ICT Advanced Training of University Teachers

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Abstract. Nowadays ICT is the integral part of modern teacher's and scholar's activity. For teachers it is reasonable to allocate two basic approach of ICT use: e-learning courses designing (to satisfaction of educational needs of students and implementation of new educational approaches) and openness in the presentation of their own research interests. For effective implementation of these approaches it requires information and educational environment of the university and special training of teachers. The model of informational and educational environment of Kherson State University, which is regarded as a set of processes and activities is presented in the article. The curriculum of advanced training course for teachers of the University was designed; the successful completion will allow teachers effectively use ICT to solve professional tasks in educational and research activities. The results of training of group of teachers of Kherson State University are analyzed.

Key words. Advanced training; information-educational environment; information technology; distance learning; blended learning.

Key terms. ICT Tool Teaching Methodology, Technology.

1 Introduction

In an era of rapid change of all spheres of society's' and development of technologies such as ICT, Big Data, robotics, self-learning neural networks, etc., there is special meaning of training of specialists according to the requirements of labor market, able to work in a situation of uncertainty and information overload, quickly adapt, work in the field, that will develop in the future. It defines a socially significant task for the education system; it is affected by macro trends: globalization, demographic changes and the emergence of new knowledge and competences. Therefore, it is necessary to build the learning process taking into account the trends of society's development, to introduce systematically the new technologies, to create an appropriate educational environment of the educational institution. It is important teachers of the high school aware the necessity of innovation introduction and was able to arrange the training in accordance with educational requirements of today's students.

2   Related Work

University competitiveness on the educational market is determined by its ranking among other schools. The number of students of the University is depended on it. In turn, the ranking of universities depends on the quality of educational services, and the quality of teaching and students' learning (fig. 1). The advanced training of teachers, support of initiatives and innovations is a strategic task of modern University.
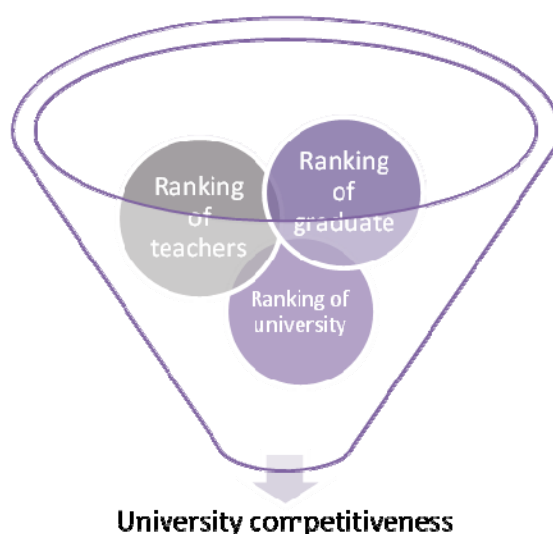

Fig. 1. Components of competitiveness of university

Important components in formation of unitary educational and scientific environment are clear standards, criteria and requirements of evaluation of quality of educational services. The analysis of standards and guidelines of quality assurance in the European higher education noted that the principal activities of scientific and pedagogical worker of modern university should be aimed at creating and using qualitative electronic content of the educational environment [8, 9]. One of the factors of ensuring standards is the policy of educational institution. The problem of standard's development of ICT competence of university's teachers was investigated by N. Morze, A. Kocharyan. The proposed model of the corporate standard of ICT competence of scientific-pedagogical staff describes the three levels of activities: understanding the role of ICT and education and its use, ICT, educational work, research activities, advanced training.

Foreign studies raise the problem of students' educational activity in the Internet. According to the study "Pew Internet & American Life Project" there is nearly three quarters (73%) of students more often used the Internet for studies than university libraries (D. J. Grimes and C. H. Boening [11]). Other studies show the majority of students address to the Internet more often (J. Griffiths and P. Brophy [12]). Some

authors argue that students use commercial search engines such as Google, and avoid the difficulties of printed sources processing (C. Thompson [10]).

In response to this trend, nine out of ten teachers (90%) ask students to use specific Internet resources that they consider the most appropriate for a particular task, and 83% of respondents formulate tasks that require using a wider variety of information sources.

