educational process that ensure the proper functioning and the relationship between them.

II. Literature review

Foreign researchers M.V.Klarin, T.Sakomoto, N.V.Kuzmina, Yu.K.Babansky, V.P.Bespalko, etc. The concept of pedagogical technology, content, effective means of training by pedagogical scientists, scientific research has been conducted on the factors that create conditions for the development of their technical thinking, independent research, regular improvement of their knowledge and skills.

The Russian scientist V.P. According to Bespalko, "Pedagogical technology is a project of the process of formation of the student's personality, which can guarantee pedagogical success, regardless of the skill of the teacher" [3].

V.M. Monakhov, a Russian scientist, drew attention to the definition of pedagogical technology as a system of orderly actions that lead to pre-planned results and must be performed. "He does," he said.

According to I.Y. Lerner, "Pedagogical technology" defines a goal that can be reliably understood and identified through the learning outcomes reflected in the learners' movement.

According to the Japanese pedagogical scientist T. Sakomoto, "Pedagogical technology is the incorporation of a holistic way of thinking into pedagogy, in other words, the integration of the pedagogical process into a specific complex."

Uzbek pedagogical scientist B.L. Farberman described pedagogical technology as follows: Pedagogical technology is a new approach to the educational process, which is an expression of socio-engineering consciousness in pedagogy. It is a social phenomenon associated with the standardization of the pedagogical process on the basis of technical capabilities and technical thinking of man and the creation of his optimal project.

Pedagogical scientist N.A. Muslimov studied the scientific and methodological bases of the formation of professional pedagogical qualities in the future teacher of vocational education, the formation of a new generation of specialists, the development of a spiritually and morally mature, independent outlook, creative thinker, committed to universal and national values. paid special attention to the issues.

Professor N.N. Azikhodjaeva conducted research on the use of pedagogical technologies in the educational process and the improvement of pedagogical skills, noting in her research that teaching technologies in the system of vocational education provide the acquisition of fundamental and practical knowledge.

O.Q. Tolipov conducted research on "Pedagogical technologies for the development of general labor and professional skills in the system of higher pedagogical education" and studied the role of pedagogical technologies in the development of professional skills and competencies in future teachers and its application in the educational process.

Based on the above definitions, it can be said that pedagogical technology is a process that focuses on a specific goal and result, taking into account the human and technical capabilities of the learning process.

Pedagogical technology can be considered as a model developed in all respects through well-thought-out pedagogical design, organization of the educational process and, of course, the creation of free, comfortable conditions for students and teachers.

III. Analysis

In the current context of globalization, the subject "Electrical Installation" is the development of a new generation of state educational standards, curricula and science programs, the definition of qualification requirements, the implementation and development of energy education, as well as the further development of this process. improvement is the main task.

Today, positive work is being done in technical higher education institutions to radically update the professional competence of students in the field of electricity on the basis of digital technologies. With this in mind, one of the most pressing issues of the day is the development of a modern concept of teaching the subject "Installation of electrical equipment." As an example, we present the modern concept of teaching, which is the basis for shaping the activities of a special science teacher.

The subject "Installation of electrical equipment" for students of technical higher education institutions in the field of

electrical engineering is divided into sections of general, specific and specific methods of teaching electrical installation. serves the purpose of implementation, development and improvement of assembly training. It is important to address the following in electrical installation training:

- a) didactic conditions for the training of special science teachers;
- b) the positive aspects of the theory and practice of modern pedagogy in the methodological training of future teachers of special subjects;
- c) a methodological framework that leads to the systematic updating and theoretical development of teaching methods of electrical installation;
- d) the place and ways of using innovative pedagogical and information and communication technologies in the methodological system of teaching;
- e) methodical system of teaching science: purpose, content, form, means and methods and technologies;
- f) how the structure of training project projects should be, etc.

