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Formation of educational content in post-graduate educational institutions by means of informational technologies

Summary. The article deals with one of the ways of educational content forming in the system of post-graduate education, in particular using of IT is considered as the realization of computer mediated communication, the basic directions of forming an electronic learning environment, identified approaches to educational evaluation of the usefulness of modern IT tools as a condition of raising the quality of educational services.

Keywords: modern IT, e-learning environment, educational content, pedagogical appropriateness.

Formulation of the problem. The objective socio-economic conditions, competition in global labor markets and technological progress led to renewed strategies development of educational policy in educational institutions of higher education, which are aimed at finding and creating effective mechanisms for improving the quality of training. The priorities of the national education policy in the restructuring of the higher education system are determined primarily by efficiency formation increasing of its socio-economic and creative potential in the transition to a market-based management of the educational process [2-4]. Reform features of postgraduate education are determined by the national socio-economic development, European integration and international educational processes as development and implementation of innovative technologies.

The main task of applying modern IT system in postgraduate education (PGE) is to provide high quality education and guiding teaching staff through the creation and using a rational network in educational infrastructure. The rapid development of IT facilitated information updating and technological environment of the system of postgraduate education. Information technology development step has begun, the

characteristics of which are: network technology, e-business activities, and community organizational structures without borders, intensive usage of information resources and the ability to manage this resource. Significant changes in the activities of such institutions as components of a single network of educational institutions are associated with increased demands to the quality of vocational education and competitiveness of employees of the educational sector in the global education market, focusing the learning process on the development of forms and methods of successful communication as individual subjects and objects of social relations.

One of the promising directions for reform of national postgraduate education is using of modern computer and telecommunication systems and technologies as forming a single component of the educational environment, which level of development meets international standards. Formation of high-quality and high-tech information-educational environment is complex, multi-dimensional and multi-process, which requires qualitative research methods, training and information technology support. For efficient formation, development and operation of such an environment is necessary to use a powerful methodological, organizational and pedagogical potential. However, keep in mind is also the readiness of scientific and pedagogical staff to solve educational problems through the usage of modern tools in a continuous operation of modern information and educational environments. The role of modern IT in providing high quality educational services is considered by us as a key element of modern postgraduate education system, the most important aspect of education policy. Formation of a network of educational infrastructure requires more attention to identifying organizational and pedagogical conditions and characteristics of each institution, the limits of its information and directions.

The relevance of using modern IT in postgraduate education institutions on scientific and theoretical level is determined by the tension between the need to conceptualize the complex process of using the mentioned tools in their work and their insufficient theoretical development. In practice, often there is a formal approach to the introduction of modem IT that determines the relevance of the abovementioned problems in the methodological level. On the socio-pedagogical level solution to this problem is

caused by the contradiction between the requirements of postgraduate education system towards the provision of educational services at a high technological level and lack of systematic attention given to the organizational and pedagogical conditions for improving the quality of teaching and the limits of the impact of IT on work of these institutions.

However, using of modern IT in the educational institutions of the PGE actualized the problem of determining the rational compromise of organizational and pedagogical conditions of these facilities and optimization of internal and external information flows management, improving the quality and effectiveness of education services through the application of adaptive network and intelligent learning systems, modern individualized learning technologies, increasing of motivational processes. Today, despite the rapid development of models for today's IT activities in the educational institutions of PGE, contradiction are kept:

- between the need to expand the range of educational services and the lack of an adequate framework for the adoption and implementation of appropriate solutions towards improving the quality of their provision;
- between the modern demands for quality education in information of PGE system and existing methods and technologies of the information;
- between the increasing of scientific and technical and educational information, forms and methods of its providing and the level of commitment of the teaching staff of educational institutions to accept and effective usage of this information.

The main material. Development of IT as one of the areas of information society is associated with the names of prominent and well-known scientists, educators and managers of education, as V. Bykov, V. Glushkov, A. Gurdjieff, A. Ershov, M. Zheldak, VA Kremen, C. Meadow, B. Malinowski, J. Mashbits, S. Nikolaienko, V. Oleinik, VN Rudenko, S. Rakov, J. Ramskyy and others.