At the same time some teachers worry about over-dependence of students from the search engines; lack of ability to assess the quality of online information; the decrease of general level of literacy; the depletion of time management skills; potential reducing of critical thinking capabilities; the plagiarism.

Exploring of Ukrainian teachers' meanings, we have conducted a similar survey of universities' teachers of Ukraine. There were 126 teachers, the majority of them agreed that priority task of modern education is teaching students to evaluate the information quality in the Internet. As a result, the significant part of interviewed teachers indicated that they discussed the question of assessment of online information reliability, improvement of information search skills. The experience of tasks' formulation, directed students to the best online resources is positive and it encourages using the alternative sources of search engines.

So, the important part of educational process, significantly affects on its efficiency, is development of training courses in accordance with requirements of students [4], teachers' training to organize and conduct distance or blended learning [3, 2], the use of web 2.0 services and blended learning technologies [7]. The necessary condition in ensuring effective management of the university and building research and educational work on ICT base is information and educational environment of the university [6].

There are activities associated with the research: project TEMPUS TACIS "ECDL for Ukrainian Administrators" ICTERI 2014, project of the Ministry of Education and Science of Ukraine "Creating the Internet Portal for Distance Learning ECDL for Higher Educational Establishments" and "Creating Electronic Data Bank on Distance Learning for Higher Pedagogical Education"

3   Experimental Settings

An important component of modern education system is information and educational environment of the university (IEE). Kherson State University has the infrastructure that provides a wide range of possibilities for realization of individual educational trajectories for teacher and for student. In the process of IEE building for KSU it was necessary to solve the main problems, which are important for its effective functioning.

- coordination of different processes management;
- search of financing;
- cooperation with external partners;
- design, build, management and support of information network of the university (software);
- install and configure of servers;
- antivirus protection of information system;

- development and maintenance of information-analytical systems;
- Web hosting and services of implementation and IT support by other structural departments of the university.
- designing and development of Web sites in various educational areas with the use of informational and educational and Open-source systems;
- designing, development and support of educational software;
- designing, development and support of distance learning systems, etc.
- educational process ensuring by technical equipment (installation of equipment in accordance with the topics of lesson and technical requirements of the teacher, access of students and teachers in classrooms for lessons and other events according the schedule, the restriction of access in classrooms by strange persons).
- highly skilled work performance in the maintenance of computer, printing and copying, video projection equipment in University's departments and classrooms; repair and maintenance.
- configuring and maintenance of LAN, telephone and alarm systems of the university.
- development of guidance materials of alarm systems, telephone usage.
- control over the implementation of fire safety requirements and sanitary-and-hygienic norms in computer classrooms.
- development of methodological support;
- development of electronic means of educational purpose, particular in research activity of students;
- distance learning courses designing [6].

To solve these tasks, the functions among three departments of the university were distributed:

1. Infrastructure - internal communications building.
2. Technological - development and administration of IT.
3. Content - the development and support of educational services.

Effective content environment, content creation and its use significantly improve the quality of educational services and affect the overall ranking of the University.

However, the developed services don't used. For example, KSU has two platforms of learning management content system for distance or blended learning "Kherson Virtual University" (KVU, Copyright © Research Institute of IT of KSU, 2003-2010) and "KSUOnline" (LMCS Moodle, start using - 2005). The employees of the Department of Support for Academic, Informational and Communicational Infrastructure conduct the training seminars for responsible employees of the departments of the university in distance learning technologies (2 times a month at KVU and 2 times a month for the Moodle system during the last 5 years). However, visitors of seminars are laboratory assistants who are not teachers, and they do not design the training courses. Thus, the teachers know about learning management content systems of the University, some teachers have the basic skills of development of courses and only a small part of teachers has developed e-learning courses and regularly uses one of the platforms. The main reason for the reluctance to develop and use of e-learning courses is the lack of time. The process of distance course development is time-consuming, but, in our opinion, this is actually an underestimation of the importance of new learning approaches and technologies using.

There is the same situation with registration of teachers in scientometric databases. Employees of the Department of computer science, software engineering and economic cybernetics made the search, analysis and systematization of the registration accounts of part of the University's scientists and the University in the scientometric databases. The result of this work is increasing at 30 publications in Scopus database; it leads to the rise of the University's ranking. Also, the accounts of KSU scientists, which had the different spelling of the surname, the name of the institution, changing the name of the educational institution in accordance with its renaming were combined. During the work of this group and the practical training of the students, the teachers of the University (about 60) were guided to create the account in Google Scholar. However, only a small part of teachers continues to do this work. The results of making accounts in Google Scholar are listed in table 1 (according Bibliometrics of Ukrainian science (http://nbuviap.gov.ua/bpnu/index.php?page_sites=poisk)), where № is actually a spot in the ranking.