The concept of installation of electrical equipment, teaching principles, laws, methods and techniques are required to be understandable and easy to master for students majoring in electrical engineering. At the same time, it is necessary to pay attention to the training materials (content) on electrical installation, professional training of science teachers, compliance with the conditions of modernization of state educational standards and curricula, the correct development of methods for accurate and objective assessment of learning outcomes.

It also plays an important role in achieving the goal, based on didactic principles such as interdisciplinary relevance, interdisciplinary integration, systematic, coherent, scientific, from simple to complex, teaching education in connection with life.

If such an organization of the educational process is considered as a separate educational technology, the above-mentioned didactic principles will allow to improve this technology, to identify and eliminate existing shortcomings in the organization of the educational process.

In general, at each stage of education, "What (general content) can be taught and what can be done to achieve it?" and "Who to teach, what exactly to teach him (in every specialty), why to teach exactly (goal), how to teach (method, form, tool, technology)?" is one of the urgent problems.

Nowadays, "What to teach?" rather, "What can be taught and how can it be done?" Apparently, the approach to the organization of the educational process plays a key role in the modernization of teaching the subject of installation of electrical equipment.

Methodological system of teaching science based on the purpose, content, form, means, methods and technologies of the subject of installation of electrical equipment on the basis of pedagogical-psychological laws and didactic principles. Theoretical and practical materials such as modern teaching methods and technologies used in teaching the subject "Installation of electrical equipment", the possibilities of their use, research methods, concepts and methods of their introduction are studied. Currently, this department is studied for two semesters in technical higher education institutions.

Since innovative pedagogical technologies are a necessary part of the education system, it is possible to make radical changes in the field of education. Enlightenment is the main idea that forms the basis of enlightenment, the understanding of the relationship between nature and society, the abandonment of authoritarian and false thinking, patience, contentment, respect for the opinions of others, respect for national and universal values. The solution to these problems is to some extent closely related to the technology of education.

Currently, in order to solve the problems, a number of activities are being carried out in the field of research of educational technologies in cooperation with prominent pedagogical scientists in the countries. In particular, on the basis of the principles of pedagogical technology available in developed countries, a national model of regional pedagogical technology has been created that is understandable to teachers of the republic [1].

Applying innovative pedagogical technologies to the educational process, of course, requires creativity, knowledge and experience from the teacher. Development of educational projects on the subject "Installation of electrical equipment" is based on the following principles of innovative pedagogical technology:

- The subject "Installation of electrical equipment" is based on all the principles and rules of didactics (educational theory) in the design of lessons. To do this, professors pay great attention to the mastery of didactics and develop the skills to use it in teaching practice.
- In the development of educational projects on the subject "Installation of electrical equipment" emphasis is placed on the independent learning of students. As a result of focusing on the formation of active thinking skills of knowledge, a mechanism of independent work of the student is created.
- In the design of lessons on the subject "Installation of electrical equipment" students are able to understand, memorize and apply in practice the knowledge acquired. In this case, the application of the theory in practice does not mean the

performance of a particular task, but the ability to apply the acquired knowledge in practice.

- The subject "Installation of electrical equipment" ensures that the results obtained at the end of each lesson are in the form of verbs. To do this, a system of actions to be achieved at the end of each training session is developed and identified in the projects.
- The basic concepts of the knowledge imparted through small modules of the subject "Installation of electrical equipment" are identified, on the basis of which control questions are developed to determine the level of knowledge of students and the type of control is determined.
- At the end of the learning process, the level of mastery of knowledge by all students is determined on the basis of the type and criteria of assessment, determined in advance for the lesson.

The training was based on the principles of didactics, rules, systematic approach and principles of pedagogical technology. The project reflects the role of knowledge in what, the rules and principles of didactics in the process of acquiring it, what types and stages of lessons, what methods, information technology and didactic materials are used in the learning process.

On the basis of a well-structured project, pedagogical activity can be carried out for several years, without difficulty, only at an excellent or at least good level. The project ensures that the learning process is good or excellent and lays the foundation for the proper organization of the teacher's work.

