INNOVATIVE TECHNOLOGIES AND METHODS OF TRAINING IN PROFESSIONAL EDUCATION OF THE UNIVERSITY

Istam Aminov, Abror Inatov
Department of Artificial Intelligence and Information Systems, Samarkand State University named after Sh. Rashidov, Uzbekistan
inatov84abror@gmail.com

Abstract. The improvement of modern educational technologies is today one of the leading directions in the development of the vocational education system. Such attention to this direction can be explained, first of all, by the fact that attempts to solve the problems of vocational education by transforming only the content do not achieve their goals. There is a need to harmonize the teaching technologies used and the requirements of modern practice in the education of specialists, to strengthen their conceptual and reflective potential. The need of society for the creative activity of a specialist and developed thinking, in the ability to design, evaluate, rationalize is growing fast. The solution of these problems largely depends on the content and methodology of training future specialists. Traditional training of specialists focused on the formation of knowledge, skills and abilities in the subject area, more and more lagging behind modern requirements. Education should be based onas many academic disciplines as ways of thinking and acting.

Keywords: innovation, learning technology, educational process, higher school, educational technologies , business games, group scientific discussion, case method, brainstorm, portfolio, interactive lectures, training,game design.

Instruction. The current stage of development of education poses a number of fundamentally new problems, among which the need to improve the quality and accessibility of the material being studied should be highlighted. One of the effective ways to solve these problems is the informatization of education, as well as the introduction of various innovative technologies. In turn, innovation (eng. Innovation - innovation) - the introduction of new forms, methods and skills in the field of training, education and science. In principle, any socio-economic innovation, while it has not yet received mass, i.e. serial distribution can be considered innovations.

The traditional training of specialists, focused on the formation of knowledge, skills and abilities in the subject area, is increasingly lagging behind modern requirements. The basis of education should be not so much academic disciplines as ways of thinking and acting. It is necessary not only to graduate a specialist who has received high-level training, but also to include him already at the training stage in the development of new technologies, adapt him to the conditions of a specific production environment, make him a conductor of new solutions, successfully performing the functions of a manager.

Changing socio-economic situationin modern society has necessitated modernization of education, rethinking theoretical approaches and accumulated practice work of educational institutions. Studying innovative experience shows that most innovations are dedicated development of new information technologies [1].In recent decades in teaching practice began widely used variouseducational technology though the idea of technologization of the processeducation was also expressed by Ya.A.Comenius almost 400 years ago [2].

The problems of using innovative technologies in the education system are reflected in the scientific and methodological works of G. A. Kruchinina, Yu. K. Babansky, S. A. Zhdanov, V. P. Bespalko, V. S. Gershunsky, S. D. Karakozov, V G. Kineleva, O. A. Kozlova, A. A. Kuznetsova, M. P. Lapchika, E. I. Mashbitsa, V. M. Monakhova, E. S. Polat, I. V. Robert, N. F Talyzina, A. Yu. Uvarova, A. A. Abdukadyrova, F. M. Zakirova, N. Tailokova and others.

Gradually pedagogical practice has accumulated a lot of money, methods and forms of education and upbringing, but the results of their applications were not always unambiguous. It is necessary not only release a

specialist who has received high-level traininglevel, but also include it already onlearning stages in the development of new technologies, adapt toconditions of a specific production environment, make ita guide to new solutions.

At present, many teaching staff have a lag in the ability to work in the field of using the possibilities of information technology in the educational process. Among one of the main reasons is the unpreparedness of the majority of teachers to introduce information and communication technology into the educational process of vocational education. The rapidly developing area of innovative technologies determines the features of the process of forming the professional competence of teachers in the field of application of information and communication technology in the educational process of vocational education of the university.

Materials and Methods. Improving the quality, relevance and effectiveness of vocational education at Samarkand State University named after Sh. Rashidov in the specialty "Software Engineering" to train a qualified specialist, a creative person who thinks outside the box, capable of effective professional work in his specialty and competitive in the labor market.

The new requirements of society for the level of education and personal development lead to the need to change learning technologies. Today, technologies are productive that allow organizing the educational process, taking into account the professional orientation of training, as well as focusing on the personality of the student, his interests, inclinations and abilities [4, 6].

Modern media and mass communications cannot replace a lecture, but it should become even more flexible, differentiated, taking into account the peculiarities of the discipline being studied, the specifics of the audience, and the psychological laws of cognition, processing what is heard, its impact on the formation of assessments, attitudes, views, feelings and human beliefs, and the possibilities of information technology [7].

