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PRACTICAL IMPLEMENTATION OF INFORMATIZATION PROCESS IN BACHELOR AND MASTER TRAINING

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Keywords:informatization of education, Bachelor training, Master training, Master's programs, electronic didactic materials, web-portfolio, ICT tools.

ABSTRACT

The research relevanceis due to the fact that the modern information society, facing informatization, mass communication and globalization of education, set new challenges toBachelor and Mastertraining in terms of implementing and producing electronic publications and resources, mastering methods and toolsof information interaction when implementingthe information and communication technologies (ICT) for independent acquisition and presenting knowledge.

The paper is aimed at solvinga problem of education informatization in the spheresof "Pedagogical Education 44.04.01" (Bachelor degree) and "Pedagogical Education44.03.01"(Master's programs on "Information Technologies in Physics and Mathematics Education" and "Information and Communication Technologies in Education").

The leading research method was comparison and grouping, which enables to reveal the efficiency of electronic educational and methodological materials as components of education informatization in the system of Bachelor and Mastertraining.

The paper presents the experience of implementation of informatization of education in Bachelors and Masters trainingwithin Master's programs "Information Technologies in Physics and Mathematics Education" and "Information and Communication Technologies in Education" at the Faculty of Mathematics, Physics and Informatics of FSBHEI "Dagestan State Pedagogical University", where the authorial electronic educational and methodological materials play the leading role for the subjects of variation part of the Basic professional educationalprogram (BPEP).

The paper materials can be useful for the implementation of the BPEP of university education under informatization, mass communication and globalization of the modern society.

Keywords: informatization of education, Bachelortraining, Mastertraining, Master's programs, electronic didactic materials, web-portfolio, ICT tools.

INTRODUCTION

Education is one of the main tasks of any country and any society. The issue of professional training of would-be teachers holds a prominent place in the documents regulating the renewal of teacher training in our country: Law "On Education"; Law "On Education in the Russian Federation"; Concept of Modernization of Russian Education until 2010; State Program of the Russian Federation "Education development for 2013–2020"; Concept for Supporting the Development of Teacher Education (2013); Program for Teacher Education Modernization for 2014–2017. Development and adoption of the Teacher Professional Standard (2013) is aimed at establishing the norms of professional and pedagogical performance, which should be used as the basis for evaluating results of professional training in a pedagogical university.

Introduction of the graded pedagogical education is urgent as it provides high adaptive opportunities in the context of the modern Russian educational space and requires a wide range of theoretical and practical training of Bachelors and Masters.

According to the researchers (Stankevich, 2010), the modern pedagogical education cannot be reduced to one of the models:

- -behaviorist paradigm (development of pre-defined and observable pedagogical skills in students);
- -personality paradigm (actions of teachers and the environment they form depend on the meanings and goals of the teacher);
- -traditional paradigm (teaching is viewed as a craft, passed on to would-be teachers from educators-experts);
- -research-oriented paradigm (development of the potential for reflective action and the propensity for critical research in would-be teachers).

Education in the field of information technologies began to develop intensively and attract young people. According to the US Bureau of Labor Statistics, the demand for computer and information technology specialists will growby 18% between 2012 and 2020 (UNESCO).

The UNESCO document titled "UNES
CO ICT Competency Framework for Teachers" notes that education informatization is a multi-aspect process comprising the requirements for teachers' competence, didactic materials, information and communication technologies (ICT), and everyday motivation of students and teachers (Osina, 2007). This process is associated with the state policy and socio-economic development.

Objectives and tasks. The research objective is to theoretically substantiate and practically implement the process of informatization of pedagogical education in Bachelor and Mastertraining.

The study solves the following tasks:
1. To analyze the status of informatization of pedagogical education.
2. To analyzeBachelors and Masters training, as provided for by the Federal State Standard of Higher Educational (FSSHE), for the use of information technology in such training.
3. To identify the conditions for practical implementation of informatization in Bachelors and Masters training within pedagogical education.

