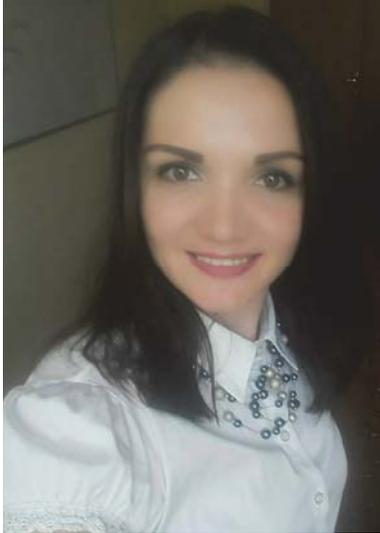


## INNOVATION APPROACHES OF INFORMATION TECHNOLOGIES USE WHILE PROFESSIONAL DEVELOPMENT OF THE GUARD ACTIVITY SPECIALIST



### ***Iryna Zhukevych***

*PhD in Pedagogy, associate professor at the Department of Humanitarian and Common Law Disciplines at the Institute of Department of State Guard of Ukraine of Taras Shevchenko National University of Kyiv, Kyiv, Ukraine,*



### ***Dmytro Kyslenko***

*PhD in Law, associate professor, Head of Department of Tactical and Special Training at the Institute of Department of State Guard of Ukraine of Taras Shevchenko National University of Kyiv, Kyiv, Ukraine,*

**Abstract.** The article deals with innovation approaches of information technology use while professional development of the guard activity of specialist. The authors have analyzed in details the fact of innovation, special peculiarities of innovative education, and the aim of computer educational system use. More detailed have been described the computer technologies (databases, text processing, electronic worksheet, business graphics, data exchange in local networks), that present needed «credit minimum» to get more sophisticated and powerful information technologies programs. All these cause the necessity to implement into educational practice the up-to-date educational technologies, which foster the studies, education, formation of scientific work skills, professional self-improvement based on modernized didactic system. The effectiveness of this process is gained by using modern methods and means of education that provide creative knowledge mastering by future specialists.

**Keywords:** *innovation, object, process, future specialist, education, information technologies program.*

## Problem setting

Contemporary educational system in Ukraine is under the pressure of expand requirements of the state and society of European community of the higher educational establishments, for which our country is going, concerning intensity and quality of professional training of different professions and qualification levels. It is necessary to point out the changes that have taken place in the recent years and they are really phenomenal. Even those, who has never been connected with computer industry is difficult to ignore surrounded technical novelties, and appearance of which is possible thanks to the computer development.

**Analysis of recent research and publications.** Therefore in Ukrainian educational sphere, especially in the higher educational establishments there is an interest in innovation use in educational process. At the same time a lack of financing of educational system reforms has led to vital lag of Ukrainian higher school from western higher schools in the sphere of education informatization. Actual problems of computer technology use in professional training were studied by H. Bordovskyi, M. Koval, V. Myronenko, J. Ramskyi, I. Saievych, Sokolova Y., L. Voichenko, and others.

## Research results

The mankind has entered the new phase of information revolution, when the information has been the main and necessary element of human existence, the information science – one of the determinant scientific discipline, and information technology – a motive force of social development. Therefore the training level of modern specialist of guard activity, except professional mastery of the basis of his specialty, common and technical, social and humanitarian sciences, largely is determined by its inclusion in the world information space; skills effectively to organize and support professional and random information processes; skills competently to operate with information resources (accumulate, store) and to use different technical means; skills effectively to work with information (find, transform, present, process in the form easy-to use by others etc.).

The study of innovation process in the educational system is actual, because innovations increase the training quality of competitive specialist on the labor market, and form creative style of future specialist activity.

The effective educational process nowadays cannot be provided without using information technology based on the modern technical means. By using them, we get

possibility fully and deeper acquire knowledge at the expense of imitation of real conditions (Ramskyi, 2006).

Nowadays, there is created new pedagogy, the main feature of which is innovation, ability to renewal, openness for new.

Pedagogical innovation – is a science of nature, legitimacy of appearance and development of pedagogical innovations relatively to educational subjects, and also provides the connection between pedagogical traditions and projecting the future education.

The object of pedagogical innovation – is a process of appearance, development and acquiring the innovations in education of the students, which lead to progressive changes of educational quality.