Table 1. The results of making profiles of research teams in Google Scholar, volumes of scientific works of Kherson State University and Kherson State University

Research teams rating		
№	Chair, Department, Laboratory, University, Volume	h- index
37	Specialized academic Council K 67.051.02	21
39	Department of computer science, software engineering and economic cybernetics	20
41	Faculty of physics, mathematics and computer science	20
University ranking		
36	Kherson State University of Ministry of Education of Ukraine	21
Google Academy		
№	University	Account
1	Kherson State University	195
2	Kherson State Agrarian University	21
3	Kherson Polytechnic College of Odessa National Polytechnic University	21
4	Kherson National Technical University	14
5	Kherson Maritime Academy	5
6	Other	45
Total		301

Top publications – Ukrainian (Google Academy)			
	Publication	h5-index	h5-median
1.	Managing of complex systems development	14	32
2.	Marketing and management of innovations	14	23
3.	Actual problems of Economics	13	19
4.	Information technologies and learning tools	13	17
5.	Ukraine's Economy	12	21
6.	**Information technologies in education (Kherson State University)**	11	17

Thus, at the creation and expansion of functionality of the informational and educational environment of the University, it is required to develop the system of motivation of scientific-pedagogical and teaching staff of the University, the formation of the concept "brand of researcher" in the minds of modern teachers.

Under "brand" it is understood "a strong link of the name of researcher with his studies, that is, by name it can be easy to find the interests of the researcher, on the contrary, by the scientific interest, you can find the researcher who work in this area" [5]. We can say that brand of researcher is a strategic tool in his research activities.

The solutions of the questions can be:

1. Initialization of solution of the task from "above", it should be developed and implemented in the University the motives system for teachers, for example, the reduction of academic hours if the teacher develops and passes the internal certification of learning course, bonuses; it should be accounted as criteria for rating teachers and others. Ukraine has a positive experience in the development and wide usage of distance learning courses, in particular the Borys Grinchenko Kiev University, National University of Life and Environmental Sciences of Ukraine, Sumy State University, Donetsk national University.

2. The creation of "critical mass" of teachers, able to support and implement IT in the practice (if the leaders is not ready to initiate the process, but are willing to support the initiative).

Due to the network it was increased the speed of propagation, transmission of information, so scientists (professors) should process it faster. At the same time with the appearance of IT, there are new opportunities to express yourself, scientific interests. Traditional academic channels of communication are:

- publication in national journals;
- participation in specialized scientific events, congresses, conferences, symposia, seminars;
- exchange programs, internships, professional development;
- participation in competitions for grants.

New channels associated with activity in the sphere of international publications are followings [1]:

- publication in international journals included in the database of Web of Science and Scopus;
- participation in social and professional networks, forums, blogs in the Internet;
- use of academic on-line services: ResearcherID, ORCID, Scopus, Web of Science, EndNote, and others;
- citations in scientometric databases.

In our opinion, this list should be added by the development of open online courses. Examples of Coursera and Khan Academy indicate that open course development is a good channel for the dissemination of the work and positively affects the awareness of the teacher, the researcher.