METHODS AND MATERIALS

The following studies serve as scientific prerequisites for theoretical comprehension of changes in professional training at pedagogical university under the conditions of pedagogical education modernization:

-disclosure of various aspects of professional training of students at pedagogical university (A.A. Orlov, N.F. Radionova, A.P. Tryapitsyn, etc.);
- determination of the requirements for the results of professional training at pedagogical university based on the features of pedagogical profession in the modern society and on the diversification of professional functions, roles and positions of a modern teacher (V.N. Vvedensky, B.P. Dyakonov, E.V. Piskunova, etc.);
- development of new approaches to understanding and organizing the professional trainingenvironment at pedagogical university (E.V. Vasilevskaya, D.L. Konstantinovsky, Ya.M. Roshchin, etc.);
- general issues in the system of higher professional pedagogical education in the sphere of Sciences (V.A. Bordovsky, V.V. Krayevsky, V.S. Lednev, N.D. Nikandrov, etc.);
- features of Masters'trainingin Russia (A.S. Akopova, D.K. Zakharov, V.P. Popov, Zh.S. Safronova, etc.).

In his thesis,P.V. Stankevich (2010) developed models for the content of Bachelors and Masters training in the sphere of Sciences,implemented on the basis of modular and variation approaches to the training of specialists in graded higher professional pedagogical education in the sphere of Sciences.

In the opinion of S.V. Osina, the training of innovative type specialists, possessing creative thinking, deep knowledge, skills and abilities in a certain subject area, is difficult under modern professional education. This is due to the lack of innovation in such training and a shortage of professors qualified in the field of innovation (Osina, 2007).

G.K. Gareyeva revealed the pedagogical conditions to form the competence of expert evaluation of the educational environment in Master students (Gareeva, 2013).

One of the prerequisites of pedagogical education modernization is informatization of pedagogical process, in which ICT tools play an important role.

V. Robert (2014) interprets ICT tools as the software, software-hardware, and technical devices that operate on the basis of microprocessor and computer

technologies, as well as modern means and systems for broadcasting information and information exchange, providing collection, production, accumulation, storage, processing, and transmittance of information, and access to information resources of local and global computer networks (Methodological, 2015).

The ICT-CFT (Information Communication Technology – Competency Framework for Teachers) project, which is in line with the goals of UNESCO and the UN in the field of education, links ICT, education and economy, and associates the use of ICT and educational reforms with economic growth. It is also noted that ICT tools can serve as a catalyst for economic growth and significantly improve the quality of education.

There are three approaches within the project: the use of ICT, the acquisition of knowledge, the development of knowledge, whichorient the education system towards participation in the economic and social development of the country. These approaches should facilitate the consecutive transition from the economy based on high-quality labor power to the economy based on the new technologies application, and then to the knowledge-based economy of the information society. As a result, students (growing citizens and employees) acquire increasingly complex skills required for economic, social and cultural development, environmental protection and improving the quality of life in their country (Order, 2016).

The structure of the ICT-CFT related competence of teachers is set by the intersection of three approaches to learning process based on human potentialdevelopment, which are: “ICT application”, “Mastering knowledge” and “Producing knowledge”, and six aspects of work, which are: “Understanding the role of ICT in education”, “Curriculum and evaluation”, “Pedagogical practices”, “technical and software tools of ICT”, “Organization and management of the educational process”, and “Professional development”.

The modern society in the context of its informatization, mass communication and globalization sets new requirements for Bachelors and Masters training in pedagogical education as far as application and production of the information resource of the Internet are concerned. Besides, the process requires mastering methods and means of informational interaction in computer networks and means for the implementation of ICT capacities while obtaining and presenting the knowledge independently.

The key elements in the creation of a new system of Bachelor and Mastertraining in the context of implementation of the concept of teacher education development are as follows:

1. Bachelor and Master courses for training of teacher-methodologists and managers; priority admission to state-funded vacancies of individuals working in the education system.
2. Practical modular Bachelor and Master courses allowing those without pedagogical education toacquire the profession quickly, with priority admission of those already working in the system of compulsory education.

