

# IV. EFFECTIVE METHODS, FORMS AND TECHNIQUES IN DISTANCE LEARNING

## DEVELOPMENT OF EDUCATIONAL, SCIENTIFIC COLLABORATION AND PROJECT MANAGEMENT WITH IC TOOLS IN UNIVERSITIES

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***Abstract.** In the job it is shown the structure of IC-competence of the teacher of higher education. It is offered system approach in forming IC-competence at the university. It is defined the need for university teachers to increase the level of educational, scientific collaboration and project management. It is described the experience of implementation distance learning course for the teachers of the postgraduate studies; course on development of educational, scientific collaboration and project management with IC tools in universities is described in order to increase their level of IC-competence. The results of reflection and self-evaluation of the participants of pilot training on the distance course are presented. The prospects for further research are described.*

**Keywords:** ICT, competence, communication, cooperation, higher education, postgraduate studies.

## INTRODUCTION

Modern requirements to a specialist ("Future Work Skills", 2011) formed under the influence of the situation on the labour market, accelerating the pace of development of society and the widespread of information, cause replacement of the authoritarian and reproductive education oriented at obtaining knowledge by the system of productive collaboration and communication.

Based on the recommendations of European institutions and the experience of introducing qualifications frameworks in the EU and countries that are leading exporters of educational services, the basis of meaningful changes in ensuring the conformity of education to the current market requirements is the concept of a competence-oriented approach in education ("DeSeCo", 2002), which can be realized at higher educational establishments of Ukraine due to adopted by the National Qualifications Framework (<http://zakon2.rada.gov.ua/laws/show/1341-2011-п>).

The competence-oriented approach is interpreted as one that not only affects the structure of knowledge, but also the quality of education in general (Korzhova, 2012). International organizations that are currently working in the field of education, in recent decades have been studying the problems associated with the emergence of a competence-based education; among them are UNESCO ("UNESCO Recommendation", 2013), UNICEF, UNDP, Council of Europe, European Commission, Organization for Economic Cooperation and Development (OECD), the International Standards Department and others. The issues of implementation the competence-based approach in the education system and the formation of information competencies (Morze, 2015, Smyrnova-Trybulska, 2007, Hansen, 2012 and others) are discovered in a significant number of scientific publications.

In recent years, the educational situation is decentralized, for many years, the constants of professional competence of teachers are beginning to change, the formation of a new professionalism is being updated - the teacher of higher education, which for today is not a simple addition to the scientific qualification, but acts as an autonomous and meaningful independent professional unity. At the same time, the analysis of training programs for advanced training revealed insufficient attention to the formation of ICT competence of teachers of modern universities - as a rule, teachers has training for the purpose of raising the level of subject competences. And in most ICT training programs, there are no modules aimed at training moderators or tutors, as well as modules providing for the teaching of teachers of the organization of pedagogical network interaction, where teachers could meet, including the need for self-education and cooperation in networking communities. Therefore, it requires the improvement of the qualifications of scientific and pedagogical workers of universities of Ukraine, capable of producing a new scientific product, to proceed to a qualitatively new

level of scientific research, scientific and professional mobility of students and teachers, etc. There is a problem of quality education that corresponds to organizational and content-based European standards for improving the professionalism of a teacher through a system of scientific training.

*The article's goal* is to describe the model and experience of implementation distance education course for university teachers for the development of educational, scientific collaboration and project management with IC tools in universities in order to increase their level of IC competency.

## 1. MODEL OF POSTGRADUATE STUDIES OF MODERN EDUCATORS AND EXAMPLES OF IMPLEMENTATION AT THE UNIVERSITY

According to the results of the analysis of different approaches (Bikov et al, 2010), we propose a universal, as we think structure of the IC competence of the teacher of higher education, which consists of motivational-value, cognitive-operational and reflective-designing components (Table 1).

In this case, the IC competence will be considered as a key, because the process includes the dynamics of passing from the basic IC competence, that is, from the formation of the optimal invariant of knowledge and skills at the level of the user to the subject-deepened, corresponding to the conscious methodically balanced use of ICT in teaching his subject, through organizational and management IC competence, which is considered as the ability and readiness to convey their knowledge, and ends with corporate competence.

