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DISTANCE TECHNOLOGIES AS A COMPONENT OF THE EDUCATIONAL PROCESS IN HIGHER MEDICAL EDUCATION ESTABLISHMENTS (LITERATURE REVIEW)

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The article analyzes definitions of smart-learning (distance learning) and specifies the priority of distant learning in contemporary conditions. In spite of all difficulties, which are currently present in our life, the main task is to inform society of possible ways of self-improvement and perfection. Modern mass open online courses for implementation of distance education that are the most perspective trends of learning development are represented in the article. Submitted support of digital learning models among teaching staff worldwide shows the globalization of distance education on international market of educational services.

Key words: *e-learning (distance learning, online education), mass open online courses.*

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ДИСТАНЦІЙНІ ТЕХНОЛОГІЇ ЯК СКЛАДОВА НАВЧАЛЬНОГО ПРОЦЕСУ У ЗАКЛАДАХ ВИЩОЇ МЕДИЧНОЇ ОСВІТИ

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У статті проаналізовано визначення поняття smart-освіти (е-навчання) і конкретизовано пріоритети дистанційного навчання в умовах сьогодення. Адже, незважаючи на всі складнощі, які є в цей час у нашому житті, головним завданням залишається інформувати суспільство про можливі шляхи саморозвитку та удосконалення. Представлено сучасні найновітніші технології для проведення масових відкритих онлайн-курсів, які входять до перспективних тенденцій розвитку дистанційної освіти. Наведена підтримка цифрових моделей освіти серед професорсько-викладацького складу світу вказує на глобалізацію дистанційного навчання на міжнародному ринку освітніх послуг.

Ключові слова: *е-навчання (дистанційне навчання, онлайн освіта, smart-освіта), масові відкриті онлайн-курси.*

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ДИСТАНЦОННЫЕ ТЕХНОЛОГИИ КАК СОСТАВЛЯЮЩЕЕ УЧЕБНОГО ПРОЦЕССА В УЧЕРЕЖДЕНИЯХ МЕДИЦИНСКОГО ОБРАЗОВАНИЯ

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В статье проанализированы определения понятия smart-образования (электронного обучения) и конкретизированы приоритеты дистанционного обучения в условиях современности. Ведь несмотря на все сложности, которые присутствуют в это время в нашей жизни, главной задачей остается информировать общество о возможных путях саморазвития и усовершенствования. Представлены современные новейшие технологии массовых открытых онлайн-курсов, относящиеся к перспективным тенденциям развития дистанционного образования. Приведенная поддержка цифровых моделей образования среди профессорско-преподавательского состава мира указывает на глобализацию дистанционного обучения на международном рынке образовательных услуг.

Ключевые слова: *е-обучение (дистанционное обучение, онлайн образование, smart-образование), массовые открытые онлайн-курсы.*

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Introduction

We are living in the society which is constantly changing under the influence of rapid and significant communication alterations. Major transformations which are taking place in modern society directly impact education area, including higher educational institutions, in their turn imposing new requirements on educating the young generation. Higher educational institutions imply responsibility for education, so they have to adjust to quick economic and social changes which have a defining effect on the concept of the role of educational system. Thus, under the current competitive circumstances, universities realize the growing importance of the services they offer and have therefore to focus on satisfying students' needs

and expectations.

Soaring growth of powerful cloud technologies, social networks (Viber, Whatsup, Twitter, Facebook) and various educational channels and courses on YouTube, G-Suite, Coursera, Udacity, Khan Academy, Prometheus, etc. enables education to become more reachable anywhere in the world, in any language, at any time, paid or free of charge. This leads to use of vast amount of digital resources and different means of informational-communication technologies during university studies, which serves as a ground of students' motivation to continuous self-improving studies, that is Smart-learning or e-learning (e-learning is a system of electronic learning, synonym to such terms as electronic learning, distance learning, computer-based learning, network learning, virtual learning by means of informational-communication, electronic technologies). According to the definition provided by UNESCO experts, e-learning is learning by means of the internet and multimedia [4]. This in fact is such learning which uses smart-technologies, namely conducting study process via modern informational-communication technologies. That is digitalization of study material takes place in virtual educational environment by means of regular update and enrichment of the content and monitories of study quality [23]. Smart-learning possesses all prerequisites to become the most efficient innovational model of conducting educational activity in the conditions of global informational society. The main sign of this educational model is a system of flexible learning in interactive educational environment, which allows to transfer a part of educational process in electronic environment.

