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Pedagogical Faculty



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# **PUBLIC INFORMATION AND EDUCATIONAL ENVIRONMENT AS ONE OF THE WAYS TO IMPROVE THE ICT COMPETENCE OF FUTURE SPECIALISTS**

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## **Abstract**

The article describes one of the ways to improve the quality of higher education in Ukraine in the context of European quality standards in the educational space of the university. There is designed model of public information and educational environment of the university, the ways of its use and development. The interdependence quality is shown between the educational environment of modern higher education institution and the level of ICT competence of their teachers and students. The model of corporate standards of ICT competence of participants of the educational process was described, developed and approved by Borys Grinchenko Kyiv University. The monitoring tools of ICT competence formation of students and the ways of its improvement were also analyzed.

## **Keywords**

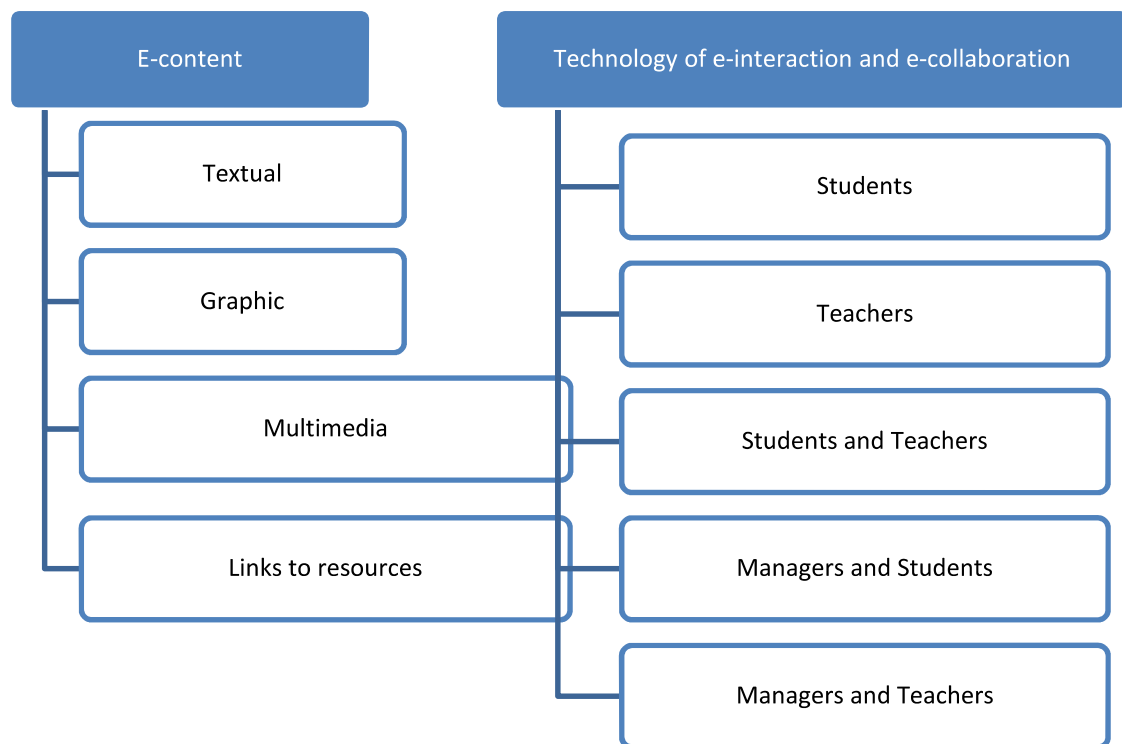
information and educational environment of the university, standard, ICT competence Model, monitoring

## **Introduction**

The modern labor market demands cause changes in the higher education system, including the transfer of emphasis from the educational process to its ultimate quality results. To solve complex problems, current student must learn the fundamentals and special knowledge, the methodology of scientific research, information and communication technology, be able to use all the new that appearing in the science and practice, adapt to market changes and improve their skills, be ICT competent. UNESCO recommendations emphasize that for the modern professional is not enough to be technologically literate and be able to shape the technological skills. Modern teachers should be able to help students use ICT to successfully cooperate, to solve arising problems, develop 21st century skills. One solution of this objective is the creation and development of public information and educational environment.