Using of modern IT in educational institutions of PGE system is complex, multifaceted, intensive course of their development, the implementation of which include: the formation of modern e-learning environment as part of a unified information space of the national higher education development of new educational models, high rigging

hardware and software tools, training and guiding teachers to the usage of ICT, the formation of a corporate network information management, providing open access to the Internet, the introduction of automation of management and others. Given the current state and prospects of the education system of PGE, using of modern IT are going towards systematic updating of content and organizational learning (semantic) and rational use of software tools to enhance the effectiveness of the educational process (instrumental and technological).

A distinctive feature of the higher education system is that it is the consumer of IT and developer of these technologies at the same time. IT property to be reproduced and distributed quickly in the social and educational systems determines its use, scholars focus on the characteristics, causes effects on the development of its implementation, defines the stages of development and so on. There are similarities of historical, biological and cultural strategies of social systems in the sense that for the theory of evolution, communication and conflict with its methods of interpretation. However, the existence of such strategies does not contradict the theory of "accurate balance".

The development of PGE system as a socially meaningful institution and sustainable using of IT put new demands on the quality of educational services to different categories of students. The content and form of educational services defined targets of education systems and strategies for their development. Every means of implementing IT in a particular use achieves the goal of functioning as a social educational institution. The functional role of this agent in the creation of information-learning environment is determined by pedagogical appropriateness of its usage. The problem of determining the functional role of each of these features in the formation of electronic learning environment is modified by ability of computer networks to integrate the functionality of many ITs. Synthesis of these opportunities before us as a result of efficient use of information and learning environment as part of social and educational systems, the components of which are schools, communication processes, learner-oriented learning, multimedia, network technology and so on.

The rapid development of IT actualized the issue of model selection of unified

educational *electronic learning environment* and *technology of its design*. However, the question of educational determination appropriateness of the communication tools use in such an environment, each of which has its limits of application acceptability in the classroom. Determination of the point as a basis for communication on the information-learning environment in PGE system, in our opinion, should be based on the following positions.

Nowadays studies in the direction of providing educational services to schools with the help of Post-graduate system implementation model are based on "social constructivism" – consumers of educational services are not passive subjects of the educational process. They project a personal educational path of continuous learning and are the customers of the appropriate level of educational services that lead to the emergence of more dynamic changes in their provision. If current IT requirements determine the level of acquired knowledge and skills, new tools provide mastery of knowledge and skills better than traditional methods. However, modern electronic media trend to preserve scientific, methodological and didactic basis mastering of traditional educational information, including forms and methods of teaching and learning.

Means of communication as means of computer-mediated communication in e-learning environments are distinguished by the following parameters:

• characteristics of educational information transmission processes – processes between sender and recipient of educational information, as well as ways of communication (interaction range, consistency of content, number of beneficiaries, synchronicity, location, monitoring, etc.);

• characteristics of media educational information (distribution, reproduction, modification, duration, possibility of review, handling, etc.);

• parameters of information production (convenience, cost, specialization, etc.);

• social parameters of information (motivational-emotional capacity, reliability, interoperability, authentication, etc.).

From the standpoint of the theory of the modern IT applying it is a complex process, pedagogical feasibility of implementation which depends on all subjects of the educational

process and the effective functioning of the administrative system of educational institutions. The effectiveness of this process may primarily depend on the identification of organizational and pedagogical conditions of its implementation for the effects of the aforementioned processes in educational practice and educational activities in general. According to T. Nyang, the basis for the analysis of the process of introducing IT into practice and theory of learning describes three interrelated levels of transformation: activity, action and operation. This theory makes it possible to describe the relationship between the individual and its context in the process of change and learning, and the context may be very different: interpersonal, cultural and technological [3].