Nowadays, Ukraine is making its determined steps to electronic learning (e-learning) which is a key driving force in many areas and a prerequisite for development of modern society. Efficiency of implementation of electronic learning is obvious since it includes distance learning, educational process management, document management automation at educational institutions. Advantages of electronic learning are time saving, increase in learning material memorizing time by 15-25% compared to that in full-time study mode, possibility to study at own pace and at any time, availability to all categories of students, chance to return to the material which is not quite clear unlimited number of times. [30]. What does the term distance learning hide? It is a technology based on open-learning principles which extensively uses computer learning programs and by means of modern telecommunications creates informational educational environment for supplying learning material and communication. Distance learning has a number of advantages over other learning forms. Without literally leaving one's home or workplace, one can maintain a regular contact with a lecturer via telecommunication technologies, including video conferencing, and received well-structured learning material in electronic form [9].

Based on the outcomes of the global analysis of international market of educational services, percentage of teaching staff who support less traditional digital learning models has been defined (Fig.1).

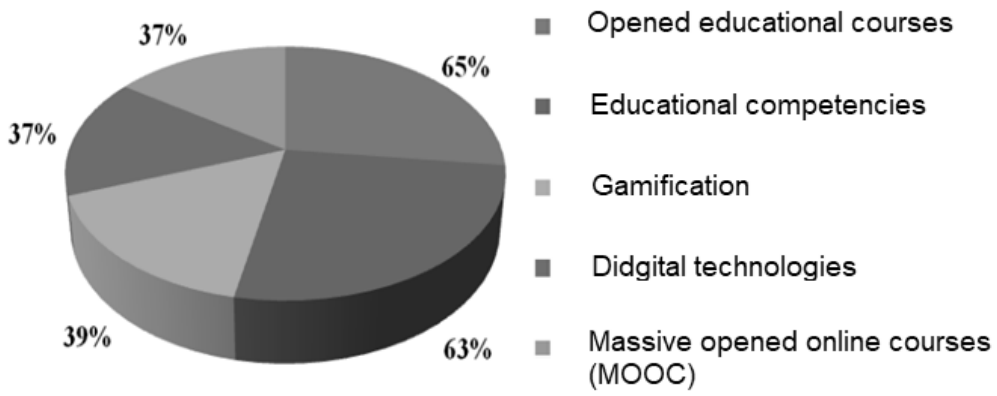

Figure1. Support of digital learning models among teaching staff worldwide, % [Source: 30]

Online learning during quarantine

Modern world conditions dictate rules of teaching and learning on all levels of educational process during this-year worldwide quarantine despite none of us was ready for the pandemic and the circumstances caused by it. All over the world measures are being taken to organize learning under conditions of COVID-19 pandemic. Educational system found itself on the frontline. Closing educational institutions and forced turn to distance learning are connected with evident problems caused mostly by insufficient technical equipment, no or weak preparedness of both lecturers and students for work in newgame conditions. These and other problems are challenging educational system in the critical situation [32].

