IMPROVEMENT OF THE METHODOLOGICAL SYSTEM FOR TRAINING COMPUTER TEACHERS BASED ON THE INTEGRATION APPROACH

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Abstract. The article examines the integration of pedagogical and information technologies as an integrative approach to education, the creators of an integration environment, identifying problems in this environment, showing their solutions, integrating pedagogical and information technologies in computer education, its pedagogical and psychological aspects, and opportunities, pedagogical and informational. Preparation of informatic teachers for the integration of technologies, the development of requirements for them, the formation of professional competencies, self-diagnosis, training in the formation and development of their own methodological system, experimental testing of these processes in educational practice and analysis of the results of experiments, conclusions and recommendations.

Keywords. Integration, teacher training modules, project, design, initial.

Introduction

The new vision of education until 2030, adopted by international organizations, the United Nations and developed countries, focuses on "education as a key driver of development and important activities leading to sustainable development goals", which includes quality education, education promotion, information and communication in lifelong learning. Accelerating the use of technology, pedagogical knowledge in the preparation of qualified teachers, teaching technologies, methods, knowledge of the use of modern tools, professional knowledge: specialization, knowledge of the legal framework that regulates education.

The transfer of society from the industrial to the information stage opens up opportunities for using new information technologies, system thinking, self-education, building an open education system, creating information and methodological support and its effective use in education management, training qualified, modern specialists, and more.

A lot of work is being done to reform the lifelong education system, introduce pedagogical and information technologies in education and improve the effectiveness of learning, conduct distance learning and computing.
erized conferences based on a comprehensive information and communication development program, systems, qualified informatics for lifelong education and the need to train information technology teachers.

The strategy of actions for the further development of the Republic of Uzbekistan defines the tasks "Organizational use of information technologies in higher education using new methods and tools", creating an environment for integrating pedagogical and information technologies into the educational process and a methodological system for training teachers of informatics and information technologies. Development, improvement and implementation is essential.

To implement the tasks set in the President of the Republic of Uzbekistan's Address to the Oliy Majlis of January 24, 2020, December 29, 2020 and the new edition of the Law "On Education", a completely new system of vocational education has been created, a reform of vocational schools, colleges and technical schools based on new approaches in accordance with international standards to ensure quality education in higher education, a sharp increase in the number of students, in the decree PQ-4623 of February 27, 2020 "On measures to further develop the field of teacher education", in the new edition of the Law "On Education" ORQ-637, dated On September 23, 2020, much attention is paid to the training of professional teachers who are able to use modern pedagogical and information technologies in the educational process.

Materials and Methods

Research methods. Comparative-critical study and analysis of political, scientific and methodological literature on the problem in the study; studying DTS, curricula, textbooks and university documents; sociological and pedagogical (observation, interview, questionnaire, test); design, modeling, pedagogical experiments; monitoring; methods such as mathematical and statistical analysis of the results were used.

Purpose of the research: Improving the methodology for training future teachers of informatics on the basis of integrative approaches, the integration of pedagogical and information technologies and their introduction into educational practice.

Functions:

- Pedagogical and information technologies as an integrative approach to education, their integration, organizers of the integration environment, identification of problems arising in this environment, their solutions;

- Coverage of the integration of pedagogical and information technologies into the process of teaching computerscience and information technology, its pedagogical, psychological aspects and capabilities;

- Development of requirements for teachers of informatics and information technology in the field of integration of pedagogical and information technology;
disclosure of training and formation of professional competence of teachers of informatics and information technology in the integration of pedagogical and information technologies;

Development and implementation into practice of the methodological system of the teacher of informatics and information technologies in the integration of pedagogical and information technologies;

- teaching diagnostics and self-diagnostics of a teacher of informatics and information technologies in the field of integration of pedagogical and information technologies;

Observing the preparation of informatics teachers for the integration of pedagogical and information technologies, organizing pedagogical experiments, statistical analysis of the results and recommendations for improving the effectiveness of the educational process.

The object of the research is the process of preparing students for undergraduate studies in the specialty "Methods of Teaching Informatics" in higher education.

The subject of the research is the content, form, methods and tools for the development and implementation of a methodological system for training teachers of future informatics and information technologies in higher educational institutions for the integration of pedagogical and information technologies.

