Training of Teachers for Professional Activity in the Digital Enviroment of the Educational Space

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Abstract

Now modern education is enriched with the latest procedural skills on the basis of information technologies. One of requirements is obligatory application by teachers of computer means and information communication technologies in professional activity. However not all teachers know how to apply the existing technologies in educational activity, badly understand information innovations and modern achievements of science, equipment and technology. Therefore, for each teacher the conditions allowing to improve its skills in the field of IT shall be created. It will allow to provide productive functioning of information educational environment and productive application in it new digital technologies. As research problems we put forward: detection of requirements by information educational environment of educational institution and to qualification of the teacher for the organization of work in it; informative filling of courses for providing the necessary skill level of pedagogical workers; development and the description of technology to professional development of teachers in information educational environment by means of cloud and remote technologies. For implementation of research tasks the following methods of research were used: the analysis and generalization of pedagogical, methodical literature on the work problem; the analysis of educational standards, the existing programs of professional development, methodical materials; synthesis of pedagogical experience. Results: the author's maintenance of advanced training course expected teachers with the different level of preparation in the field of IT is developed; all materials are placed in

cloud computing storage and remote system of training LMS Moodle; the innovation methods and forms of providing the training material to listeners of the course and technology of training of teachers are offered. Outputs: the teachers who were trained received skills of work in the digital environment of educational space that will allow them to organize at the high level studies using modern digital technologies; create own remote courses; train in information technologies of the colleagues.

1   Introduction

Information technologies were included already firmly into our everyday life and into education. In the next years education will adapt even more to requests of the people born during the digital era, placing emphasis on technological effectiveness. Now it is paid to questions of improvement of quality of education, creation of conditions for development of digital educational space, active expansion of educational media space and forming of the directions of digital pedagogy much attention. Effective functioning of information educational environment and application of new digital technologies in it, demand the appropriate level of qualification from workers it using and supporting, imposes new requirements to the education system in general and to training of the teacher in particular.

Relevance and demand of training of the teacher is caused by the increasing requirement of society for the highly skilled competent teachers who are professionally owning educational and digital technologies and ready at the high professional grade to perform versatile pedagogical activity in the context of current trends of digitalization of society and education.

Today in Russia there is forming of the new concept of education directed to the introduction in the world educational space. This stage is followed by significant conversions, both in the pedagogical theory, and in practice of educational process. Besides, the content of education is enriched with the latest procedural skills on the basis of information technologies (IT).

One of requirements of upgrade of the modern education system - obligatory implementation in educational process of the innovation approaches and methods connected with use of computer means and information communication technologies. Each teacher, irrespective of the discipline read to them, is obliged to own modern information technologies and to be able to apply them in the professional activity [Abd17]. That is, knowledge in the field of digital technologies and ability to put this knowledge into practice is simply necessary for the teacher for successful work.

However, not all teachers of the educational organizations possess necessary skills in this area. Their information competence does not conform to modern requirements. They not always know how to put the existing technologies for achievement of higher step of professional skill into practice. Occasionally to teachers can be difficult independently to master new forms, methods and training aids on the basis of IT, it is difficult to deal with modern achievements of science, equipment and technology. Therefore, for each teacher the conditions allowing to improve its skills in the field of IT shall be created.

2   Problem statement

Improvement of pedagogical skill of teachers and increase of their professional qualification in the field of IT is obliged for any teacher and one of conditions of its effective work now. It will allow to provide productive functioning of information educational environment and productive application in it new digital technologies.

As the main objectives of research we put forward:

-– detection of requirements by information educational environment of educational institution, to qualification of the teacher for the organization of work in it on management and maintenance of educational process;

— the description of informative filling of courses for providing the necessary skill level of pedagogical workers in the field of practical application of digital technologies in their professional activity;

— development and the description of technology to professional development of teachers in information educational environment by means of modern digital technologies (in particular, cloud and remote technologies).

3 Development of methodology

3.1. Information educational environment, information competence of the teacher and prerequisite for the organization of advanced training courses of teachers

In continuously developing digital society there are regularly new information technologies providing increase of efficiency of training activity in information educational environment of university.