Learning technology is understood as a certain way of learning, in which the main load on the implementation of the function is performed by a learning tool under the control of a person. In teaching technology, the leading role is given to teaching aids: the teacher does not teach students, but performs the functions of stimulating and coordinating their activities, as well as the function of managing the teaching aid.

The pedagogical skill of the teacher is to select the right content, apply the best methods and means of teaching in accordance with the program and the pedagogical tasks set.

Method is the wayprogress towards truth. Successlearning depends mainly on the direction and internalthe activity of the trainees, the nature of theiractivities, degreeautonomy, expressioncreative abilities andserve as an important selection criterionmethod.

There are 5 teaching methods:
- ✓ explanatory-illustrative method;
- ✓ reproductive method;
- ✓ method of problematicpresentations;
- ✓ partially - search, orheuristic method;
- ✓ research method.

Basic forms and methods learning that promotes improving the quality of education is:
- role-playing and business games:
- seminarsiterative-generalizing lessons;
- conferences, disputes, dialogues;
- problem learning;
- independent work, protection abstracts, individual work, creative essays, reports, messages;
- testing, programmed control, research work, etc.

All listed technologies learning contribute to solving education quality problems.

Analyzing the modern lecture practice classes [7], we can formula tea number of didactic problems, requiring a solution. Yes, one of which is significant the amount presented to students information combined with insufficient level of structuredness, hindering perception.

Instructor use predominantly one channel does not provide perception adequate development of educational material - the main body of information must be comprehended by ear student(What gives rise to yet another difficulty.- inaccurate and fuzzy writing notes).

Information submission formin a lecture sessionusually static and cannot adapt flexibly to content changes education. As for themselves students - a conservative form of lectures is not contributes to their active activities that are not conducive formation of subjective students' positions in relation to to the didactic process.

These problems are especially relevant for teaching special technical disciplines.

Correction of the listed deficiencies can be through a variety of didactic innovations - the use of the method of problem training, analysis of specific situations, a method of working in small groups, computer simulation and practical analysis results, interactive lectures, application of test tasks in as a control component of lectures, as well as the inclusion into the educational process of new forms of presentation of educational material. Practice shows which is most effective in this context, isuse of electronic presentations structuring he content of the lecture in accordance with the logic of its presentation.

Research results. In order to improve the qualityspecialist training, activation of cognitive activities, disclosure creativity, formation of communicative student skills, organization educational process with high level of independence using the experience of implementation in pedagogical activity innovative methods, department" Artificial Intelligence and Information Systems" apply the following educational technologies (table 1).

No. p/p	Type of educational technology	Characteristic	discipline where this technology
1	*2*	*3*	*4*
1	business games	games that promote the development of critical thinking skills, communication skills, problem solving skills, processing of various behaviors in problem situations	Computer software
2	Group, scientific discussion, dispute	the ability to lead a discussion, convince others, use visual material, cooperate in groups, defend one's point of view, write a concise but convincing report	Basics programming
3	case method	an improved method of analyzing specific situations, a method of active problem-situational analysis based on learning by solving specific problems - situations	Fundamentals of computer science
4	Project method	a way to achieve a didactic goal through a detailed development of the problem, which should end	Algorithm and data structure

1754

		with a very real, tangible practical result, formalized in one way or another	
5	Brainstorm	an operational method of solving a problem based on stimulating creative activity, in which the participants in the discussion are invited to express a greater number of solutions, then the most successful ones that can be used in practice are selected from the total number of ideas expressed	Workstation development
6	Portfolio	modern educational technology based on the method of authentic evaluation of the results of educational and professional activities	Methods of teaching informatics
7	Analysis of specific situations	any event that contains a contradiction or conflicts with the environment. Situations can carry both positive and negative experiences.	Computer networks
8	Method of working in small groups	group discussion of any issue, aimed at achieving a better mutual understanding and finding the truth	Computer graphics
9	Computer simulation and practical analysis of results	modeling carried out with the help of a computer program that implements an abstract model of some system	Fundamentals of computer science
10	Presentations based on modern multimedia tools	effective way to communicate information, visually present the content, highlight and illustrate the message and its meaningful functions	All disciplines departments
eleven	Interactive lectures	lectures using such active forms of learning as discussion, conversation, slide show or educational films, brainstorming	Computer software, Fundamentals of informatics, Computer graphics
12	Binary lecture (lecture for two)	a kind of lecturing in the form of a dialogue between	Parallel programming

