

Software Development of Pedagogical Diagnostics by Means of Information Technologies (on the Example of Higher Educational Institutions)



M.H. Lutfillaev, Sh. A. Abdullaeva

Abstract: The article is devoted to the development and implementation of pedagogical diagnostic software (POPDICT) based on information technology in higher educational institutions of the republic. The authors believe that the introduction of pedagogical diagnostics with the use of information and communication technologies creates the opportunity to quickly analyze and evaluate the levels of competence of graduates, combined with the ability and willingness to self-regulate further education and professional mobility, to diagnose the level of knowledge of foreign languages, preparedness for the specialty: ability to collect, evaluate and use information; to diagnose the high adaptability of future specialists, expressed in the ability to adapt to the information loads caused by updating the means of production, communication skills and teamwork.

Keywords : competence, highly qualified specialist, labor market, information technology, pedagogical diagnostics, methodological system, test tasks, software, diagnostics, monitoring, database.

I. INTRODUCTION

In the world of educational community, large-scale studies are being conducted to diagnose and assess the quality of education, which are aimed at studying the development of the abilities and giftedness of trained youth on the basis of the international assessment programs PISA (Program for international Student Assessment), TIMSS (Third International Mathematics and Science Studi) ICILS- (International Computer and Information Literaci Studi), PIRLS (Progress in International Reading Literaci Studi).

These scientific developments are carried out in the Consortium of Pedagogical Scientific Research of Australia (AGER), the US Pedagogical Research Testing Service (ETS), and the Institute for National Research in Education in Japan [1]. In addition, research in the field of international assessment, diagnosis and qualimetric measurement in the field of education is conducted in such developed countries as the USA, UK, Japan, Germany, China, Singapore, South Korea, based on the TALIS, CIVIC, ICCS- (International CIVIC and Citizenship Education Study) [2]. The introduction of information technology in the educational process creates favorable conditions for obtaining high-quality knowledge throughout human life, activates students, contributes to the development of their basic and subject competencies, intellectual and creative abilities. This implies the need for the development and practical implementation of diagnostic software for assessing the professional competence of future specialists based on information technologies in higher educational institutions of the republic as one of the factors for the preparation of highly qualified specialists who are able to solve future problems. A legal framework has been built in Uzbekistan to create a base for the formation and development of a consumer's media culture in the form of media portals, video and audio information, information resource centers, printed and electronic literature, textbooks, teaching and methodological manuals, electronic textbooks have been developed at the level of world standards, multimedia programs. "Improving the system of continuing education, improving the quality of educational services" is a priority task outlined in the decree of the President of the Republic of Uzbekistan on an action strategy for the further development of the country [3]. Therefore, ample opportunities have been created for conducting practical research on providing software information technologies in the context of the globalization of telecommunication systems.

However, the development of software for pedagogical diagnostics based on information technologies in higher educational institutions of the republic practically remains not fully developed. The above allows us to explore the topic of this work and brings it to the rank of the most pressing issues of computer science and pedagogical diagnostics.

Implementation of Decrees of the President of the Republic of Uzbekistan dated December 29, 2016 No. UP-2909 "On measures to further improvement of the educational system for 2017–2021", as well as

Revised Manuscript Received on December 30, 2019.

* Correspondence Author

Lutfillaev Mahmud Hasanovich*, Head of the "Information technologies" Department Samarkand state Institute of Foreign Languages, Doctor of Pedagogical Sciences, el_kitob@rambler.ru

Abdullaeva Shahzoda Abdullaevna, Doctor of Pedagogical Sciences, Professor of the Department of Pedagogy, Uzbek National University named after Mirzo Ulugbek Tashkent, Uzbekistan, Universitetskaya strel, 4. shax.abdullahayeva@mail.ru

© The Authors. Published by Blue Eyes Intelligence Engineering and Sciences Publication (BEIESP). This is an [open access](#) article under the CC-BY-NC-ND license <http://creativecommons.org/licenses/by-nc-nd/4.0/>

“On additional measures to improve mechanisms for introducing innovations into the economy and the sphere of production and industry” from May 7, 2018 under No. UP-3569 largely depends on improving the mechanisms for using information technologies in the preparation of future specialists in the continuing education system and is an urgent issue of the time [1].