The subject of pedagogical innovation – is the complex of pedagogical conditions, means and legitimacy, connected with working out, introduction and acquiring the pedagogical innovations in educational reality.

Specific peculiarity of innovation education is its openness for future, ability to foresight on the base of constant reevaluation of values, constructive action-mindedness in refreshed situations.

Forming the stable «store» of mentioned skills and abilities is a result of knowledge and acquiring of a number of perspective information technologies. Information technology – is a system of methods, means and ways (steps) of collection, filling, storage, search, processing and giving out the information.

New information technologies programs are connected with the use of modern and perspective electronic technologies for processing information (connection technology, consumer electronics, broadcasting) (Markard, 2008).

Modern specialist of guard activity should handle minimum five main «business» computer technologies (personal database, text processing, electronic tables, business graphics, data communication in local

computer networks), which present the necessary of «credit minimum» for getting more sophisticated and powerful information technologies programs.

The main directions of information technologies programs:

telecommunications, local, corporative, global and combined computer networks;

opened systems and support of divided calculations on the base of objective orientation and technology «user-server»;

multimedia including sound support, pictures (graphics, slides, animation), video, hypermedia, expert media;

sophisticated surroundings support (virtual reality, films or games with alternative or hyper-scenarios).

It is significant, that information technologies programs of any direction constantly improve and extend technologic and information processes, technical methods and other hardware, software and environments.

We show the examples of information technologies programs of different directions, new qualities and opportunities, which can implement the information technologies programs into educational process.

Network technologies solve main problem of operative access to information independent of storage place. Global network community Internet and integrated by it RUNNET, RELCOM and others were directed on storage, transfer and search for varied information, self-education and education. It is significant, that almost all created information technologies programs firstly are being achievement of Internet as a powerful ground for approbation of all program, hardware and technological novelties. Thus, working in Internet, the user constantly is mastering new information technologies programs, enriches skills and abilities. Moreover, the Internet as worldwide information environment is a natural supporting mean of international distant education system, uniquely combining the informational and educational resources of leading universities of the world (Koval, 2004).

Hypertext is nonlinear or information structure consisting of discrete database site and semantic connections between them, where the site is the text or hypertext and connections can be local, global and mixed. Hypertext can be also multilevel with difficult

network relations among different fragments. The use of hypertexts in education opens new ways to study the fragments of educational material; ranging methods of material; implementation mechanism of links; types and qualities of sites.

If the database site of hypertexts is able to post like texts, pictures and sound, then this informational structure is called multimedia. Multimedia is the interaction of audio and visual effects under the guidance of interactive software.

Hypermedia is a class of environment created on the intersection of multimedia area with the area of hyper technologies. The document is a base of any hypertext system. But usually the document is acquired only as object of users in the environment. In the hypermedia the document is also the mean for organization of this environment and conducting common work in it. Hypermedia gives for specialist the effective means for motivated studying of material supporting a metaphor to reach the aim, exciting travel with computer help in the environment of the given theme in details are meeting the pictures of objects, studying of their qualities, getting and strengthening operative abilities as navigation.

Expert media is a new technology founded on the use of artificial intelligence in multimedia and hypermedia (Voichenko, 2012). Expert media system can:

- «feel» communicative environment, adopt to it, optimize the communicative process with the user;
- adjust to the readers, analyze the range of their interests, memorize questions that made troubles while communication;
- offer additional or elucidative information;
- contain integral subsystems, that understand natural language and also language recognizer – everything that extends the range and friendliness of communication.

These are the qualities of ideal computer educational program. If hypermedia allows creating «live» books, then electronic books of expertmedia could be called «thoughtful».

Virtual reality is a complex of means, that allows creating illusion for future specialist of guard activity, that he is in artificial created world by means of substitution of normal perception of reality (with the help of sensation) by information that is generated by computer. Virtual reality is gained by the use

of multimedia assets, three dimension graphics and special devices for putting on and off the information, that simulate usual human connection with environment.

Virtual reality allows transferring in three dimension world with 6 stages of freedom and observing it in a real time. Virtual reality environment allows also supporting of «deep» educational process, so far as it is determined, that educational process includes almost all centers and systems of future specialist of guard activity. The researchers note that in virtual reality environment the audio and visual acts and other complex acts foster the active and quicker significative material fixing in people's memory.

