

UDC 378.1

DOI <https://doi.org/10.32840/1992-5786.2022.81.43>

N. V. Mukan

Doctor of Sciences (Pedagogy), Professor,
Professor of the Department of Pedagogy and Innovative Education
Lviv Polytechnic National University

S. F. Kravets

Senior Instructor of The Department of Foreign Languages
Lviv Polytechnic National University

THE USE OF INFORMATION AND COMMUNICATION TECHNOLOGY (ICT) IN HIGHER EDUCATION: ADVANTAGES AND DISADVANTAGES

The article presents the research into the specifics of applying information and communication technology (ICT) in the academic environment of higher education institutions. The aim of the article is to identify the advantages and disadvantages of using modern information and communication technology. The research is meant to contribute to improving the activities of teachers and students, as well as the organization of higher education institutions' functioning in general. In the course of the research the analysis of scientific and pedagogical literature was performed, which highlighted various aspects of the research problem. It was found that the main areas of research are the informatization of education (V. Bykov, M. Shyshkina, O. Spirin); formation of ICT competence of specialists (M. Kademiya, N. Morze, I. Vorotnykova); ensuring the quality of ICT-based education (Ju. Zaporozhchenko, V. Osadchyi); the use of ICT as a learning and teaching tool (Koryahin, N. Mukan, O. Blavt, V. Virt, Ju. Lavrysh). The main advantages of applying ICT in the academic environment of higher education institutions are identified, namely: reducing the students' workload; improving the process of editing and making changes; improving the communication process; transforming the education system; generating ideas to solve problems; providing support for lifelong learning; improving the evaluation system and procedures; increasing effectiveness and efficiency; developing technology to improve performance of management functions. The main shortcomings of applying ICT in education are highlighted: vague statement of the problem to be solved; lack of clear and general indicators and criteria according to which innovations in the field of education should be implemented; lack of flexibility in education policy; lack of appropriate technical equipment and software; lack or insufficient level of knowledge, skills and abilities of participants in the educational process, their psychological unpreparedness for the use of ICT in everyday educational practice; insufficient level of teachers' competence in using ICT; insufficient level of funding. Conclusions are presented stating that at the beginning of the XXI century there exist a number of factors that justify the need for new ideas and the use of ICT in many spheres of society, including education. Their advantages and disadvantages need further studies the same as clearly defined recommendations on application of ICT in higher education and further dissemination of best practices require more time and effort.

Key words: *information and communication technologies (ICT), institution of higher education, educational process, ICT advantages in education, disadvantages of ICT in education.*

Problem statement. At the beginning of the XXI century at all levels of education the use of modern information and communication technology is considered an important factor in improving the educational process, promoting the implementation of educational tasks in general and certain activities in particular.

First of all, we consider it necessary to emphasize that the problem of using modern ICT in education is reflected in the legal framework in accordance with which the system of higher education in Ukraine operates. In particular, it is a strategy for the development of higher education which is reflected in the Law of Ukraine "On Higher Education" (2014), standards of professional training for educational and professional programs of bachelors, masters, and doctors of philosophy. "It has been found that with

the development of the information society, the education of the XXI century should ensure the successful functioning of the individual in an innovative type of social life. The leading trend in the development of national educational systems is their modernization on the basis of innovative approach, the essence of which is that the determining factor in the success of a modern individual is his/her ability to innovate and to think innovatively" [1, 18].

The analysis of recent research and publications. Given the relevancy of the research problem of using modern ICT in the educational process in the academic environment of higher education institutions, it is analyzed by researchers from different perspectives: informatization of education (V. Bykov, M. Shyshkina, O. Spirin); formation of ICT com-

petence of specialists (M. Kademiya, N. Morze, I. Vorotnykova); the quality of ICT-based education (Ju. Zaporozhchenko, V. Osadchyi) the use of ICT as a tool of learning and teaching (Koryahin, N. Mukan, O. Blavt, V. Virt, Ju. Lavrysh) etc.

The aim of the article is to identify the advantages and disadvantages of using modern information and communication technology in higher education, which will serve as a basis for improving the activities of teachers and students, as well as organization of the work of higher education institutions in general.

The research results. First of all, it should be noted that the use of modern ICT involves the use of scientific teaching methods. During the intensive development of information and communication technology, both teachers and students are extensively using the Internet for information search, its generation, processing and analysis, and its further use in the educational process. However, not only information and communication technology forms the basis of innovative technologies in the field of education. There are also used innovative methods based on the integration of traditions and innovations in the pedagogical field, as well as a range of methodological developments represented by schemes, maps, charts, layouts, models, manuals, reading materials, Power Point presentations and more.