1755

		two teachers (either as representatives of two scientific schools, or as a theorist and practitioner).	
13	Lecture with pre-planned mistakes	lecture for encouraging students to constantly monitor the information offered (search for errors: content, methodological, methodical, spelling). At the end of the lecture, the students are diagnosed and the mistakes made are analyzed.	Information Security
14	Socratic Method	the method of questions that imply a critical attitude to dogmatic statements is also called the method of "Socratic irony". This is the ability to extract knowledge hidden in a person with the help of skillful leading questions, which implies a short, simple and predictable answer.	OS

Results and discussions. The use of innovative methods is of particular importance in the preparation of students for the qualification " Software Engineering " due to the fact that graduates in their future activities should turn to the use of innovative technologies in their professional activities, as well as to search for new didactic methods and techniques in the course of their professional activities [4, pp.120-123].

Considering role-playing games ("business", "plot-role-playing") as an active method of learning, it should be noted that it helps to reveal the search capabilities of a future specialist. During practical classes on " Computer support ", students distribute roles, gain skills in conducting lectures, seminars, as well as the basics of management skills in a "student group-teacher" environment.

When conducting classes in the form of organizing a "brainstorming", a dual task is solved:

✓ on the one hand, as a method used in the professional activities of a future specialist;

✓ on the other hand, expert groups, with the help of working hypotheses, consider a wide variety of ideas, prove the importance of a solution taken from a real real situation, gain experience in organizing and conducting an innovative lesson.

In practical classes in the discipline "Fundamentals of Programming Languages", "Game Design" is used, the essence of which is the development of engineering, design, technological projects in game conditions that maximally recreate reality, characterized by a high degree of combination of individual and joint work of students.

The creation of a project common to the group requires, on the one hand, knowledge of the technology of the design process, and on the other hand, the ability to communicate and maintain interpersonal relationships in order to resolve professional issues. Game design turns into real individual design.

The project activity of students puts the practical issues of mastering a profession at the center of the educational process and, on this basis, stimulates interest in theory. Practice shows that students who have developed their software project are ready to defend it, argue their position, conduct a discussion with opponents - and for this

purpose they motivatedly master the theory of the issue, keep the material well in memory even years later. This is also facilitated by the analysis of specific situations (case-study) - a method of activating the educational and cognitive activity of students, characterized by the following features:

✓ presence of a specific situation;
✓ development by a group (subgroups or individually) of options for solving the situation;
✓ public defense of the developed options for resolving the situation with subsequent opposition;
✓ summing up and evaluating the results of classes.

According to the students, they feel like they are active participants in such classes.

This method is also used by teachers in the educational process when it is necessary to pause and switch students' attention from one issue to another, at the end of the lesson, when students are tired, before the start of trainings and other educational activities that involve group forms of activity.

At the heart of the dialectical "Method of Socrates" and today remains a dialogue as a clash of opposites, opposing points of view.

The advantages of this method are as follows: it keeps the interlocutor's attention, does not allow distraction; if something in your logical chain is unconvincing for the interlocutor, you will notice it in time; the interlocutor comes to the truth himself [5].

Today, an integral part of modern teaching methods are information and communication technologies (ICT), which use a wide arsenal of digital educational resources. The quality of the modern educational process is directly related to the improvement of technologies and teaching methods, which in turn depends on the use of a set of ICT tools [8].

Using such an organizational form as educational modeling of scientific research (when studying the subject "Fundamentals of Informatics"), students apply their previously acquired knowledge on the methodology of data collection, master research procedures. At the same time, an important goal is achieved: theoretical knowledge turns into a kind of tool for creative awareness of reality by a specialist in programs and he gains skills in using a new method in professional activities.

Since 2020, the teachers of the department have begun to actively use innovative educational technologies in lectures, laboratory, practical classes, it has become more interesting to take classes on SIWT (see table 3).