In the Decree of the President of the Republic of Uzbekistan “On additional measures to improve the mechanisms for introducing innovations in the economy and the sphere of production and industry” dated May 07, 2018, No. UP-3569 specifically states that “... an in-depth and comprehensive study of international experience in the use of advanced pedagogical methods, information and communication technologies, e-learning resources and multimedia presentations in the educational process, create great opportunities for organizing a full and high-quality th education of the country's population”[1].

“The modern information society with its complex, high-tech and rapidly changing production, well-developed infrastructure imposes qualitatively new requirements on the training of specialists in various fields” [5]. In this connection, there is an increasing need to review curricula and work programs, the teaching load of the teaching staff with an emphasis on increasing hours of practical training in higher educational institutions of the country, in order to integrate education and production, taking into account international experience in the field of education. Therefore, the development and implementation in practice of pedagogical diagnostic software based on information technology (POPIT) in higher educational institutions of the republic is a timely response to solving the above problems.

Materials and Methods. The development and implementation in practice of pedagogical diagnostic software based on information technology (POPDICT) in higher educational institutions of the republic is not only a fundamental basic preparation of future highly qualified specialists, but also creates the conditions for information and technological readiness of modern personnel of all profiles, namely:

- assessment of the level of competence of future specialists;
- preparedness for the specialty: the ability to collect, evaluate and use information;
- diagnosis of high adaptability, expressed in the ability to adapt to the information loads caused by updating the means of production; communication skills and teamwork;
- correction of committed shortcomings in the training of specialists at the training stage;
- level of ability to self-education and the need for regular training, etc.

Software for pedagogical diagnostics based on information technology (POPDIT) is built in such a way that it can serve to assess the level of preparedness of future specialists, the development of their information and media culture; corrective work in this direction.

“Providing the necessary level of information culture of a specialist requires a certain level of professional training of the teaching staff, their acquaintance with the potential capabilities of these technologies, the ability to use these opportunities in their practical and scientific activities” [3]. Therefore, the development trends of the modern education system are inextricably linked with the widespread

introduction of various forms and methods of information technology and active learning into the educational process.

“As a result of studying the development of information technologies in Europe, the USA, Canada, it was found that they have priority features: the implementation of media education by achieving integration between academic disciplines has been achieved; in 1960-80, media education organized in general educational institutions was based on the integrity of the integration of academic disciplines (mother tongue, art and social disciplines), which cannot be said about the natural sciences. By 1980, the scope of research conducted to study the importance of information technology and the place of trainees' media culture was expanded ”[4]. In the national curricula of the countries of Denmark, Norway and Sweden, the integration of media education with academic disciplines is not limited, but they are classified in accordance with the creation of opportunities for “mastering the necessary skills for the further life of students in an informative democratic society. “The use of information technology in European countries also extends to the activities of business organizations” [20].

Since the beginning of the 20th century, information technologies and media education began to develop in the USA at all stages of the educational space. In Switzerland, educational institutions have their own media libraries, universities in Zurich and Lausanne - research centers for media education in terms of competing with other higher education institutions.

In English-speaking developed countries, the main aspects manifested in the development of media education are as follows: Canada was able to show its ability in social adaptation by evaluating changes in the state as a development factor, in the USA passivity was noted for many years in organizing media education, by the beginning of the 21st century significant achievements in the application of media education in practice, the state began to have its own model of media education; in the United Kingdom, they opposed the use of media education in the teaching system of a conservative approach, many teachers did not show initiative in applying the fundamentals of media education in the learning process, and the government in 1992-1993 tried twice to exclude elements of media education from the curriculum, and in the UK this obstacle has been overcome since the last years of the last century.

A theoretical study of the problem showed that there is a fairly large number of studies in foreign countries, in particular in Russia, on the use of information technology in the educational process.

A study (2018-2019) shows that in Uzbekistan, practical research on diagnosing software information technology in the context of the globalization of telecommunication systems is a poorly studied issue, despite the growing importance of the media and the Internet in the life of society and the individual. This opinion is proved by the fact that during the study it was difficult to find information in the aspect of the issue that interests us.

It was revealed that in the developed countries of the world the issues of introducing pedagogical diagnostic software based on information technologies were widely developed by specialists [2,6-p.].