Technology is the use of knowledge, tools, techniques, systems and methods with the main goal – to solve problems or achieve a particular goal [5]. In higher education institutions, teachers use technology to prepare lectures and practical classes [6]. However, technologies are used not only to conduct classes with students, but also to organize the educational process, perform such functions as monitoring, control, and so on.

The use of ICT in higher education has a number of advantages that are reflected in the effectiveness of higher education institutions in general, and teachers and students, in particular. The following are among them:

- reducing the workload: Due to ICT, both students and teachers can perform tasks and functions with less effort associated with computerized performance of certain functions, and thus reduce the time and effort required to perform certain tasks or projects. The use of technology has reduced the cost of time and labor which has led to increased efficiency and timeliness of tasks performance;

- improving the process of editing and making changes: the actual use of modern ICT facilitates the process of editing the tasks performed and making changes as needed;

- improving the communication process: ICT simplifies the communication process. Teachers and students can now communicate using a variety of audio and video tools, including a variety of smartphone apps, social networks, and more.

Modern technologies are used for sending e-mails, exchanging messages, as well as for preparing assignments and projects, using learning materials in a virtual learning environment. Besides, ICT meets students need to interact with each other and share ideas to complete the tasks properly. Thus the use of ICT has made a significant contribution to facilitating communication between people. Technology has facilitated the transmission of short messages, the exchange of ideas and views, as well as long tasks, reports and projects. N. Chernukha notes that today ICTs “significantly intensify and transform modern communication processes, cooperation and contacts at the level of economy, politics, culture, information security and more. An important segment is the interaction of social institutions in modern society, especially in the educational space, in the process of training of new generation of professionals, in particular, in the field of social communications” [3, 54];

- transforming the education system: the wide use of ICT inevitably leads to changes in the education system as a whole. However, it is important to remember that any transformation requires in-depth analysis, clarification of its advantages and disadvantages that need to be addressed. This is about the need to apply the work of theorists and practitioners who study the specifics of the organization of the educational process due to the use of ICT and the use of advances in cognitive sciences and effective learning models [7]. Effective learning models help to establish and strengthen constructive relationships between teachers and students;

- generating ideas to solve problems: generating ideas is necessary to solve problems and overcome difficulties that may arise in the process of performing certain tasks or mastering the educational subject in general. The actual generation of ideas and their integration aimed at solution of a specific problem is one of the advantages of applying innovative technologies in education [7];

- supporting lifelong learning: today special attention is paid to providing opportunities for lifelong learning. Modern ICT allows not only to acquire new knowledge in the academic context, but also to simplify and facilitate human life in the social, economic, cultural, professional environments. For example, the skills and abilities to use the Internet allow you to organize your own leisure, recreation, shopping, ordering services that require relevant knowledge. Today, social networks include sites that allow you to find business contacts, friends, partners. There are also programs that exchange text and voice information and support the possibility of video communication between computers over the Internet. Dominant features of social networks are: connection without spending money; a large number of users; possibility to create communities of like-minded users (within the group); many additional services through

which each user can get their multivarious simulated space. Thus users of social networks create their own convenient simulated space in which they spend a lot of free time. At Oxford University, for instance, ICT is a key tool used in the educational process. The main social networks used at the University of Oxford are Facebook, YouTube, Tumblr, Google+, LinkedIn, Goodreads [2]. Thus it can be stated that the use of ICT makes a significant contribution to supporting lifelong learning. In addition to academic learning, people participate in other types of comprehensive learning through technology. V. Denysenko, M. Vinnyk and Ju. Tarasich emphasize that one of the most important criteria for the competitiveness of a specialist in the labor market today is his ability to learn, acquire knowledge independently, apply acquired knowledge in new environment and professional situations, think creatively and make non-standard decisions. Accordingly, there is a need to introduce a new paradigm of education [2];

– improving the system and procedures of assessment: assessment is one of the important components of the pedagogical process. Actually, establishment of the assessment system involves a clear definition of assessment criteria that provides for the analysis and formulation of conclusions about the efficiency of the methodology used by the teacher in the pedagogical process; the efficiency of students as well as the achievement or failure to achieve certain goals and learning outcomes. That is, it is about improving the process of measuring progress and taking into account the efficiency and usefulness of a particular teaching methodology [4; 7];

– increasing the effectiveness and efficiency: new approaches and new technologies need to be used to increase the effectiveness and efficiency of the learning and teaching process. Improvement of technological tools is in demand. Technologies should provide real-time resources for timely decision-making based on the data, diagnostics of the educational process, and professional development of academic staff. The development of technologies should advance towards making them flexible and adaptable to the needs that arise and so that their users would enjoy the benefits of modern and innovative methods;

– developing technologies to perform management functions: in higher education institutions, as well as in the classrooms, each participant in the educational process performs, among others, a certain management function. It is important to form managerial competencies for the appropriate performance of these functions. Management functions include planning, organizing, leading, coordinating and controlling. Innovative ICT is largely used to implement these management functions. Thanks to the use of technology, members of the academic community of higher education institutions

can perform these functions in a controlled manner. Technologies need to be improved to meet the needs of all participants in the educational process. In addition to computers, there are other technologies used including scanners, printers, photocopiers, projectors, tablets, smartphones, mobile phones, and more.

