MASSIVE OPEN ONLINE COURSES PHENOMENON IN THE CONTEXT OF DISRUPTIVE INNOVATIONS IN HIGHER EDUCATION

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У статті аналізується феномен масових відкритих онлайн курсів як основного інноваційного впливу в системі вищої освіти, окреслено сильні та слабкі сторони, а також можливості, які забезпечуються для інноваційного розвитку вищих навчальних закладів, розроблені пропозиції щодо їх інтеграції у навчальні плани.
__Ключові слова:__ вища освіта, інноваційний розвиток, підривні інновації, масові відкриті онлайн-курси, онлайн освіта, дистанційна освіта.

В статье анализируется феномен массовых открытых онлайн курсов в качестве основного инновационного влияния в системе высшего образования, определены сильные и слабые стороны, а также возможности, которые обеспечиваются для инновационного развития высших учебных заведений, разработаны предложения по их интеграции в учебные планы.
__Ключевые слова:__ высшее образование, инновационное развитие, подрывные инновации, массовые открытые онлайн-курсы, онлайн образование, дистанционное образование.

The article analyses the phenomenon of MOOC as major disruptive innovation in the system of higher education, outlines its strengths and weaknesses as well as opportunities it provides for innovative development of higher educational institutions, offers several solutions for its integration in university curricular.
__Keywords:__ higher education, innovation development, disruptive innovations, MOOC, online education, distance education.

Problem statement and its connection with important scientific or practical tasks. Ukraine's integration into the global educational environment and the peculiarity of modern civilization advances (informatization, globalization) necessitates the formation of an innovative model of the development of the system of higher education in Ukraine, dictating its new priorities, requiring stable dynamism, sustained generation of innovations that would contribute to the continuously updating of knowledge, and, as a consequence, the economic and social growth of the country.

Technological innovation is based on two main factors: new knowledge and skilled professionals who are able, using new skills, to create an innovative product. Only a combination of capital, new skills and knowledge ensures sustainable

development and increases standards of living. Thanks to such synergy, new knowledge becomes not only a means of production, but also a result. Creating new knowledge, its dissemination, a kind of circulation of knowledge in the economy eventually lead to the creation of a new type of economy - the knowledge economy. However, the growing volume of knowledge and globalization of education often makes it impossible for one particular individual to "digest" this knowledge. In addition, the strategic orientation of many countries, Ukraine in particular, on life-long learning requires the development of mechanisms providing the opportunity for the specialists to improve, shape and extend their knowledge and gain new skills which will enable them to be competitive on the changing employment market.

The introduction of information innovations in the educational sphere is increasingly challenging the traditional structure of education. Researchers tend to believe that modern educational projects based on new technologies are designed to transform traditional educational institutions. Proceeding from the diversity of world information innovations (distance education, mass free online courses, "cloud computing"), it becomes clear that the education system is headed for fundamental changes that involve qualitative restructuring of the educational process [6, p. 29]. Today, the situation on the labor market in innovative areas of activity shows that people with cross-platform education and the specialists of the narrow profile are in great demand. Therefore, a modern student during the training is aimed at obtaining unique knowledge and competencies. In order to provide this, the university has to introduce additional student specialization and individual educational trajectories. The university's new tasks are adding new ones, and training and counseling at universities are beginning to absorb more and more time and money. It is not surprising that universities are looking for ways to solve this problem. The use of MOOCs (massive open online courses) in student curricula may partly solve the problem of individualizing educational trajectories and expanding the number of supported disciplines, while using fewer resources [9, p. 250].

Analysis of recent research and publications. The theoretical foundations of innovation activity in higher education are actively studied in the world and national scientific literature. Various aspects of this problem were studied by, B. Twice, H. Friedman, J. Schumpeter, Clayton M. Christensen, O. Rudenko. The theoretical foundations of on-line education and MOOC have been laid by Dave Cormie, George Siemens, Stephen Downs. In foreign scientific literature, the subject of the MOOC is very actual and is being actively developed by such authors as Andrew P. Kelly, Frederick M. Hess, Li Yuan, D. Holton, J. Daniel, S. Dhawal, and many others. In Ukraine, the history of open online courses is explored by O. Zarva, I. Batsurovskaya, Yu. Dzhalandinova, specifics of distance learning and on-line technologies in education – M. Kukharenko, V. Bykov, N. Sirotenco. Features of introducing on-line courses in high school are the subject of analysis by V. Guseev, T. Piliavoz, O. Oleynikov, I.Y. Travkina and others.