**Table 1.**

**The structure of the teacher's IT competence**

Component	Basic ICT competence (User)	Organizational and pedagogical competence (Tutor)	Subject- Deepened IC-competence (Consultant)	Corporate IC-competence (Consultant-researcher)
Motivational-value	Personal interest in the study of ICT and use in educational process	Desire to transfer their knowledge and experience of using ICT to colleagues and students	Ready for search of pedagogical technologies corresponding (relevant) modern ICT	Readiness for active participation in network pedagogical communities

Cognitive-Operating	Knowledge of the functionality of the PC and software, the technological and methodical methods of preparing e-content, the use of the network and digital educational resources in the pedagogical activity	Having of methodical methods of using ICT in the educational process, ways of organization of distance training and after course support of students	Ability to select, create and apply in Initial digital education resources, generalize and disseminate the experience of using ICT, including through the network interaction	Inform organizational and scientific and methodological support of all levels of informatization of educational process of higher educational institutions, organization of network interaction, formation of network of pedagogical communities
Reflection and design	Ability to self-assess their own activities in using ICT	Ability to build individual educational trajectories for advanced training in ICT	Ability to provide expert assessment of educational products developed using ICT	Ability to determine the problems of informatization and ways of their solution, in particular through teamwork and reflection

*Source: Own work*

Because competent graduates can be trained only by qualified instructors, and IC competence is considered to be key, there is a need for designing the content of continuing education programs, taking into account the regularities of the formation of IC competence (Table 1) and the implementation of innovative learning models, namely:

- personalized model with the use of remote learning technologies;
- corporate, which involves studying in your own educational institution, taking into account not only the level of formation of the e-environment of a specific higher school, but also that satisfies the professional pedagogical inquiries of each teacher and the institution as a whole.

At the same time, the necessary condition is the accumulation system of advanced training in the environment of continuous education, which implies continuous updating of its content adequately to the level of development of both the ICT itself and modern educational technologies. For example, in order to obtain the *basic level of IC competence* at the Borys Grinchenko Kyiv University, the following courses are offered in the system of advanced training (<http://e-learning.kubg.edu.ua/dn/course/index.php?categoryid=24>): Create video presentations in Power Point 2010 and Google Apps; *organizational and pedagogical competence* (tutor) - course Distance Learning Platform Moodle;

*subject-deepened IC-competence* (consultant) - the course Electronic educational and scientific environment of the modern University.

At the same time, the analysis of the results of the educational, scientific activities of the teachers of the Borys Grinchenko Kyiv University for 2016/2017 academic year showed problems:

- teachers have a certain level of IC competence, but they do not always apply it systematically in scientific activities and scientific communications, do not have appropriate scientific portfolios in open space, do not take advantage of the use of electronic publications and scientific open networks, the results of scientific activity are purely theoretical and not always used in practical activities;
- scientific articles in most cases do not meet international requirements, not oriented to the use of the best European practices;
- scientific studies have weak evidence of the results presented;
- there is a monotony in research designs;
- the methodological base of scientific research is limited to the most typical methods and technologies, not oriented to modern European research designs;
- academics are not aware of international ethical standards and ethical policy of research;
- the scientists are not able to formulate project proposals for conducting scientific researches on a local, at the national and international levels, which eliminates the possibility of conducting joint research with the leading educational institutions of the European Union.

Therefore, an electronic course "Development of Educational, Scientific Collaboration and Project Management with IC Tools in Universities" was created for the purpose of solving these problems and gaining corporate IP competence (consultant-researcher).