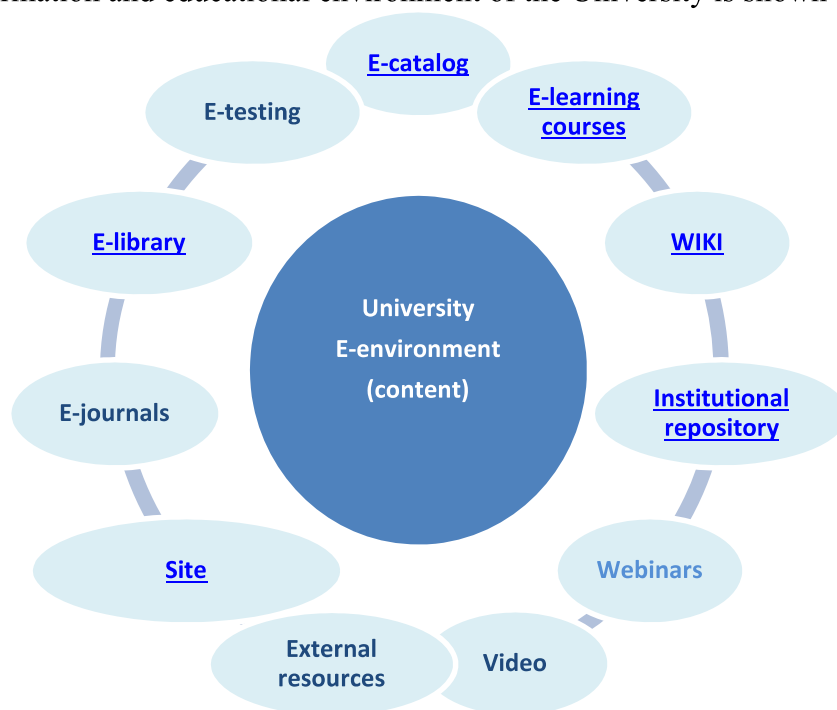
## **1. Designing information and educational environment of the University**

Studying the experience of world universities we have developed the model of information and educational environment, the use and development of which will help improve the quality of university education. An obligatory condition of its creation is the availability of e-content, technology of e-interaction and e-collaboration. (Fig. 1).



**Fig. 1:** E-environment of the University

Among the e-content we highlight textual, graphic, multimedia, links to resources. Technologies of e-interaction and e-collaboration differentiate among students, teachers, students and teachers, managers and students, managers and teachers. The content of electronic information and educational environment of the University is shown on Fig. 2.