Need of creation and development of information educational environment and its components (remote educational technologies and technologies of e-learning) is reflected in government and legislative documents of Russia and the EU.

These documents normative fix and actually transfer to discharge obligatory still absolutely recent "innovations" of the education system, such modern forms of the organization of educational process as "network interaction of organizations of education", "e-learning", "remote technologies", "online training", "mass open educational courses" and others.

According to requirements of legislative documents, information educational environment of educational institution shall provide:

1. Access to curricula, working programs of disciplines (modules), the practices, to the editions of electronic library systems and electronic educational resources specified in working programs;

2. Fixing of the course of educational process, results of intermediate certification and results of mastering of the main educational program;

3. Carrying out all types of occupations, assessment procedures of results of training which implementation is provided using e-learning, remote educational technologies;

4. Forming of the electronic portfolio which is trained including preserving of its works, reviews and estimates for these works from any participants of educational process;

5. Network interaction between participants of educational process, including synchronous and (or) asynchronous by means of the Internet network [Pan18].

And it is not all functionality which is assigned on information educational environment of educational institution. The teacher, getting to educational space of information environment, shall be able to manage this functionality, to understand technical aspects and to be able to use tools of the educational environment in the professional activity. Thus, information competence becomes one of important sides of professionalism of the modern teacher: level of proficiency in skills of use of information and communication technologies at the solution of educational and educational tasks.

The term "information competence" rather often occurs in scientific pedagogical publications of the last decade. Such researchers as L.K. Raitskaya, P. V. Sysoyev, A.L. Semenov, S. V. Trishina and many others consider information competence as knowledge, abilities, skills, and also the ways of activity in the field of information technologies directed to the solution of professional pedagogical tasks. In our opinion, more precisely interpretation of information competence in relation to the teacher of a higher educational institution is given in article A.V. Mukhamedshina: "Information competence of the teacher of higher education institution is the integrative property of the identity of the teacher based on internal readiness for interaction with the trainee in the information environment with use of digital data representation form, which is based on possession of knowledge of bases of information literacy and information security, existence of skills of use of hardware and software, desire to seize effective technologies of processing and transformation of information and aspiration to use new information technologies in educational process for achievement of a main goal of training - formation of the identity of the trainee competent of the modern information world" [Muk11].

Thus, on the basis of the carried-out analysis of the characteristics of information competence stated in scientific and methodical literature it is possible to define information competence as the acquired concrete knowledge, abilities, skills and ways of activity as a result of training aimed at effective decision-making in educational and professional activity by means of use of computer technologies.

However our appeal to real high school practice showed that not all teachers own modern information and communication technologies and necessary level of information competence. In our opinion, it is caused by the following reasons:

– unwillingness to carry out the additional loadings connected with acquisition new, uncharacteristic for the studied subject domain of the knowledge, abilities and methodical skills connected with development of information and communication technologies;

– lack of due quality and number of the modern computer equipment;

– increase of time expenditure on preparation for classes with use of ICT, etc.

To help teachers of higher education institution to master modern information and communication technologies and to teach to organize the professional pedagogical activity with their application, it is regularly necessary to conduct advanced training courses of the faculty in the field of ICT.

3.2. Possibilities of cloud and remote computing for maintenance of educational process and professional activity of the teacher

For implementation of function of the organization of work on management and maintenance of educational process in information educational environment the majority of the educational organizations use own remote platforms or well-known systems of remote learning, for example, such as "Moodle", "eLearning Server", "eLearning 4G", etc. [Jam15]. However, application of the listed platforms, demands, first, considerable material attachments from the organization, and secondly, rather long training of teachers in technologies of work on creation and maintenance of training courses by means of these remote platforms [Kal18].

There is also some other the reasons forcing educational institutions to look for alternative options: it is redundancy of tools of remote platforms and, as a result, complexity in mastering of resources, the insufficient opportunities for the organization of communication between subjects of educational process, restriction of the group of people having access to the resource, impossibility of joint activity, need of permanent and obligatory administration and others.

Experience shows that modern digital technologies offer teachers and other alternative decisions.

For example, at the organization and management of educational and methodical work within separate structural division of the educational organization, it is quite possible to use technologies of cloud computing [Pan16].