Course type - depending on the purpose of the lesson and the topic, which is focused on the study, depending on the internal structure is divided into:

- ✓ Introductory lesson;
- ✓ Introductory lesson with basic materials;
- ✓ Lessons on acquiring new knowledge;
- ✓ Lessons to strengthen and improve knowledge, skills and abilities (practical work, laboratory work, problem solving, etc.);
- ✓ Coordinated lesson (mixed lesson);
- ✓ Repetition and generalization lesson;
- ✓ Control lesson;
- ✓ A lesson on the practical application of the acquired knowledge.

In most cases, a mixed type consisting of four stages is referred to. These are: preparation for the acquisition of new knowledge (repetition of the past); acquisition of new knowledge; consolidation and systematization of new knowledge; apply the acquired knowledge in practice (homework) [2].

In turn, the following types of lessons are widely used:

- theoretical course, mixed course;
- independent work, laboratory work, practical work, excursion;
- control classes (oral questioning, written work, test, control work, mixed work).

Today, the use of interactive teaching methods plays an important role in the effective organization of the lesson.

Interactive teaching methods are teaching methods that activate thinking, encourage independent thinking, and focus on the learner.

These are "Brainstorming", "Debate", "Blitz Questionnaire", "Frontal Questionnaire", "Working in Small Groups", "Roundtable", "Business Game", "Role Play", "Debate", "Problem Situation", "Project", "Case Study", "Reference Text", "Boomerang Strategy (Exchange of Questions)", "Concept Analysis", etc. There are more than 300 types now. In this study, we effectively used the above didactic methods, forms of teaching methods, as well as didactic software teaching aids, conducted experimental work in groups on the example of the subject "Installation of electrical equipment" in the field of "Energy supply in agriculture and water management."

The mechanism of carrying out experimental work

(methodology)

Experimental work was carried out on the subject of "Installation of electrical equipment" in groups 2/1 and 2/2 of the direction "Energy supply in agriculture and water management" of the Bukhara branch of the Tashkent Institute of Irrigation and Agricultural Mechanization Engineers.

The purpose of the experiment: "Energy supply in agriculture and water management" was to determine the level of effective use of pedagogical conditions that allow students to use modern pedagogical technologies in the educational process, the development of factors that encourage them to study independently.

In order to determine the effectiveness of the experimental work, students were assigned to the groups "Experiment" and "Control" on an equal basis. Of these, 20 students from group 2/1 were based on experience and 21 students from group 2/2 were based on supervision. In the experimental group, practical work was carried out on the basis of the methodology recommended by researchers and helping to ensure the formation of students' use of modern pedagogical technologies, while in the control group, educational work was carried out in the traditional way.

Assessment of students' knowledge was based on a 5-point system. The experiments were conducted in accordance with state educational standards and educational goals.

In the experimental work in the "control" group, the teaching process was organized in the traditional way. In this form of lesson, the teacher is active, that is, the student acts only as a listener. Students memorize what they hear, answering some of the questions asked.

In the "Experiment" group, the teaching process was conducted in an unconventional way, designed on the basis of pedagogical technologies. In this case, the teacher pre-designs the topic to be covered. Purposefully implements the lesson on the basis of teaching technologies. In this form of study, the student is the center of the learning process.

During the experiment, trainings based on a number of technologies and methods were organized, such as "Problem", "Debate", "Case Study", "Working in small groups", "B / B / B". Demonstration methods were used to explain the topics of practical training in the field of "Energy supply in agriculture and water management", problem situations were created, discussions were held and students' opinions were shared. The purpose of this approach is to increase creative activity in students, the formation of independent thinking and the development of creativity [7]. During the experiment, the selection of goal-oriented content for the lesson, demonstration of methods of correct delivery of teaching materials to students, analysis, the ability of students to apply their knowledge during the internship were carried out on the basis of instructions.

