

перестаєт служити самоцелью. Это позволяет не форсировать такое внедрение, а рассматривать различные формы обучения, как своеобразные «сообщающиеся сосуды», когда развитие одной из форм позволяет усовершенствовать и другую форму.

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INCORPORATION OF MASSIVE ONLINE OPEN COURSES BEST PRACTICES INTO UKRAINIAN UNIVERSITY CURRICULUM

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ВПРОВАДЖЕННЯ МЕТОДИЧНИХ ЗДОБУТКІВ МАСОВИХ ВІДКРИТИХ ОНЛАЙН КУРСІВ У НАВЧАЛЬНУ ПРОГРАМУ УКРАЇНСЬКОГО УНІВЕРСИТЕТУ

Quality assurance remains one of the cornerstones to the development of the European Higher Education Area (EHEA), commonly referred to as the Bologna process [1]. Leaving aside multiple misconceptions about the European higher education trends and practices accompanying education reforms in Ukraine, we would like to focus here on the newly emerging paradigm of Massive Online Open Courses (MOOCs) which has Big Bang effect on world educational market [2, 3] and has the potential to become valuable factors for national educational system improvement. This is a branch of long-standing open education movement, expansion of which is due to revolutionary web technologies and omnipresence of the Internet in the modern world. Today you can virtually attend lectures of Harvard, MIT or Stanford professors, just a few to mention of the highest ranked universities [4], without necessity of seeking for USA entry visa or paying tuition fees, travel and lodging expenses. No doubt, never before was the education global in the same sense as it is today, thanks to MOOCs offered (basically) for free by the most prominent Universities of the world. The most important for our practical academic purposes is a unique opportunity to refresh our knowledge bases, to compare our courses against the world standards and improve our educational techniques, to assure ourselves and our students that here in Ukraine they are offered as good education as they can find in the best world universities.

We have to admit that there also circulates an idea of higher education managers who open courses thus endangering traditional, brick-and-mortar universities, and Humboldtian university paradigm is approaching collapse in the same way as dinosaurs had given up the terrain to mammals. What a dino point of view, isn't it?!

In our opinion the openness is the vital necessity for both science and education, as important, as unity of these two. Paying appropriate attention to fair use of copyrighted material, using the bulk of creative commons copyright-free resources we can greatly enrich our courses and make them much more competitive. Moreover, encouraging our students to take MOOCs in their field of specialization, we create a new level of motivation for diligent learners and eliminate the barrier between post-soviet states and the developed economies.

As an educational experiment, in 2013 at Ternopil National Technical University we proposed to ukrainian students of the Information Safety major and international students of Computer Science major to join a few selected MOOCs, namely “Nanotechnology: the basics”, “Fundamentals of Electrical Engineering” at Coursera platform and “Circuits and Electronics” at edX platform as additional elements to their courses of Physics and Electronics. As a matter of fact, it would be a great exaggeration to say that this incentive has met immediate and overwhelming success. From the very beginning we realized that any substantial change of the educational trajectory requires a time span of a few full cycles to set deep roots and become a self-sustainable one. In our opinion, the decisive arguments in favor or against a particular instructional technique are the results of student assessments, which provide numerical data for quantitative analysis. For MOOCs such numerical data are available in abundance and have been analyzed in depth [2,5]. For our experiment it is too early to trace tendencies and make well-justified conclusions as the body of evidence is not enough and sufficient statistics has not been accumulated yet. Nevertheless, we would like to share some preliminary observations. At its current stage the experiment has brought the following main outcomes: slightly increased student motivation, more qualified participation during in-class discussion and some kind of ‘active-passive students’ polarization within student groups. Two main distinctions between ukrainian and international students, as expected, were found to be the language barrier more pronounced for ukrainians and greater drop rate for international students as result of more substantial initial preparedness level dispersion. We have found that the courses providing English, Arabic and Ukrainian subtitles can be used by students to study new subjects more effectively in their mother tongue but effect is greatly amplified if they take also another course in the same subject, this time in foreign language. For both student and teacher the MOOCs rich instructional inventory widens horizons for desired and attainable goals of the learning process. In particular, students who successively passed a few online courses in computer networks would be well-prepared to the programme offered by CISCO networking academy at TNTU or similar professional development courses elsewhere.

To match the EHEA principles, curricula for engineering majors are to be perpetually modified and refined to comply with the requirements of modern economy. The impetus for such modifications can be provided by reading and analyzing syllabi of leading technical universities MOOCs. Textbooks built in some MOOCs in fields of science, technology, engineering and mathematics (STEM) are

invaluable addition to the course textbooks and manuals developed and published in TNTU. One of the best developed bunches of techniques within online courses are the student assessment subsystems [5]. It is generally agreed that despite some shortcomings, automated testing tools have undisputable advantage of fast and unbiased assessment of large number of students. We personally admire the multilevel tests based on practical problems in some physics, mathematics and engineering courses at edX.org. Testing tools of e-learning management system ATutor, which is used in our University, still lacks flexibility of corresponding assessment tools of the most developed coursera.org and edX.org platforms. Nevertheless, our approach has an advantage of possibility to include necessary components and tune the LMS locally, at the University level, with willing and skilled support of our Institute for Distant Learning personnel. The flexibility of assessment process can be further improved [6] by combining three components, external propedeutic tests of specially selected MOOCs, test subsystem of LMS ATutor and traditional paper tests (which alone come with face-to-face analysis). This way the strengths of different approaches can interfere constructively to the benefit of our students. The mentioned coordinated usage of both internal and external instructional tools is to be viewed as but one level of integration [7] of national educational system and global educational structures.

Last but not the least to note, massive online open courses offered by universities not only from USA and Europe, but from all over the world foster the cultural adaptation of foreign students by developing the ability to comply with external requirements and engaging students into intensive intercultural communication.

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ВИКОРИСТАННЯ ІНФОРМАЦІЙНО-КОМУНІКАЦІЙНИХ ТЕХНОЛОГІЙ В МАТЕМАТИЧНІЙ ПІДГОТОВЦІ ІНОЗЕМНИХ СТУДЕНТІВ

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USAGE OF INFORMATION – COMMUNICATION TECHNOLOGIES IN THE MATHEMATICAL PREPARATION OF FOREIGN STUDENTS

Невід’ємною частиною сучасної підготовки фахівців різних галузей стають інформаційно-комунікаційні технології (ІКТ). Все більше в навчальний процес запроваджуються електронні форми навчання, в тому числі: електронні навчальні методичні комплекси, електронні бібліотеки, віддалені лабораторні комплекси, електронні математичні програми.

Аналіз досліджень і публікацій показав, що питанням впровадження і використання ІКТ у вищій школі займається багато науковців, зокрема: Алексеева І.В., Башмаков І.А., Биков С.А., Вахрущева Т.Ю. [1], Загірняк М.[5], Ігнатенко В.М., Нефедченко В.Ф., Селякова Л.І., Флегантов Л.О., Яковлев А.І. [8] та ін.. Розглядаються питання формування основ інформаційної культури студентів [7], побудови і можливості використання комп’ютерних навчаючих програм, електронних курсів лекцій [2]. Проте більшість авторів сконцентрована на проблемах навчання українських студентів і ніяк не враховують специфіку роботи з іноземними студентами. Хоча робота зі студентами-іноземцями вимагає зовсім інших підходів до організації навчального процесу. Особливо це стосується викладення фундаментальних дисциплін студентам, які навчаються на технічних спеціальностях. Зокрема, при викладенні курсу вищої математики виникають певні труднощі, для подолання яких найбільш ефективно використати сучасні засоби ІКТ. Отже,