In a process of such studies continues to work active the associative thinking of a person. Therefore, has been getting «bright», complex knowledge are connecting with before gotten knowledge and experience of future specialist of guard activity, simplifying the process of knowledge systematization.

The peculiarity of information educational environment is that that the tempo of mastering knowledge depends on individual peculiarity and increases due to organizational connection between user and information recourses in a real time. The individualization of education is realized according to the use of information educational environment and realization of specialized educational methods with the use of visualization of educational information, opportunity of its transferring, easy access of users to data, information and search activity, control of mastering educational information results (Bordovskiy, 2014).

Education is a process of transferring and mastering knowledge, skills and abilities that qualifies person for life and work. In this process are always presented two sides: the one who teaches and the second who is taught (teacher and future specialist of guard activity). The teacher's task is to use in educational process such forms, methods and means of transferring knowledge that will provide mastering of this knowledge (Ramskyi, 2006).

It should be stressed, that the poorest place of traditional education is passiveness of future specialist of guard activity on condition of high one-side activity of the teacher. The oldest famous educational form is a lecture, while reading of which the main mean of information transferring is the word. While

experimental education we used different methods of lecture reading, that foster work activation of future specialist of guard activity during the lessons. Namely, problem lecture, lecture-consultation, lecture press-conference, binary lecture, lecture-conversation, lecture-discussion, lecture-provocation, lecture-research, lecture with the use of feedback technique, visual lecture etc (Dubov, 2010).

During the lectures, except verbal methods the means and methods of visualization were used, ranging with pictures, schemes, and graphics presented on the board and completing with visual examples, animations and films. Thanks to the up-to-date technologies while reading a modern lecture the different multimedia means are used. Owing to the progress in development of telecommunication technologies such means can be available at a distance.

The rapid progress of society has caused the appearance of one more educational form – distance. Its sense is the teacher and future specialist of guard activity don't have immediate connection. Distant form integrates more and more into educational process. Sometimes the elements of distant education and proper technologies we can see and use in previously known educational forms, for example, while independent work. The process of independent mastering of knowledge on the base of teacher's tasks is directed on advanced study of academic discipline, training for taking the exam as an extern, on filling the gaps in knowledge caused by illness and other cases. However, not every independent work belongs to distant form (Amosha, 2015).

The analysis of the work of higher educational establishments showed, that among telecommunication technologies that are used in educational establishments, the most widespread are video conferences. However, with the advent of distant educational form, except video conferences, has appeared significant interest to the problem of lecture translation and other educational disciplines, distant lab work execution etc (Ramskyi, 2006).

For reading lectures the sufficient quantity of teachers use presentation forms like MS Power Point. The principle of work of presentation programs is in demonstration of slides with textual and graphics information. These programs can use completed graphics images, multimedia fragments and also have