Still most of educational institutions teaching staff remain satisfied with the conditions of their work. It turns out, this satisfaction is linked to present system communication and a clear algorithm how to act on the level of the institution, which are provided by professionals of the technology department. High professionalism, wish to cooperate and high level of communication with the colleagues are main signs of successful distance learning. In the era of modern technologies, Bukovinian State Medical University has utilized its enthusiasm and innovativeness and found the

solution of this complicated problem by means of instant involvement of all lecturers and students in Google Meet online platform. For us, lecturers, it is a great and useful experience which will be used by most of us for further improvement and self-development. For students, it is a possibility to closer embrace modern opportunities of smart-technologies with their mandatory use in the future practical work. Alongside with obvious challenges and problems, the new learning format opens a broad range of opportunities and perspectives for changing and improving educational systems under forced conditions created by the critical situation.

E-learning development and implementation

World community of leading experts and specialists in the area of education and information technologies admit that online education is the way of the future. Such conclusion was made during the "round table" meeting on distance learning issues in Davos (January, 2013). Numerous educational institutions have declared distance learning a progressive development strategy and use learning platforms as a means of spreading own content. Mass open online courses (MOOC) is among the top of 30 most perspective trends of learning development before 2028.

As K. Robinson, international advisor on educational system and innovations, has put it, MOOC is a combination of video lectures, interactive tasks and forums for discussing learning materials. Their peculiarity lies in providing unlimited and free access to best university level learning courses to all those interested, irrespective of their location, age or income. Implementation of such format is embodiment of the concept of lifelong learning. A vast number of educational institutions have already incorporated MOOC into their main courses. Their mass appearance took place in 2014-2015. As of 2015, there were over 4,000 MOOC created by over 500 universities worldwide. The top providers are still American MOOC. In such countries as France, China and Jordan, MOOC exist as national planforms. They are British "Future Learn", German "Iversity", Australian "Open2Study", American "Canvas" and "NovoED". They are most attractive to students who cannot use the traditional learning.

Online learning trend considerably broadens distance learning opportunities, its efficiency and audience. It contributes to purposeful uniting of universities for exchange and improvement of distance learning practices. For instance, the joint effort of Massachusetts Technological Institute and Harvard University in May 2012 let launch "EdX", a platform of mass open interactive free courses which covered vast audience worldwide. At the beginning of 2014 the number of partners of this learning initiative constituted 25 educational institutions. Having adopted open-code policy, the learning startup initiated "OpenedX" environment, which was the ground for "Google" to create the internet portal MOOC.org where any university can create a count and place its own open mass online courses. Besides, the creators of the platform have developed various technologies for collective assessment of submitted works, namely by means of artificial intelligence [16]. "Coursera" is a leader in supplying MOOC with the audience of over 17 million of users at the beginning of 2016. "Coursera" certificates and screenshots of achievements are being taken into account while calculating credits by stationary educational institutions. It is worth mentioning that American Education Board has approved some online platforms for enrolment in US colleges.

Another online platform which was created with the purpose of learning virtualization is "Udacity". It is not among the top ones in terms of numbers of users who can access learning products developed in collaboration with "Google", "Facebook", as well as "Capital One" finance company. In spring 2012 "Udacity" in collaboration with "Georgia Tech" and "AT&T" launched a master's degree program which allows to obtain an accredited master's degree in "Computer Science". Another example of a breakthrough in the development of learning was made by "Khan Academy" which offers short classes of 5–15 min. on a vast number of courses in different study areas which are in high demand by broad audience of all ages and professions. The Academy is now referred to as "the Big School of the World", with millions of students. Nowadays "Khan Academy" has over 600,000 users on "YouTube" with free lectures viewed over 230 million times.

These processes have impacted Ukrainian market of learning services as well, with launch of first MOOC from "Online University" (Kiev National University) in 2013 which led to over 9,000 of registered users. In October 2014 another Ukrainian online learning project known as "Prometheus" started its work, with current 150,000 students, with almost equal numbers of both sexes, 25-29 being the most popular age group and a tendency to growing age, which is a sign of online learning dissemination (Fig. 2, Fig.3).