The technology of cloud computing (cloud computing) is understood as technology which allows to integrate IT resources of different hardware platforms in the whole and to provide to the user access to them through the wide area network the Internet. Cloud services offer users access to the resources by means of free, or conditionally paid cloud computing applications which program and hardware requirements do not assume presence at clients of high-performance and capable computers [Duk14]; [Leo15].

Most of heads and teachers of the modern educational organizations for the present experience the number of difficulties in need of application in the activity of new digital technologies. Unfortunately, all of them still poorly represent as it is possible to use possibilities of cloud services and remote technologies in management of work of educational institution and in professional activity of the teacher for the organization of main types of this activity, as well as for creation of subject information educational environment [Kono17]. Distribution of experience of application of remote and cloud computing (in particular, cloud computing storages and web services) for creation of information educational environment, the organization of educational process and management process within separately taken division (department) of university was organized on means of advanced training courses. Here, it is necessary to notice that, in our opinion, the task of teachers of the specialized departments connected with teaching information science and information technologies - to help the colleagues to master modern information and communication technologies and to teach them to build the professional pedagogical activity with the support on these technologies.

3.3. Tasks of the organization of the teachers training course for professional activity in the digital environment

To problems which will be solved by means of advanced training courses forming of readiness of the teacher for the innovation educational activity in the digital environment of university, belongs to the organization of e-learning in it, to the use of distance learning technologies and cloud technologies in the teacher's professional activities. Within courses teachers study theoretical bases, methods and technologies, resources and materials of electronic education. They create practical skills of creation of modern electronic educational content, pedagogically competent application of the innovation methods and technologies of e-learning in education and professional activity. Teachers learn to model and organize educational process on the basis of electronic resources and by means of instruments of electronic interactive training. Teachers consider the possibilities of application of electronic educational resources and means of e-learning on occupations, master the technique of carrying out occupations in the form of the teleconference, the webinar or the chat occupation. Besides, teachers analyze problems of implementation of technologies of e-learning, sort advantages and difficulties of application of e-learning in educational institutions, master possibilities of network interaction as the form of professional

communication of teachers in modern information space [All16].

3.4. Structure and maintenance of advanced training course of teachers

Let's describe the experience of the organization and carrying out advanced training courses which is saved up by us for the faculty of university on subject "Modern information and communication technologies in activity of the teacher". Increase of level of competence of listeners in the field of use of information communication technologies in professional activity, forming of additional knowledge, skills of creation of subject information educational environment with use of modern information technologies, including remote and cloud computing became the purpose of organized advanced training courses.

The maintenance of the course includes training materials on the following subject, actual for teachers:

– informatization of education, perspective of development of information and communication technologies. The state policy in the field of development of e-learning and remote educational technologies. The overview of opportunities of application of technologies of remote education, cloud services, technologies of e-learning in professional activity of the teacher;

– technical and software of remote technologies and technologies of e-learning. Interactive technical and software;

– Internet-technologies in the solution of problems of professional activity. Overview of educational services of the Internet network;

– cloud computing: use perspectives in professional activity of the teacher. Web services, organization of collaboration;

– preparation of text documents, including by means of cloud services. Work with documents of difficult structure. Professional formatting and protection of documents in office applications. Creation of document templates. Preparation of electronic documents. Electronic reviewing. Collaboration in GoogleDocs;

– use of electronic spreadsheets in professional activity of the teacher. Consolidation of data. Creation of pivot tables. Work with data of the electronic spreadsheet as with the database. Collaboration with Google Tables;

– the overview of programs of demonstration graphics and cloud services for preparation of presentation materials. Professional creation of the presentations in office and network applications, in on-line the designer of Prezi.com. Examples of pedagogical acceptances of supply of materials in the presentations;

– bases of digitization of images, and work with graphics. Preparation of training graphic materials for occupations and for placement in the network;

– technologies of creation and processing sound and video of information. Bases of computer video-tape editing. Technologies of creation of educational video. Recommendations about digital processing of video and sound, to application of algorithms of compression;

– work with the electronic library systems (ELS). Registration in library systems. The organization of information search in EBS;

– the organization of information educational space of the teacher and trained. Electronic portfolio. The overview of platforms for creation of the electronic portfolio;

– use of legal-reference systems in professional activity of the teacher.

