



Mykola Nakaznyi, Lyudmyla Sorokina, Maryna Romaniukha
Ukraine

ICT in Higher Education Teaching: Advantages, Problems, and Motives

Abstract

This paper analyzes some results of a survey for university professors and university management, held by the international research team within the European IRNet Project: International Research Network for study and development of new tools and methods for advanced pedagogical science in the field of ICT instruments, e-learning, and intercultural competences. The survey researched motivation and aims of professors from the Dniprodzerzhinsk State Technical University – official partner of the project. The article reveals professors’ beliefs and preferences about ICT-aided learning as well as it analyzes advantages, problems, and motives of the introduction of ICT in higher education teaching.

Key words: e-learning, higher education, IRNet project, survey, academic staff

Introduction

The article reveals the benefits of electronic educational and scientific space, the problems that hinder the introduction of innovative technologies in teaching activity in higher educational institutions and motives that are important for the teacher when implementing information and communication technologies.

Nowadays educational space of higher education institutions is in the state of significant modernization, which is embodied in the growing differentiation

of educational opportunities, using more flexible educational communicational mechanisms, increasing complexity of technological, organizational, and cross-cultural relations under the influence of globalization. According to modern standards, teachers' activities should be based on a combination of achievements of pedagogical and information technologies. To improve the quality of educational services teachers of higher educational institutions should develop and use in their teaching activities a variety of electronic educational resources: presentations, video lectures, video conferences, electronic textbooks, multimedia courses, educational portals, educational resources with remote access and others. Each of them has its advantages and improves the efficiency of the educational process.

We should mention that the theoretical development and practical actions for the implementation of information and communication technologies in the educational process in Ukraine have been under way for more than one year, but there is not much efficiency nor important educational results. According to researchers (Zenkina, 2007), the main reason for this is that the development and application of electronic educational resources is aimed at improving teachers' and students' activities in the field of traditional presence education, its goals and content. This approach to the use of electronic educational resources within the traditional educational system cannot effectively realize educational activities and significant didactic potential of these resources. The problem of quality of education aimed at achieving new outcomes can actually be solved when didactic potential of e-learning resources will be realized on the basis of a new model of educational process.

It is obvious that the development and introduction of electronic educational resources, educational web resources, and e-learning in the educational process in general should increase the efficiency of learning only if they are applied based on the examination and analysis of their didactic possibilities, namely: visualization of educational material, enhancing the interactivity of learning, access to knowledge, prompt control.

An important component of informatization of the educational process is the accumulation of experience of ICT use in the educational process of higher educational institutions. Today, it is necessary for every teacher in any discipline to be able to prepare and deliver a lecture with the use of ICT because an ICT-enhanced lecture is clear, colorful, informative, interactive; moreover, it saves both the teacher's and the student's time, allows the student to work at their own pace, allows the teacher to work differentially and individually with students, gives the opportunity to monitor and evaluate the learning outcomes. In our opinion, the formation of informational and educational environment of the university through the application of information and communication technologies is crucial for the development and self-development of teachers, as well as the improvement of their educational activities, pedagogical creativity, and ICT competence.

However, this does not mean that the presence in a higher educational institution of modern means of ICT will lead to the growth of professional skills of teachers and quality of education. The involvement of teachers in the process of informatization of the educational space cannot catch up with the tightening of requirements for professional competence and skills of academic staff. In this context, it is impossible to ignore the so-called “internal,” or the psychological, aspect of the use of ICT by teachers in their educational activity. We should pay attention to the importance of values and motivation of the use of electronic educational resources by teachers. The basis of human behavior is “a reflex of purpose” – the wish to achieve the desired result. This requires permanent psychological aim: not to stop, not to be afraid of difficulties, to respect, to assess the acquired knowledge and skills from the standpoint of achieving the goal.

Research Problem

Consequently, it is necessary to find answers to a number of existing problems:

- why is the process of introduction of modern information technologies so difficult and slow;
- what is the motivation of desire or unwillingness of teachers to use ICT in their professional activities;
- what problems should be solved to enhance teachers’ effectiveness in the use of ICTs (Shevtsova, 2005).