The introduction of modern IT in the context of the theory we consider as three interrelated levels of functional transformation of the educational process, namely:

- Cooperation as actions and operations motivation (Activity → Motive → Quality and effectiveness of education improving).
- Balance of individual actions with specific goals and psychological centralization in the transformation process (Acts → The purpose → Introduction of ICT: choice, adaptation and practice change).
- Rational compromise of operations and organizational-pedagogical conditions for achieving learning goals (Condition → Operations → ICT availability). According to the theory there are three identified levels (choice of technology,

technological adaptation, changing practices of teaching and learning), they are interdependent and should not be regarded as discrete steps that affect each other. All three processes are constantly present in the transformation of educational practice. In a broader aspect, the introduction of modern IT makes the existence of such processes as: choice (knowledge), motivation, persuasion, decision, implementation, adaptation (depending on the technology and purpose of its introduction), distribution and so on. The implementation of these processes requires special research methods and pedagogical tools. Thus, the tools are based on asynchronous communication; require lower levels of adaptive characteristics of the subjects of the educational process.

In the process of adaptation distinction between those who are involved in this

process and those who are forming limit of these processes dissemination is clearly seen. Teachers strive to create an informal adaptive team that collaborates on the design of the content adaptation and learning material based on its core technology mastery. Adaptive team members are other coaches, internal consultants who support the project and staff who ensure implementation of IT. Adaptive teams are groups of people who take part in the process of adaptation due to their professional skills, competence and interests.

The system of personal relationships in these adaptive teams for more efficient implementation of IT creates equal opportunities for all teachers. However, the system of personal professional relations contributes to the emergence of innovative ideas that would not appear otherwise. Teaching practice identifies the ways to achieve a common goal that is pursued in the choice of technology and the subsequent adaptation. In system of postgraduate education it is difficult to introduce technologies that are changing the division of responsibility between teachers and students. Thus, during the distance learning phase of a major role is played by the students of professional development rather than adaptation team, causing only an indirect impact through teachers who interact with students or train similar training courses.

The choice of technology depends on individuals and properties of the technology itself. When the adaptation process requires sophisticated tools, new skills and rare educational and technological resources, teachers are less likely to implement it. The practice of IT suggests that teachers in the profession mostly use the technologies that were previously mastered by them. Technologies such as
electronic word processing, Internet and e-mail have been used for a long time because there is enough common basis of the processes of teaching and learning. New technologies are mostly interpreted in a format of previously developed technology and its implementation. This creates barriers to the introduction of innovative educational technologies. According to *the principles of social construction of knowledge* advantage in choosing this technology should be given to modern IT that support dialogue and reflection.

Computer-mediated communication. According to the theory of communication, the

modern society is characterized *by social model* that emphasizes the role of conscious processes of self-identity, increases the weight of creative and substantive component of productive activities. The current state of IT implementation in the postgraduate educational system is characterized by task of forming a unified educational electronic environment allowing the computer-mediated communication. One of these features is the potential possibility of each participant of communication of the educational process without limits in time and space. Equal participation in this process may ensure the development of the social component of the delivery of educational services on the basis of the modern theory of communication. This updates the detection of organizational and pedagogical conditions network technologies in informational and educational environment of postgraduate education as social and educational system and determining the appropriateness of their pedagogical introduction [4].

Widespread use of networking tools is caused by their ability of communication processes. Thus, e-mail communication opportunities in education are caused by its adaptability, educational process participants motivation, formulation and solution of real problems, presentation of the final result, ability of ethical and intercultural communication and so on.

Communication technology of the Internet is not always considered as a means of communication in education. Today almost all of them can be successfully used in the educational process. This can be due to their ability to maintain the necessary communicative, cognitive and social processes that accompany the provision of educational services. Network technology can be viewed by two parameters: *the location* of the participants of communication (physical, virtual) and *real time.* From this perspective, the process of computer-mediated communication can be realized by the presence of different combinations of these parameters. Each following set of parameters is put under a certain kind of network technologies (Chat-technology, video conferencing, Internet telephony, ICQ, Web-forums and guest books, mailing, etc.). However, no matter what is the direction of these technologies as forming components of electronic learning environment, their development and use is a difficult process. Design and implementation

of such a process happens in several stages (conceptual designing, feasibility, forming and structural, industrial testing, etc.). The basis of this design is to study the feasibility of computer-mediated communication in the Internet in two models: " *the person – communication tool – the person"* (e.g., a technologies model of email using) and *"theperson – the computer"* (a model of Web-technologies).