**Fig. 2:** E-content of e-environment of the University

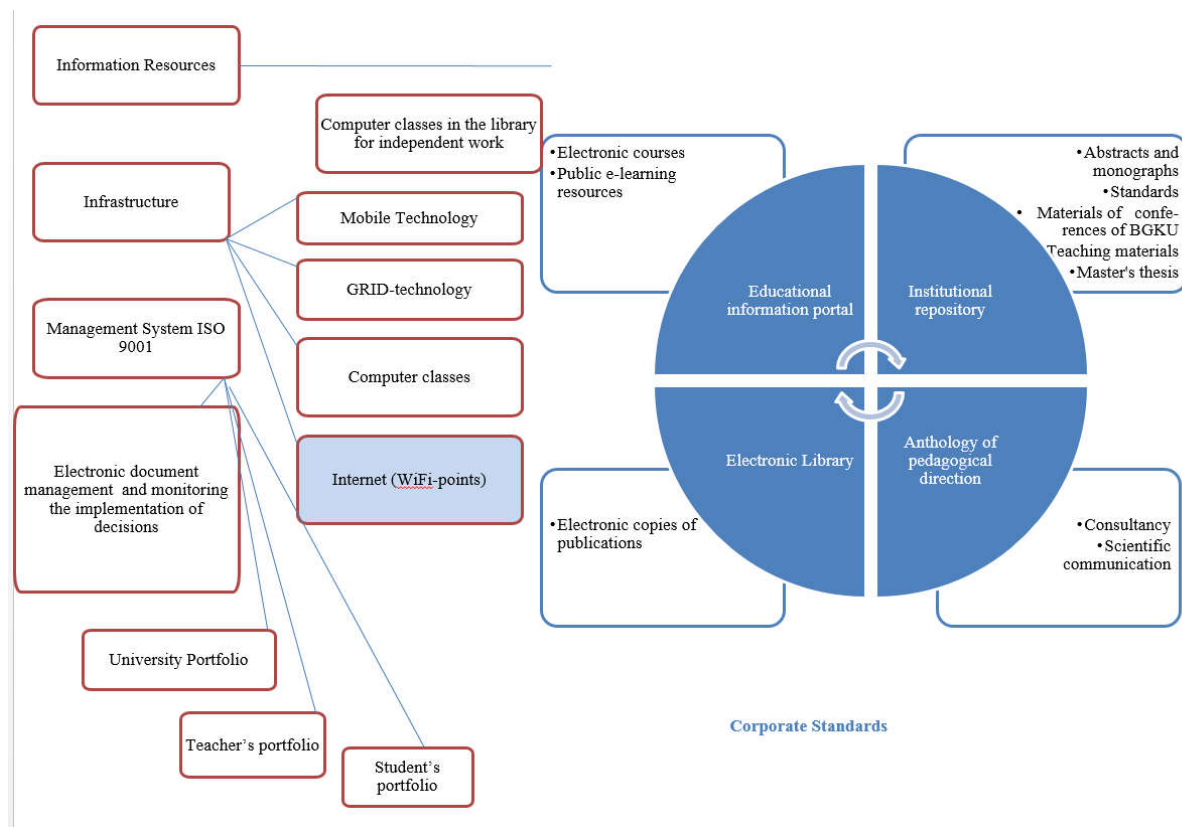
Details of the e-content of e-environment in Borys Grinchenko Kyiv University can be found on the official portal <http://kubg.edu.ua/>, selecting main page menu «E-environment» (Fig.3), or use the links:

- E-catalog - <http://lib.kubg.edu.ua/cgi-bin/koha/opac-main.pl>
- Learning management system - <http://moodle.kubg.edu.ua/>
- WIKI - <http://wiki.kubg.edu.ua>
- VULYK - <http://vulyk.kubg.edu.ua/>
- Institutional Repository - <http://elibrary.kubg.edu.ua/>
- Webinars - <http://kubg.edu.ua/servisi/2012-11-12-08-34-21.html>
- E-publishing - <http://library.kubg.edu.ua/resursi/fakhovi-elektronni-vydannia-universytetu.html>
- Scientific masterworks - <http://masters.kubg.edu.ua/>
- Astudia - <http://astudia.kubg.edu.ua/>
- E-Library - <http://elib.kubg.edu.ua/>
- E-testing- <http://testing.kubg.edu.ua/>
- E-portfolio - <http://e-portfolio.kubg.edu.ua/>