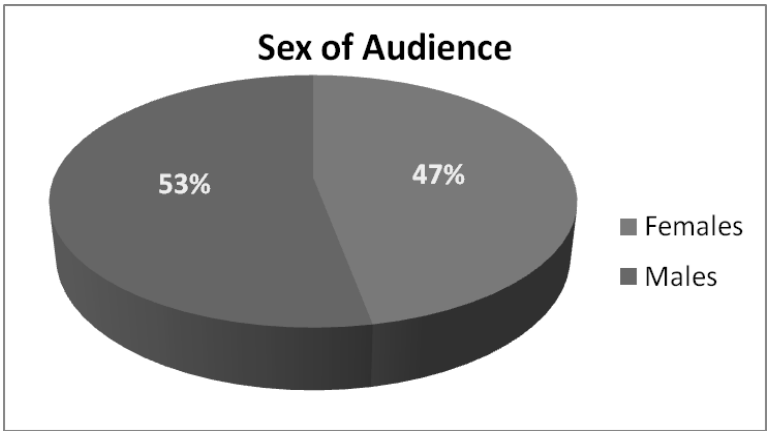

Figure 2. Sex of "Prometheus" platform students

(Source: https://starylev.com.ua/news/onlayn-osvita-v-ukrayini-shcho-novogo)

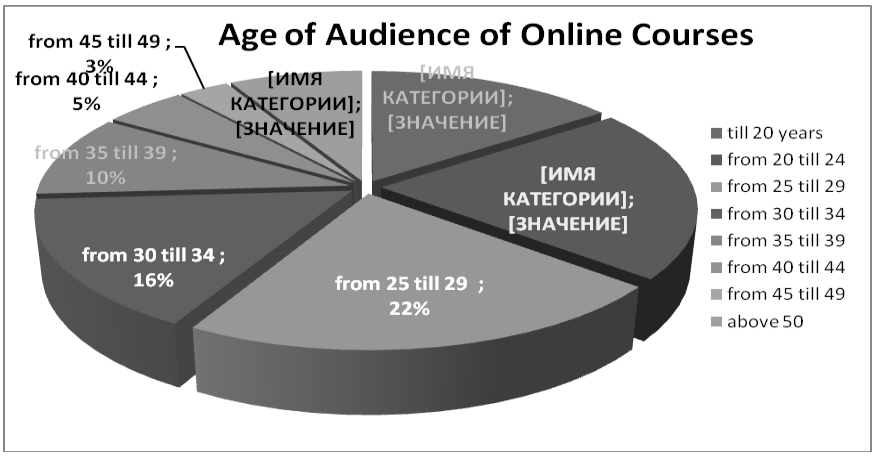

Figure 3. Age of "Prometheus" platform students
(Source: https://starylev.com.ua/news/onlayn-osvita-v-ukrayini-shcho-novogo

All of these prove that education and learning should be taken on another level with involving maximum opportunities and producing a tangible result in the short term.

The advantage of Ukrainian market of online learning is not copying best practices from abroad but an effort to create own learning product. It is worth mentioning that MOOC format is being successfully used for teaching school subjects and preparing school graduates for External Independent Assessment (Ukrainian equivalent of SAT). Among projects which are currently offering such learning form are the online platforms "EdEra" (edera.com) launched at the beginning of 2015, "Osvitaonline" (osvitaonline.com.ua) working since February 2015, "Eduget" (eduget.com) [27]. Online learning is in demand by various population groups for various purposes (Fig.4).