All materials of the course were placed in cloud computing storage, separately created account of advanced training courses (itvpdp.skfu@gmail.com), with individually provided access for the students who are previously registered in system. Access to subjects was provided in process of passing of the training material. In parallel, all material was provided in system of remote learning LMS Moodle.

The developed course is expected teachers with the different level of preparation. At the time of record on training listeners passed the input case test by results of which groups of different levels were formed. At the same time the professional direction of pedagogical activity of the listener "humanitarian", "technical", "natural-science", etc. was considered.

Materials of the course are constructed in such a way that allow, both to master this or that technology from "zero", and to improve the available experience of application of information and communication technologies in pedagogical activity. For example, mastering office technologists, the user can pass to the section "Professional Work with Documents" at once or begin mastering of the training material "On steps". Each section of the course contains as training materials, and the additional materials, obligatory for mastering by listeners, on the subject expanding knowledge of listeners in the field of the studied subject.

3.5. Technologies of the organization and carrying out advanced training courses of teachers

The advanced training course of teachers distinguishes not only actual contents, but also the innovation methods and forms of providing the training material.

Feature of this course is that it has the practical focus, and all theoretical material is presented to listeners in the form of master classes. Practical studying of information technologies happens to use as we called it, "the immersion method on environment" - on environment the studied technology. That is, for example, studying possibilities of cloud services, listeners plunge on environment cloud computing, create the accounts on the Gmail server, carry out their setup, create contact lists, work with GoogleDocs, will organize collaboration with them in group, etc. Getting acquainted with the environment of remote education LMS Moodle, listeners work in this environment. Creating the remote course directly in the LMS Moodle system, place training materials, develop tests, configure environment, etc. As a result of such work listeners have the understanding of need of use of information and communication technologies, systems remote and e-learning in pedagogical activity, and practical skills of their application [Kone13] form.

Interesting fragment of the course is the organization of back coupling with listeners which is configured on several channels:

1. Mail service of Gmail.

At the initial stage, during practical class in mastering of Google services, obligatory registration of listeners is carried out. Each listener creates the account, the electronic mailbox on the Gmail e-mail server and carries out setup of this box.

Despite the seeming simplicity of action, this stage is the most difficult and labor-consuming. The main objective of the teacher of courses to create elements of information culture during creation and use of mail services, to enter the concepts DNS (English Domain Name System) of the domain name system. During registration the level of readiness of listeners and ownership of them of elementary skills of work with computer engineering and mobile devices comes to light.

Then there takes place creation of contacts and forming of groups. Through the created mail service of Gmail, the listener sends the letter to the teacher to the specified address *@gmail.com ¡mailto: * @gmail.com¿. The teacher, in turn, creates the contact list of the received messages, integrates these contacts in group and carries out mailing to all group of listeners of texts of the practical works on the subjects "Creation of Contacts and Groups" and "Acquaintance to Google Services" which are stored on Google disk. The listener, receiving the letter, sees all contacts to whom the message was still sent, and creates the own contact list, including in it addresses of listeners of the course. Thus, already on the first occupation listeners purchase skills of work with the mail service of Google, get acquainted with the Contacts service, create own contact block, pass to the Disk, saving on it the training materials provided by the teacher, have the collaboration opportunity with documents and materials of the course.

2. System of remote learning Moodle.

The course "Modern Information and Communication Technologies in Activity of the Teacher" is developed with the remote support organized in the LMS Moodle system. This system belongs to the class of learning management systems and allows to use training materials in the form of text files, images, the presentations, audio and video of files; organize the monitoring system of knowledge in the form of polls, tests, tasks, lectures, seminars; carry out monitoring of actions of listeners; organize interactive interaction with listeners, etc. of [Niaz14]

At the end of the first occupation by means of the electronic message on the created mailbox of *.gmail.com login and the password for access to training materials through the LMS Moodle system (¡http://el.ncfu.ru¿) is sent to the listener. Through this system back coupling with listeners of the course which is performed by teachers through such elements of the course as the Chat, the Forum, Poll, Comments to tasks and others is organized. Thus, listeners plunge at first classes on remote environmental learning, study environment content, master technologies of work in this environment, get acquainted with elements of the remote course. At later stage of training in teachers it is offered to create the trial remote course directly in the environment of Moodle.