We believe that all the activities of the teacher of higher educational institutions, including the use of electronic educational resources, are primarily determined by the teacher’s personality and his or her motives rather than the type and amount of computer equipment. That reveals the main thesis of our article: in order to improve motivation of ICT use by teachers it is necessary to create such working conditions at universities for the teachers to be willing and able to apply computer literacy to their teaching.

General Background of Research

To confirm this thesis we carried out a questionnaire to find out if teachers understand the importance and their personal participation in the processes of informatization of educational and scientific space, as well as their motivations, which are important for the implementation of ICT in teaching activities. This study constituted the second phase of the IRNet project – International Research Network for study and development of new tools and methods for advanced pedagogical science in the field of ICT instruments, e-learning, and intercultural competences. The project is financed by the European Commission under the 7th Framework

Programme, within the Marie Curie Actions International Research Staff Exchange Scheme. The participants of the project are higher educational institutions in Australia, Poland, Czech Republic, Portugal, Spain, the Netherlands, Russia, and Ukraine. One of the representatives of Ukraine in this project is Dniprodzerzhinsk State Technical University (hereinafter DSTU). The project's main objectives are defined in the following way:

- to set up a thematic multidisciplinary joint exchange program dedicated to development of new tools for advanced pedagogical science in the field of ICT instruments, distance learning and intercultural competences in the EU, Australia, Ukraine, and Russia.
- to strengthen collaboration between the EU and third country institutions through mutual secondments of researchers.

Instrument and Procedures

For such sociological research a special questionnaire has been developed and uploaded onto the website of the University of Silesia in Katowice, which is the coordinator university for the IRNet project (The IRNet WP3 questionnaire), the English version can be found here: <https://e12.us.edu.pl/ankieta/index.php/494253/lang-en>. Below is a screenshot, representing the general view of the questionnaire (Figure 1).

In April and May 2015 the university management and professors involved in the project IRNet in general, and DSTU in particular were anonymously questioned, which was intended to analyze the existing situation, as well as to reveal the opinions and suggestions of teachers in the following areas: benefits of e-learning and research space; problems that hinder the implementation of e-learning technologies in teaching activity of teachers of higher educational institutions; motives that are important for the teacher of the higher educational institutions in the implementation of ICTs in their teaching activities.

The questionnaire contained 19 questions, which were devoted into four main thematic units:

- the use of ICTs in educational activity;
- the use of ICTs in scientific research;
- further education, professional growth;
- the understanding of ICTs in education, computer literacy.

Most of the questions are multiple choice questions, the rest of them demand gradable answers.

In this paper the authors aim to explore the prospects and challenges towards the creation, implementation, and operation of electronic educational resources in DSTU (for other aspects of the surveyed topics see Nakaznyi et al., 2015). The quantitative results of the research and analysis will enable us to define the most actual problems of electronic educational space and identify the motives of teachers in using ICT, which will influence the creation, implementation, and

operation of e-learning system in DSTU in the future. The choice of academic staff of DSTU as object of study is due to the fact that this educational institution is an average university in Ukraine, which allows to extrapolate the results of the analysis on a wide range of universities of Ukraine.