Description of the technologies used in the course

"PROBLEM" Technology

"Problem" technology is to teach students to find the right solution to various problems or situations arising from the subject matter. Forming skills to identify the essence of the problem from them. Introduce some ways to solve the problem and teach you to choose the right methods to solve the problem. The letter of the root cause of the problem and the solution to the problem is to teach the correct identification of actions.

After the teacher divides the students into groups and places them in the appropriate places, he explains the rules and requirements of the lesson, that is, the lesson should be staged and each stage requires maximum attention from students, they work individually, in groups and as a team. This mood helps students to be ready to complete the tasks assigned to them and stimulates interest in completing them. The training will start after the rules and requirements are explained.

Topic: Installation and adjustment of overhead lines.

In the following diagram distributed by the students, each group member writes and analyzes the chosen problem independently.

They fill in the problem table

Type of problem	Causes of the problem	Ways to solve the problem and your actions

For example

Type of problem	Causes of the problem	Ways to solve the problem and your actions
Electricity shortage	An increase in various losses due to an increase in electricity consumers.	Widespread use of electricity metering devices (ASKUE).

As a result of training with such technology, students learn that before solving a problem, they must first determine its cause, and then choose the methods and techniques they need, and clearly define their actions.

In the example of the "debate" method



The technology of "debate" (from the word "debattere", "debast" - "to argue") serves to organize a debate between participants on a topic in a meeting, session or training, to ensure their mutual exchange of views.

Stages of the debate

1. The problem to be discussed on the topic is selected.
2. The selected problem is brought to the attention of the group for discussion.
3. Opinions expressed by individual students, groups or pairs on the problem are analyzed.
4. A conclusion is made on the points expressed in the debate.
5. The debate ends.

IV. Discussion

The problematic question chosen for the debate.

The installation and adjustment of the overhead line or the level of perfection of the power supply system is usually determined by comparing the performance of the rational power supply system calculated for the enterprise. found by comparison on the basis of a certain criterion. It is therefore much more difficult to determine these prices theoretically.

This, in turn, casts doubt on the validity of the calculated power supply system and the validity of the results, as well as makes the designer's capabilities dependent on these random factors. In addition, the designer has a certain freedom in choosing the elements of the power supply system. Because the cut-off surface is priced differently depending on the type of cables or the plant or type that produces the same power transformers, the same power supply circuit may have different, and in some cases conflicting, results depending on which information or reference is used.

How to solve the problem of eliminating the above uncertainties in the calculation results?

QUESTION: As a future specialist, what suggestions and comments do you have on how to solve this problem? Justify your ideas with examples.

Problem assignments on the module



SITUATION 1

Comparison of the disadvantages and advantages of the main power transmission overhead lines via cable lines of the external power supply given in the science of installation of electrical equipment.

Problem situation: Why do overhead lines take up so much distance in transmitting electricity?



SITUATION 2

For a long time, the electricity meter reading was in the range of 150-180 W. But in the last two or three months, that figure has nearly doubled, to 300 watts. The owners of the apartment were concerned and appealed to the specialists of the district power supply department. The experts of this organization could not determine the reason for this. Homeowners were forced to apply to the State Inspectorate for Electricity Use. The cause has been identified. It turned out that the homeowners were not to blame.

Students are required to:

1. Give reasons options.
2. Provide solutions to the situation.
3. To determine whether there are grounds for compensation of moral and material damage caused to homeowners by the district "Energy Supply" department.

Training was conducted on the basis of the above technologies, as well as teaching methods from a number of active methods. At the end of the training, the activities of the groups were studied and the results were analyzed.

The initial state of students in experimental classes.

(Table 1)

Practice stage and academic year	Educational institution	Number of students		Level (mastery)	In the experimental group	In the control group
		In the experimental group	In the control group			
2021-2022 Academic year	Bukhara Institute of Natural Resources Management	20	21	Top (the best)	4 (20%)	3 (14%)
				High (good)	5 (25%)	4 (20%)
				Medium (satisfactory)	11 (55%)	14 (66%)

Students in the group were considered to meet the requirements of state educational standards. In order to determine the effectiveness of teaching specialty subjects on the basis of experimental and modern educational technologies, the final questions received from students, the results of tests and generalizations were analyzed in terms of quality and quantity.