3. Service of message exchange and video conferencing of Google Hangouts.

For individual consultations (on requests of listeners) or according to the diagram videos on-line consultations are (once a week) held. The Hangouts service allows to create group chats with a capacity up to 150 people, and gives the opportunity to video of meetings with 10 listeners at the same time (directly from the chat).

Convenience of application of such type of back coupling is caused by the possibility of participation in video meetings and chats from any available mobile device having access to the Internet network.

Thus, listeners any by method, convenient for them, can always get the qualified advice of teachers of the interesting questions within the studied material, at accomplishment of independent work or by preparation of the final project.

Feature of the course is also that on the filling and contents the course is characterized by "redundancy" of training materials. Therefore, mastering the main program of the course, listeners have the opportunity to get acquainted also with additional materials for deeper independent mastering of modern information and communication technologies. Each of sections of the course if the corresponding request is received from listeners, can be expanded and offered as the separate thematic course with more detailed statement of training materials.

The corresponding material and technical resources are necessary for the qualitative organization of training when carrying out advanced training courses in the declared subject. Shall be trained listeners only in the computer class having the local area network and connection to the Internet network. The obligatory requirement is existence of the interactive board and multimedia projector. It is desirable that the computer class was equipped with the scanner and the printer.

4 Results

The teachers who were trained on given course received skills of work in the digital environment of educational space:

First, use of cloud services allowed to optimize work of teachers within educational division or department. Teachers learned to create cloud computing storages of the educational and methodical developments on the taught disciplines. The training materials including curricula, working programs of disciplines, fund of estimated means for disciplines, methodical recommendations to the practical training and to independent work, etc. are collected and placed in cloud computing storage of personal information educational space of the teacher [Star12]. Now all developments of the teacher are always available to him, in the presence the Internet.

Secondly, teachers learned to provide access as required to the developments for students at classes or at the request of structural divisions of university. The cloud computing storage allows to support training materials in the actual status, to constantly update them. Besides, need of their replication is excluded. Thus, cloud services allow the teacher to create own subject-oriented information environment answering to problems of the taught discipline[Vas12]. For providing educational information to the teacher it is enough to know the e-mail address trained to organize access to cloud computing storage of educational and methodical materials, for example, by means of the link to them. And access to educational and methodical materials can be opened only in browse mode, without the editing right. So developments of the teacher will not suffer in any way and will not be changed.

Besides, thirdly, in need of preparation of different current and reporting documentation at department collaboration of the manager and teachers in Google Docs with documents will be organized that considerably simplifies and accelerates process of preparation of this information and excludes duplication of documents. And, the cloud computing storage allows not only to store all current documents, but also to have to them access from any device including mobile, connected to the Internet and in any place where this network is available.

Waugh-fourth, each teacher of department has the personal portfolio where personal papers and data on all its achievements, awards, professional development, etc. are stored in cloud computing storage that allows to provide necessary personal information on demand quickly. Fifthly, the cloud computing storage allows to collect the photo and video materials from different actions and to store them.

Organizing educational process with use of cloud services, the teacher manages this process. Web services help to organize joint activity of students over the project, communication between subjects of educational process, interaction of the teacher with group and students of group with each other.

It should be noted that all obtaining by teachers at advanced training courses skills of the organization of the digital space and application of technologies of electronic and remote learning are successfully applied by them in professional activity.

5 Conclusion

In the conclusion, it should be noted that the offered program of professional development will allow teachers who mastered it, to organize at the high level studies using modern information and communication technologies; create own remote courses; train in information technologies of the colleagues; develop the qualitative electronic

educational and methodical materials meeting all requirements of standards which, further it will be possible to certify, etc. Professional development can be considered successful and effective only when it aims the teacher at creative reconsideration of content of the activity and when the gained knowledge and abilities can become the good basis for further work of the teacher.

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