Table 3 - Indicators of the application of innovative educational technologies in the disciplines of the department "IIIS"

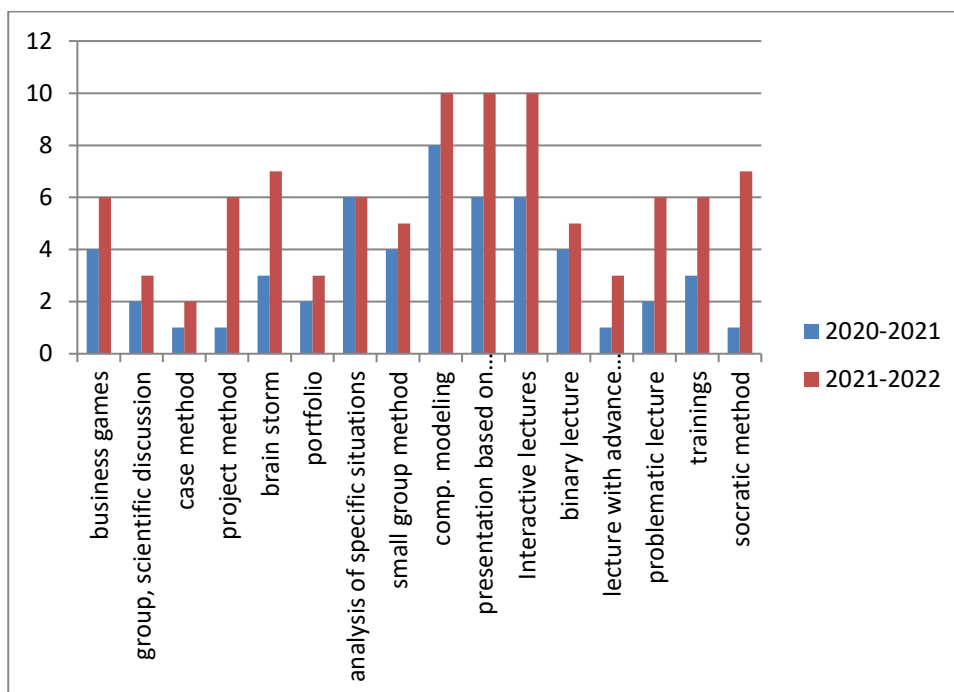|	business games	group, scientific discussion	case method	project method	brain storm	portfolio	analysis of specific situations	small group method	comp. modeling	presentation based on multimedia funds	Interactive lectures	binary lecture	lecture with advance planned mistakes	problematic lecture	trainings	socratic method
2020-2021	4	2	1	1	3	2	6	4	8	6	4	1		2	3	1
2021-2022	6	3	2	6	7	3	6	5	10	10	10	5	3	6	6	7

Figure 1 - Application of educational technologies in 2020-21 and 2021-22 academic years

Based on the results of the analysis of the use of active educational technologies over the past 2 years, it can be seen that artificial intelligence and information systems, presentation based on multimedia tools and interactive lectures are most often used in the disciplines of the department (Figure 1).

It is obvious that the optimization of the pedagogical process by improving the methods and means is a necessary but not sufficient condition. The selection of methods, means and forms should be combined with the implementation of a specific goal and the development of a system for monitoring the indicators of training and education.

Educational technologies provide ample opportunities for differentiation and individualization of educational activities.

The result of the application of educational technologies to a lesser extent depends on the skill of the teacher, it is determined by the totality of its components [9].

This statement is confirmed by the results of a sociological survey of students of artificial intelligence and computer technology of the faculty of Samarkand State University named after Sh. Rashidov of full-time education, in which lectures on the discipline "Fundamentals of Informatics" were read using multimedia technologies.

99% of the students surveyed consider it necessary to use multimedia technologies in lecture courses, 88% of students note that when using multimedia technologies, the perception of the lecture material has increased.

To the question "What do you like more about lecturing with the help of multimedia?", the following answers were received:
- image in color - 75%;
- clear presentation of formulas, text and graphics - 81%;
- animation of graphs and diagrams (the appearance of curves (vectors) on the screen in stages, in a strict sequence of construction and the corresponding comment) - 77%;
- discrete overlay of sound as a psychological discharge - 85%;
- 75% believe that multimedia technology contributes to writing lecture notes more efficiently, without errors;
- 19% wanted to create a small scientific message themselves using the Power Point software product using a multimedia installation;

1758

− 30% noted that the material presented with the help of multimedia aroused their interest in studying the course "Fundamentals of Informatics".

Conclusion

The emotional state of a student largely determines mental and physical performance. The high emotional tone of the audience and its involvement in the educational process ensures the realization of the student's personality reserves. If there is no psychological comfort in the classroom, then other incentives for educational and cognitive activity are paralyzed, the main value of the relationship between the teacher and students is their cooperation, which involves a joint search, a joint analysis of successes and miscalculations. In this case, the student turns into an initiative partner.