**Fig. 3:** E-environment of BGKU

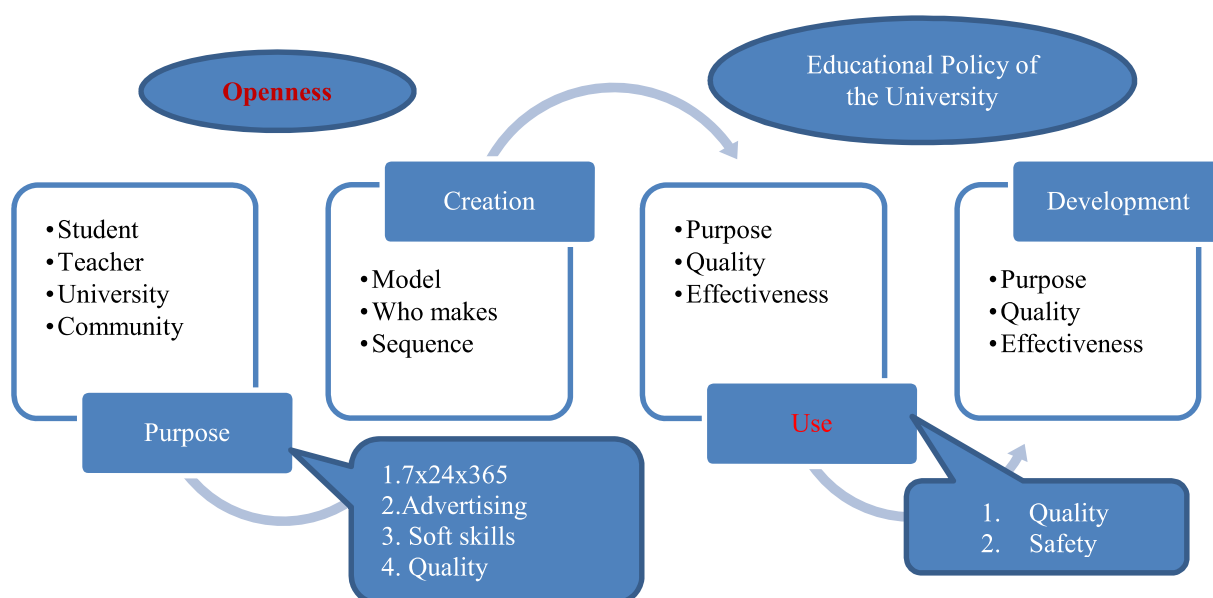
Conventionally e-content can be divided into four main components: educational information portal, electronic library, institutional repository and anthology of pedagogical direction. Given this distribution model obtain electronic information and educational environment of the University (Fig.4).



**Fig. 4:** The model of information and educational environment of the University

Constructing an electronic information and educational environment of the University, structure-functional model which is based on competence and personality-oriented approach learning, Borys Grinchenko Kyiv University will provide a modern information society demands on preparing competitive professionals.

Schematically, the process of creating and using information and educational environment of the University is shown on Fig. 5.



**Fig. 5:** The process of creating and using information and educational environment of the University



Modern specialists should have ICT competence, which should become part of the professional competence of specialists of any profile. To implement this task universities have to develop and approve their own corporate standards which will ensure the appropriate competence of students and teachers of Modern Universities.

Among the corporate university standards we highlight:

- Standards for Quality Management System
- Standards for IT and information environment
- Standards of training documentation in electronic form – Electronic Document Management
- Standards to provide additional education on the basis of DL
- Standards on scientific and methodological materials and tests
- Standards for the training
- Standards for organization of scientific activity
- ICT competency standards of teacher and student
- Standards for e-content and e-learning environment
- Standards for educational technology

As to form ICT competence is the development of standards in the ICT expertise of all participants of the educational process of the University to ensure quality of education and the creation and subsequent implementation of educational policy of the University, these corporate standards for ICT competencies of student and teaching fellow developed and approved in Borys Grinchenko Kyiv University. The main tasks here is to create the model, determining the levels of development and monitoring tools.

Key information and communication competence - the ability to effectively use ICT in teaching, research and daily activities, to address information and professional tasks [1].

In developing ICT competency standards we followed the standards of ICT competencies of UNESCO (Figure 6) which defined the international program UNESCO (ICT Competency Framework for Teachers) [2].



**Fig. 6:** UNESCO: ICT competence Standard

UNESCO recommendations emphasize that for the modern professional is not enough to be technologically literate and be able to shape technological skills. Modern teachers should be able to help students use ICT to successfully cooperate to solve arising problems, develop 21st century skills. When building a model ICT competencies of scientific and pedagogical staff member identified three main approaches to teacher activities. The first approach - «Technological literacy» - the ability to require the teacher to help students use ICT to improve teaching and research. The second - «Enhancing Knowledge» - requires the ability of teachers to help students learn the content in deep subjects, applying the acquired knowledge to solve complex problems that occur in the world. Third - «Creating Knowledge» - requires the ability of teachers to help students produce new knowledge and skills that employers need today.

