

CHAPTER II.

Development of Key and Soft Competences and E-learning

Innovative Educational Technologies, Tools and Methods for E-learning
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DISTANCE LEARNING: ON THE WAY TO DEVELOPING A NEW DIDACTIC MODEL OF UNIVERSITY EDUCATION

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Abstract: *The article considers the problem of developing a modern didactic model of university education, which is competency-oriented, designed for a reasonable combination of pedagogical management with its own initiative, independence, and activity of students. It is noted that a significant role in this belongs to distance learning resources. It is proved that when developing a modern didactic model of professional training, the following should be taken into account: distance learning allows creating the same conditions for all students; it is necessary to constantly increase lecturers' digital competence as a basis for the introduction of distance learning; electronic systems for monitoring and measuring the effectiveness of training, etc need to be improved. It is proved that the most optimal format for the organization of the educational process in higher school is a harmonious combination of distance and classroom learning.*

Keywords: distance learning; e-learning tools; university education; didactic model; professional training of students.

INTRODUCTION

The quality and efficiency of education have always been the main problem of pedagogical science. It has gained special importance recently, in the conditions of new information and communication reality – the dominance of information and communication technologies. It is with pedagogy that scientists hope to create concepts

for combining the humanistic and technological components of the educational process (Bykov, Zhaldak, 2017).

Today, the leading influence in education is actively occupied by distance learning, the use of various educational resources, the creation of a virtual environment of educational and practical activities, etc. Modern learning is becoming more electronic, computer, Internet-dependent, mobile. This expands opportunities for communication, stimulates the development of mobile thinking, personal awareness. Therefore, it becomes obvious and at the same time necessary from the standpoint of the realities of the information society to develop a new didactic model of training specialists in higher education, taking into account the impact on this process of information and communication technologies, distance learning.

In the modern didactic model, the essence of learning is not reduced to the transfer of ready-made knowledge, it is competency-oriented, and designed for a reasonable combination of pedagogical management and students' own initiative, independence, and activity. A significant role in this didactic model belongs to distance learning resources, which helps deliver information in an interactive mode through the use of Information and Communication Technologies (ICT) from those who teach (lecturers) to those who study (students).

Given the above, the modern didactic model of university education as a certain system must have certain features:

- be based on the following conceptual methodological approaches: personal, axiological activity, competence, communication, interactive, information technology, which allows individuals to self-realize in their own development and profession on the basis of common human values and culture;
- create of various technological spheres of professional and personal development of personality: intellectual-cognitive, communicative-behavioral, emotional-value, digital, reflexive-evaluative;
- provide learners with systematic and at the same time operational knowledge, stimulating cognitive interest and motivation of students to search in the information space for new information and the ability to self-development;
- combine cognitive and practical strategies in the process of professional training of future specialists due to the creation of virtual environments of educational and practical activities; use of electronic simulators; computer simulation tools, etc.;
- build an information and educational environment that allows future professionals to be formed in the conditions of redundancy of options for solving personal and professional problems and more.

1. ANALYSIS OF CURRENT RESEARCH

Theoretical and practical aspects of distance learning have been the subject of research by a number of scientists. Thus, Zormanová's comparative study presents a comparison of the main trends, forms, and directions of the development of distance education in European countries (Zormanová, 2016). In research of Zalewska, and Ślósarz revealed the democratic potential of distance learning, it is proved that it, in contrast

to the traditional more qualitatively affects the process of professional training of students of generation Z (Zalewska, 2015; Ślósarz, 2019). Fojtík outlined the methodical, partnership, advisory, and mentoring role of the teacher in the organization of distance learning of students (Fojtík, 2018).

Of particular interest to us are those studies that reveal the priority areas of transformation of the higher education system in terms of distance learning. Smyrnova-Trybulska proved that changes in the university information and educational space are caused by the modernization of educational technologies, content, resources based on the strategy of development of the electronic environment of the university (Smyrnova-Trybulska, 2018).

At the same time, the analysis of available scientific sources has shown that modern scientists consider mainly methodical or organizational issues of realization of distance learning of students. Currently, there is a significant need for both lecturers and students to rethink and lead the development of higher education in distant learning. *The purpose of the article* is to investigate the attitude of lecturers and students to the use of distance learning and its various resources; assess their satisfaction with the educational process and its effectiveness, which will serve as an analytical basis for further development and implementation of a new didactic model of training specialists in the higher education system.