The purpose of this research is to determine the role MOOCs as disruptive innovation technology in the context of globalization and European integration processes of the transformation of higher education in Ukraine, outline the main problems and opportunities related to the introduction of this innovative platform and offer some solutions, which facilitate the process of integrating MOOC into university curricular.

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Main research material. The development of information technology has prompted the search for new training formats from the academic community that allow the delivery of content globally, and not within the same educational institution. This was the main reason for the emergence of such educational technology as the MOOC – a course on which can study up to several tens of thousands of people, which is considered disruptive innovation in higher education. For institutions, which are not flexible enough and are unable to timely react to the current challenges, disruptive innovation can turn into catastrophe [4, p. 15]. However, for some innovative startups, which are looking for a chance to enter a new market, disruptive innovations provide a unique opportunity. Thus, it is possible to say that nowadays higher educational institutions face a choice – either to follow the path of innovative development, or to leave the industry. Disruptive innovation, a term coined by Clayton Christensen, describes a process by which a product or service takes root initially in simple applications at the bottom of a market and then relentlessly moves up market, eventually displacing established competitors [2, p. 58]. The theory of disruptive innovations suggests an explanation of why some innovations undermine existing markets by already proven players. Christensen identified two types of innovations that have an impact on organizations and enterprises: sustainable and disruptive. According to this researcher, sustainable innovations imply the improvement of the existing system, whereas disruptive innovations create an entirely new market, usually reducing the price, creating a product for another target audience or other needs of an existing audience. Disruptive innovation is a process where a sector that previously occupied only a limited part of the market because its products and services were complex, expensive and inaccessible turn into a place where products and services serve many, regardless of the wealth or experience of everyone. Innovation is carried out by redefining quality. Quality is often much worse than that of "old brands," and then gradually improves, so that the product takes up an ever larger and larger share of the market for a long time as the ability to solve more complex tasks is enhanced. At the same time, the quality reduction is offset by new features of products that were previously unavailable (price) or even not intended (for example, the collapse of the industry of music CDs under the pressure of mp3 and the Internet, as well as iTunes). As a rule, disruptive innovations combine a new technology that can develop very fast and an innovative business model [2, p. 60-61].

Nowadays, one of the leading examples of disruptive innovation in the sphere

of education can be considered a relatively new phenomenon which is called MOOC. The term MOOC was first used in 2010 by Dave Cormier from the Prince Edward Island University (Canada) and consists of four separate concepts: Massive – involves a large number of participants from around the world; Open – the course is free and anyone can join it; Online - the course is openly available on the Internet; Course [1, p. 28].

As bright examples of the existing MOOCs it is possible to mention the Coursera, a private educational institution Udacity Organization, Futurelearn, Khan Academy, Open2Study, Saylor.org, etc. These organizations have partnerships with major corporations and leading research universities and offer online courses for free or at a low price, through MOOC. Ukraine also has experience using this technology – one of the largest and most successful online education platforms in Ukraine is Prometheus (prometheus.org.ua), which was launched in October 2014. MOOCs are a relatively recent on-line learning phenomenon and is currently generating significant media attention and interest of higher education institutions and venture capital investors who see them as an opportunity for making profit [3]. They can be seen as an extension of existing on-line methods of training, in terms of open access to courses and the scale of their increase, they also offer an opportunity to rethink new business models that include elements of open education. This includes the ability to differentiate teaching from assessment and accreditation for differentiated pricing and marketing activities. Since MOOCs offer unlimited access to courses, which considerably extends the demographics of the users, they immediately attracted the attention of governments, institutions and commercial organizations. A considerable amount of work has been done on developing MOOC platforms in collaboration with different universities. An increasing number of institutions are involved in collaborative activities and experiments with MOOCs with the goal of expanding access, developing marketing strategies and branding, and the potential for expansion of new sources of income. There are various motivations for students to attend MOOCs, and many of them are struggling to engage in courses and support motivation in the context on-line learning environment. The statistics of MOOC activity are quite impressive: for example, the course on the computer programming offered by the Coursera project in 2011, recorded more than 100 thousand students and 13 thousand of them received certificates. On the wave of this stunning success by 2014, the Coursera project had managed to accumulate 85 million dollars of venture capital [3]. But since the MOOCs are relatively new phenomenon, it is pretty difficult to judge about long-term financial sustainability. However, it is hard to deny the tremendous scale effect. With such a large number of students participating in programs, organizations can make money through sales of Ad space on the site. In addition, they can issue official certificates of completion of courses worth less than 100 dollars. As far as corporations are concerned, they can thus identify talented students who make progress with studying technical or other courses [4, 18].