Basing on the theoretical analysis of works on the development of higher pedagogical education system in Russia,we can identify the following factors for its planned development:

- changing the demand in the regional educational markets;
- severe competition in the current system;
- new understanding of the criteria for assessing the level of professional competence of would-beBachelors and Masters;
- review of the qualification characteristics of would-beBachelors and Masters inPedagogy;
- defining the new principles of organization of higher pedagogical education system taking into account the international standards and national experience.

Basing on the analysis of the FSSHE in the sphere of "Pedagogical Education 44.04.01" (Master degree), the authors single out the main objectives of Masters training:

- development of knowledge and scientific thinking among Master students, mastering and consolidating the skills of carrying out scientific and pedagogical work;
- trainingthe research and pedagogical workers for universities and other areas of professional activity, or for postgraduate courses(Vezirov & Babayan, 2015).

Basing on the analysis of FSSHE in the sphereof "Pedagogical Education44.03.01" (Bachelor degree), the authors distinguish the following professional tasks, which thewould-beBachelors should be ready to solve under informatization of pedagogical education:

- forming the educational environment to ensure the quality of education, including with the use of information technologies;
- using the technologies appropriate to the age-related characteristics of students and reflecting the specifics of the subject area;
- modeling individual road-maps for education, upbringing and development of students, as well as their own educational route and professional career (Gareeva, 2013).
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The authors of this paper, being representatives of the universities of the Republic of Dagestan and the Chechen Republic, contribute to the process of Bachelors and Masters training on the basis of ICT tools. The main approach adopted by the authors is that the methodology of using the ICT tools by undergraduate and graduate students can be based on solvingresearch tasks by using the Internet and elaborating the electronic learning resources that are the main components of the information educational environment of a university.

In accordance with state requirements for Masters' training, universities are entitled to channel about 80% of the content of two-year specialized training

program on education individualization and development of the students' personality.

Masters' degree program assumes a narrower and deeper specialization, motivating candidates for research or teaching activities.

The introduction of ICT tools into the pedagogical education system becomes more widespread every year. The most of the practical training, scientific and methodological studies are translated into electronic format.

For practical implementation of the UNESCO programs in the field of the education informatization, the authors make a contribution to Bachelors and Masters training, which requires a highly-saturated information-educational environment of a university. The environment is a complex multi-purpose system, integrating educational and didactic-methodological resources, software, knowledge management systems, being at the same time a highly-constructive environment for organizing various forms of independent work on the basis of ICT educational tools.

Such environment is a dynamically developing, self-organized system available for teachers and students. The system provides a variety of content and functions allowing the students to build up an individualized educational trajectory.

The authors opt for the following forms of implementing the information and communication technologies in the Masters program:

1. The use ofthe authorial electronic tutorials enables to intensify the activity of would-beMasters, improve the quality of training in a particular discipline, and demonstrate the essential aspects of objects embodying the principle of visualization.

2. The use of multimedia presentations enables to present the didactic material as a system of bright reference images filled with exhaustive structured information in algorithmic order.

3. The use of the Internet resources provides a huge potential of educational services (e-mail, search engines, electronic conferences) and becomes an integral part of modern education. While receiving education-relevant information from the Net, the would-be Masters acquire certain skills.

4. The use of an interactive whiteboard and its software facilitates an interactive organization of educational-cognitive activities of would-be Masters.

Masterdegree students in the sphere of "Pedagogical education44.04.01" (Master's programs "Information technologies in physics and mathematics education" and "Information and communication technologies in education") must be able to solve problems related to:

- the creation and use of pedagogical technologies oriented to forming the skills in various types of independent activities aimed atacquisition, processing, storage, transfer, and producing of educational information, as well as educational activities aimed at formalizing the processes of knowledge presentation and extraction and ensuring comfort and motivation of the educational process;
- the functioning of "virtual" open educational systems with telecommunication access on the basis of the distributed information resource potential, providing social adaptation to activity in the information society;
- the useof ICT tools in the management of educational institutions of secondary and higher education and development of policies for their implementation in the upbringing and educational process;
- the use of the educational-material basis of the education informatization;
- the creation and use ofthe ICT-based tools for monitoring the educational process development at institutions;
- the organization of research and experimental activities, based on automation of the training experiment results processing, which takes place both in real conditions and virtually.