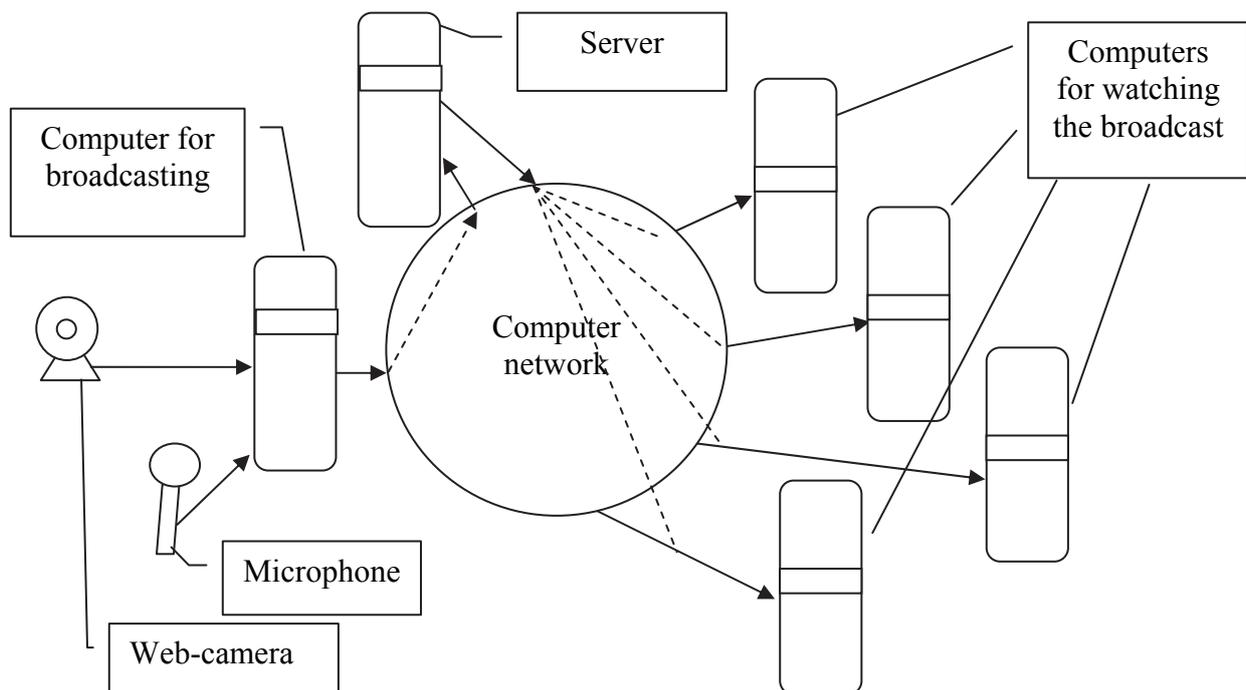
integral graphics editor for independent creation of simple images. Separate elements of image can be animated setting time and way of their appearance and disappearance. The regime of slide exchange is also set.

The teacher's task is not only present material on slides, but also to find its optimal quantity and presented form for each slide, that will provide mastering of educational material. Presentation programs are successfully used during the lessons of all disciplines and also during educational events. The worked out lecture or presentation, recorded as a file, the student can view while independent work.

For preparation and conducting direct translation and recording the lecture with the help of program, it is needed to power up the computer which will provide broadcasting, to Intranet or Internet network. For transferring sounds it is needed microphone, for transferring images – digital camera (web-camera), appropriate software, encoder program of video and audio – Windows Media

Presentation files while experimental education we noted in electronic library, which is opened for users of internal computer network. The view of separate lectures can be realized also per Internet. However while independent work with presentation between the teacher's contact and future specialist of guard activity is one-sided and is realized only by worked out visual means of presentation. It can be strengthened by addition to the presentation the soundtrack of appearance of each slide and elements. Such opportunity gives MS Power Point, but it takes more time needed for working out the lecture.

Encoder. With such a set of programs and hardware the view of broadcasting can be performed at the same time no more than on ten personal computers, where Internet Explorer program is set. For increasing the audience it should be used Windows Media Server or other server multimedia software, broadcasting according to the scheme, is showed on pic.1.



Pic. 1. Broadcasting with the use of server technologies

Before starting lecture broadcasting on a computer (server), it is needed to create a shared folder and give it access to network users. In MS Power Point, it is needed to specify the way to this folder, the name of the presentation, the speaker's name, and keywords. After defining a shared folder, the program will check the access to it and