## **2. THEORETICAL BASIS OF THE RESEARCH**

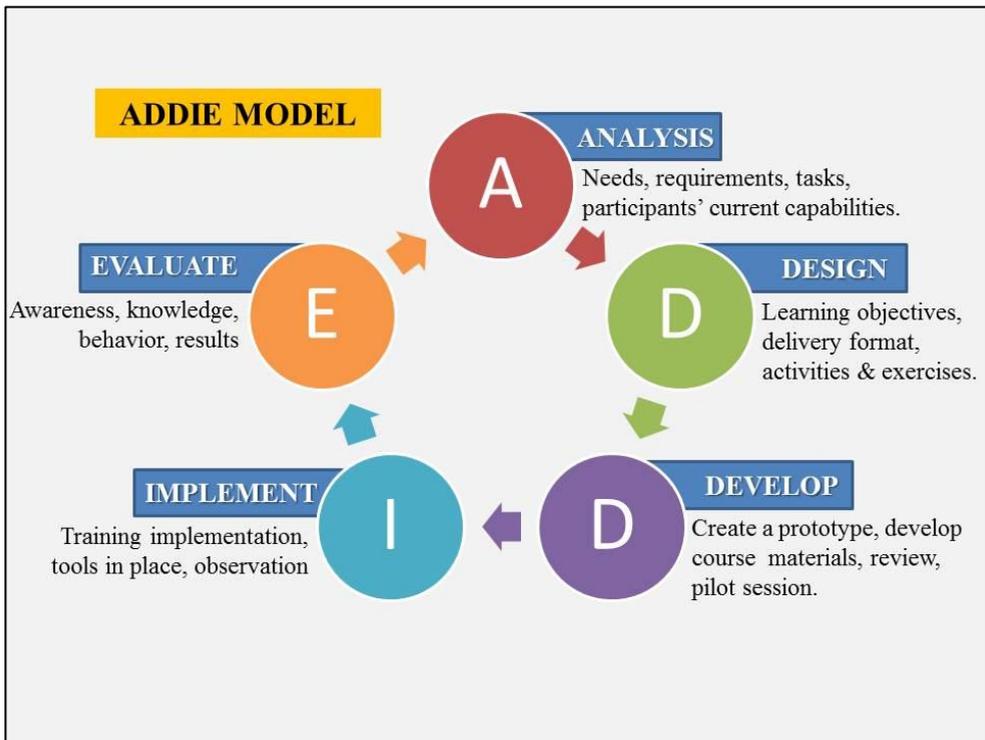
Within the framework of the International project "International Research Network for the Study and Development of New Technologies and Methods for Innovative ICT Pedagogy, E-Learning and Intercultural Competencies" (IRNet) of the European Commission's Seventh Framework Program (FP7) within the framework of the International Research Staff Exchange Scheme (IRSES). In 2016/2017 academic year the group of researchers (Morze N., Makhachashvili R., Kuzminskaya O., Lyakh T., Vorotnikova I.) created and implemented an electronic training course for the system of professional development of scientific and pedagogical workers of Boris Grinchenko Kyiv University. The training course "Development of educational, scientific collaboration and project management with IC tools in universities" became a variant part of the obligatory program of

postgraduate studies of scientific and pedagogical workers of the Borys Grinchenko Kyiv University.

One of the indicators for determining the expected learning outcomes at the proposed course was considered by the Education Technology Standards for Education and Training ("ISTE", 2016), including the standards for teachers (source: [online] at <http://www.iste.org/standards/standards/for-educators>).

The guide for implementing collaborative learning is the European Union's standards for building a higher education system and pursuing collaborative research ("Ethics for Researches. Facilitating Research Excellence in FP7", 2013, "Legal Rules of the Scientific Research under the EU Law", 2016).

The basis of the course concept is the ADDIE model (Figure 1).



**Figure 1. ADDIE model**

*Source: <http://eclipse.mu.ac.in/mod/forum/discuss.php?d=1783>*

The ADDIE model is a framework that lists generic processes that instructional designers and training developers use. It represents a descriptive guideline for building effective training and performance support tools in five phases: Analysis, Design, Development, Implementation, Evaluation (Durak, 2016).

*Analysis Phase.* In the analysis phase, instructional problem is clarified, the instructional goals and objectives are established and the learning environment and learner's existing knowledge and skills are identified.

*Design Phase.* The design phase deals with learning objectives, assessment instruments, exercises, content, subject matter analysis, lesson planning and media selection. The design phase should be systematic and specific. Systematic means a logical, orderly method of identifying, developing and evaluating a set of planned strategies targeted for attaining the project's goals. Specific means each element of the instructional design plan needs to be executed with attention to details.

*Development Phase.* The development phase is where the developers create and assemble the content assets that were created in the design phase. Programmers work to develop and/or integrate technologies. Testers perform debugging procedures. The project is reviewed and revised according to any feedback given.