Basing on the studied publications of foreign scientists (Order, 2016;Osina, 2007),the authors consider it expedient to more effectively use the possibilities of social networks of the Internet and mobile phone applications in the educational process. Additionally, this will attract students who are active users of the networks,and these are now the majority.

At present, the digital educational resources and network social services are rapidly evolving, which allows organizing fundamentally new forms of education. One of such new formsis networking for the implementation of undergraduate and graduate educational programs.

In the Federal document "Methodological recommendations for the organization of educational activities using networking formats of the educational programs implementation",the network format is understood as the organization of trainingusing the resources of several institutions that carry out educational activities (Vezirov & Babayan, 2015).

In July 5, 2016, Dagestan State Pedagogical University and Novosibirsk State Pedagogical University signed the Agreement "On the network format of implementation of the basic professional educational programs of higher education "Information and Communication Technologies in Teaching Foreign Languages" and "Information and Communication Technologies in Education"in the area of "Pedagogical education 44.04.01",with a view of improving the quality of students' training, facilitating integration of pedagogical and scientific activities and extendingaccess to the educational resources for their more efficient use. The Agreement provides students with the opportunity to choose courses, disciplines, modules, to implement a competence approach, including distance learning technologies and e-learning, as well as to exchange experience in training, and improve the educational, methodological and research work of the partner universities. The partner

universities provide theirstudents with the opportunity to masteran educational program using the resources of their institutions (all resources required for training, practice and other types of educational activities offered by the networked educational program including internships).

RESULTS

The practical experience of teaching in the Masters program in the area of "Pedagogical Education 44.04.01" (for Masters programs "Information Technologies in Physics and Mathematics Education" and "Information and Communication Technologies in Education") at the Faculty of Mathematics, Physics and Informatics of FSBHEI "Dagestan State Pedagogical University" provides an opportunity to increase the efficiency of using ICT tools in the system of higher pedagogical education.

The main approach adopted by the authors of this study is associated with the methodology of using ICT tools by would-be Bachelors and Masters of pedagogical education while finding solutions to research problems inthe Internet, allowing the shift of the main computing load from the university to outlet servers with"cloud" technologies.

One of the components of the information-educational environment is the 4portfolio.ru platform, which enablesto create and maintain the web-portfoliosof thewould-be Bachelors and Masters.

The web-portfolio is a combination of the capabilities of portfolio technology and social network, which serves as a modern instrument for interaction in the network community, providing access to the personal information of a teacher and a student irrespective of the place of work or study.

The web-portfolio of would-be Bachelors and Masters is their own website with an unlimited number of pages that makes it possible to colorfully demonstrate the results in various kinds of activities educational, scientific, creative, etc., as well as a tool for personal development and improvement, for visual self-promotion and self-presentation in the Internet community.

The authors created and maintain web-portfolios of would-be Bachelors and Masters, an important place in which is held by multimedia projects on the main content of asecondary school course of Informatics and ICT, as well as digital tutorials (DT) in different disciplines of the variationpart of the Masters curriculum.

The authors interpretDT as an educationaltoolthat implements the capabilities of ICT media for providing educational information with the use of multimedia technology and network interactive teaching tools (Vezirov, 2017).

Educational information is provided in the form of electronic educational and methodological complexes (EEMC), electronic educational-methodical module (EEMM) and electronic teaching and learning aids (ETLA).