Thus, the area of the effective cooperation is formed at the intersection of the needs of all participants of educational process by means of information and educational environment (fig. 2).
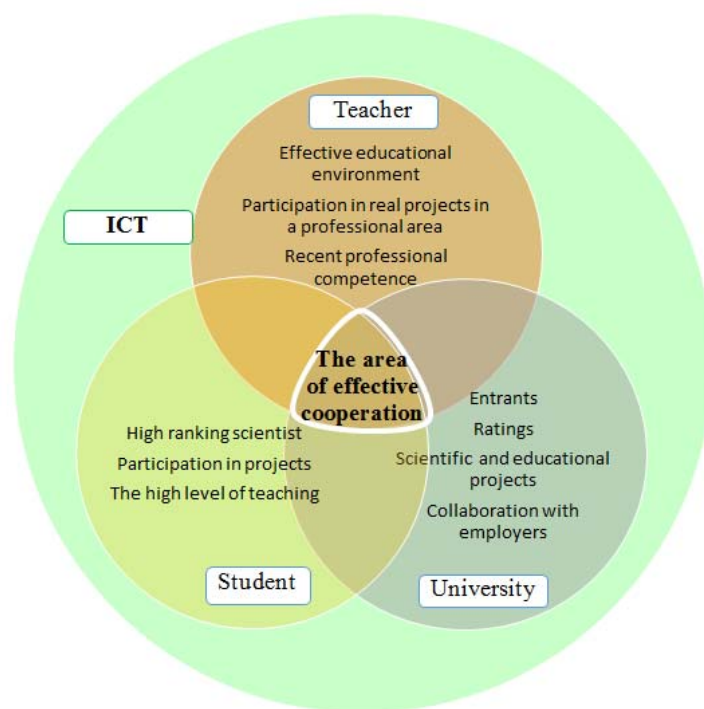

Fig. 2. The needs of educational process participants

One of the ways to achieve a high level of proficiency of ICT use by academics is the introduction of regular courses, seminars of advanced training.

The support tools of the work of the scientist-teacher can be divided into three categories:

1. The resource block is a totality of information and technical facilities required for teaching and research activity; it can be used as a resource in purposeful activity of the teacher and it allows obtaining a specific professional result.

2. Activity block – activities, aimed at solving professional tasks, creation of the particular information product; it is a series of actions aimed at execution of their duties as teachers, the needs of the generation, transfer and synthesis of new knowledge.

3. Creative block appears only at further independent work of the teacher in using ICT in the professional activities, it formed on the basis of resource and activity blocks, the motivation and ability of teachers to creative activity. At this level, the teacher creates new learning methods that motivate students to independently acquiring of new knowledge by means of ICT, independently mastering and using untraditional tools in the educational process as social networks.

At activity block there is advisably to distinguish three level of mastering of ICT tools: basic, sufficient, effective (table 2). **Basic** is the existing level of formed abilities and skills; **sufficient** - we want to form in learning process of courses; **effective** - the level which the scientist reaches by yourself in the process of purposeful application of acquired knowledge in professional activities. The accordance of activity's results to its purposes should be characteristics of this level.

Table 2. Levels of ICT knowledge of the university's teachers (action block)

	Basic	Sufficient	Effective
E-mail skills	know own e-mail address, able to check the mail from different computers, able to write, send, receive and read an email, answer.	able to configure the address book, attach files, use styles, templates, signatures	Able to use mailing lists, to create rules to import calendar events, conduct synchronization between multiple accounts and devices
Using the profiles of SD and Scopus system	has the profile, knows how to view it	monitors the work of the TOP groups in the World in the research field	
Using the profiles of SD and Google Academy	has the profile, able to view it	able to edit the list of articles, to change profile settings	follow news in scientific publications, updates in the index of articles, able to use links to other electronic resources portfolio
Using the profiles of SD and *Research Gate*	created the profile, following the forum posts, and updates the publications	takes part in discussions, following the articles, share documents	debating, blogging
E-portfolio (own website, blog)	has the e-portfolio	can edit e-portfolio	able to change the structure of the e-portfolio
Youtube	use video Manager to browse videos	able to subscribe to channels, has own channel, able to publish and edit videos	able to broadcast, running the own channel
Access to Cloud Services (Google	has the account, able to create documents,	able to connect applications, able to pro-	Able to integrate in services documents

Drive)	download and upload files	vide different rights of access to own documents, able to orient in the updates	from disk, use tools for planning meetings, organizing surveys, compare different versions of files and select the correct
The possibility of organizing collective meetings	able to prepare materials, to make an announcement and expansion it	able to develop a program of meetings, make announcement, find speakers, to hold a meeting	able to organize the discussion, to highlight the results of the meeting, making meetings periodic, constant
Skype	*existing profile, able to correspond in chat, to take an incoming call, to make the call*	*able to find and add users, call via Skype, send files*	*able to organize a Skype-conference, to create groups*
Webinars skills	understanding the principle of conducting the webinar, able to join the webinar.	able to download files of webinar, interact with other members, participate in polls, check the settings	Able to organize webinar
Effective use of social networks in educational process	Able to publish or distributes the learning content, respond to comments, able to configure the access	Able to make the group, initiate and support discussion of questions, problems	Able to produce events, conduct surveys, researches

4   Experimental Results

We have developed the advanced training course "Distance learning" for teachers of the University in which much attention is paid to new trends in education, the use of information technologies in research, learning, common work with various types of documents, tools to design the distance course. In particular, the purpose was not just to teach teachers to develop online courses, and effectively use information technologies to identify themselves as a scientist in research and in the student's environment.