Prospects for mass open online courses are estimated by many researchers as promising. If until 2013, universities considered the development of the MOOC as a way of emphasizing their status, and the possibility of using the MOOC in higher education was more of a theory and caused a large amount of skepticism from the educational community. But in 2013, several mass courses on Coursera and Udacity platforms were approved for the American program ACE CREDIT [5], the University

of Colorado has already credited student loans to students who have successfully completed Udacity's online programming course. Two courses on the European MOOC platform Iversity have already been approved by the European program ECTS.

Actually MOOC is only a part of technological innovations able to change the system of education. Advances in the field of information technology made it possible to "unpack" or "unbundle" a single set of educational services previously provided in one "store-university" [6, p. 41] into their component parts and sell them individually, providing customization and lowering prices. Figuratively speaking, the consumer, the one who uses educational services, is no longer interested in buying these products-services in one educational department store in which the product-service is, assembled, produced and sold in a set without any choice. The consumer wants to adds to his cart products-services of different manufacturers, choosing them according to the main indicator of the consumption society – the price / quality ratio. MOOC is at the very beginning of the dynamic process of competition between sustainable and breakthrough educational innovations, but the analysis shows that they contain key characteristics of disruptive innovations and the core for further development and evolution, that is a combination of new business models and new technologies. If MOOC is developed to a level where students can obtain a degree and qualification, this can have an impact on the process of admission to traditional educational institutions and a change in the entire higher education market in the future.

So far, most of the projects related to MOOC do not have clear business models, therefore, follow the traditional approaches of the Silicon Valley, quickly creating new projects and without paying due attention to the sources of income. However, it becomes apparent that MOOC projects supported by venture companies (Coursera, Udacity) outperform, projects developed by universities (EDX) in income and its diversity. [5]

Nowadays the organizers and architects of MOOC are working out new business models which will comprise the following elements: certification, pre-selection of applicants, classes with an instructor or assessment of completed tasks, training courses, provided and paid by the companies, sponsorship, career guidance, sponsored courses in technical subjects and others. Of course, it is quite difficult for universities to organize income in such ways. In established business models, universities themselves control all fees they charge [5]. So far, educational institutions see MOOC primarily as increasing access to their educational programs, experimenting and expanding the brand. MOOC can expand access to education for those who are interested in it, and universities will have the opportunity to become famous all over the world. Most online courses are a reflection of the struggle of universities for the prestigious title: the existence of their own online courses is now also considered a sign of "elitism" [9, 261]. On the contrary, business organizations consider MOOC as a promising business model. It's not just Coursera and Udacity. Larger corporations such as Pearson and Google are planning to move to higher education and most likely they will use an approach based on the MOOC.

At the current stage, MOOC is a global experiment in the field of education, which is in constant development, however, even right now it is possible to outline the considerable advantages it has.

- Availability – MOOCs are special to ensure greater accessibility and greater potential for attracting learners, as well as the development of a lifelong learning

concept. At present, MOOCs are able to provide a low entry threshold, a free, flexible training schedule without essential initial eligibility requirements [4, 5]. Such conditions may be particularly attractive to poor families or students from countries where education is difficult to access for a variety of reasons;

- Widespread involvement of students - the main purpose of MOOC is to attract students, improve students' progress, and expand their educational practices. For example, in the Coursera project, the Higher School of Economics offers a large number of courses in its specialization: Economics for Non-Economists, Linear Algebra, Fundamentals of Corporate Finance, etc. Such courses can be used by students from other universities and even from other countries;

- The implementation of the principles of continuous education - MOOC encourages a system of "life-long learning", forcing the student to reflect on the goals and meaning of their own education. An adult learner MOOC provides an effective tool for maintaining their competitiveness [4, 10].

If the mentioned above opportunities MOOCs provide students with are obvious, there is still a question how universities can benefit from producing and launching such courses. Among others, it is possible to single out the following undeniable advantages which necessitate the integration of MOOCs in university curricular.

- Today massive open online courses are seen as a platform, which connects the university with the global education environment since the number of those willing to take this or that course is numbered in thousands. If the university is aimed at creating the image of developed and prestigious one, it will be able to attract more students through MOOCs.