Let us consider the standard model of corporate ICT teacher competency Borys Grinchenko Kyiv University in terms of its main aspects: understanding the role of ICT and their applications in education, research activities, training. Each of specified levels of ICT expertise of the teacher inherent specific knowledge and skills [3].

Activity	Technological literacy	Enhancing knowledge	Creating knowledge
Understanding the role of ICT in education and their use	Familiarity with education policy	Understanding educational policy	Innovation in education
ICT	Basic tools	Advanced tools	New technologies
Educational work	Basic knowledge: fragmented ICT use in education	Application of knowledge: systematic use of ICT in education	Skills knowledge of society
Scientific activities	Basic knowledge of scientific communication	The use of scientific knowledge (incl. virtual) electronic communications and scientific cooperation	Skills implementing research projects
Advanced training	ICT literacy: formal training in ICT	Management and direction: informal ICT learning	The teacher as an exemplary student: study on public courses (eg, MOOC)

**Tab. 1:** Model of corporate standard of ICT competence of teaching staff

For the measurement of formation of knowledge and skills of each of the levels required specialized tools. Such monitoring tools forming ICT teacher's competence is presented in Table 2.

Corporate ICT competency standards developed and approved for students Borys Grinchenko Kyiv University. With the formation of student ICT competencies conditionally distinguish three main levels:

- base (1st level, corresponding 1<sup>st</sup> bachelor year);
- advanced (2nd level, corresponding 4<sup>th</sup> bachelor year, or early education in magistracy);
- professional (3rd level, 2<sup>nd</sup> master year).

Activity	Technological literacy	Enhancing knowledge	Creating knowledge
Measurement tools: <i>Understanding the role of ICT in education and their use</i>	1. Online survey to determine the level of awareness of teachers about the availability of documents on education policy at the University or the State and their role in the activities of the university. 2. Participation in seminars (full-time or remote) on educational policy of the University.	1. Survey of students for use in the profession of innovative educational policy. 2. The survey of teachers in understanding ways to use innovation in the profession of education policy. 3. Survey of students to determine the role of ICT in education and identify requests students to enrich the e-university environment. 4. Teacher's e-portfolio: availability of data on participation in some group of educational initiatives.	1. E-portfolio: availability of information on participation in the group to create new educational development, a strategy for ICT and their use.
Measurement tools: <i>ICT</i>	1. Tests for independent verification of levels of basic tools (created by the University, IT-Academy). 2. Some components of e-learning courses (electronic educational course)	1. Certified electronic educational course, which is a necessary condition for the use of complex ICT tools. 2. Teaching materials are based on the use of e-tools	1. Usage of Wiki portal. 2. Own blog of the teacher. 3. Usage of social networks for education. 4. Teacher's e-portfolio.
Measurement tools: <i>Educational Activities</i>	1. Survey of students about the quality of fragmented use of ICT. 2. E-testing students' educational achievements. 3. Availability of electronic course in LMS Moodle. 4. Questioning teachers in understanding the effectiveness the use of ICT in practice.	1. Statistics of usage by students of electronic course, placed on LMS Moodle. 2. Links in electronic course on Institutional repository resources. 3. Links on open e-resources. 4. Links on open learning courses (MOOC). 5. E-science publications. 6. Survey of students on teacher satisfaction with the proposed e-resources. 7. Evaluation of training programs: a list of recommended resources. 8. Availability of certified electronic courses on each disciplines that teacher teaches. 9. Assessment of systematic use of electronic course resources: reports on e-dean and electronic gradebook of specific electronic course. 10. Availability on the Wiki portal annotations to certified electronic course. 11. Assessment of systematic use of resources in the university environment	1. Creation an open electronic courses (MOOC) and statistics of their members. 2. Organization of email communication and collaboration (including educational projects) in soc. networks and on the basis of virtual communication (skype, video conferences, webinars, etc.). 3. Joint projects on the Wiki portal. 4. Teacher's e-portfolio. 5. The use of ICT for administration of the educational process