Formation of e-learning environment. Eventually, the range, amount and diversity of technological solutions (forms, tools, and options) expand in the direction of electronic learning environment formation of postgraduate. Nowadays network training (CH, Web-based education) as the realization of adaptive and intelligent educational technologies is intensively studied, due to its dynamic development, the ability of audience and platform independence, adaptability and intelligence. By adaptive and intelligent network technology training, the implementation of which is associated with various software functionality, we are referring to different ways of functionality intellectual or adaptive learning systems adding. Network adaptive and intelligent systems are a new kind of educational system in their entirety. The basis of almost all of these learning systems are developed *intelligent learning systems* and *modern adaptive hypermedia systems* (Table 1).

Table 1

Technological aspects of e-learning environment

№	Technological solutions	Functionality of use
1	Development of network learning: adaptive presentation of learning material and adaptive support of user navigation	Application of adaptive educational hypermedia, the development of intelligent tutoring systems, simultaneous use of multiple educational representations
2	Corporate activities through computer systems	Usage of systems of design, decision support, modeling of corporate structures
3	Activity of experts, tutors and coaches in limited subject areas	The introduction of models of individual and team work, expertise
4	Use of CD systems with numerous reading	Support by databases and virtual environments
5	Standardization of computer and telecommunication protocols	Ensuring of rapid communication and compatibility of software
6	Usage of specific vocabulary-limited speech recognition, voice synthesis	Limited usage of corporate audio technologies
7	Implementation of user interface authorization management	The development of software applications, programs and restore operational changes

The education system was one of the major social institutions which implemented educational hypermedia tools (1990 – 1996), most of which served educational information as static hypertext pages. Traditional intelligent educational systems (training systems, training environments) are designed to work with pre-defined (one) user model. Educational technologies based on these systems have focused on individualized learning, based on the subject of educational applications. Most of these applications have implemented a general learning approach to learning without the individual needs of each user. This common practice made it impossible to enjoy the educational resources in the Internet due to the dynamic integration of applications no matter their location.

Providing the paradigm of management and teaching staff as professional and creative personalities requires adequate advanced development of postgraduate educational system, the use of technology and the continuous improvement of their skills. The absence of fundamental training of specific categories of students in the direction of applying modern IT does not allow to use the potential of these technologies and improve the efficiency of educational services. However, "... the use of IT creates almost unlimited opportunities for teachers' self-education" [4, 7].

Today, the Internet has become a platform for the development of educational adaptive hypermedia systems in particular sites and distance learning network. Technologies of adaptive user support in navigation almost have no root in "befor-Internet" educational systems. An important feature of this technology is the presence of conditions simultaneously analyzes and selection the model of learning (long or short) for many users. Thus, long-term user model may consist of a statement that has been collected during previous interactions (user's level of knowledge, errors, etc.). Short-term user model reproduces the result of the functioning of the educational system in the given time. The best option functioning of such a learning system is to ensure the exchange of information between long-term and short-term model [3].

The user has the discretion to apply any kind of adaptive hypermedia systems. The purpose of the application of adaptive technologies of user navigation support is the support (orientation) and user navigation in hyperspace through rational compromise of obvious links, technology which provides the "optimal path" for training course. In our opinion, there are two appropriate technologies in the field of adaptive educational hypermedia for postgraduate education: *adaptive presentation of learning material and adaptive support in navigation*. The use of adaptive presentation of learning material and adaptive support in navigation technologies, in our opinion can ensure selection of different models of learning (collaboration support, intelligent monitoring and maintenance training), facilitate the construction of learning trajectories of individual oriented audience through personalized educational-methodical complex. Implementation of these technologies aims to help students of postgraduate educational institutions to use the file repository of educational information. Ready for use models of the trajectories can be used in the proposed form or be adapted to the individuals. This approach provides the fundamental semantic and functional basis for the development of learner-oriented learning technology.