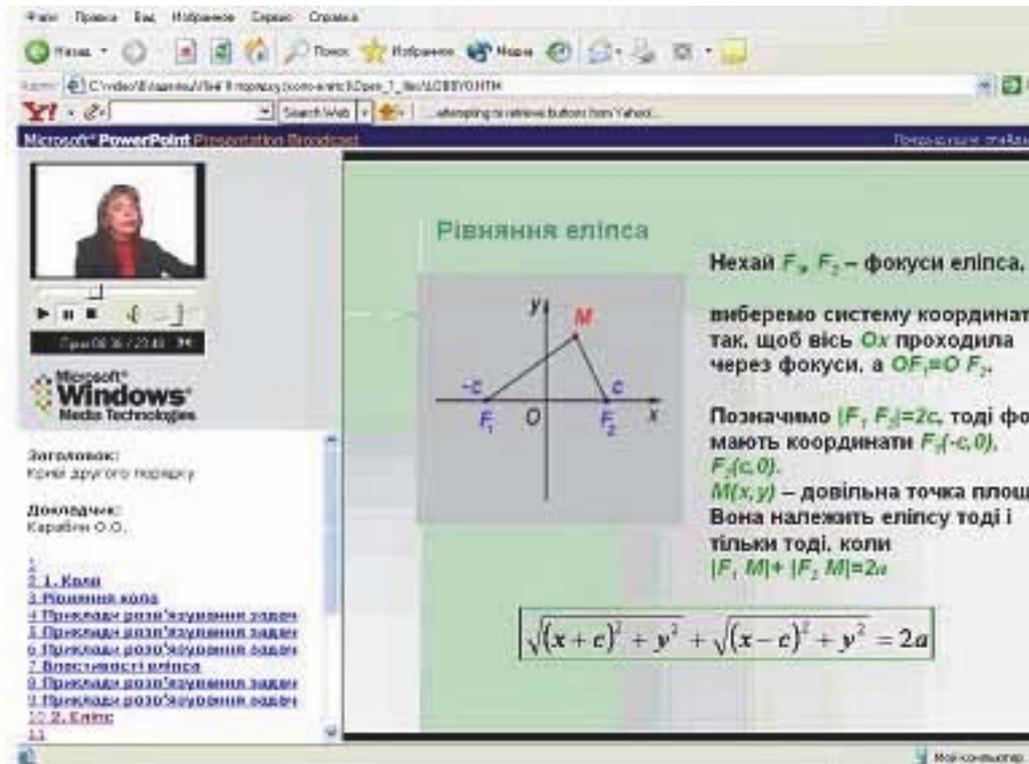
propose to test the hardware, adjust the camera and sound level.

If the email addresses of remote users are noted, they will be sent the invitations indicating the time, the broadcast name, and the hyperlink to the address at which you can listen to the lecture.

Then the program starts working with the simultaneous recording of the broadcast in the shared folder. The lecture is at the same time automatically recorded in HTML format.

MS Power Point developers have provided a broadcasting mode that allows lecturing on a real-time basis both on a local network and on the Internet with simultaneous recording.

While broadcasting a future specialist of guard activity can not only visually perceive the information prepared for him by a teacher, but also to hear his voice and see the «live» image of the teacher (pic. 2), strengthening the contact with him/her. Live broadcast mode provides e-mail feedback capability.



Pic. 2. View the lecture broadcast in Internet Explorer

If the presentation slide contains a multimedia fragment, it may not be completely correct to play it. This fault can be eliminated by watching a media fragment after the broadcast is over or watching its recording.

Another way of broadcasting with the transmission of video and audio applies only to live broadcasts of scientific conferences, sports competitions, educational events, lectures. The software tools for such tasks are different, ranging from the Microsoft NetMeeting communication program, which is part of any Microsoft Windows operating system and completes specialized server applications. Such programs use the following principles of image transmission: the transmission of a set of static images that are changed with a certain frequency; transmission of a compressed streaming media file.

The first principle. The transmission part provides reception of image from the camera, recording in JPEG image files and transferring these files to the network. The program is either integrated into a webpage or downloaded as a separate module. The image frequency changes depend on the image size, the speed of transferring information in the network and it is in the range of 5 to 25 images per second. In the case of a local network or a «fast» Internet, the image frequency is chosen more. Increasing the frequency images can be achieved by reducing the size of the image, so in each case, the optimal ratio of frequency images and image size is selected. The disadvantage of such a broadcast is a significant flow of information, which makes it expedient only in the local network or in the case of high-speed Internet connection.

The second principle of the transmission of images is the preliminary dynamic encoding of

image and sound in a compressed media file (streaming video), which is constantly replenished during the broadcasting process. The viewer can accept this file using either the programs integrated with the web page or through the multimedia viewer. Usually Windows Media Player and Real Player are used for this.

Both principles provide a broadcast recording, while it can be done in the following ways: direct broadcast from a computer using the Web server; broadcast with the use of FTP server for retransmission; broadcast using media server. The first way provides a limited number of users (up to 10-12) and is suitable for a small audience. It is suitable for using in the local network. The number of simultaneous views in the second method is larger than the first one and is determined by the speed of the access channel to the FTP server and its parameters. The largest simultaneous number of views can be provided by the broadcast using a media server; however, it works with a compressed image (Koval, 2004).

Thus, the effective use of multimedia and communication technologies in education is accessible and can be based on a combination of the use of the Power Point presentation program, video-conference programs with server-based communication programs.