Scientific novelty of the research:

- Models of integration of pedagogical and information technologies in education in informatics and information technologies, pedagogical, psychological aspects and possibilities of integration;

- Development of requirements for teachers of informatics and information technology in the field of integration of pedagogical and information technology;

- Disclosure of information on the training and formation of professional competence of teachers of informatics and information technology in the field of integration of pedagogical and information technologies;

- Development of a methodological system for a teacher of informatics and information technologies in the integration of pedagogical and information technologies and its implementation in educational practice.
Tests and criteria for the integration of pedagogical and information technologies were developed in order to teach teachers of informatics and information technologies to carry out diagnostics and self-diagnostics.

Observing the integration of pedagogical and information technologies in the training of informaticians, organized pedagogical experiments, statistical analysis of the results and recommendations for improving the efficiency of the educational process.

The scientific significance of the research results in the integration of pedagogical and information technologies in the preparation of curricula and work programs in the subjects "Method of teaching informatics", "Technology of teaching and designing informatics", "Pedagogical software and teaching technologies", the development of models for the integration of pedagogical and information technologies into the system of continuous education, the content of means, forms, methods, requirements for the training of teachers of informatics, the formation of their knowledge, skills and abilities contributed to the training of qualified teachers in this area; is explained by the fact that a specialist who is creatively suited to his professional activity can be involved in training.

The practical significance of the research lies in the fact that methodological developments, pedagogical software, control tests, registration of pedagogical activities of teachers of informatics and information technologies (educational process, spiritual and educational work, circle work, group leadership, etc.) have been developed, system and its implementation in teaching practice contributes to the preparation of qualified teachers for our society.

**Literature Survey**

The essence of the concept of integration, its place in philosophical, methodological and practical research, the variety of integration processes; integration is the movement of large integrated systems, the integration of knowledge and skills, the generalization of a purposeful independent system, purposeful integration, the unity and commonality of the laws of nature, the leading form of organizing content, into general, pedagogical integration, specific situations in pedagogy, various forms of scientific integration in the field of pedagogical theories and practices that require action, explanation, forecasting and management in accordance with the problems of science, integrative approach to teacher training, teacher training in the integration of pedagogical and information technologies, their competence, Methods for assessing students' knowledge in an integrated environment Dzhuraev T. [1, 2], Kayumova N. [3, 4], Kluge J. [5], Kravchenya E. M. [6], Li Honqing [7], Lutifilaev M. [8, 9], Magomedov R. M. [10], Mandich D. [11], Muminov B. B. [12], Monakhov D. N. [13], Muslimov N. A. [14], Serdyukova N. [15], Suropov B. M. [16, 17], Khimmataliev D. O. [18], Yakovlev I. P. [19], Yuldashev I. A. [20] and others.

**Discussion**

As a result of the effective integration of pedagogical and information and communication technologies on the basis of pedagogical experience into the educational process, it has been established that from integrated
pedagogicaltechnologiesactivelearningtechnologies,projectlearningtechnologies,problem-modularlearningtechnologies,distancelearningtechnologies.

Thefactthattheeducationalprocessisquiteaccuratelydevelopedfromascientificpointofviewintheenvironmentofinnovativepedagogicalintegrationandintegrationofinformationtechnologieshasledtoaguaranteedresult(sometimesataneXelentlevel)inpractice.

Whenanalyzingthepossibilitiesofintegratingpedagogicaltechnologiesandinformationtechnologiesineducation,thefollowingpossibilitieswereidentified:

- rational,systematicorganizationofpedagogicalandstudentactivities;

- modularpresentationofeducationalinformationandeffectiveinvolvementofemotionalperceptionandintelligenceintheacquisitionofknowledge;

- Intheorganizationofanactiveeducationalprocess,thabilitytoquicklyandeffectivelyclassifystudentsaccordingtotheirabilities,interests;

- takeintoaccounttheindividualcharacteristicsofthestudentforagivengrouptask,thabilitytoseekcompletelynewknowledge,makeprofoundchangesintheeducationalprocess,achievesystemictinking;

- Thespecificityandsoftwarecapabilitiesofthecomputerareusedintheeducationalprocessstosupporttheproject,anactive,problematic,modularapproach,thorganizationofstudent-centeredlearning,thindividualizationoftraining,thactivationoftheeducationalprocess,aneffectivemanagementsystem;

- Intheeducationalprocess,pedagogicaltechnologiessupporttheintroductionofinformationtechnologiesand,conversely,pedagogicaltechnologiesofinformationtechnologies,etc.