An analysis of the scientific and pedagogical literature on the research problem shows that but for the advantages, the widespread use of ICT in education has a number of disadvantages, which should be discussed in more detail. Thus in the field of higher education, tasks and activities are performed at different levels: a teacher, a student, an institution of higher education, the system of higher education in general. All members of the academic community of higher education institutions strive to effectively perform academic and professional functions using the best opportunities and to obtain appropriate results. They should use modern and innovative methods and approaches to achieve their goals and objectives. There are some obstacles in the implementation of modern innovative approaches.

Such obstacles include the vague formulation of the problem to be solved. There are some problems in the process of getting education. Significant ideological differences over the purpose and role of public education, the rights of students and other stakeholders etc. create confusion in identifying the issues to be addressed. Thus it is one of the main factors that causes ambiguity and lack of clarity on the part of certain educators in terms of the problems to be solved.

Another obstacle is the lack of clear and common indicators and criteria according to which innovations in the field of education should be implemented. It also means that a large amount of funding is used to achieve key government goals in the content of education and evaluation in the field, leaving less room for innovations in how to teach and evaluate the progress. In other words, using modern and innovative methods in the education system, teachers need to continuously learn and develop professionally in order to improve the quality of their own activities and the higher education system in general.

Obstacles to the introduction of innovations in the education sector also include the lack of flexibility in education policy. We mean that it takes long for systemic changes based on innovative technologies to be reflected in educational policy, regulatory documents etc. As transformations take a considerable time, it is impossible to support any innovation long enough to truly understand its feasibility.

Among the problems hindering the widespread use of ICT there is the lack of appropriate technical equipment and software, ie technological infrastructure is underdeveloped. Researchers note that "... requirements for education in Ukraine should emphasize the balance between, on the one hand, the ability of the institution to have the appropriate strategic

resources, and on the other hand, the willingness of students to use them. The rapid pace of development of the IT industry characterizes the system of interaction of strategic resources of a higher education institution and the willingness of students to use these resources as a dynamic system" [2, 43].

Along with the problem of insufficient technical and technological support, there goes inadequate level of knowledge, skills and abilities of participants in the educational process, as well as their psychological unwillingness to use ICT in everyday educational practice, which was proved in 2020 during the Covid-19 pandemic. One of possible solutions to this problem is to use the opportunities of both formal and non-formal education.

It is important to understand that with the rapid dissemination of information, increasing expertise in various fields of scientific knowledge, the widespread use of ICT, modern people need constant updating of their knowledge base. Therefore, we consider the insufficient level of knowledge as another obstacle to the use of ICT in education. Continuous professional development, updating knowledge and mastering new knowledge provide for teachers' becoming acquainted with innovative methods of teaching the discipline based on the use of ICT, gaining relevant experience in their daily pedagogical activities, creating a constructive educational environment, giving assistance to students in achieving certain learning outcomes.

The proper physical infrastructure of a higher education institution is essential for the application of innovations in the field of education. The development of infrastructure facilities contributes to the creation of an effective academic environment in which all participants in the educational process work in comfortable conditions. The physical facilities and resources of the higher education institution include laboratories, library premises, computer centers, playgrounds, public spaces, furniture, equipment and teaching materials, which help to increase students' interest and motivation to learn. On the other hand, the lack of these resources is seen as one of the obstacles in organizing the innovative activities in higher education institutions.

In our opinion, insufficient funding is among the obstacles to application of innovative technologies in the field of education. Financial resources are considered necessary to improve the country's education system as a whole. When it is necessary to introduce new ICT and innovative practices and to improve teaching methods, financial resources are considered extremely important. Thus proper planning and appropriate financial resources are an important factor in the effective use of ICT in education.

Conclusions. Effective dissemination of positive experiences is important for the introduction and wide-

spread use of ICT in higher education. Ineffective dissemination is mainly due to a lack of opportunities to share best practices, as well as a lack of rewards and incentives to implement ICT in teaching and learning. By disseminating information and knowledge, educators will be able to raise awareness and supplement their understanding of how innovations can be useful to colleagues and students in order to improve the education system as a whole.

So, summing up, we can say that at the beginning of the XXI century there are a number of factors that justify the need for new ideas and the use of ICT in many spheres of society, including education. Their advantages and obstacles to their introduction and wide application in higher schools of the country obviously need further studies. Clearly defined recommendations for quicker and more efficient introduction of ICT in all higher education institutions are also worth further detailed research and workout.