The stage of development of the institution, its scientific methodology, software, information and human resource capacity determines directions, amount, power, forms and methods of these technologies using. Thus, the main areas of the educational

potential of individual oriented IT training in the current development of the University of Educational Management of National Academy of Pedagogical Sciences of Ukraine (UMO) within university education, in our opinion, are: упровадження елементів дистанційного навчання в навчальний процес Університету;

- transfer of routine controlling functions of the department in the sphere of "electronic teacher" activity;
- • the use of parametric problems for retrainees automatically generated by a given algorithm with the ability to solve the problem;
- the use of different models and forms of training for the implementation of individual educational trajectory;
- development of training courses based on micro modules when each separate issue is a collection of completed micro modules that can be used in other courses and issues etc.

Each pedagogical paradigm (competence, pragmatic, cultural, cognitive informational, personally oriented) may specify a vector in the modernization of the content of the educational environment, to determine the strategy of the institution of PGE system. Implementation of these paradigms provides not only extend range of knowledge, acquiring new information, and also the accumulation of experience in reform efforts, emotional and creative approach to the world and people in it and the formation of values that determine the behavior of the individual in a variety of the world. In practice, this means:

• setting at the center of educational process a person with individual needs, motives, aspirations, considering patterns of development, age, individual characteristics of personality;

• research and recover of content, forms and methods of educational activities with a reasonable use of tools that intensify the educational process;

• establishment of subject-object relations in training activities by including them in the process of humanistic-oriented, involving dialogue;

• designing the objective oriented content of educational activities, which enables

efficient development and transformation of the world, build a personality oriented trajectory of productive interaction in society.

In our opinion, there are several key aspects of reviewing the impact of modern IT in the educational process of UMO, in particular for teachers, retrainees and students, the content of educational programs, administrative decision-making structure, the formation of support of the educational institutions and others. Naturally, the most important IT application level is for retrainees and university students, because their learning is beyond the application of these technologies - their impact on retrainees and students is the key which determines the pedagogical usefulness of these technologies in the educational process of UMO. For this reason in our opinion it is essential to conduct multi-faceted analysis of this phenomenon, including the points :

- demand in the labor market *(level of development in the community);*
- time and the term the study course *(when studied*);
- the content and the amount of training material *(which is studied*);
- orientation training course (trainees);

Table 2

Impact on decision making

Impact of evaluation position Aspects of ICT usefulness definition	Decision-making by		
	a consumer of educational services	a lecturer	a future employer
Попит на ринку праці	*	*	*
Час і термін вивчення навчального курсу	*	*	
Зміст і обсяг навчального матеріалу	*	*	*
Спрямування навчального курсу	*	*	
Рівень викладання	*		
Форми і методи подання навчальної інформації	*	*	
Рейтинг навчального закладу	*	*	*
Коштовність освітніх послуг	*		

Educational content of module "Modem ICT in Education", which was introduced by lecturers of the department of informational and communicational technologies in educational process of UMO.

The development of such materials Lecturer ICT is a continuation of planned work to create an electronic bank scientific methods and information support for training management and teaching staff using a standardized approach to content and content of academic disciplines. Features of the formation of educational content within the department is teaching his professional guidance and practical orientation with the level of preparedness of different categories of listeners to perceive the content of the training module .

To improve the efficiency and quality of learning and teaching executives lecturer designed modular organization and comprehensive training and methodological support appointed module. The main advantage of this presentation is to provide educational material and educational organization adapts semantic component modules based on the specific audience of students, the level of their initial training and career guidance. Complete study of practical problems is composed of complex exercises of varying difficulty and various forms of representation. All training exercises are professionally oriented and are associated with the actual practice of professional listeners. To perform such exercises lecturer widely used pre- designed tasks (files) located in a networked folder to which access is organized on all PCs.

Conclusions. Issues related to computer via didactics and pedagogy, in particular the objective of testing students , all sharper rise to the lecturer . Testing for e-learning is very powerful tool to monitor students' knowledge . In addition to all other benefits sufficiently serious to automatically process the results of tests of systematic analytical work with them. However , the problem of evaluating the quality of students under conditions eLearning actualized problem of diagnosis of the current level of knowledge and skills in learning. Therefore, the lecturer is scientific and methodical work towards determining the typology of tests, types of tests, designing test formats for e-learning environment.

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