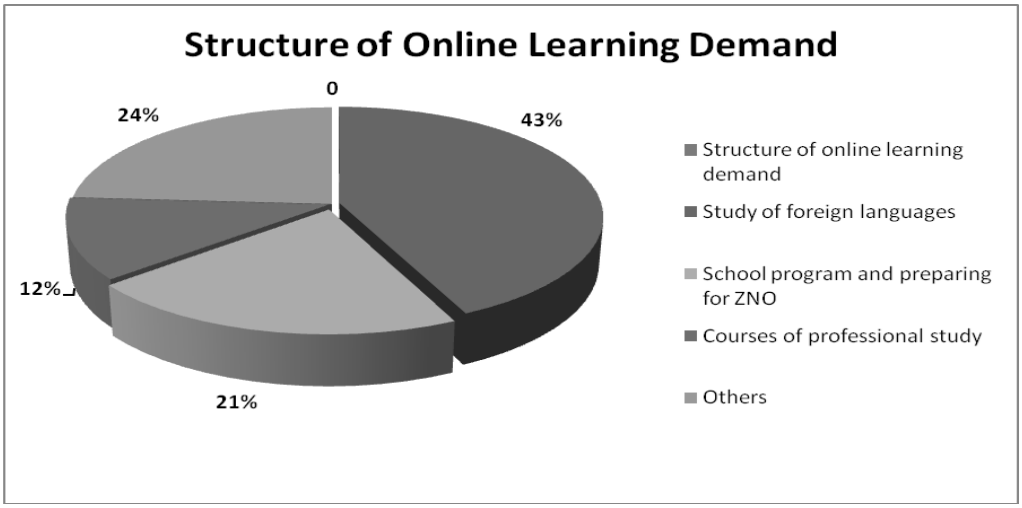

Figure 4. Structure of online learning demand (Source: Preply data)

While possessing certain amount of experience in distance learning organization and use of its particular forms, among which mass online open courses, offline distance courses with learning materials presented by video lessons, lecture materials, practical works, test assessments, presentations, scientists and higher educational institution lecturers have different opinions as for challenges and perspectives of such learning. This is why it seems necessary to make a deep dive into some of them.

Peculiarities of distance learning. Advantages and disadvantages

Having analyzed Ukrainian and foreign experience in e-learning, one can define some didactic advantages of electronic technologies use for learning process improvement and intensification, namely:

•orientation on self-motivation and increase of learning autonomy as a result;

•there arises a need for methodical variety of learning forms, methods and approaches. Each lecturer has to support himself/herself with already working or newly created models of pedagogical interaction;

•ability to use graphic, audio-visual and animated objects for presenting learning material, which has a direct impact on online learning intensification;

•monitoring of students' learning activity thanks to controlling tasks results is crucial for successful completion of any course;

•provision of various kinds of feedback with the purpose of control, analysis and assessment of students' academic performance is a weighty lever in the development of smart-learning.

The above mentioned practices can be enhanced by means of creating virtual groups, professional communities, chats, forums, using blogs, and by doing so lecturers, students and all those interested will be able to exchange experience, solve problems and address practical situations together [6; 8; 9; 10; 22]. In their turn, organizational-pedagogical advantages of distance learning are as follows:

•free choice of an educational institution irrespective of a student's location, that is a possibility to acquire needed competencies while being anywhere;

•no age limits, physical handicaps or main professional activity restrictions, which allows to involve a great number of students. While being in a military service or on a maternity leave, having limited physical abilities, one can receive the required cognitive content. Implementation of online learning brings to life the idea of continuous lifelong learning since nowadays there is a marked increase in those who study after 40 and even 60;

•flexibility and mobility in performing learning activity, which implies having own study timetable, independent pace depending on individual-characterological peculiarities, as well as a possibility of time saving;

•a student can organize a study place according to own preferences, which will eventually contribute to more effective acquisition or required competencies due to favorable atmosphere;

•professional growth of lecturers since development and implementation of distance learning courses requires possessing innovational-technological competencies;

•communication and feedback between a lecturer and students by means of modern communication tools, that is chats, forums, blogs;

Psychological advantages of distance learning include:

•development of such individual-psychological features as internal learning motivation, independence, individual style of learning activity, adaptability, goal-orientation etc.. The said features don't only contribute to effective acquisition of required competencies but also encourage compatibility of a would-be specialist on the modern labor market;

•formation of effective distance communication, which is a requirement for an applicant from a modern employer [44].