2. MATERIALS AND METHODS

Achieving the goal of the study contributed to the use of a set of appropriate methods: the analysis of the scientific literature to establish the state of development of the problem implementation of distance learning in higher education, the definition of categorical-conceptual apparatus of research; synthesis, generalization, systematization for theoretical substantiation of the basic tendencies of development and realization of a new didactic model of training specialists in the conditions of intensification of distance learning; empirical: diagnostic (conversation, testing); statistical (Mann-Whitney U -criteria, Fisher's test φ^*) for quantitative and qualitative interpretation of the results of the attitude of lecturers and students to the impact of distance learning. To implement the criteria, statistical hypotheses were formulated: null hypothesis H_0 : – students and lecturers have the same attitude to research problems; alternative hypothesis H_1 : – students and lecturers have different attitudes to research problems. The “presence of effect” position was characterized by those respondents who assessed the distance learning issues positively, i.e. at 5 and 4, and the “lack of effect” was characterized by respondents who rated such issues at 3, 2, and 1.

The experimental base of research – Borys Grinchenko Kyiv University (Ukraine). A total of 53 lecturers and 120 students from various faculties and institutes of the university took part in the study. The survey of lecturers and students was conducted during 06/26 – 07/03/2020.

3. MAIN RESULTS

Given that the question of building a new didactic model of university education that we see in the development of distance learning of students, first of all, it is necessary

to clarify the interpretation of the term “distance education” (Distance education). Modern understanding of the concept of distance education allows its consideration from two main perspectives:

1) purposeful and methodically organized management of educational and cognitive activities of persons at a distance from the educational center, which is held by electronic and traditional means of communication; 2) the process of acquiring knowledge and skills through a specialized educational environment, which is based on the use of IT, which provides the exchange of educational information at a distance and implements a system of support and administration of the educational process (Dictionary, 2019). We share the scientific position of Bykov that the successful use of digital technologies is the task of education of the 21st century, it is associated with learning, development, building a successful life trajectory. An important area of educational policy today is the process of informatization of education (Bykov, Spirin, Pinchuk, 2019). However, it should be noted that at the beginning of 2020, we all witnessed a certain intensification of distance learning. The forced mass transition to e-learning during the quarantine period has become a kind of global challenge for the entire educational environment, for higher education, in particular.

It is clear that in such a situation it was the lecturer of higher education who was given increased responsibility for the process and results of professional training of students. Therefore, it is important to find out how lecturers evaluate the quality of distance learning for the period of quarantine, as well as to compare their views with the views of students (see Figures 1a, 1b).

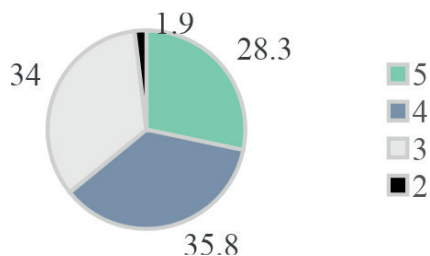


Figure 1a. Lecturers' assessment of the quality of distance learning (%)

Source: Own work.

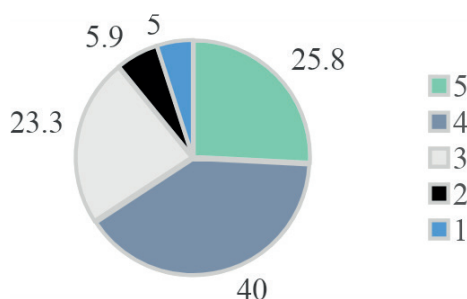


Figure 1b. Students' assessment of the quality of distance learning (%)

Source: Own work.

According to the results of the study, lecturers and students evaluate the quality of distance learning approximately equally, which was confirmed by Fisher's test φ^* . Received, $\varphi^*_{emp} = 0.247$, $\varphi^*_{cr} = \{1.64, p \leq 0,05 \ 2.31, p \leq 0,01$, hence we accept hypothesis H_0 . However, every tenth student evaluates the quality of distance learning very negatively (2 and 1 points). Only 1.9% of lecturers rate the quality of distance learning as unacceptably low (2 points).

It is clear that in order to develop and implement a new didactic model of university education, it is necessary to investigate the level of digital competence of lecturers and students as a significant guarantee of distance learning.

To date, there are a number of approaches to the definition of "digital competence". The approach described by Bykov in the "Dictionary of information and communication technologies in education" is a reference point for us. According to the scientist, digital competence is the ability of an individual to confidently and thoroughly use the means of digital technology in such areas as professional activities and employment, education, leisure, community activities, which are vital for participation in everyday socio-economic life (Dictionary, 2019).