The course includes the following thematic blocks:
1. Distance learning as an element of educational environment of modern University;
2. Informatization of teacher's research activity;
3. The learning management content system Moodle;
4. Tools Web 2.0 for content development of distance course;
5. Google services in educational process.

The content of the course was chosen to achieve the sufficient level of ICT proficiency and to promote the development of internal motivation to further self-development and use of ICT in the professional activities.

Let's consider the content of each theme in details.

Thematic unit: "***Distance learning as an element of the educational environment of modern University***". This block is very important for formation of internal motiva-

tion for active information technologies usage in professional activity not just on the level of correspondence, searching information in Internet and the development of presentations. One of the tasks of this block is the destruction of stereotypes and prejudices in using new channels of popularization of the studies, associated with copyright.

Social networks are becoming popularity not only as a platform for communication, but also as a source of news, knowledge. Organization of group in social networks provides the ability to transfer the information quickly in a convenient and familiar mode to modern students.

Taking into account the UNESCO recommendations on the diversification of learning platforms [2] we included two thematic blocks related to the use of Google Services and web 2.0 services to create the professional activities and the development of more attractive educational content.

Thematic unit *"Tools Web 2.0 for content development of distance course"* is divided into two sections: information technologies and online editors, graphics, video, audio. In the section "Information technologies" we included the resources that help make the course's content more interesting for the representatives of the Net generation [4]: educational online games (LearningApps), mindmap (Cacoo, Mindmup, Creately), the cloud of word (Tagxedo), time line (Dipity, Tiki-Toki), quiz (Kahoot, Riddle). Each of the tools is considered from a practical point of view: to make a word cloud and develop tasks; design online game to support the course, which will help the student to test skills and knowledge. This section has the online graphic editors and audio and video content editors. Teachers familiar with text processors and multimedia editors are still remain outside their attention and the work with them causes some difficulties. However, the success of the course depends on technical aspects. The content should be arranged in such way students can use mobile devices, it imposes a number of restrictions on size of image file, video length etc. Therefore, we proposed to consider the graphic and video editors, and services to create infographics (easel.ly, piktochart, infogr.am, vizualize.me) and interactive training videos (eduCanon, Teachem, EdPuzzle). Infographics is a powerful tool in teaching. Information presented graphically is better remembered. Therefore, data visualization has received the considerable attention.

Thematic block "*Google services in educational process*". It was selected Google services to work with shared documents. These resources have several advantages, including:

- free cost;
- easy registration and use;
- similar interface in different applications;
- ease data exchange between different applications;
- integration with other applications;
- import and export data from/to different formats;
- sufficiently large set of tools.

In addition, among these applications is Google Scholar, which coordinates with the theme of scientometric databases.

To build the course the following topics were chosen:

– Time management for teachers (work with calendar, schedule of classes). Using the Calendar app, the teacher can plan and organize not only the activities, but the activities of the group. Calendar is synchronized with e-mail and list of recipients, so it is easy to send messages about upcoming events for the group. During the classes we develop a timetable which is synchronized with the schedule of the trainees. In addition, smart phone owners have possibility to quickly receive updates to the schedule in the appropriate widget.

– Blogging. This is one of the ways to disseminate (publish) research papers, create the archive of events, displaying the work of the scientific circle and so on.

– Maintain of YouTube channel. Developing of the video is difficult task for teacher: recording, editing, installing requires considerable efforts. But there is a possibility to use already developed professionally made recordings. Therefore, the work with YouTube channel at first it is the development of collection of videos required for the distance course designing. The second stage is to edit the video (cutting, gluing). In the third stage the students are trying to record, edit the video, upload it on the channel and notify the group about it. Video Manager allows you to subscribe to interesting channels, sort selected videos, and create the own educational channel.