The definition of theoretical and methodological issues of the implementation of pedagogical diagnostic software based on information technology shows that pedagogical diagnostics are included in the educational process in the form of expert evaluating systems. For example, in Kharkov (Russia), software-based assessment systems for pedagogical diagnostics based on information technologies, which are called "Expert 3.02", were created. They placed tasks of test questions on the administrative methodology for applying these technologies [7, -67-p.]. However, as the analysis of theoretical and methodological issues shows, the question of researching the value of a holistic approach to the introduction of pedagogical diagnostics (and pedagogical diagnostics includes such components as: diagnosis, monitoring, correction, etc.) in higher education institutions through information technology has not been completely resolved.

In Uzbekistan, the issue of developing and implementing pedagogical diagnostic software based on information technology in the country's higher education institutions is urgent, namely:

- a holistic approach has not been introduced to diagnose and assess the competencies of studying youth, to develop their media culture, with the wide dissemination of information in society;
- diagnosing the level of educational achievements of the teacher-psychological (creative, intellectual, spiritual, educational development) values of the impact of the media;
- "the level of media literacy, media education, media ability, media competence;
- the level of preparedness of future specialists in various spheres of human activity "[13, 10-p.];
- a mechanism for diagnosing learning young people based on information and communication technologies, etc. has not been developed. In this regard, the development and implementation of pedagogical diagnostic software based on information technologies in higher education institutions and the organization of the activities of "Innovative laboratories for pedagogical diagnostics" in higher education institutions are required that will create the opportunity for:

firstly, the identification of the level of development of creative, creative abilities of students, professional competencies in the field of professional activity (to conduct research and development aimed at creating and ensuring the functioning of software of computer equipment and automated systems), the possibilities of enhancing the acquisition of knowledge, skills, as well as professional competence [];

secondly, the development of the competence of the teaching staff to diagnose students using information and communication technologies, improving the skills of using advanced foreign experience in the field of education in the studied aspect of the study;

thirdly, the organization and conduct of training seminars, special training courses aimed at the use of pedagogical diagnostics based on information technologies during the educational process, the provision of paid educational services, the attraction of extra-budgetary funds to the account of an educational institution;

fourthly, the development and implementation of educational literature on the creation and implementation of pedagogical diagnostic software based on information technology in universities;

fifthly, the development and implementation of proposals based on the study of competencies in the future specialty of students [];

sixth, the development of recommendations based on monitoring and measuring the degree of development of creative abilities of future specialists, readiness for future work (to solve complex engineering problems in the design, engineering, technological and research areas; take an active part in scientific, pedagogical and organizational-management activities of enterprises, etc. [].

We plan to develop and subsoil pedagogical diagnostic software based on information technology (PDSIT), which will apply to all stages of lifelong education (Fig. 1st).

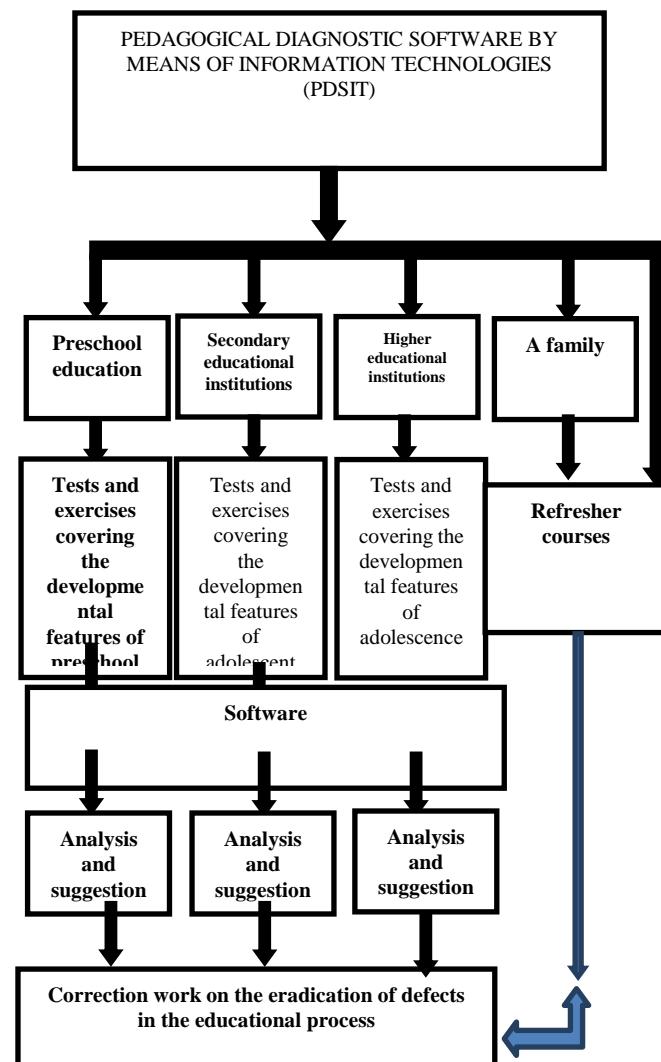


Figure 1. Software for pedagogical diagnostics based on information technology in the continuing education system (LIT)