In Figures 2a, 2b presents a self-assessment of the level of formation of the digital competence of lecturers and students.

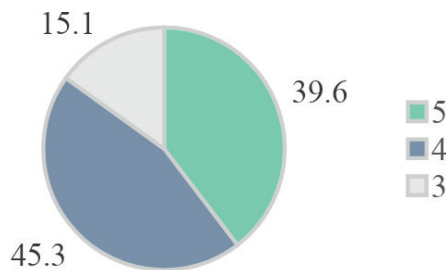


Figure 2a. Assessment of the level of lecturers' digital competence (%)

Source: Own work.

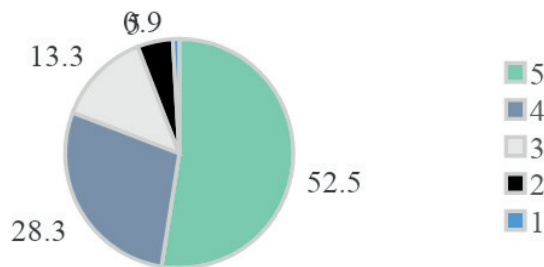


Figure 2b. Assessment of the level of students' digital competence (%)

Source: Own work.

According to Fisher's criterion φ^* , $\varphi^*_{emp} = 0.771$, $\varphi^*_{cr} = \{1.64, p \leq 0,05 \ 2.31, p \leq 0,01$, therefore we accept the hypothesis H_0 , which states that students and lecturers equal-

ly assess the level of development of their own digital competencies. As we can see, both students (80.8%) and lecturers (84.9%) believe that the level of their digital competence is sufficient to ensure the educational process. Besides, more than half of students (52.5%) say that they have the highest level of development of digital competencies for the implementation of the tasks of the educational process. Lecturers, unlike students, are less confident in their own digital abilities – only 39.6% of respondents rate the level of their own digital competencies with the highest score. At the same time, 5.9% of students believe that their level of development of digital competencies does not allow them to solve the problems of the educational process. In this context, it is also necessary to draw parallels with the previous study of the authors, based on the results of the international project № 21720008 Visegrad Fund “Competences of higher education teachers in the days of change”, which was aimed at diagnosing a number of competencies of higher education lecturers in Ukraine and Poland. The results of the study also showed that not all lecturers have a high level of digital competence. The study also proved that such competencies include the ability to something new, which is realized through the use of ICT technologies in the process of training and creating new information resources (Khoruzha, Proshkin, Koutenko, Smyrnova-Trybulska, 2019).

The problem of the formation of lecturers at an insufficiently high level of digital competence was manifested in the conditions of social distancing (during the quarantine period), when all professors, even opponents of e-learning, turned en masse to digital technologies. However, as a practice has shown, for most of them the ability to use digital technologies is extremely limited. Typically, lecturers during the quarantine period used the free open learning management system Moodle, as well as various programs for video conferencing (Hangouts Meet, Skype, Webex, Google Classroom, Zoom). Additionally, in the course of the survey, it was found that the most popular programs among both students and professors are Hangouts Meet and Zoom. In our opinion, this is due to the advantages of such programs, among them the most important:

- a significant number of participants in the free package (up to 250 people);
- available choice of platforms (Android, iOS, Chrome, Mozilla, Firefox, Apple, Safari, Microsoft Internet Explorer, Microsoft Edge browsers);
- wide possibilities for joining (via browser, mobile application, Google Calendar, via URL or meeting code, etc.);
- the ability to record video calls, show documents and program windows, view high-resolution content, support scaling in the mobile application, etc.

It is clear that the quality of distance education determines not only the level of digital competence of lecturers and students but also the available technical opportunities (Internet access, availability of equipment, computer programs, etc.) that allow you to qualitatively implement the educational process. We obtained the following results (Figures 3a, 3b).

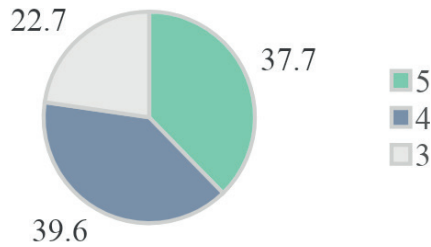


Figure 3a. Lecturers' assessment of the technical feasibility of quality implementation of the educational process (%)

Source: Own work.