Measurement tools: <i>Scientific activities</i>	1. Survey for teachers awareness on the use of scientific communication: repositories, scientometric databases, e-libraries, e-journals, as well as opportunities and participate in online conferences. 2. Number of publication in Institutional repository. 3. Citations index in Google Scholar.	1. Number of international publications. 2. Number of appearances at international conferences	1. Participation in Intercollegiate and international research projects. 2. Teacher's e-portfolio. 3. Number of joint international publications with scientists from other universities. 4. Citations index in international scientometric databases. 5. Organization and conduct online conferences, seminars.
Measurement tools: <i>Advanced teachers training</i>	The certificate of training for ICT	1. E-portfolio. 2. Participation in distance training courses in Ukraine. 3. List of graduated non-formal learning.	1. E-portfolio. 2. The list of graduated open professional online learning courses (MOOC). 3. Training for colleagues on the use of ICT. 4. Online consultations, conducting webinars out of the experience.

**Tab. 2:** Monitoring Tools of formation ICT teacher's competency

In accordance with the defined levels developed model of ICT competency of the student, which is based on standards laid by UNESCO [4].

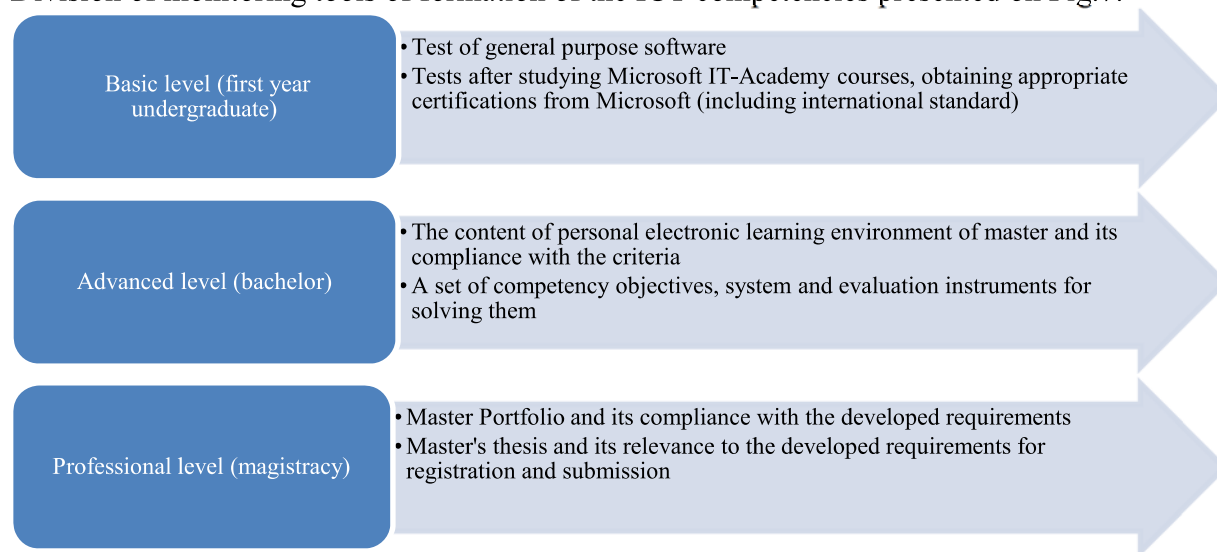
Levels Aspects of Masters	<b>Basic</b> (basic knowledge and skills to meet the needs of their own cognitive)	<b>Advanced</b> (to meet the challenges of educational, scientific, social, cultural and practical nature)	<b>Professional</b> (component of professional competence to solve professional tasks)
<b>Exploring ICT</b>	Basic knowledge and skills  Basic tools	Advanced Knowledge and skills  Complex tools	Ability to self-education in ICT
<b>Educational Activities</b>	Application of knowledge and skills	Solving Competence Tasks of educational nature	The solution of the tasks of the competent professional designation
<b>Research activities</b>	The use of scientific communication	Scientific cooperation The ability of application of e-Science	Presentation of research results in the form of research project
<b>Social and cultural activities</b>	Knowledge and skills of citizen knowledge society	Solving Competence general tasks	Submission of Portfolios