The ability of create personal and professionally significant context of learning activity and form individual strategies and means of self-learning will eventually lead to improvement of learning in interactive mode. According to the abovesaid, distance learning has a plenty of advantages, which makes it popular for implementation in educational process at leading foreign universities and on the territory of Ukrainian higher education.

Yet, distance learning, especially when introduced in Ukraine, has a number of disadvantages which do not let fully implement this form of learning in Ukrainian higher educational institutions and are the opposite to their advantages.

Among organizational-pedagogical disadvantages of distance learning the following can be listed:

•no possibility to provide a high-quality feedback between students and a lecturer with the purpose of addressing current pedagogical issues connected with unclear homework; explaining learning material on examples, etc.;

•lack of a high-quality pedagogical control from a lecturer's side which is a stimulating factor for effective learning;

•resource consumption and labor intensity for the side of an educational institution and a lecturer. On top of the required technical equipment from the educational institution, the lecturer has to create a distance learning course, which takes approximately 500-1,000 hours, that is a detailed distance learning course will take up a bigger part of general load;

•difficulties in practical application of learning material when a student receives a vast amount of information in a short time, which causes a certain chaos in understanding how to use it in real life.

Informational-technological disadvantages of distance learning include:

•difficulties with technical equipment and access to the internet, which cause problems in accessing distance learning courses and doing required tasks;

•student's authentication issue, since a lecturer cannot identify whether a student who is taking a course does tasks and tests;

•material-technical base present at an educational institution (PCs, laboratories, multimedia, software, etc.), that allows to effectively maintain and administer distance learning process.

Among psychological disadvantages of distance learning are the following ones:

•lack of the key requirement of effective communication in educational process: face-to-face communication, which leads to insufficient emotional contact between a lecturer and a student and impossibility to follow such psychological-pedagogical principles of education as anthropocentrism and humanism;

•impossibility of effective learning caused by lack of developed individual-psychological qualities: independence, motivation, self-discipline, etc. [22; 25].

Implementation of high-quality distance learning in Ukraine is hindered by numerous factors, among which difficulties of informational-technological nature top the list. This is explained by superficial understanding and insufficient development of methodological and psychological-pedagogical peculiarities of distance learning, as well as demanding requirements to a "virtual" lecturer, who on top of usual knowledge has to possess information and communication technologies means. Sometimes this cannot be achieved because of conservatism, psychological barrier and unpreparedness of scientific-pedagogical staff, unacceptance of innovations, low motivation level in development of distance learning courses and work with distance technologies. An issue of copyright to electronic learning

materials, no allocated time for development of electronic media learning materials are also major challenges to successful development of distance learning in Ukraine. Population distance learning awareness level has to rise for the sake of effective intensification of smart-learning [31].

Perspectives of distance learning

Relevance and further developmental perspectives of the market of electronic learning has provoked extensive debate and caused a number of positive processes in the area of education. Available, accessible and free learning content for broad audience has been made possible due to increase in number of learning online services – online lessons constructors, webinar management services, computer video lessons, learning web resources catalogues, use of scribing technology etc [16].

Review of recent researches and publications on the said topic reveals differences in opinions of economists and analytics on the relevance of development of electronic learning market. Despite the fact that in 2011 over 320,000 American schoolchildren attended virtual schools and in 2015 a number of people who took at least one online course exceeded 17.3 million worldwide, there are still e-learning opponents. For example, in 2008 the first online course lecturer J.Siemens in Canada called them "shadow economy of education" which functions in parallel with formal education. T. Eagleton has another opinion according to which modern universities are turning into business projects, lecturers are turning into managers and students are turning into consumers. This causes universities starting to satisfy consumers' interests in competition for a student, which gradually leads to slow "death" of classical universities [39].