The introduction of pedagogical diagnostic software based on information technology (POPDICT), as can be seen from the figure, applies to all stages of lifelong education and will contain not only a database of testing students, but also "will create the possibility of developing competent evaluating expert systems at the level of international standards for analysis, processing the obtained diagnostic results "[6].

II. RESULT AND DISCUSSION

One of the main goals of pedagogical diagnostics is the effective organization and optimization of the educational process. For the functioning of the internal mechanisms of each system, a thorough analysis of the operation of the components of this system is required. "This, in turn, presupposes an extensive, rigorous study of the issues of the mechanism aimed at creating and ensuring the functioning of software for computer equipment and automated work systems within the framework of a methodological system for the quality training of competitive specialists for the modern labor market" [9]. Conducting pedagogical diagnostics based on information and communication technologies in higher educational institutions of the republic, implemented at the Mirzo Ulugbek National University of Uzbekistan and at the Samarkand State Institute of Foreign Languages, is a system of educational and methodological documents developed by the university taking into account labor market requirements based on state educational higher education standard in the relevant areas of higher education preparation, and taking into account the approximate educational program.

"The software for pedagogical diagnostics based on information and communication technologies (POPDICT) regulates the goals, planned results, content, conditions and technologies for the implementation of diagnostics" [15, 45-p.], Assessing the quality of graduate training which includes:

- general characteristics of the software;
- The schedule of pedagogical diagnostics;
- the curriculum, work programs of disciplines, practices, funds of assessment tools and other materials that provide objective diagnosis of the quality of training of future specialists, as well as teaching materials that ensure the implementation of the technology used [18, 164-p.]. Let us consider the structural features of the methodological system for the implementation of pedagogical diagnostics (PD) based on information and communication technologies (Fig. 2).

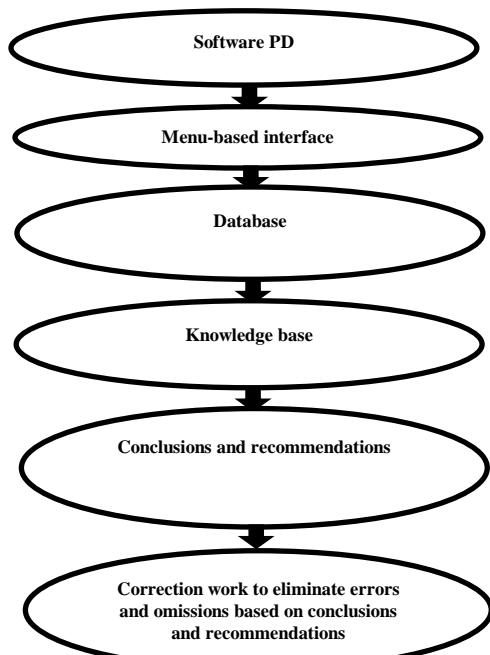


Figure -2. The structure of pedagogical diagnostics (PD) based on information and communication technologies

As can be seen from the figure, the software database (software) consists of structured components relating to the individual stages of the educational process in a whole methodological diagnostic system. In this case, the software is aimed at solving the following problems:

- formation of certain information based on conclusions and recommendations on the obtained diagnostic results;
- diagnosing the level of students' ability to understand the role of science in the development of civilization, the relationship of science and technology, to have an idea of the contemporary social and ethical problems associated with them, to understand the value of scientific rationality [17, 118-p.] and its historical types);
- diagnosis of the ability to self-study new research methods, to change the scientific and scientific-industrial profile of their professional activities;
- diagnosis and correction of the level of practical use of skills in organizing research and design work, in team management;
- diagnosing the level of ability "to take the initiative, including in risk situations, to take full responsibility; independently acquire using information technology and use in practice new knowledge and skills, including in new areas of knowledge not directly related to the field of activity "[3.93-p.];
- diagnosis of students' skills for the future professional operation of modern equipment and instruments;
- diagnosis of students' skills in drawing up reports on research work and preparing publications based on research results, etc.