– Google Maps. Maps are powerful data visualization tool. The teacher of Geography can use the coordinates, develop maps of fields. The teacher of History - the maps of events, the teacher of Mathematics can develop maps of distances, angles, etc. Also, scientists can visualize the travels, public speeches and researches. Development of the own map is another stage of informatization activity of the teacher, the student.

– Google Survey. The tool of Google Forms is Quizzes, it designs surveys and tests [7]. This service allows the teacher quickly assess the knowledge with the help of automatic validation. In addition, to consolidate the material, you can add explanations and videos.

– Website design. Design and support of website and blogging, this is another opportunity of creating the own research environment. Using these tools the teacher can organize the work of group, to inform about new research and results. The advantages of these tools before CMS (Content Management System) are they do not require any special server setup and hosting because the server place is allocated automatically. However, there are drawbacks: the domain name can be unknowable and difficult to remember. The website (blog) is informative without accounting students' rating. The website is gradually filled by the results in other applications: visitors' survey of the site, Google map with showing the educational institutions, video page of YouTube channel, results of work using Web 2.0. services.

Thematic section: "***Content Management System Moodle***" includes the stages of planning, development and launching of e-learning course. The purposes of this thematic unit is to acquaint teachers with the functionality of Moodle; to determine the pedagogical appropriateness of the use of certain units; to plan and develop learning course on the basis of experience of the teacher and with the use of content developed by tools of Web 2.0; to learn how to do course settings required to run it (to create groups, to decide the method of registration of students, limit the period for download completed task, test, etc.).

Thematic unit: "***Informatization of teacher's research activity***" includes theoretical and practical modules. The theoretical part consists of the following topics:

- Infometrica (scientometric, bibliometric, Webometrics).
- Databases (bibliographic, scientific).
- Styles of literature.
- Modern publications and publishers.
- Web services for publishing of scientific information.
- Modern tools of communication.
- Social networking for scientists.
- The repository.
- System of links' calculation.
  The practical module includes:
- Work with scientific databases.
- Search and systematization of scientific literature.
- Designing of the studies in publications by ICT means.
- Practical work with modern communication means.
- Create the own profile in educational and scientific services.

The objectives of the thematic unit are to provide dynamic knowledge of IT use in research activities of teacher and the practical skills to support individual professional growth.

The growth of specialist is associated with the publication of his scientific work in journals with high impact factor or in resources that have the great rating in the world. Scientometric databases, professional and social networks contribute to improve the scientific status of scientist, to broaden his research activities. As a result, it affects one the University rating.

Thus, the developed course of advanced training "Distance learning" for teachers of the University, will allow participants to obtain the results, in particular:

1. Development of distance course in the specific discipline, taught by the teacher.
2. Development collection of academic content in the discipline by web 2.0 services.
3. Create a Google account and use of Google services for the educational process, the organization of private professional activities and cooperation with colleagues.
4. Making account in scientometric databases, particularly in Google Academy.
5. Development of the professional resume by online editors of infographic.
6. Design of the scientist's website.

An important aspect was to build the course in such way the teachers of the University will form the necessary skills and received the results. An additional motivation for teachers was getting the certificate. The proposed curriculum of distance course meets the needs of a modern scientist. In the development of the curriculum we took into account the trends of ICT development and the requirements of scientific activities at the University. It covers the various types of scientific activities of teachers.

We have formed the group of 16 listeners, age 45 years and older, which includes 15 teachers of the Humanities and 1 lecturer of Economics. The important fact was that 8 of the 16 listeners - are the officials who determine the KSU development: 1 person is the Vice-rector, 1 is the Dean, 1 is the Deputy Dean, 2 persons are the head

of departments, 1 person is the head of the Academic Lyceum at KSU, 1 son is head of educational-methodical Department.