Most important perspectives of distance learning development in Ukraine include: firstly, fulfillment of the National Strategy of Education Development in Ukraine in terms of obtaining a degree via online learning; secondly, broadening a range of offers which allow to obtain a degree via online learning; thirdly, development of informational infrastructure of an educational institution; fourthly, rise of lecturers' culture level with the help of free courses at an educational institution and advanced training institutes.

One of the effective tools for solving the problems in question is a system distance learning platform with open access – Moodle next to Google Meet (software for instant messaging and videoconferencing) which was a reliable and frequent support for lecturers and students during the quarantine restrictions at Bukovinian State Medical University. As a result of a powerful collaboration of all teaching staff and students of Bukovinian State Medical University, all methodical work was successfully and timely completed in the second term of the academic pandemic year.

The outcome of thorough collective work in the conditions of the quarantine can be defined as a list of the following measures for distance learning improvement and development, as well as improvement of academic performance during the quarantine:

•it is primarily recommended to conduct online discussion classes which will involve all present students, prerequisites being providing practical cases, provoking a healthy conflict and debate, detailed discussion of critical issues;

•ready learning exercises and tools for creating tests and tasks can be found here: https://learningapps.org/;

•ideas for perspective and modern approach in turning an audience into a working community with elements of gamification can be found here: https://www.classdojo.com/uk-ua/;

•for better memorizing it is essential to fully discuss the topic of the class or lecture, elucidate main issues and maintain constant dialogue between a lecturer and students;

•some internet resources are provided below for high-quality assessment and group involvement: https://www.mentimeter.com/; https://get.plickers.com/; https://www.quizalize.com/; https://nearpod.com/;

•one can also use a constructor of tests, surveys, crosswords, games and complex tasks and hundreds of ready materials which can be found here: https://onlinetestpad.com/ua and conduct tests and assessment with elements of gamification: https://kahoot.com/;

•an important condition in organizing online lectures and practical tasks is a lecturer's availability for a student by means of providing access to watching lectures/practical/seminar classes or other learning videos with the possibility for a student to ask important and critical questions in the nearest few days and receive a meaningful answer. This is the only way for a lecturer to play a role of not a regular average lecturer and a tool for delivering material, but that of a tutor, mentor for his/her students.

Learning management systems can track an individual student's progress and behavior and compile this data for lecturer's review. Data called learning analytics tell a lecturer how often students log in, how much time they spend on doing a particular task and how well they master the material. Such tracking can bring value. Learning analytics helps lecturers quickly identify questions which cause concerns at any moment so that they are able to accordingly adjust teaching methods, learning materials or tasks.

Conclusions

We can assume that the year 2020 will be a milestone one for development of online learning both in Ukraine and all over the world. Firstly, people now have more time for self-study due to quarantine and as a result demand will grow among students and young adults who are already aware of the process of online learning but were forced to postpone taking courses due to constant offline work load. Secondly, many foreign universities started offering free online lectures, as well as some libraries open access to their data, which contributes to the increase of supply on the market.

As it has already been mentioned, distance learning is a new paradigm of global virtual learning the purpose of which is to improve quality of students' lifelong learning. Smart-learning focuses on contextualized, personalized and integral learning for progressing students' intellect and facilitating their problem solving ability in smart environment. As technologies develop in modern

society, distance learning will face many problems such as pedagogical theory, learning technologies, leadership classes for both lecturers and students, educational structures and educational ideology etc. Strategically, for a successful competitive distance learning universities have to constantly participate in focused special events on personal growth, having considered analysis of competencies a successful online trainer has to possess.

We expect that distance learning can decrease students' cognitive overload and thus will enable them to focus on the sense of the subject. In addition, students' learning experience can be deepened and broadened and in such way students might benefit in general (affectively, intellectually and physically). This clearly exhibits a flexible learning model that contributes to cooperation in electronic learning environments and can encourage both students' personal and collective intellect. Besides, teaching stuff can better manage learning support, be reachable for students, which will improve their expectations to e-learning.

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