The introduction of pedagogical diagnostic software based on information technology (POPDICT) creates the opportunity for future specialists to develop:

- analyze and evaluate "the levels of competence of graduates in combination with the ability and willingness to self-regulation of further education and professional mobility" [2, 6-c.];
- "creative and critical thinking, the ability to build a logic of reasoning and statements based on the interpretation of data integrated from different fields of science and technology;
- to diagnose the level of knowledge of foreign languages at the level of social and professional communication, the ability to apply special vocabulary and professional language terminology "[5, 94-p.];
- assess the level of ownership of methods and means of obtaining, storing, processing and broadcasting information through modern computer technologies, including global computer networks;
- to correct the ability of analysis with professional information to highlight the main thing in it, structure, design and present in the form of analytical reviews with reasonable conclusions and recommendations.

III. CONCLUSION

The article presents data on the content of the development and implementation of pedagogical diagnostic software (POPDICT) based on information technology in higher educational institutions of the republic. The introduction of POPDICT creates the opportunity to analyze and evaluate the competencies of future specialists in the shortest possible time,



combined with the ability and willingness to self-regulate further education and professional mobility; diagnose the level of knowledge of foreign languages at the level of social and professional communication, the ability to apply special vocabulary and professional language terminology; preparedness for the specialty: the ability to collect, evaluate and use information; "To diagnose the high adaptability of future specialists, expressed in the ability to adapt to the information loads caused by updating the means of production; communicativeness and ability to work in a team "[14, 55-p.].

Thus, "... the introduction of pedagogical diagnostic software by means of information technology (POPDICT) in the future will extend to all stages of lifelong education and contain not only a database of testing students, but also create the possibility of developing competent evaluating expert systems ..." [2 , 184-p.] at the level of international standards according on the results and recommendations of diagnosis.