At the beginning of the course we have recorded the current level of ICT mastering according to the themes of the course. Note that we have not defined the level of MS Office mastering, and course's curriculum is not provided by the organization of collective meeting, however, participants were introduced with tools and platforms of organizing and conducting webinars. According to the results of the diagnosis it was established results of educational achievements of participants at the end of the course, which is shown in picture 3.
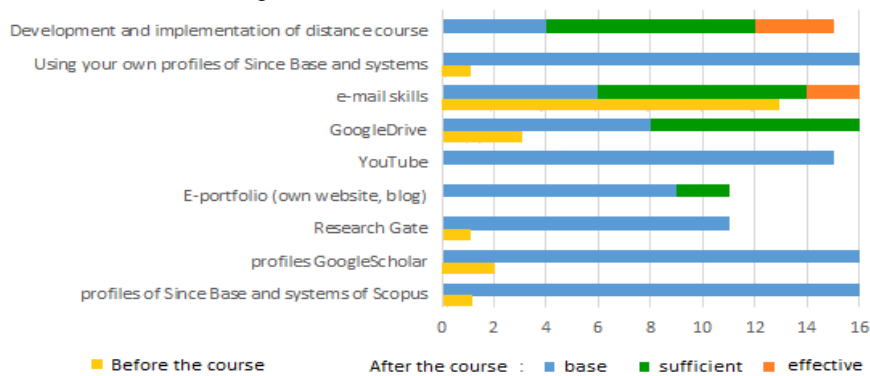

Fig. 3. Dynamics of the number of resources used by participants at the course

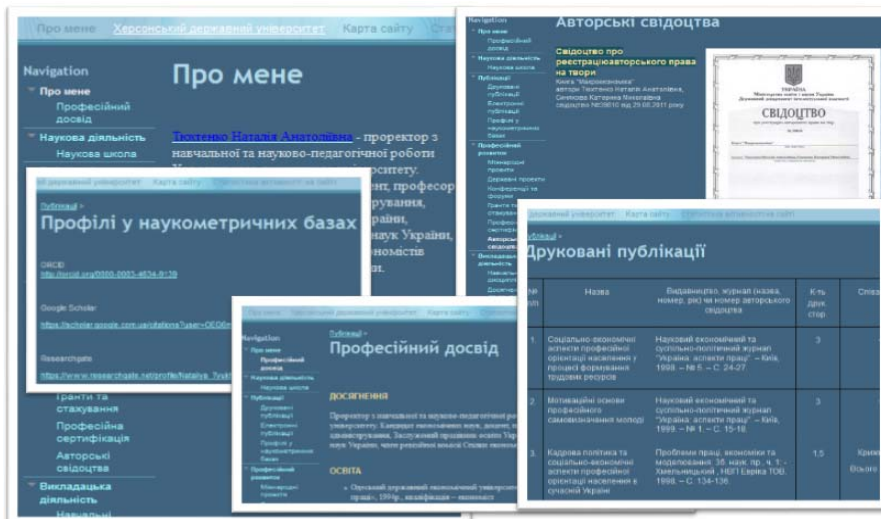Examples of personal sites of course' participants and the course's curriculum can be viewed at the link: http://ksuonline.kspu.edu/mod/assignment/view.php?id=9808

Fig. 4. Example of participant's page https://sites.google.com/site/tuhtenkonatalia/

5 Conclusions and Future Work

Therefore, an important factor to ensure competitiveness of the university is to organize training according to the needs of all participants in the educational process. An important role is giving to the information educational environment of the university. However, the conducted study showed that the presence of functional environment is a necessary but not a sufficient condition for the effective use of ICT in teaching and research work. Therefore, from our point of view, it is advisable to conduct of advanced training courses of teachers of the University according the ICT possibilities in the following areas:

1. Developing of e-learning courses that conform to the educational needs of Net generation of students, provides the opportunity for educational approaches such as blended learning, flipped learning, etc.;
2. Developing of e-portfolio, in particular the personal website of the researcher and profiles in scientometric databases, which promotes the exchange of scientific information and integration into the universal scientific society.

The developed training course for teachers of KSU was implemented by means of platform of learning management content system Moodle and includes thematic units, aimed at the formation of ICT competence of teachers, namely: distance learning as an element of the educational environment of a modern university; informatization of scientific research activity of the teacher; the content management system Moodle; Web 2.0 for content developing for distance learning; Google services in the educational process.

The course was attended by 16 teachers of the humanitarian disciplines in the age above 45 years. After training, the teachers received the practical results: profiles in scientometric databases, the personal website of the researcher and developed online course. However, it should be noted that not all attendees completed the objectives of the course because of full-time employment. Appropriate step was the developing of video tutorials for performing certain tasks of the course.

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