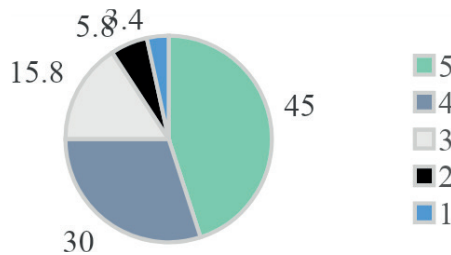


Figure 3b. Students' assessment of the technical feasibility of quality implementation of the educational process (%)

Source: Own work.

With the help of Fisher's criterion φ^* received, that φ^*_{emp} , therefore we accept the hypothesis H_0 , which states that students and lecturers equally evaluate the technical capabilities (Internet access, availability of equipment, computer programs, etc.) for the quality implementation of the educational process. At the same time, every fourth student (25.0%) and every fifth professor (22.7%) do not have the necessary technical capabilities for the quality implementation of the educational process. In addition, 9.2% of students assess their own technical capabilities as extremely unsatisfactory. It should be noted that e-learning courses are of special importance for the implementation of distance learning. According to Morse, ETC – a set of teaching materials and educational services designed to organize individual and group learning using distance learning technologies implemented by ICT, in which educational material is presented in a structured form (Morse, Glazunov, Mokriev, 2016). As a result of conversations with lecturers, we have summarized the main advantages of using ETC, in particular: expanding access to different categories of participants in the educational process to educational content; ensuring the individualization of the educational process; improving the quality of the educational process; implementation of monitoring the quality of education.

Considering that ETCs have become in fact the most important means of implementing distance learning during 2020, we asked lecturers and students to assess the quality of ETCs (Figures 4a, 4b).

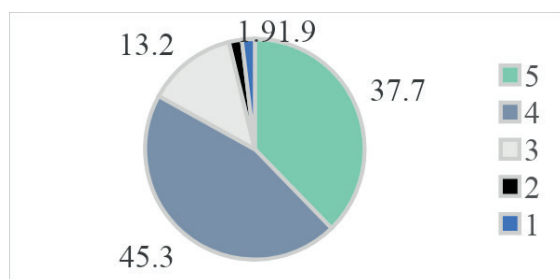


Figure 4a. Lecturers' assessment of ETC quality (%)

Source: Own work.

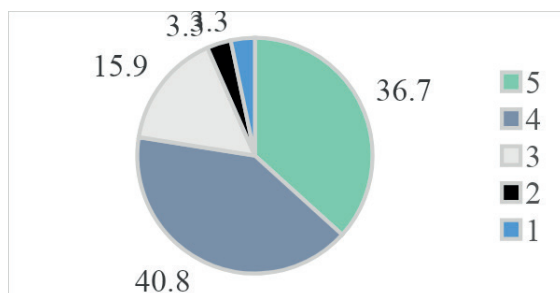


Figure 4b. Students' assessment of ETC quality (%)

Source: Own work.

Using Fishers test φ^* it was found that φ^*_{emp} so we accept hypothesis H_0 , which states that students and lecturers in general equally evaluate the quality of ETC. At the same time, 17.0% of professors consider the quality of ETC to be quite low. In addition, every fifth student (22.5%) is extremely dissatisfied with the quality of the ETC. Critical attitude to the quality of ETC prompts us to pay attention to the general problems of distance learning. To do this, lecturers and students are asked to make a ranking existing problems according to the following principle: 1 – is the most serious problem, 5 – is the least serious problem (see Table 1).

Table 1

The attitude of lecturers and students to the problems of distance learning

Problems	Lecturers	Students
Lack of practical skills	1	2
Interpersonal communication	2	4
Task overload	3	1
Weak consideration of the level of available knowledge of students in the discipline	4	3
Late verification of completed tasks and their evaluation	5	5

Source: Own work.

According to the U – criterion of Mann-Whitney is obtained $U_{emp} = 12.5$, $U_{cr} = \{4, p \leq 0,05, 1, p \leq 0,01\}$, so we accept hypothesis H_0 , which states that students and lecturers in general equally evaluate the problems of distance learning. Together with him, we outline certain trends:

- For both lecturers and students, the problem of the weak possibility of distance learning for the formation of practical skills is relevant.
- Students and professors are equally convinced that the lateness of the tasks and their evaluation is not the most important problem of distance learning.
- Lecturers consider interpersonal communication as a guarantee of quality learning. According to the mobile „computerized“ young generation, weak interpersonal communication in the implementation of distance learning is not a significant problem.
- Distance learning outlined another important problem – the excessive overload of students with tasks. As practice has shown, lecturers do not always take into account the available opportunities for students to master the material: time for self-study of the material and do tasks, different levels of preparedness of students (including psychological), etc.