References:

1. Havrysh I. V. Teoretyko-metodolohichni osnovy formuvannia hotovnosti maibutnikh uchyteliv do innovatsiinoi profesiinoi diialnosti. (Avtoreferat dys. d-ra ped. nauk). Luhansk, Ukraina: Luhanskyi natsionalnyi pedahohichniy universytet imeni tarasa Shevchenka. 2006. 46 s.
2. Denysenko V. V., Vinnyk M. O., Tarasich Yu. H. Hotovnist studentiv do vykorystannia IKT unavchalnomu protsesi VNZ. Informatsiini tekhnolohii v osviti. 2015. Vyp. 23. S. 43–51.
3. Chernukha N. Sotsialni komunikatsii v interkulturnomu prostori: vidpovid na vykyky sohoden-nia. *Visnyk Kyivskoho natsionalnoho universytetu imeni tarasa Shevchenka. Psykholohiia*. 2018. № 1(8). S. 53–56. Koryahin V. M., Mukan N. V., Blavt O. Z., Virt V. V. Students' coordination skills testing in physical education: ICT application. *Information Technologies and Learning Tools*. 2019. № 70(2). URL: <https://journal.iitta.gov.ua/index.php/itlt/article/view/2437/1462>
4. Layng T. V. J., Twyman J. S. Education + technology + innovation = learning? In *Handbook on innovations in learning*; M. Murphy, S. Redding, J. Twyman (Eds.). Philadelphia, PA: Center on Innovations in Learning, Temple University; Charlotte, NC: Information Age Publishing. 2013. P. 133–148.
5. Mukan N., Lavrysh Yu. Video Conferencing Integration: Challenges and Opportunities at Universities. *Revista Romaneasca pentru Educatie Multidimensionala*. 2021. [S.l.], v. 12, n. 1. Sup. 2. P. 108–114.
6. Smith K. *Innovation in Public Education: Problems and Opportunities*. New Schools Venture Fund. 2009. URL: <http://pahara.org/wp-content/uploads/2012/12/innovation-in-education.pdf>

Мукан Н. В., Кравець С. Ф. Використання ІКТ у вищій освіті: переваги та недоліки

Стаття присвячена дослідженню специфіки використання інформаційно-комунікаційних технологій в академічному середовищі закладу вищої освіти. Метою статті є виявлення переваг та недоліків використання сучасних інформаційно-комунікаційних технологій, що слугуватиме підставою для удосконалення діяльності педагогів, студентів, організації роботи закладу вищої освіти загалом. У ході дослідження виконано аналіз науково-педагогічної літератури, що висвітлює різноманітні аспекти проблеми дослідження. З'ясовано, що основними напрямками досліджень є інформатизація освіти (V. Bykov, M. Shyshkina, O. Spirin); формування ІКТ-компетентності фахівців (M. Kademiya, N. Morze, I. Vorotnykova); забезпечення якості освіти на основі застосування ІКТ (Ju. Zaporozhchenko, V. Osadchyi) використання ІКТ як засобів навчання (Koryahin, N. Mukan, O. Blavt, V. Virt, Ju. Lavrysh). Виявлено основні переваги застосування ІКТ в академічному середовищі закладу вищої освіти: зниження трудомісткості завдань; удосконалення процесу редагування та внесення змін; покращення процесу комунікації; трансформування системи освіти; генерування ідей для вирішення проблем; підтримка навчання упродовж життя; удосконалення системи та процедури оцінювання; підвищення продуктивності та результативності; розвиток технологій для реалізації управлінських функцій. Виокремлено основні недоліки застосування ІКТ в освітній галузі: нечітка постановка проблеми, яку потрібно вирішити; відсутність чітких та загальних показників, критеріїв, відповідно до яких мають впроваджуватися інновації в освітній галузі; відсутність гнучкості політики в галузі освіти; відсутність відповідного технічного оснащення та програмного забезпечення; відсутність або недостатній рівень знань, умінь і навичок учасників освітнього процесу, їхня психологічна неготовність до використання ІКТ у щоденній освітній практиці; недостатній рівень знань викладачів; недостатній рівень фінансування. Представлено висновки про те, що на початку XXI століття існує низка факторів, які обґрунтовують необхідність розвитку нових ідей та застосування ІКТ у багатьох сферах життєдіяльності суспільства, зокрема й в освітній. Вони мають свої переваги, що зумовлює необхідність їх подальшого вивчення.

Ключові слова: інформаційно-комунікаційні технології, заклад вищої освіти, освітній процес, переваги використання ІКТ, недоліки використання ІКТ.