**Tab. 3:** ICT competence Model of student

Formation of basic and advanced levels assigned to the department of computer science and information technology department and mathematical disciplines. With the formation of the professional level of ICT competence the responsibility of graduating university departments. Each level of ICT competence formation of the student has its own monitoring tools. It may

be, TEST software, sets competency tasks, master work, complying with the requirements, developed a personal portfolio and the student's educational environment, etc.

Division of monitoring tools of formation of the ICT competencies presented on Fig.7.



**Fig. 7:** Monitoring Tools of formation of ICT competence of student

In order to test the developed tools were tested the basic level of ICT competencies of students in Borys Grinchenko Kyiv University.

During checking baseline formation of ICT competencies tested: knowledge and ability to use personal computers and computer networks; knowledge, understanding and ability to use computer programs (different OS (operating system), work with files, start the program, use the help system OS and other programs to work with files, word processor, image editor, means preparing presentations, tools preparation of publications, spreadsheet, antivirus programs, archiving and other programs); knowledge and ability to use basic services for the Internet (e-mail, information retrieval systems, teleconferencing); knowledge and ability to use technology Web services and Web 2.0 - 3.0 for solving educational problems; the ability to use electronic information and educational environment of the University; use of teaching tools created through ICT.

The test consisted of 100 questions, divided into four main sections: the study of ICT; ICT training activities; ICT research activities; ICT in social and humanitarian activities. Students had to answer 50 questions that were selected randomly automated (20 questions - studying ICT, 10 questions - ICT in the educational activity, 10 questions - ICT research activities, 10 questions - ICT in social and humanitarian activities). The computer questionnaire was attended by 885 students of 1 year (from 1360, enrolled at the University), representing 65% and 253 students of 5th year (of 475 people), which is 53%. Average score for the monitored University Bachelor's Degree students of 1 year of training is 31,4. Average score test results for the 5th year students of the University is 33,6. Due to the test results we can see that students like 1 and 5 study years should seriously increase the level of formation of ICT competence. To recommend this undergraduate students: seriously treat the study course "I'm in the information environment of the University", fulfill all the tasks placed in an open course on wiki portal of the University; be trained in IT Academy; seize all opportunities and related corporate mail free services and more. For the 5th year students recommend: receive training in IT Academy; seize all opportunities corporate e-mail and related services free of charge; open master course "Presenting research masters using ICT", which is hosted on the environment on wiki portal of the University; master the use of e-learning university. These recommendations are nothing like the necessary conditions for the formation of the ICT

competencies for students who participated in the monitoring. In general, the necessary conditions for the formation of ICT competencies include: the use of certified teacher's courses and social networks and Web 2.0 services; electronic course monitor the quality and effectiveness of their use; creation of personal electronic learning environment of the student; creation of e-Portfolios of student and its analysis; requirements for professional competence of masters, which includes ICT competence. This in turn is qualitatively created an public information and educational environment of the university.

## Conclusion

One way to create an electronic information and educational environment of the University is to develop corporate standards, create a personal learning environment for students and teachers. An important condition for the effective functioning of electronic information and educational environment is to transform it into a public system by the interaction with the labor market, providing students with more control over the educational process by participating in its planning and evaluation of quality, implementation of self-control and self-esteem. Privacy is a public environment in this case will be a means of strengthening the subjective position of students in teaching, increase the level of formation ICT competence as a teacher and student. The presence of public information and educational environment of the university is a necessary condition of formation the ICT competencies of students, which improves the efficiency and quality of the learning process.

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