Asaresultofteachingtheintegrationofpedagogicalandinformationtechnologies,therequirementsoffutureteachersofinformaticswereidentified.Theyare:

functionalanddidacticcapabilitiesofmoderncomputersandpedagogicaltechnologies,thedevelopmentofcomputer-teachingaidsusingsoftware,thetheoreticalanddidacticrequirementsofpedagogicaltechnology,thetheoreticalanddidacticrequirementsandprinciplesintheeducationalprocess,therequirementsofpedagogicaltechnologiesand-classificationmethodsthattakeintoadccountpedagogicalandergonomicrequirementsfororganizinglessons,theneedtoknowthepossibilitiesofautomatingtheeducationalprocessusingpedagogicalandinformationtechnologies,etc.,aswellaspresentationsusingpedagogicalandinformationtechnologies,preparingacomputerclassforclasses,beingabletocreaterepresentationmaterialsusing2-4interactivemethodsincordancewiththepurposeofthelesson,electroniclearningresourcesbasedoninf
ormation technology; development of e-learning tools, application of existing elements of pedagogical technology in accordance with the taught subject, the need to have experience in making creative changes if necessary.

An in-depth analysis of a number of studies on the training of informatics teachers showed that teacher training in the integration of pedagogy and ICT is clearly divided into "theoretical", "technological" and "practical" modules.

The training of informatics teachers in the "Theoretical" module includes an in-depth study of pedagogical and ICT laws, basic concepts, algorithms, as well as knowledge of pedagogical technologies and ICT in the study of specialty subjects. In the "Technological" module, it presents their use, implementation, integration, all knowledge, skills and abilities in pedagogical design, and in the module "Practical" presents the practical activities of a computer science teacher in the whole process of work.

In the course of our research, we found that the following training opportunities are available for informatics teachers in the field of pedagogy and ICT integration. These are: rational organization of the teacher's work, changing the traditional didactic principles of teaching, keeping abreast of innovations in this area, continuous learning, effective use of time, participation and victory in various competitions, projects, ensuring communicative (proactive) communication with students, motivation, promotion, development, teacher self-esteem, correcting deficiencies and achieving career growth.

The integration of pedagogical and information technologies into the research process is effective when the informatization of educational technologies is aimed at not only the computer, but also at its entire potential, the main emphasis is on mastering the content of the subject during the informatization of educational technologies. This is the development of the student's personality, that is, in the development and implementation of a system project for the organization, implementation and correction of shortcomings in the educational process.

Methodological system and organizers of teaching informatics: when disclosing the purpose, content, form, method, means and control, the features of the methodological system of teacher training are determined. These are: the ability to set the correct goal, the choice of content, the goals of the educational process, design on a scientific basis using methods and means, taking into account the selected content, teaching methods, the unity of theoretical, technological, and practical preparation of students for each other to achieve completeness, to create opportunities for rapid assimilation of educational and methodological materials of increased complexity, for the complete equipping of the educational process with modern pedagogical and information technologies and the use of their integration environment, for the organization of the educational process, for harmonious and comprehensive training in various subjects, forming coverage.

The creation of a methodological system of a teacher of informatics in the environment of integration of pedagogical and information technologies contributes to the improvement of the methodological system during pedagogical practice, diagnostics and self-diagnosis of important qualities of the teacher of informatics.

It is known that an educational project is a clear plan, the development of the content of pedagogical activity on the basis of a set goal, the product of effort to ensure its results, and design is a practical effort to develop the
ontent of an activity or process by predicting, predicting and planning the expected result based on input data.

As a result of the study, it was found that a change in one or several elements in the methodological system of any education leads to a change in other elements, a voluntary methodological system is associated with a specific activity in which goal setting based on social need takes a leading position.

To develop a methodological system, a goal is set, ideas are put forward, activities are replanned, pedagogical and information technologies are determined using the principles of sorting, sorting and selection, the pedagogical process is carried out, evaluated and evaluated. The results are analyzed. The ways of correcting shortcomings (corrections) are identified and further actions are planned.

Research studies on educational design were studied, and a methodological system was developed at the design stages: preparation (research), preparation of a project (design), implementation or implementation of a project, conclusion and conclusion and recommendations. At these stages, the design of classroom and extracurricular activities as a methodological system organizing the activities of a teacher of informatics was demonstrated.