The training of highly qualified specialists with fundamental and applied knowledge, able to successfully master new, professional and managerial areas, respond flexibly and dynamically to changing socio-economic conditions, possessing high moral and civic qualities at the present stage is impossible without innovative educational technologies associated with increasing efficiency training and aimed at the final result of the educational process.

Studying the experience of using innovative methods in pedagogical activity, one can single out their advantages:

− they help teach students active ways to acquire new knowledge; provide an opportunity to master a higher level of personal social activity;

− create such conditions in training under which students cannot fail to learn; stimulate the creative abilities of students;

− help bring learning closer to the practice of everyday life, form not only knowledge, skills in the subject, but also an active life position.

In this connection, active teaching methods are of particular interest, because. they contribute:

✓ effective assimilation of knowledge;
✓ form the skills of practical research, allowing to make professional decisions;
✓ allow solving the problems of transition from simple accumulation of knowledge to the creation of mechanisms for independent search and research skills;
✓ form the value orientations of the individual;
✓ increase cognitive activity;
✓ develop creative abilities;
✓ create didactic and psychological conditions conducive to the manifestation of student activity.

Bibliography

1. Guzeev V.V. Planning for educational outcomes and educational technology. - M.: Public education, 2000.
2. Zhukov G.N. Fundamentals of General Professional Pedagogy: Textbook. -M.: Gardariki, 2005.
3. Bychkov A. V. Innovative culture / A. V. Bychkov// Profile school. - 2005. - No. 6. - p. 83.
4. Alekseeva, LN Innovative technologies as a resource of experiment/ LN Alekseeva// Teacher. - 2004. - No. 3. - p. 78.
5. Lepshiy A.P. Lepshiy A.P., Lepshaya N.A. Improving the effectiveness of lectures by the method of active learning of students. // Gomel, 2011.
6. Deberdeeva T. Kh. New values of education in the conditions of the information society / T. Kh. Deberdeeva / Innovations in education. - 2005. - No. 3. - p. 79.
7. Vakulyuk V.M. New technologies in the educational process. The use of multimedia technologies in the lecture course. /Vakulyuk V.M., Semenova N.G./ Orenburg: RIK GOU OSU, 2004.
8. Kolesnikova T.A., Kolokolnikova Z.U., Lobanova O.B. Application of innovative technologies in the educational process of a modern school // Scientific Review. Pedagogical Sciences. - 2017. - No. 6-2. – p. 261-269.
9. A.I.Inatov Pedagogical tact ensures the quality of education. // International Journal on Integrated Education, Volume 4, Issue I, January 2021, 39-41 p.
10. Ilyin, G. L. Innovations in education [Text]: textbook / G. L. Ilyin. M.: Prometheus, 2015. - 4p.426

11. Mandel, B. R. Innovative technologies of pedagogical activity [Text]: textbook for undergraduates / B. R. Mandel. M.: Berlin: Direct-Media, 2016. -p. 260

12. Aminov I . B ., Bustanov X . Technology for solving mathematical problems using software.Scientific and methodological journal "Bulletin of science and education", eLIBRARY, Google Academy, Russian impact factor-3.78. No. 10 (88). Part 4, Moscow, 2020, pp. 65-69.

13. Khutorskoy, A. V. Pedagogical innovation [Text]: a textbook for students studying in pedagogical specialties / A. V. Khutorskoy. - Moscow: Academy, 2008. - 252 p.

14. A.I.Inatov "Education in Development Society (Functional Aspect)" // Eastern European Scientific Journal, Ausgabe 1-2019, 97-101 p.

15. Osmolovskaya, I. M. Innovations and pedagogical practice / I. M. Osmolovskaya // Public education. - 2010. - No. 6. - p. 184-185.

16. Aminov IB, Tugalov R. Formation of information competence of teachers as one of the main tasks of modern education. Cite as: AIP Conference Proceedings **2432** , 060015 (2022); https://doi.org/10.1063/5.0089966 . Published Online: 16 June 2022.

17. Volkova, I. E. The quality of higher education in the information society / I. E. Volkova // Open Education. - 2009. - No. 2. - p. 20-21.

18. Aminov I . B ., Bustanov X . European Journal of Molecular & Clinical Medicine .ISSN 2515-8260, Volume 07, Issue 03, 2020.