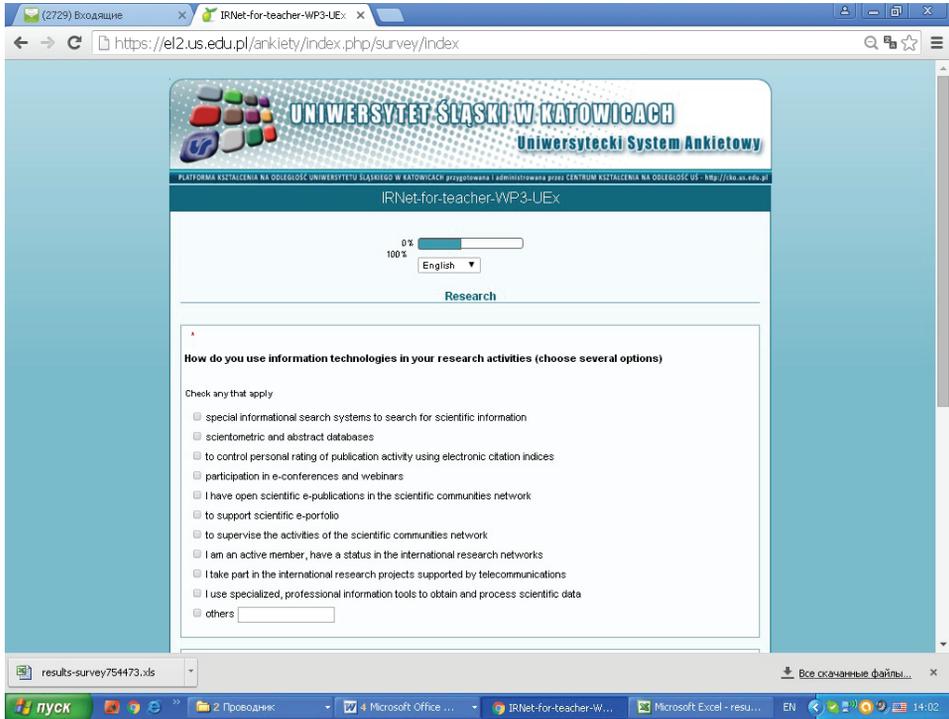


Figure 1. General view of the IRNet academic staff online questionnaire.

Source: IRNet team research

Research Results

Evaluating the Benefits of Electronic Educational Environment for Academic Staff

The study involved 51 members of scientific and academic university staff, among them 58.8% of associate professors, 25.5% of the teachers, 11.8% – heads of structural divisions of the university and 3.9% are professors.

In this article we tried to see the trends in one section of the questionnaire, which is devoted to the understanding of ICTs in education, that is, computer literacy.

We analyzed the benefits of electronic educational and scientific space by the following indicators: access to professional information; information processing and communication in digital form using computer tools of general nature (office applications, email, and so on); the use of specialized electronic tools in the professional sphere; searching for ways to use new tools for solving professional tasks; participation in professional network entities and access to their resources, as well as participation in network projects, organization of professional associations network, management; easy access to information related to the management; constant analysis of professional information space for personal development; active contribution to the formation of strategic directions of development of higher educational institutions (see Table 1).

Table 1.

Opinion on the benefits of electronic educational and scientific space

Options	Percentage of positive answers
The access to professional information	17.3
Processing of information and communication in digital form using general computer tools	16.0
The use of specialized electronic instrumentation in the professional field	13.6
Friendly access to the information connected with managing	12.3
The search for ways to use new tools to solve professional tasks	11.5
Constant analysis of professional information space for personal development	10.7
Active contribution to the formation of strategic directions of development of higher educational institutions	7.0
Participation in professional network communities, access to their resources	5.3
Participation in professional network communities and in network events	3.7
Organization of professional networks, their managing	2.1
Other	0.5
Total	100.0

Source: The authors' own work.

The analysis showed that 17.3% of respondents indicate that the main benefit offered by electronic educational and scientific space is access to professional information; 16% of respondents have noted that information processing and communication in digital form using computer tools in general as the main advantages; on this list of advantages 13.6% of respondents identify the use of specialized electronic instrumentation in the professional field. It should be noted that recent indicators are gaining good results from the above-mentioned list of

advantages, namely: easy access to information related to the management – 12.3%; the search for ways to use new tools to solve professional tasks – 11.5%; constant analysis of professional information space for personal development – 10.7%. Other indicators have significantly lower number of positive answers – 7.0%, 5.3%, 3.7%, 2.1%, 0.5%. This could be explained by the fact that participation in professional network entities, gaining access to their resources, active contribution to the formation of strategic directions of development of higher educational institutions depends not only on pedagogical staff of higher educational institutions.

Revealing the Problems Hindering the Implementation of E-learning Technologies in University Teaching

We attempted to analyze the problems that hinder the implementation of e-learning technologies in the teaching activity of teachers of higher educational institutions in the mode of a multiple-choice question. These problems include: the intensity and complexity of work associated with the development of electronic educational resources; lack of training in the field of educational technology, which is connected with the potential of the electronic environment; lack of training in the field of information technology; insufficiently developed regulations for the use of electronic tools in higher education; insufficiently formed e-environment of higher educational establishments, lack of Wi-Fi, and a unified system of electronic courses (LMS), databases, electronic library, and so on; insufficiently developed system of incentives for implementation of e-learning in higher education, and so on (see Table 2).