Practice has shown that in the classroom in the specialty, when the teacher forms a methodological system in the minds of students, its constituent elements, tasks, and methods of teaching, a pedagogical and methodological system, the student develops a reflexive approach to creating a methodological system. As a result, the student understands the methodological system using the example of a subject, science, a whole direction.

When developing a methodological system for training teachers of informatics in the field of integrating pedagogical and information technologies, it is necessary to analyze the content and structure of the curriculum, clearly formulate the requirements for the organization of the educational process, to achieve and improve the design of the form of teaching, content, method, tool and results.

To improve the content of the methodological system for training teachers of informatics in the integration of pedagogical and information technologies, modeling, design and teaching of subjects and events as a methodological system, the formation of skills in the use of pedagogical technologies, methods, means and information technologies in teaching informatics, the formation of the educational process on the basis of active, metasubject approaches, teaching the use of pedagogical software, electronic educational resources, the formation of psychological and pedagogical, theoretical, practical and technological training, skillful independent work in methodological training in the form of credit studies.

To improve the method of the methodological system, students should be taught pedagogical and information technologies in teaching computer science, the use of opportunities for their integration, the choice and application of interactive methods using the principles of analysis and selection, innovations in teaching, and the use of innovative methods in teaching computer science.

In order to improve the tool of the methodological system, it is necessary to prepare attention-grabbing slides, animations, visual aids, to create and use in the educational process pedagogical programs, pedagogical and information technologies, their integration into conditioned reflex, the goal of improvement Control in the methodological system was considered necessary for comparison and achievement of the
iregalstrength,self-assessment and assessment of students, development of control criteria, implementation in practice, to achieve a fair assessment of their own activities and students.

In the integration of pedagogical and technical knowledge in improving the training of future teachers of informatics, the possibilities of pedagogical disciplines "Method of teaching informatics", "Technology and design of informatics", "Pedagogical software and technologies" were highlighted. To teach these subjects, educational, methodological, and pedagogical software tools have been developed. Promising teachers pointed out the problems associated with the inability to correctly set goals and objectives when creating pedagogical software, lack of understanding of pedagogical, psychological, ergonomic and methodological requirements, inability to correctly present main inputs, as well as design solutions. For example, using Macromedia Flash 8, AutoPlayMedia Studio 8, Movavi Video Editor Plus, Bandicam, Audacity, TurboSite, Ispring, HotPotatoe and other computer software, the pedagogical software tool "Teaching Software Creation Technology" was created.

As directions for the implementation of the improvement of the methodological system of training in informatics teachers in the field of integration of pedagogical and information technologies, we organize the teaching of specialty subjects in practical and laboratory classes together with students, directing students to projects, as well as 3-4 years of pedagogical practice, it is advisable to integrate the use of pedagogical and information technologies in the development of lesson plans, technological maps, integrate them into the activities of students and thereby develop the professional competences of students in order to improve the methodological system.

Improving the methodological system of pedagogical practice begins with the state educational standard (SES) and state requirements. The goal of implementing DTS requires the creation of a pedagogical system. The process of implementing education is based on laws and principles. Overtime, a computer science teacher begins to design his pedagogical activity, and this process leads to continuity, the emergence of a methodological teaching system and full understanding on the part of the teacher. Only then will the teacher receive his/her initial professional competence.

Overtime, a computer science teacher carries out targeted training, the task of the methodological training system, the design of lessons in the process of educational activities, the development of various design models, the organization of training in general, its purpose, content, form, method, tools and results, and understands that this can be done together with students. It is in this process that the teacher acquires basic professional competence.

Overtime, the teacher creates his own methodological system, understands the continuity of connections between these methodological systems, designs his activities. That is, he quickly and easily understands which pedagogical technologies, which information technologies can be used to achieve the highest results. As a result, they begin to develop their professional competence and achieve special professional competence, apply their special professional competence in practice, further develop and achieve pedagogical skills, which is the highest point in pedagogy.

Results
Organization of experimental work on the basis of theoretical foundations of the integration of pedagogical and technical knowledge in improving the system of professional training of future teachers of informatics, in particular students studying in higher educational institutions in the field of teaching methods of informatics. Special attention has been paid.