The further development of telecommunication technologies and their widespread implementation into the educational process depends on the development of computer networks and the improvement of parameters that characterize the transmission of information.

The formation of the information educational environment of an educational establishment and its use in the educational process will have an effect on the condition of formation of psychological readiness of the teaching staff, the administration of the higher educational establishments to the activity with the use of the environment, training of teachers, students and staff to work with the information resources of the environment, organization of the exchange of experience, conducting conferences on the development and exploitation of the educational environment (Myronenko, 2008).

Consequently, the use of the informational educational environment opens up significant opportunities for the use of innovative approaches in education; ensures the

preservation of human resources, continuous improvement of professional skills; levels the conditions for all by providing equal access to educational materials due to the systematic use of information and communication technologies to form the professional competence of future specialists of guard activity.

The most prominent program information technologies allow intensifying educational process, making it more interesting, natural and trustworthy.

Peculiarities and problems of innovation management in higher education system connected with the results of scientific and technical progress and are defined by scientific leaders can be organized this way (Koval, 2004):

- enormous constantly increased nomenclature of new types and standards of educational services;
- constantly increase of role of information and intelligence resources, programs and educational plans providing educational services and have independent innovative importance;
- constantly increase of quality standards at specialist training and selection of professional and teaching staff;
- appearance of the new kinds of innovative methods, forms and systems of management in the higher educational establishments, that provide strengthening of its competitiveness on the educational services market;
- the change of physical limits of economic system of education, globalization and international standardization of the program of higher professional education, exchange of experience between higher educational establishments, students and teachers.

The effectiveness of education on the base of new technologies, when it is provided by certain teachers in some educational programs within the limits of organizational system typical for traditional education, according to the experience, is low. But such education demands of additional costs for creating new technologic base of educational process. In order to rehabilitate it and to increase qualitative result it is needed to work out and widespread organizational innovations in educational sphere. If the new technologies are used in old organizational structures, then this process meets big obstacles and

difficulties, some of them are (Hurevych, 2016):

- lack of time in teachers for working out the courses on the base of new technologies;
- lack of educational and support personal;
- lack of time for assessment of possibilities of new technologies in education and renewal of educational courses;
- lack of worked out educational materials on the base of new technologies;
- lack of personnel for providing help for students for computer work;
- lack of good equipped computer classes;
- not enough use of teaching with innovation use in educational process;
- half-worked organization of encouragement of teacher's work concerning implementation of new technologies into educational process and acknowledgement, expressed by promotion.

The inertness of education organization, poor mastering and extension of organizational innovations in educational sphere – is the main barrier of using new technologies in educational process (Koval,

2004). The working out of organized innovations and their active realization, conducting policy in a sphere of using new technologies in education, main method of increasing the effectiveness of education.

New mechanism of management and coordination of elements of modern innovation activity in education is directed on the use of computer and telecommunication technologies in educational sphere, mastering technological innovations fostered firstly not only increasing of education quality, but also enormous growing of users number of educational products and services, and increasing of products and services offers in educational sphere in consequence of development of the new forms and methods of education, informal education. The process of innovation changes in a higher school enhanced the prestige of the higher educational establishments, created the new culture of professional education, which offers new forms of education based on the using of information technologies.

### Conclusions and further research prospects

Thus, it is necessary to coordinate joint activity of all participants of educational process that are provided in training of future specialists of guard activity to carry out the complex tasks. Also, it is important to stimulate firstly these forms of innovation activity which in a short future will provide for students the conditions for orientation on concrete highly-qualified professional activity, absence of prolonged stage of postgraduate adaptation and also guaranteed high material level and clear perspectives of professional advancement for the most talented and professionally motivated graduates of higher educational establishments. All this causes the necessity for implementation into educational practice the newest educational technologies that foster education, training, formation of scientific work abilities, professional self-improvement based on upgraded didactic system. The effectiveness of this process is gained by using modern methods, means and ways of education that provide creative mastering a big amount of scientific knowledge.

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ІНСТИТУТ УПРАВЛІННЯ ДЕРЖАВНОЇ ОХОРОНИ УКРАЇНИ  
КИЇВСЬКОГО НАЦІОНАЛЬНОГО УНІВЕРСИТЕТУ ІМЕНІ ТАРАСА ШЕВЧЕНКА