It is evident that among the problems that hinder the implementation of e-learning technologies in teaching, the first problem is insufficient degree of incentives' system for the introduction of ICTs in higher education, namely 23.9%, which is not surprising. The following issues attracted rather little attention: the lack of regulations for using electronic tools in higher educational institution (18.3%) and problems of insufficient degree of electronic space development in higher educational institutions, the lack of Wi-Fi, a unified system of electronic courses (LMS), databases, electronic library (18.3%). Not much attention is paid to the problem connected with tension, complexity of work associated with the development of electronic educational resources (13.4%) and a lack of training in the field of information technology (13.4%). And, of course, the last problem is the lack of training in the field of educational technology, which is connected with the potential of the electronic environment (11.3% of the respondents' votes), and the problem of access to electronic resources, which scored 1.4% of the respondents' votes.

Table 2.
Problems that hinder the implementation of e-learning technologies in teaching activity of university professors

Options	Percentage of positive answers
Insufficiently developed system of incentives for implementation of information	23.9
Insufficiently developed regulations for the use of electronic tools	18.3
Insufficiently formed electronic space of higher educational establishments	18.3
The intensity and complexity of work	13.4
Lack of training in the field of information technology	13.4
Lack of training in the field of educational technology	11.3
No access to the resources	1.4
Total	100.0

Source: The authors' own work.

Analyzing the above, we can conclude that the list of these problems confirms that the main factor of effectiveness of implementation of e-learning technologies is the interest of students in educational material and attracting a lot of attention to it. We should note that this approach does not only develop individual abilities of students, but also reveals personal skills and abilities of university teachers.

Uncovering the Motives of University Teachers during the Introduction of ICTs in Their Teaching

As a conclusion, we can analyze what motives are more important for a university teacher in the implementation of ICTs. This was also a multiple choice question. For this purpose we analyze the following indicators: the desire to make their professional activity more comfortable; the teacher's desire to meet the requirements; the desire to expand educational opportunities for students in terms of comfortable interaction and satisfaction in the process of educational activity; the desire to prepare students for life-long learning, continuous professional growth; improving the quality of students' education (including the development of information society competences); higher personal status for university teachers, professional self-realization of the teacher; the desire to use modern models of information behaviour, including the models you can address to the students and so on (see Table 3).

Table 3.
Important motives for university teachers during the introduction of ICTs in their teaching activities

Options	Percentage of positive answers
The desire to expand educational opportunities for students	17.2
Improving the quality of students' education	16.7
The desire to meet the requirements	14.1
The desire to make professional activity more comfortable	13.2
The desire to prepare students for lifelong learning	12.8
Improving personal status of a teacher	12.8
The desire to use modern models of information behavior	12.8
Other motives	0.4
Total	100.0

Source: The authors' own work.

We can observe that among the list of significant motives 17.2% of respondents emphasize the need to expand educational opportunities for students in terms of comfortable interaction and satisfaction in the process of educational activity. Slightly smaller group of respondents (16.7%) prefer to improve the quality of students' education (including the development of information society competences). An even smaller group (14.1%) focuses on the desire to conform to the requirements for the university teacher and the desire to make their professional duties more comfortable (13.2%). It should be emphasized that the number of respondents' votes is distributed equally to other three questions: the need to prepare students for lifelong learning, continuous professional development (12.8%); higher personal status as a university teacher, professional self-realization of the teacher (12.8%); the need to use modern models of information behavior, including such models that you can address to the students (12.8%). We should note almost imperceptible fluctuations from 12.8% to 14.1%. This suggests that all the motives are very important for the university teacher in the implementation of e-learning.

Thus, noting the benefits of electronic educational and scientific space, we conclude that respondents preferred access to professional information processing and communication in digital form using computer tools in general (office applications, email, and the like).

Among the problems that hinder the implementation of e-learning technologies by university teaching staff the respondents stressed the fact that the system of remuneration for the implementation of ICTs in the university educational process is not developed in much detail. Along with this problem the following issues were emphasized:

- insufficiently developed regulations for the use of electronic tools in higher education;
- insufficiently formed e-learning university environment, poor Wi-Fi, and the lack of a unified system of electronic courses (LMS), electronic library, etc.