The main purpose of organizing experimental work is to determine the level of effective use of the proposed pedagogical conditions, which will allow them to prepare for professional and pedagogical activities to improve the system of training future informatics teachers based on integration of pedagogical and technical knowledge.

Experimental work was carried out in 2015-2018. Directions Gulistan State University, Bukhara State University, Fergana State University, Karshi State University "Methods of Teaching Informatics".

In the course of experiments, the possibility of improving the system of training teachers of informatics based on the integration of pedagogical and technical knowledge were identified, and its qualitative development and effectiveness were confirmed in practice on the basis of scientific assumptions. According to the results of the experimental work, the preparation of future teachers of informatics for professional and pedagogical activities based on pedagogical and technical knowledge, their integration, preparation for design, research, innovative activities, the ability to create a pedagogical program to improve the learning system, teachers of informatics (mobility), partly research, variable: cognitive, motivational-axiological, practical criteria were developed and applied in practice. General and statistical analysis of the results of experiments to improve the performance of students through the methodology of organizing less project activities of students in practical and laboratory classes on the subject "Methods of Teaching Informatics". When determining the effectiveness of the study, the level of assimilation by students of the experiment was studied on the basis of qualitative criteria of assimilation and the Student's criterion was used.

A statistical analysis of firsthand, on, eight laboratory sessions during the study was presented. As a result of the analysis, it can be seen that the assimilation efficiency suddenly becomes large (\( \bar{e} = 1.13 > 1 \)). It turned out that the effectiveness of the experimental groups was higher than that of the control groups, and the results increased by 1.13%.

Conclusion

In our country, a certain experience has been accumulated in the training of teachers who meet the requirements of the time among developed countries. However, the main task of the higher education system is to prepare teachers in the field of informatics in accordance with modern requirements, provide them with the latest achievements in science and technology, the latest knowledge in the field of activity, stimulate innovation, and make the most necessary decisions in non-standard situations.
To fulfill such a responsible task, it is necessary in the process of teaching specialized subjects in the higher education system to set goals and work with all strength and zeal to achieve this goal. The main result of the research work and the conclusions drawn on their basis are as follows.

1. The technical, didactic and preparatory problems in the process of creating an environment for the integration of pedagogical and information technologies in the training of future teachers of informatics in higher educational institutions are identified, ways to overcome these problems, their role, opportunities are identified, the psychological and pedagogical aspect of the created environment are identified.

2. The levels of integration of pedagogical and information technologies have been determined, the possibility of achieving a high level of integration as a result of the enrichment of pedagogical and information technologies by teachers and students has been substantiated.

3. To achieve a high level of integration in teaching informatic teachers, students were shown the way to achieve research work, design, professional identity and professional competence.

4. In order to teach future teachers of informatics to design methodological systems in the integration of pedagogical and information technologies, a methodology for designing an educational process was developed and implemented in practice: lesson plans, flowcharts, e-learning tools.

5. In the process of integrating pedagogical and information technologies, methods and criteria for diagnosing learning outcomes and self-assessment, as well as the pedagogical activities, were developed and introduced into educational practice for future teachers of informatics.

6. Criteria for the formation of professional and pedagogical competence of students in pedagogical practice, which is the result of training future teachers of informatics, have been developed and introduced into practice, it has been established that they do not develop communicative, informational, spiritual, educational, introspection, research and design skills.

7. In the integration of pedagogical and information technologies, a methodological system of future teachers of informatics has been developed, and as a result of its implementation in practice, the achievement of the formation of professional competence of teachers of informatics is shown.

We believe that the following recommendations should be followed to improve the training of future teachers of informatics based on an integrated approach in the higher education system.

1. More attention should be paid to teaching pedagogical and information technologies, their integration, levels of integration, models of training informatic teachers in higher educational institutions.

2. It is necessary to teach the future teachers of informatics to construct pedagogical activity as a methodological system and to bring the project activity to the level of reflection, so that clearly represents his profession activity as an integral system.

3. At the present stage of development of pedagogical and information technologies, it is necessary to ensure the improvement of the curriculum of undergraduate students in the direction of “Methods of teaching informatics.”
4. To strengthen communication with production, it is necessary to introduce continuous teaching practice for teachers of informatics, trained in the integration of pedagogical and information technologies.

5. Teachers of informatics, trained in the integration of pedagogical and information technologies, should be trained to organize their pedagogical activity, identify problems, and conduct research by solving problems.

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