*Implementation Phase.* During the implementation phase, a procedure for training the facilitators and the learners is developed. The facilitators' training should cover the course curriculum, learning outcomes, method of delivery, and testing procedures. Preparation of the learners include training them on new tools (software or hardware), student registration. This is also a phase where the project manager ensures that the books, hands on equipment, tools, software are in place, and that the learning application or Web site is functional.

*Evaluation Phase.* The evaluation phase consists of two parts: formative and summative. Formative evaluation is present in each stage of the ADDIE process. Summative evaluation consists of tests designed for domain specific criterion-related referenced items and providing opportunities for feedback from the users.

Quality assurance in e-learning premises (Grifoll et al, 2010):

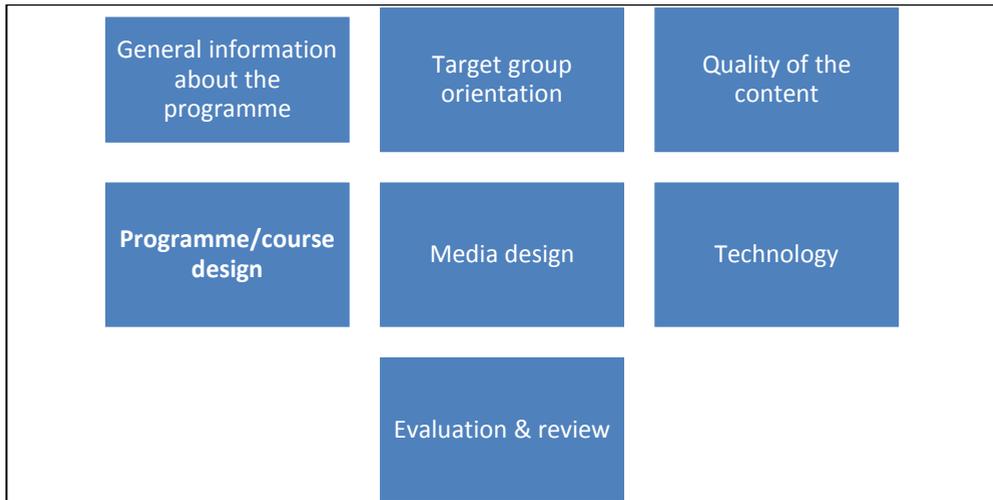
1. The first basic principle declares that providers of higher education have the primary responsibility for the quality of their provision and its assurance. This is a principle that should be developed and implemented in a deeper way. However, e-learning programmes are progressively enrolling students and hiring teachers situated in different countries. Facing this situation, how do we match the primary responsibility with the needed "secondary" responsibility of QA agencies and other stakeholders? How will international e-learning programmes be externally assessed?

2. The second basic principle that the interests of society in the quality and standards of higher education need to be safeguarded; the concept of society here, and taking into account again the possibilities of e-learning programmes to be delivered worldwide, needs also deep reflection. Who represents the society? That is important if we wish to include the voice of society in the quality of study programmes, and in the definition of new proposals.

Assessment challenges include the following components:

- *Context.* Context evaluation is different from that of a conventional university, and it emphasises the specific characteristics of e-learning as to conventional higher education. On-line distance study has potentialities, on the one hand, but it also suffers from limitations, such as the type of degree that can be obtained.
- *Inputs.* The profile of students enrolled in an e-learning education is different from that of students attending a bricks-and-mortar university. E-learning students usually work full time (they are employed in the labour market), they have family responsibilities and they tend to be more mature. The teaching staff profile is also different from that of conventional universities. The own teaching staff propose courses, define the contents and aims, look for authors for the teaching materials, select and coordinate student counsellors, etc. Collaborating teaching staff consists of two posts: the student counsellor and the tutor. The student counsellor gives incentive and impetus to learning activities from the very beginning through assessment (by proposing and monitoring the student's activity, moderating discussions and debates, resolving doubts regarding the subject, etc.). The tutor supports and advises the students on matters connected with the running of the virtual campus and course enrolment, and gives guidance regarding possible professional opportunities. Lastly, technology infrastructure forms the core of a virtual university, as the university has to guarantee that the services for study and learning purposes are satisfactory.
- *Process.* The main difference concerning the delivery process is the high degree of homogeneity. All classrooms used for the same subject have exactly the same learning documentation, tools (forum, guidance, etc.) and assessment process. Distance learning education implies a high level of teaching process homogeneity: the same author for all materials in one particular subject, the same learning and assessment activities, the same student support system for all programmes, etc. This degree of homogenisation has advantages, such as the fact that the institution can make a cascade of changes quickly and effectively, although it also implies risk, such as the hegemony of a single culture to the detriment of plurality, as well as the possible devaluation of teachers as mere mediators of knowledge described by UNESCO.
- *Product evaluation.* Product evaluation identifies and assesses three kinds of outcomes: academic outcomes (progress rates, drop-outs, etc.), personal outcomes (skill development) and professional outcomes (employment rates and adequacy, etc.). It is important to state that the evaluation of e-learning programmes should be of the same quality as that of non-distance learning degrees (i.e. conventional degree programmes).