The following table shows the changes in the dynamics of students' knowledge (in terms of numbers and%) in the process of teaching on the basis of modern educational technologies.

Indicators of the formation of skills and abilities of students in the field of "Energy supply in agriculture and water management" using modern pedagogical technologies in the classroom are expressed on the basis of Table 2.

(Table 2)

Experience stage and academic year	Educational Institution	Mastering Level	In the Experimental Group		In the Control Group	
			At the beginning of the experiment	At the end of the experiment	At the beginning of the experiment	At the end of the experiment
2021-2022 Academic year	Bukhara Institute of Natural Resources Management	Top (the best)	4 (20%)	7 (35%)	4 (19%)	5 (24%)
		High (good)	4 (20%)	8 (40%)	4 (19%)	6 (28%)
		Medium (satisfactory)	12 (60%)	5 (25%)	13 (62%)	10 (48%)

Thus, based on the results in the table, it was found that the methodology used in the experimental group was more effective than in the control group.

Based on this data, we determine the quality indicators of the groups.

X- Quality indicator;

A- 5 number of grades;

V- 4 number of grades;

S- 3 number of grades;

N is the number of students;

In that case

Determining the quality indicator

$$X = \frac{A+B}{N} 100\%$$

the equation is reasonable.

Quality indicator in the experimental group.

$$X_{T6} = \frac{A + B}{N} 100\% = \frac{4 + 4}{20} 100\% = \frac{8}{20} 100\% = 40\%$$

$$X_{T0} = \frac{A + B}{N} 100\% = \frac{7 + 8}{20} 100\% = \frac{15}{20} 100\% = 75\%$$

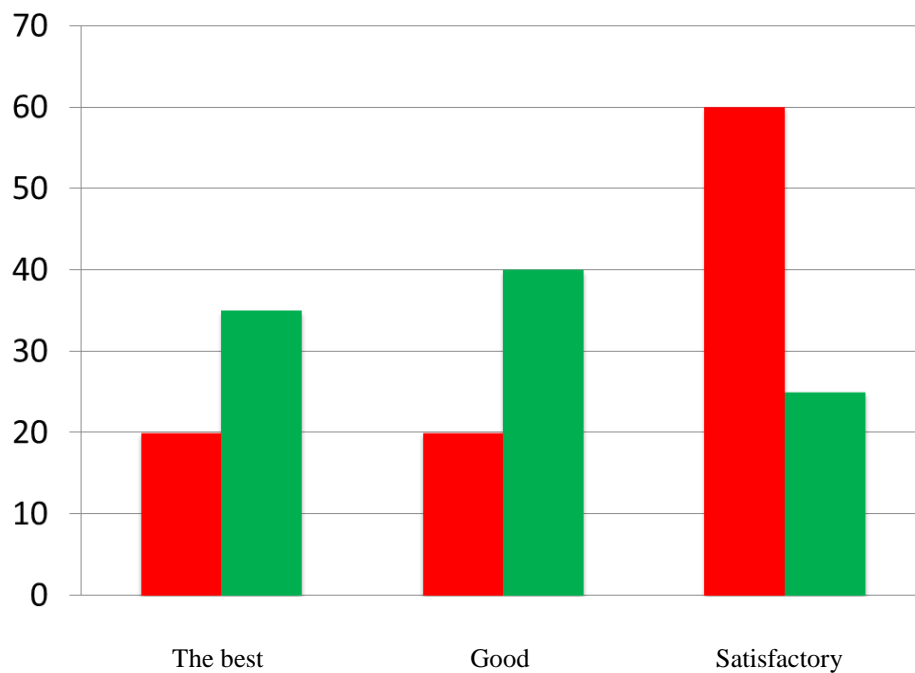
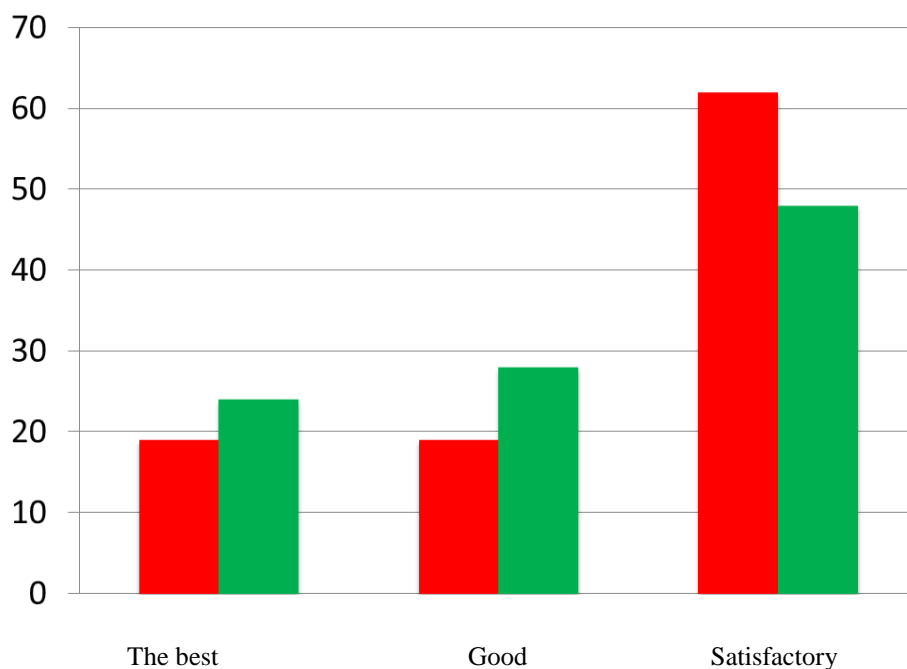
Quality indicator in the control group.