- The introduction of MOOCs into the curricular will enable universities to considerably decrease the amount of hours (credits) spent in the classroom, thus economizing on major expenses connected with the support of educational process.

- MOOC platform provides an opportunity to increase the number and diversify courses offered by the particular university, which will attract more students and generate additional income.

- MOOCs are seen as favorable environment for academic mobility of both students and teachers.

However, in spite of undeniable advantages of massive open online courses and the opportunities they provide, it is necessary to admit that there are certain limitations and shortcomings of this new format of delivering educational services. Those who criticize MOOC base their arguments on the following points:

- The high cost of creating a MOOC - it is considered that the creation of a MOOC course will require an average of 100 hours and 10 weeks (at the rate of 8-10 hours per week for the creation of the course). In the monetary equivalent, the cost of developing a MOOC, according to different data, is estimated at minimum 15-30 thousand dollars [3]. What is more, creating a MOOC requires the involvement of a wide range of professionals. Otherwise, there is a high probability that the course being developed will be of low quality.

- The lack of individual approach and feedback. The very name "mass courses" indicates a large number of students involved. To some extent, such a characteristic contradicts the goals of individual learning. However, this problem is being actively discussed by architects of MOOC platforms to provide their consumers with necessary

interaction and customization.

- The majority of universities are now involved in developing pilot projects and are only experimenting with this format, therefore there are no grounded standards on implementation of these courses into academic curricular, which requires a lot of time and efforts from university management. In addition, the lack of scientific research on the effectiveness of these courses makes it impossible to assess the quality of education.

Like any other new technology, MOOC has its strengths and weaknesses, therefore there are still a lot of disputes in scientific and educational circles about the necessity of introducing this innovation into the education process. Taking into account the fact that there is no common attitude to this phenomenon, nor are there any standards of implementation of MOOCs, the decision about whether to use MOOCs or not in the curriculum is left for consideration of particular universities, which, in their turn must develop their own standards based on the specifics of these higher educational establishments. However, it is possible to single out some factors, which should be taken into account while integrating MOOCs into the education process. Currently there are several types of courses used in high education:

- A traditional course, which does not have any online components. This course is dominant in Ukrainian high education.

In 2007 the representatives of The Sloan-C provided the definition and classification of online courses depending on the ratio of online component [6, 41]:

- Online course – a course in which the biggest part of content (80%) is delivered to students online.

- Web-facilitated courses, in which the web technologies are used as additional tool of content delivery (1 to 29% of content).

- Blended or hybrid courses – in these courses the classical mode of content delivery is combined with online activity. The significant part of the content is offered online (30 – 79%).

Taking into account the peculiarities of massive online courses, the most effective way of integrating these courses into the education process may be considered integrating these courses as a part of a blended course or a web-facilitated course. Video lectures, which can be recorded and uploaded online, give teachers the opportunity to not spend time reporting the standard lecture material and use the model of an inverted class, and students have the opportunity to watch lectures at any time, return to them unlimited times, and the use of automatically checked assignments reduces the time of the teacher considerably.

Each university will need to develop its own standards for the use of MOOCs, taking into account the profile of the institution and the specifics of the educational process. But nevertheless it is possible to allocate the following general factors which should be considered at integration of mass courses in educational process.

- Since now every university is working on integrating the MOOC into the learning process on its own, one of the most important factors to be taken into consideration is the university's capabilities and resources.

- The universities must also take into account the difference between aggregates of knowledge at various faculties and departments, and it is up to the faculties and departments to determine the technologies for the implementation of mass open online courses in their educational programs.

-The universities should provide teachers with the opportunity to conduct blended courses and courses with web support, to encourage the use of the MOOC to support their own disciplines.

As we can see, there are still a lot of questions and problems to be considered on the level of communities, universities and governments. Many shortcomings in the use of MOOCs can be explained by the fact that it is a relatively new concept, which does not have grounded scientific philosophy, and takes still uncertain place in relation to other forms of education, especially classical ones. MOOCs remain a costly tool for online learning that requires the involvement of various specialists - authors of a course, tutors, software engineers, copyright protection specialists and others. Meanwhile, MOOCs can be an effective tool for developing informal learning when using them as stand-alone alternative sources of knowledge. In addition, students and teachers may be interested in them as additional digital learning resources within the traditional curriculum and university management may be interested in additional source of income. Prospects for mass open online courses are estimated by many researchers as promising. However, in addition to overcoming the mentioned technological weaknesses, for the further development there is a need for the recognition of MOOC certificates. Massive open online courses will allow more university entrants, masters and graduate students to be attracted to universities, recognition of certificates will simplify the mechanism of crediting. The availability of MOOCs creates conditions for professional development and the formation of professional communities without language, cultural or territorial restrictions.