The ECB-checklist method ("ECB-Check Quality Criteria", 2016) is employed to assess the open e-course, created to implement the IRNet project groundwork findings (Figure 2).



**Figure 2. The ECB Check Criteria to analyse a course**

*Source: Own work based on <http://www.ecb-check.net/criteria-2/>*

### **3. ELECTRONIC TRAINING COURSE "DEVELOPMENT OF EDUCATIONAL, SCIENTIFIC COLLABORATION AND PROJECT MANAGEMENT WITH IC TOOLS IN UNIVERSITIES"**

Electronic Training Course "Development of educational, scientific collaboration and project management with IC tools in universities" (<http://e-learning.kubg.edu.ua/course/view.php?id=2879>) covers the actual issues of organization of cooperation in education, assessment and application. IC-tools in scientific communication, collaboration, development of scientific projects and research.

*The purpose of the course* is to: increase the level of competence of scientific and pedagogical staff of the University in the field of educational and scientific communication, collaboration and project management by introducing into the professional activities of the IC tools.

*The main tasks of the course:*

- to develop general ideas about directions and perspectives of application of collaboration (cooperation) in educational activity;

- develop the ability to profiling, evaluating, applying innovative pedagogical and information and communication technologies in educational and scientific cooperation;

- develop the ability to organize training with the help of IC tools;

- develop the ability to organize scientific collaboration and project management with means of IC tools;

- to increase the competence on modelling and implementation of educational, research projects.

*The course is aimed* at the formation of such professional competencies:

- possession of basic methods, methods and means of receiving, storing, distributing information, computer skills as a means of organizing scientific collaboration and communication;

- ability to work in a team and organize team work with information in global computer networks;

- designing educational tasks for organizing student cooperation and for solving educational problems;

- usage of various types of IC tools for online learning, collaboration, cooperation;

- creation and use of different models of cooperation according to the purpose using the IC tools;

- assessment of the effectiveness of the organization of cooperation;

- the ability to collect, analyse and process the data necessary for solving the research tasks;

- development of educational and scientific projects;

- the willingness to identify and use the most effective IC tools in the course of scientific collaboration, to make effective choices and decisions, to rely on correct estimates and rationally to prioritize the best possible alternatives;

- monitoring and evaluation of projects;

- organization and coordination of scientific partnership and interaction.

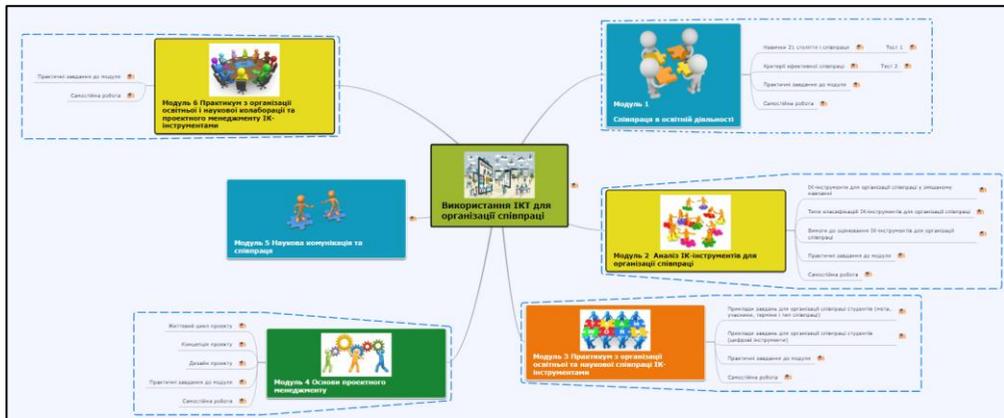
The curriculum program consists of six content modules (Figure 3).