It was also interesting to explore the benefits of distance learning (Table 2).

Table 2

The attitude of lecturers and students to the benefits of distance learning

Benefits	Lecturers	Students
Objectivity and impartiality	1	4
Creating conditions for the implementation of independent work of students	2	1
Self-management of educational (professional) activities	3	3
Variability of educational resources	4	5
Equal conditions for all	5	2

Source: Own work.

As in the analysis of the previous question using U – criterion of Mann-Whitney obtained $U_{emp} = 12.5$, we accept the hypothesis H_0 , which states that students and lecturers in general equally evaluate the benefits of distance learning. However, there are certain patterns:

- Both lecturers and students believe that distance learning provides opportunities for independent learning of students.
- Respondents equally treat such an advantage of distance learning as self-management of educational (professional activity).
- Professors and students agree that the variability of educational resources is not the most important factor in the quality of the educational process.
- Lecturers pay more attention to objectivity and impartiality.
- The implementation of learning on the basis of equal conditions for all is most important for students.

It is clear that the further development of a new didactic model of university education will depend on the format of the educational process. Rethinking the importance of informatization of education can be a guarantee of the implementation of new teaching methods, which are already being successfully implemented in universities in different countries, but have not yet become widespread in Ukrainian higher education. The most important of them, as described by Morse and other Researchers, are: blended learning, inverted learning, research learning, problem-based learning (PBL-Problem Based Learning), and IBL-Inquiry Based Learning, etc. (Dzyabenko, Morse, Vasylenko, Varchenko-Trotsenko, Wember, Boyko, Vorotnikov, Smirnova-Tribulska, 2020).

Therefore, it is important to predict such a format and highlight its main trends. Figures 5a, 5b show the results of the relevant survey.

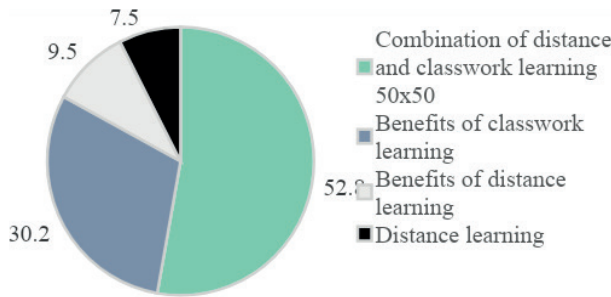


Figure 5a. The optimal format of the educational process according to lecturers (%)

Source: Own work.

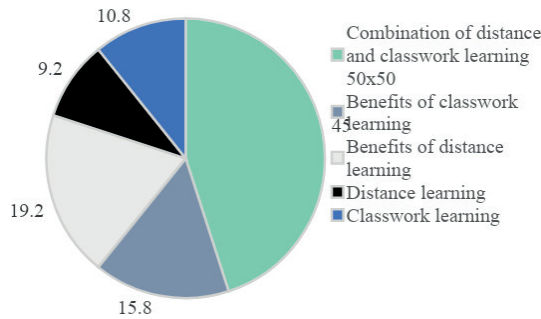


Figure 5b. The optimal format of the educational process according to students (%)

Source: Own work.

So, let us outline certain trends:

- Lecturers have a more conservative spirit – in the second place, in terms of importance, they put the traditional format of learning – the advantage of classroom learning over distance learning, students are more flexible and mobile in

this matter. For them, the most convenient format is the advantage of distance learning over the classroom.

- Both lecturers and students believe that purely distance learning is not effective (professors – 7.5%, students – 9.2%).
- None of the lecturers mentioned that training should be implemented only in the classroom. 10.8% of students spoke about the implementation of purely classroom training.

CONCLUSION

- An important feature of the modern didactic model of professional training of a specialist is its openness, which applies not only to the content but also to new learning technologies, among which the distance learning plays a leading role.
- When developing such a model should be taken into account that:
- Distance-learning makes it possible to create equal conditions for all students;
- It is necessary to constantly increase the digital competence of lecturers as a basis for the introduction of distance learning;
- Needs to improve electronic systems for monitoring and measuring the effectiveness of training;
- Distance learning resources should be diversified in terms of their competence orientation. Not to be limited to the educational content of ETC, but to provide students with the opportunity to participate in virtual environments of educational and practical activities; use of electronic simulators; to develop computer means of simulation modeling, etc.;
- The most optimal format for organizing the educational process in higher education is a harmonious combination of distance and classroom learning.

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