Conclusions. The new innovative models of education such as massive open online courses are relatively new and require the pursuit of fundamental and applied research in its various aspects: pedagogical, psychological, philosophical, social and technical.

The rapid development of MOOCs can be considered as challenge to the existing form of delivering knowledge at higher educational institutions, but at the same time it offers opportunities for those universities, which are able to change and develop new ways of providing educational services. First of all, it requires institutions considering strategic questions related to on-line learning and various innovations such as MOOCs. Institutions will need to evaluate their strengths and develop a strategic plan that will allow them to make the most out of classroom and on-line education by providing MOOCs or other initiatives. It is necessary for universities to review their models of implementation of curricula and courses in order to make them truly flexible and affordable.

References:
1. Cormier D., Siemens G. Through the open door: open courses as research, learning, and engagement / D. Cormier, G. Siemens// EDUCAUSE Review/ № 45(4), 2010. - pp. 30–39.
2. Christensen Clayton M. The Innovator's Dilemma: the revolutionary book that will change the way you do business / Clayton M. Christensen // Harvard Business School Press / Boston: 1997. – pp 56-68.
3. Dhawal S. How does Coursera Make Money? [Electronic resource] / S. Dhawal. – Mode of access: https://www.edsurge.com/news/2014-10-15-howdoes-coursera-make-money

4. Daniel J. Making sense of MOOCs: Musings in a maze of myth, paradox and possibility / J. Daniel // Journal of Interactive Media in Education / no. 3, 2012. – pp. 1–20.

5. Holton D. What's the «problem» with MOOCs? [Electronic resource] / D. Holton// – Mode of access: http://edtechdev.wordpress.com/2012/05/04/whats-the-problem-with-moocs.

6. Kelly A, Hess M. Beyond Retrofitting: Innovation in Higher Education /A. Kelly, M. Hess // Hudson Institute, 2013– p.41

7. Гусєв В. Інноваційна орієнтація системи підготовки і підвищення кваліфікації державних службовців / В. Гусєв // Проблеми й тенденції розвитку галузі науки «Державне управління» в Україні: від теорії до практики : зб. матеріалів симп. за міжнар. участю / за заг. ред. О.Ю. Оболонського, С.В. Сьоміна, С.В. Загороднюка. – К. : Вид-во НАДУ, 2007. – С. 28-33.

8. Зарва О. Підривні інновації як ключовий елемент «формули успіху» у сучасному бізнес-середовищі // Економічний аналіз. – 2012. – No. 10/4. – С. 108 – 111.

9. Пілявоз Т.М. Інноваційний розвиток підприємства як важливий аспект розвитку економіки / Т.М. Пілявоз // Інноваційна економіка: Всеукр. наук.-вироб. журнал. – 2012. – № 4. –С. 185-190.

10. Руденко О. Інноватика в системі вищої освіти: методологія інноваційних фільтрів / О. Руденко // Геополітика України: історія та сучасність: зб. наук. праць. – Ужгород : Ліра. – 2009. – № 2. – С. 247-260.

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The rapid development of information technology, globalization and new requirements to the modern specialists prompted the search for new training formats from the academic community that allow the delivery of content globally, and not within the same educational institution. This was the main reason for the emergence of such educational technology as the MOOC, which is considered disruptive innovation in higher education. MOOCs are seen as an extension of existing on-line methods of training and are distinguished by their availability, widespread involvement of students, customization of education and flexibility. The design of MOOCs and in introduction of them in curricular provides universities with the opportunity integrate in the global educational community, build the image, attract more students and generate additional income. At the same time, there are certain limitations of MOOCs, among them are high cost of creating a MOOC, absence of standards of course creation, implementation and assessment, recognition of certificates and others. The new innovative models of education such as massive open online courses are relatively new and require the pursuit of fundamental and applied research in its various aspects: pedagogical, psychological, philosophical, social and technical. The rapid development of MOOCs challenges the existing form of delivering knowledge at higher educational institutions, but at the same time it offers opportunities for those universities, which are able and willing to change and develop new ways of providing educational services.