Let's look at the topics of the modules and the list of issues that are considered during the study of individual topics.

1. *"Cooperation in educational activities"*: 21st Century Skills and Assessment of their Formation; The concept of soft skills; Place of cooperation in the 21st century skills system; Participants and subjects of cooperation in educational activities, forms of cooperation organization, environment for cooperation, model of organization of cooperation, criteria of effective cooperation.

2. *"Analysis of IC tools for the organization of cooperation"*: the preconditions for the organization of mixed learning; A typology of effective IC tools for cooperation based on criteria of effectiveness, time-spatial criteria and aspects of

collaborative activity; Trends and modelling of the effectiveness of IC-tools of cooperation; Criteria and categories of evaluation of cooperation tools; Classification of elements of user requirements for the effectiveness of cooperation.



**Figure 3. Structure of the course**

Source: Own work [online] at: <http://e-learning.kubg.edu.ua/course/view.php?id=2879>

3. *"Workshop on the organization of educational and scientific cooperation with IC-tools"*: SMART approach in defining the goals and objectives of cooperation; Examples of educational, scientific cooperation; Classification of learning styles Vark; Analysis of mistakes in the formulation of tasks for cooperation; Digital research and search tools; IC tools for creating e-products and shared content; IC services for communication and data collection; Assessment and ranking in the capacity of ICT; Examples of using IC tools for learning management.

4. *"Fundamentals of project management"*: project as a system vision of positive changes; Components of the project activity; "Problem" - "causes" - "consequences" in the concept of the project; Constituents of the project concept: project purpose and objectives, requirements for their formulation (SMART), target audience of the project, term of project implementation, geographic coverage of the project; Project design: project planning, definition of short-term and long-term results; Project assumptions and risks; Monitoring and evaluation of the project; Project budget.

5. *"Organization of scientific communication by IC tools"*: electronic scientific communications: the structure of scientific communications, the initiative of open access, tools for the implementation of electronic scientific communications, ethical issues of electronic communications; Evaluation of the results of scientific activity: the classification of scientific publications, tools for publishing publications in the online space, indexes of citation; Creation of a profile of a scientist in various science-based databases; Social networks for scholars.

6. *"Workshop on the organization of educational, scientific collaboration and project management with IC tools"*: features of planning and implementation of individual and collective projects; IC-support for implementation of collective projects; Creation of a project (individual and group) for educational, scientific collaboration with the use of IC tools.

Students' training is based on mixed technology with the maximum share of distance learning (80%). When designing the course, a practical approach was used: 80% of the training material was aimed at training practical skills and competencies through the application of applied tasks and independent work on the organization of educational and scientific cooperation.

Here is an example of a task for self-executing from module 5 "Organization of scientific communication with ICT-tools".

Independent work 8. *Model of scientific communication.*

*Case*: "You have decided to explore the models of scientific communication in your own experience. To do this, you plan to create a community and simulate several processes".

*Progress*:

1. Investigate the services for establishing scientific communication:

- Office 365 Services (<https://products.office.com/uk-ua/student/office-in-education>);
- G-Suite Services (<https://www.google.com/intl/uk>);
- Social network Facebook (<https://www.facebook.com/>);
- Social network Research gate (<https://www.researchgate.net>);
- Social network LinkedIn (<https://www.linkedin.com>).

2. Discuss the benefits of using one or another tool in the forum.

3. Identify and simulate several processes of scientific communication, such as setting up personal contacts, disseminating research results, finding experts or partners to participate in projects;

4. Invite members of the group to establish communication: presentation, sending of invitations, etc. (is an integral part of the integrating collective project, in this work is not evaluated).