REFERENCES

1. Decree of the President of the Republic of Uzbekistan Sh. Mirziyoyev "On the Strategy for the Further Development of the Republic of Uzbekistan", February 7, 2017.//www.lex.uz
2. AbdullaevFarkhad A.Organizing Effective Information Service at Higher Education Institution Using Digital Educational Resources Key//Eastern European Scientific Journal ((ISSN 2199-7977)), Journal, ©2018 AURIS Kommunikations- und Verlagsgesellschaft mbH Düsseldorf – Germany, DOI 10.12851/EESJ201805.Ausgabe5-2018.- Pp.183-187.
3. Abdullaev F.A. Integration of digital educational resources in education: pedagogical conditions for modeling electronic services.-Zh.: Young scientist (Russia), 2019.№3.-Pp.47-51.
4. Abdullaev F.A. Information and communication service in the pedagogical management of pedagogical universities.-Rostov-on-Don. Materials of the XVth Scientific and Practical Conference "Education Throughout Life", 2018-November 4.-P.6.
5. Abdullaeva Sh.A. Pedagogical diagnosis and correction. Textbook for undergraduates of higher educational institutions of pedagogical universities.-Tashkent: University, 2019.-310 p.
6. Abdullaeva Sh. A., Zainitdinova M. A. Improving the quality of education in the system of retraining and improving the qualifications of pedagogical staff // EL. JOURNAL Pedagogy and Psychology of Education (No. 765-12 / 2014), Volume 4, Issue No. 3, 2018. Electronic resource. Access mode: <http://rrpedagogy.ru/journal/author/2002>
7. Andreas Scheleicher. PISA 2012 Results: Students and Money. OECD Publishing. 2014.- 200 p.
8. Andreev A. A. The dissertation for the degree of Doctor of Pedagogical Sciences: "Didactic Foundations of Distance Learning in Higher Education Institutions" [Electronic resource] – Access mode:http://www.iet.mesi.ru/nav_2_3.htm
9. Boud D. The move to self-assessment: liberation or a new mechanism for oppression, Assessment in Higher Education.Central Queensland University,Australia.<http://www.leeds.ac.uk/educol/documents/000002954.htm>
10. Vakhobov MM. Tasks for the introduction of personality-oriented education and the simulation of monitoring the quality of education. Tashkent, 2015; 232. Juraev R Kh. Stages of improvement of the education system in Uzbekistan. Tashkent; 186.
11. Voronina T.P., V.P. Kashitsin, O.P. Molchanova Education in the era of new information technologies (methodological aspects)<https://istina.msu.ru/publications/book674785.4>.
<https://inha.uz/ru>
12. Kellaghan, T. (2003), Assessing National Achievement Levels in Education, The World Bank, Washington, USA. 14. International Standards Office (1998), ISO 690 – 2 Information and documentation: Bibliographical references: Electronic documents, ISO, Geneva, Switzerland.
13. Lutfillaev M.Kh., W.M. Lutfillaev. Creation of textbooks for inclusive education based on computer simulation models. // J.: Science News of Kazakhstan, No. 1 P .. 9-20. Almaty, 2019.
14. 14.Lutfillaev M.Kh., R.R. Eshimov. Development and application in the educational process of Web-applications of virtual resources based on computer simulation models. // J.: News of science of Kazakhstan, No. 2 B. 55-63. Almaty, 2019.
15. Lutfillaev M.Kh., Lutfillaev U.M. Computer simulation models in the educational models (Monograf). LAP Lambert Academic Publiting, Germani, 2019 y, 47 p.
16. Smolin D.V., Tskhai A.A. quality assessment of electronic textbooks in the educational environment "CHOPIN", <http://www.altnet.ru/~mcsmall/DOCS/DOC/academy.htm>
17. Tuhtasinov I.M. Expressing Stylistic devices in Compound Words. //Journal of Foreign Language Teaching and Applied Linguistics (J-FTAL) Volume 4 – Number. 2 – 2017, page 117-123.
18. Turdiev Sh. Information and Communication Technologies in the Sphere of Education: The Advanced Science. China 2018; 67-70. 10. The concept of informatization of education in the Republic of Uzbekistan. [Internet] Available from: <http://beta.edunet.uz/index.phpid=164>
19. EshimovRakhmon. Creating Educational Literature for Inclusive Education based on Computer Imitation Models// Eastern European Scientific Journal (ISSN 2199-7977), Journal, ©2018 AURIS Kommunikations- und Verlagsgesellschaft mbH Düsseldorf – Germany, DOI 12851/EESJ201805.Ausgabe 3- 2018.
20. Jucevičienė, P.A. Theory and practice of modular learning / P.A. Yutsevichene. - Kaunas, 2009 .-271 p.
21. E-learning in South Korea. Overview of the e-learning sector in South Korea [Electronic resource] / scientific. ed. A.A. Arinushkina, S.S. Disruptions; per. from English M.M. Burenko // KURSOBR: [portal]. - Access mode: URL: <https://www.kursobr.ru/opyt-i-innovatsii/569-elektronnoe-obuchenie-v-yuzhnoj-koree.html> Digital Learning Compass: Distance Education State Almanac 2017 [Electronic resource] - Access mode:digitallearningcompass.com.
22. British Standards Institute (2002), BS EN ISO 11623: Transportable gas cylinders: Periodic inspection and testing of composite gas cylinders, Author, London, UK. 13. Greney, V. and Kellaghan, T. (2003), Assessing National Achievement Levels in Education, The World Bank, Washington, USA. 14. International Standards Office (1998), ISO 690 – 2 Information and documentation: Bibliographical references: Electronic documents, ISO, Geneva, Switzerland.

AUTHORS PROFILE



Prof. Mahmud Hasanovich Lutfillaev was born in 1953 in Samarkand region, Republic of Uzbekistan. In 1976 he graduated from Samarkand state University. In 1980-1985 he studied at Moscow state University named after M. V. Lomonosov. In 1989 he defended his PhD

and in 2006 his doctorate. He has published more than 286 works on Information technologies and computer simulations. Under the leadership of M. X,Lutfillaev developed more than 60 multimedia electronic manuals and more than 40 virtual laboratories.



Prof. Abdullayeva Shahzoda Abdullayevna, doctor of pedagogical Sciences, Professor, native of Samarkand region. Author of over 300 works on pedagogy. Readers are known for the books "Pedagogy", "Pedagogical diagnostics", "History of pedagogy", " folk pedagogy" Since 2010 Professor.He deals with the problems of Informatization of pedagogical diagnostics in continuing education, contributing to the qualimetric measurement of creativity and competencies of future professionals able to navigate the labor market. Under the guidance of Professor Sh. Abdullayeva prepared more than 10 doctors of science (PhD)