The students of Masters course, under the supervision of Professor T.G. Vezirov,developed the following DT and implemented them into the educational process of educational institutions:

1. Computer networks.
2. Higher mathematics.
3. Multimedia technologies.
4. Zoology of invertebrates.
5. Traditional culture of the peoples of Dagestan.
6. Network information resources for foreign languages learning.
7. Geography of tourism.
8. Foreign language in legal sphere.
9. Portal technologies in education.
10. Computer graphics.
11. Foreign language.
12. Arabic countries studies.
13. E-learning tools in Bachelorstraining.
14. Project activity of a Bachelor of Law.
15. ICT-competence of a teacher.
16. Social Informatics.
17. Methodological foundations of informatization of compulsory and higher education.
18. Information and telecommunication technologytools in pedagogical education.

Some DT are included into Federal Register of Scientific and Technical Information Center "Informregistr"as the compulsory federal copy of an electronic publication (Moscow), others are logged on the web-site of the Department of Distance Learning and Advanced Qualification of Don State Technical University (Rostov-on-Don, http: //skif.donstu.edu.ru) in the section of Dagestan State Pedagogical University, as well as on the web-site of Master students of the Faculty of Mathematics, Physics and Informatics of Dagestan State Pedagogical University (http://magistr-fmf.ru).

The authors' experience of working on Master courses and the performed studies have shown that the use of modern ICT tools enables to:

- promote motivation, increase interest and expand the cognitive needs of would-be Masters of pedagogical education;

- ensure individualization of training; create prerequisites for the transition to personality-oriented learning;
- increase interactivity of teaching; develop the dialogical nature of the learning process;
- increase visibility in training and raise the level of visualization of the studied material;
- expand the range of training tasks in the training process;
- increase efficiency of the learning outcomes monitoring;
- ‘immerse” the would-be Masters into a virtual environment with the opportunity to modeleducational and professional situations that would trigger theirreadiness for solving the emerging problems.

The analysis of the motives for using electronic publications and resources in educational activities demonstrated that the majority ofthe Master program students (82%) wish to improve their professional training with ICT tools.
The Masterstudents of the partner University (Novosibirsk State Pedagogical University) have access to electronic educational and methodological materials developed by the Master students of Dagestan State Pedagogical University in collaboration with Professor T.G. Vezirov, which are posted on the portal http://skif.donstu.edu.ru and on the educational web-site http://magistr-fmf.ru.
We prepared video lectures using the WebcamMax program for Master students of the partner University in the following disciplines:

1. Theory and methodology of education informatization.
2. Modern information and communication technologies in pedagogical education.
3. Distance educational technologies in teaching foreign languages.
4. ICT-competence of a teacher.
5. Internet and web 2.0 services in teaching foreign languages.

CONCLUSION

Ourexperience in working for Bachelor and Mastercourses, as well as the conducted studies,demonstrated that the use of modern ICT tools enables to:

- promote motivation, increase interest and expand the cognitive needs of the would-be Bachelors and Masters of pedagogical education;
- ensure individualization of training; create prerequisites for the transition to personality-oriented learning;
- increase interactivity of teaching; develop the dialogical nature of the learning process based on authorial digital tutorials;
- increase visibility in training and raise the level of visualization of the studied material;
- expand the range of training tasks in the training process;
- increase efficiency of the learning outcomes monitoring;
- ‘immerse” the would-be Bachelors and Masters into a virtual environment with the opportunity to model educational and professional situations that would trigger their readiness for solving the emerging problems.

The analysis of the motives for using e-publications and resources in educational activities showed that the majority ofwould-be Bachelors and Masters (78%) wishto improve their professional training with the modern ICT tools. Basing onthe publications of foreign scientists (Prestridge, 2014; Prescon, 2013; Cochran-Smith & Fries, 2001; Bureau, 2014–2015; Prescott, 2014; Kassens-Noor, 2012; Mapping, 2009; Wilson, Grizzle, Tuazon, Akyempong, & Chi-Kim, 2011; Vezirov, Borozinets, & Sorokopud, 2013),the authors believe that the usage of possibilities of social Internet networks and mobile phone applications in the educational processcan be more efficient. This will additionally attract Bachelor and Master students, who are active users of these networks.

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