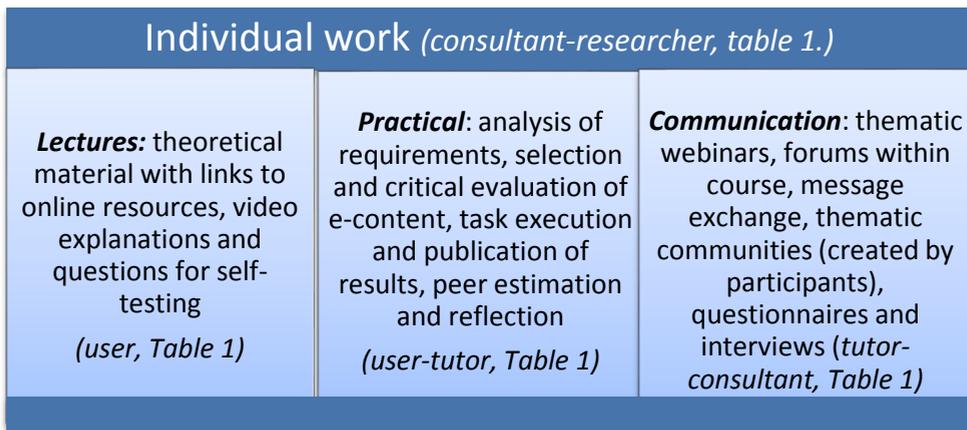
The fulfilment of the tasks of independent work requires from the participant a profound knowledge of the material obtained during lectures and practical classes (Figure 3), develops the ability to independently explore the problem through the search and analysis of special literature from various fields of knowledge, develops the ability to teach and defend their own point of view, develops creativity (Figure 4).

Criteria for evaluating independent work (Table 2).

**Table 2.**

Criteria for evaluating		
Criteria	Sign	Point
Tool Representation and Choice Argument	2 tools	2 points
Proposals for the implementation of scientific communication processes online	1 proposal	2 points
Comments on other proposals	1 comment	1 point
Total for answers and comments		5 points

*Source: Own work*



**Figure 4. Structural model for acquiring competences through the implementation of educational activities**

*Source: Own work*

The training activities of the students of the course were designed in accordance with the theory of connectivity (Andreev et al, 2012) and Project-Based Learning (Ni, 2015). Thus, during the entire course, each course participant not only creates an individual project for organizing scientific collaboration, presents it on the forum, evaluates the projects of other participants (Figure 5), but also finds a common theme with other participants, engage in discussions and create a joint project.

Доступні групи		Усі учасники		Додати тему для обговорення	
Обговорення	Почато	Група	Відповіді	Последнее сообщение	
Середовище налагодження комунікації	 Олена Кузьмінська		11	Ахліна Олена Володимирівна Вс: 16 Июл 2017, 02:33	
Створити власний сайт - просто	 Тетяна Георгіївна Купрій	Чернева група	12	Ахліна Олена Володимирівна Сб: 15 Июл 2017, 22:15	

**Figure 5. An example of discussion in the course forum**

*Source: Own work*

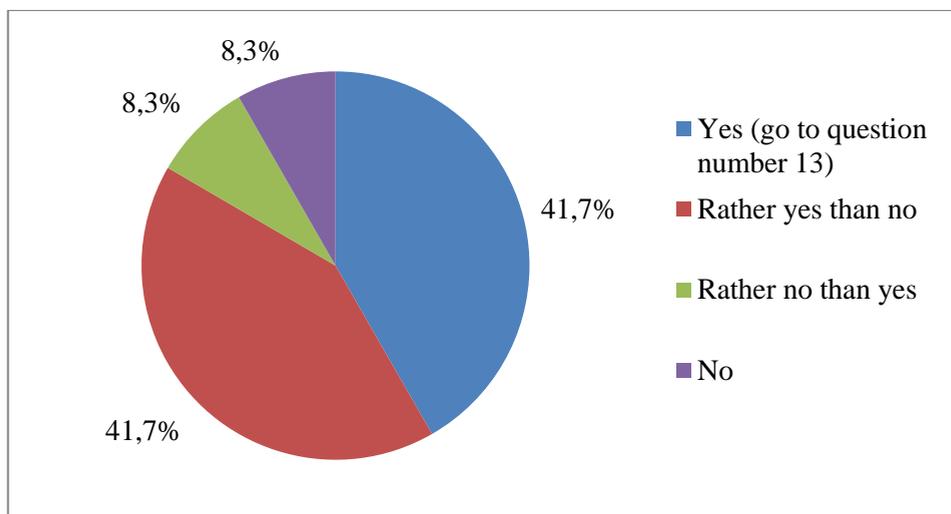
And studying the course "Development of educational, scientific collaboration and project management with IC tools in universities" ends with the implementation of the project task, in which students of the course create individual and group projects for educational and scientific collaboration.