$$X_{T6} = \frac{A + B}{N} 100\% = \frac{4 + 4}{21} 100\% = \frac{8}{21} 100\% = 38\%$$

$$X_{T0} = \frac{A + B}{N} 100\% = \frac{6 + 5}{21} 100\% = \frac{11}{21} 100\% = 52.3\%$$

The results of the experiment showed that the indicators of the formation of skills and abilities of students using pedagogical technologies in the teaching process were 1.87 times more effective in the experimental group and 1.37 times more effective in the control group.

Based on the obtained scientific results, a comparative analysis of the technological approach of students to the teaching process, the formation of their knowledge, skills and abilities is given in the following histograms.

Histogram of experimental group results**Histogram of control group results**

As can be seen from the histogram, the indicators of the formation of skills and abilities of students using modern educational technologies in the field of "Energy supply in agriculture and water management" increased in the group "Experience" compared to the group "Control". The status of the above experimental work shows that the use of educational technologies in the teaching process: increases the level of knowledge of students and also guarantees the quality of the lesson.

V. Conclusion

In conclusion, the analysis of the national and foreign literature on the teaching of vocational subjects using interactive methods concluded that the planning of training in higher education on the basis of innovative educational technologies and principles needs to be studied as an urgent pedagogical problem. The basics of the use of pedagogical technologies in the development of lessons have made it possible to increase the quality of the educational process and, ultimately, the effectiveness of teaching.

In our research, the use of "Modern educational technologies" has the following advantages:

- Interaction and active participation of teachers and students; because if the teacher becomes the main figure in the lesson, the students' sense of responsibility and accountability diminishes.
- Independent thinking, observation of students;
- Promotion of new ideas by students;
- Increased interest in science;
- Sharing each other's thoughts.

The methodology of using modern educational technologies in the educational process in the field of "Energy supply in agriculture and water management" was improved, and the method of using more "Problem-oriented technologies" to develop students' creative skills in the teaching process of general and specialized subjects was recommended.

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