Among the motives that are important for a university teacher in the introduction of ICTs the respondents identified the following: the desire to expand educational opportunities for students in terms of comfortable interaction and satisfaction in the process of learning, as well as the desire to improve the quality of education for students (including building up competences of the information society), and the desire to conform to the requirements for a university teacher.

Conclusions

From the above results we can draw a general conclusion that for the development, implementation, and practical use of e-learning system in Ukrainian universities there should be identified the following main directions for further development.

Returning to the questions, let us stress that according to the opinion of academic staff of the university the main problems hindering the implementation of e-learning technologies in university teaching were stated as follows: insufficiently developed system of incentives for implementation of information, insufficiently formulated regulations for the use of electronic tools, insufficiently formed electronic space of higher educational establishments with quite significant number of positive results – 23.9, 18.3, and 18.3% respectively. Importantly, these reasons are stated as more important than the lack of training in the field concerned.

Let us sum up and present the main directions of improvements for the ICT development in higher education to run smoothly:

- a systemic vision of the role of ICT in the context of informatization of education;
- designing and monitoring the development of information and educational environment of higher educational institutions at all levels of the educational process;
- upgrading academic staff's computer literacy to use new information technologies in the educational process as part of supporting learning;
- the development of facilities of higher educational institutions;
- use telecommunications and types of technologies;
- the development of information resources for educational purposes.

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Mykola Nakaznyi, Lyudmyla Sorokina, Maryna Romaniukha

ICT w szkolnictwie wyższym: zalety, problemy i motywy wprowadzania TIK

S t r e s z c z e n i e

Celem artykułu jest analiza wyników ankiety przeprowadzonej wśród kadry naukowej i administracji uczelni przez międzynarodowy zespół badawczy w ramach europejskiego projektu IRNet (International Research Network for study and development of new tools and methods for advanced pedagogical science in the field of ICT instruments, e-learning and intercultural competences). Ankieta badała motywację oraz cele edukacyjne i badawcze wykorzystania ICT przez wykładowców Państwowego Uniwersytetu Technicznego w Dnieprodzierżyńsku – oficjalnego partnera projektu. W artykule zostały przeanalizowane zalety, problemy i cele wprowadzenia TIK w kształceniu na poziomie akademickim.

S ł o w a k l u c z o w e: e-learning, szkolnictwo wyższe, projekt IRNet, badanie, kadra akademicka

Микола Наказный, Людмила Сорокина, Марина Романюха

ИКТ в педагогической деятельности в вузе: преимущества, проблемы, мотивации

Р е з ю м е

В статье приведены некоторые результаты опроса профессорско-преподавательского состава и руководства университета, который проводился международной исследовательской группой в рамках европейского проекта IRNet: «Международная исследовательская сеть для изучения и развития передовых педагогических знаний в области ICT-инструментов, e-learning межкультурной компетенции». На основании опроса изучались мотивации и цели сотрудников Днепродзержинского государственного технического университета, который является официальным партнером проекта. Статья отражает представления и предпочтения преподавателей университета на вопросам обучения, основанного на использовании ИКТ. В статье проанализированы преимущества, проблемы и мотивации, связанные с внедрением ИКТ в образовательный процесс высшей школы.

Ключевые слова: электронное обучение, высшее образование, проект IRNet, опрос, профессорско-преподавательский состав

Mykola Nakaznyi, Lyudmyla Sorokina, Maryna Romaniukha

Las TIC en la educación superior: ventajas, problemas y motivaciones

Resumen

Este artículo analiza algunos resultados de una encuesta realizada a profesores universitarios y gestores universitarios, recopilados por el equipo de investigación internacional Proyecto Europeo IRNet: Red de Investigación Internacional para el estudio y desarrollo de nuevas herramientas y métodos de la ciencia pedagógica avanzada en el campo de las TIC, es decir, en lo que se refiere a instrumentos, e-learning y competencias interculturales. La encuesta investigó la motivación y los objetivos de profesores de la Universidad Técnica del Estado Dneprodzerzhinsk, socio oficial del proyecto. El artículo revela las creencias y las preferencias de los profesores en el aprendizaje asistido por las TIC. El artículo analiza las ventajas, problemas y motivos de la introducción de las TIC en la enseñanza de la educación superior.

Palabras clave: e-learning, educación superior, proyecto IRNet, encuesta, personal académico