#### 4. RESULTS OF THE STUDY

Approbation of the electronic course was carried out during June 2017 at the Borys Grinchenko Kyiv University. 26 teachers took part in the approbation process.

Learning achievements of the students of the course are estimated by the modular-rating system, which is based on the principle of operational reporting, mandatory modular control, accumulation system for assessing the level of knowledge, skills and abilities; Expanding the number of final points to 100. Each student was able to monitor his or her own learning activities using the LMS Moodle tools (used to accommodate e-course resources): independently mark individual activities, review current ratings and comments of teachers in the evaluation journal, and track Progress in completing the course.

To correct the training and design of the course, students at the end of each module were offered to answer the questions of the feedback form of the participant (<https://goo.gl/forms/QSFtNsCzyOmBCNQk2> ). The questionnaire concerned to the monitoring of expectations from training for each module, the quality of the proposed materials and resources, support and counselling, the time allocated to study each module and the practical significance of the results. According to the results of the survey, approximately 82% were satisfied with their achievements at the end of the course (Figure 6).



**Figure 6. Evaluation of the students' satisfaction with their own results**

*Source: Own work*

Students also were asked to evaluate the level of the competence by acquiring a 5-point scale, where 1 describes the lack of competence, and 5 - characterized as mastery of it.

The results of self-assessment (<https://goo.gl/2YWMYt>) of the participants at the beginning and at the end of the course are presented in Table 3.

**Table 3.**

**Results of the respondents self-competence the beginning and at the end of the study course "Development of educational, scientific collaboration and project management with IC tools in universities" (average)**

Competence	Before beginning of studying course	After finishing course study
Knowing the basic methods and ways of receiving, storing, distributing information, computer skills	3,5	4,5
Ability to work in a team and organize teamwork with information data in global computer networks.	2,15	3,45
Designing educational tasks for organizing student cooperation and for solving educational problems	3,1	4,2
Using various types of IC tools to organize online learning, interaction, collaboration	2,4	4,15
Creation and use of different cooperation models according to the purpose using the IC tools	2,5	3,85
Evaluation of the effectiveness of the organization of cooperation	2,5	3,1
Ability to collect, analyse and process the data needed to solve the research tasks	3,6	4,7
Development of educational and scientific projects	2,5	3,75
Readiness to identify and use the most effective IC tools in the course of scientific collaboration, to take effective ways and decisions, to rely on correct estimates and rationally to give preference to the best possible alternatives.	2,5	3,6
Organization and implementation of project monitoring and evaluation	3	3,8
Organization and coordination of scientific partnership and interaction	2,5	3,4

*Source: Own work*

## CONCLUSIONS

The positive dynamics of self-esteem by the scientific and pedagogical staff of Borys Grinchenko Kyiv University after completing the study of the electronic course "Development of educational, scientific collaboration and project management with IC tools in universities" during the lecturer's postgraduate studies indicates its effectiveness and can be recommended for implementation into the system of training of teachers of higher educational institutions.

The developed e-course will also be attractive not only for university lecturers, researchers, professionals who seek to use IC tools for collaborating in distance learning and in blended learning (in private or in the educational institution or company structure), but also teachers, lectures and trainers who want to learn about the modern technology of application and training based on design techniques; heads of social and public institutions, enterprises, who need tools for the rapid outspread of knowledge, skills and modern tools of competence in the knowledge economy; A general public who is interested in learning the technologies of blended learning and implementing these guidelines in the process of lifelong learning.

## ACKNOWLEDGMENTS

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