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Analysis of Main Challenges in Higher Education on the Case Study of Selected xMOOCs Providers: Coursera, and edX

Abstract

MOOC is one of the forthcoming challenges of global higher education system. Development of education system cannot be considered without global trends. Massive Open Online Courses (MOOCs) become more and more popular. Article focuses on analysis of case studies of the most important xMOOCs providers: Coursera, edX. Authors focuses their analysis on direction of the development of xMOOCs in higher education as well as on key barriers for further development of the model.

Keywords:

massive open online course, MOOC, xMOOCs, e-learning, free online courses, mobile learning

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1. INTRODUCTION

MOOC concept is not started from the scratch as it is rooted in the pedagogy of distance education[2] and development of the Open Education Resources Movement and the Open Education Movement[3]. Self-paced education outside of institutional establishment was advocated by classical pedagogy of democratic education[4].

Albeit, first connectivist MOOCs (cMOOCs) organized by George Siemens and Stephen Downes in fall 2008 received moderate attention. George Siemens' cMOOCs were based on the theory of connectivism and active learning in network, but xMOOCs which we discuss in this article are mass online courses offered in traditional distance learning approach where students do not have (or have limited) opportunity to modify and contribute to course content. The real breakthrough for the new idea came in fall 2011 with the course of Introduction into Artificial Intelligence run by Sebastian Thrun and Peter Norvig, which enrolled 160 000 students worldwide[5]. Shortly after, three big players of xMOOC education emerged: Udacity founded in 2011 by Thrun himself, Coursera created and owned by Andrew Ng and Daphne Koller in April 2012, and finally in May 2012, edX – joint venture of MIT and Harvard University was launched. In 2013 we approached a wave of new MOOC initiatives all over the world, amongst them Brazilian Veduca (partnered with University of Sao Paulo), National Programme on Technology and Enhanced Learning in India, and France Université Numérique, to name a few most important initiatives. MOOC are to stay longer in the field of higher education but are they a disruptive technology which will completely change the structure and characteristic of higher education market?[6]

In history of distance higher education, there were technological advancements which were to revolutionize the market, however the position of traditional university is still not conquered. As an example we can enumerate distance educa-

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[2] P. McAndrew, E. Scanlon, *Open learning at a Distance: Lessons for Struggling MOOCs*, "Science" 2013, Vol. 342(6165), pp. 1450–1451.

[3] L. Yuan, S. Powell, *MOOCs and Open Education: Implications for Higher Education*: *A White Paper*. *JISC CETIS – Centre for Educational Technology and Interoperability Standards,*http:// publications.cetis.ac.uk/wp-content/uploads/2013/03/MOOCs-and-Open-Education.pdf, [Access date: 25 March 2015].

[4] I. Illich, *Deschooling Society*, New York 1971.

[5] Ibidem.

[6] J.L. Bower, C.M. Christensen, *Disruptive Technologies: Catching the Wave*, "Harvard Business Review" 1995, http://hbr.org/1995/01/disruptive-technologies-catching-the-wave/, [Access date: 25 March 2015].

tion through radio, which became massively popular in the 1920s and 1930s. "Colleges of the Air" mushroomed in the US and leading nation universities including Harvard, Purdue and Columbia offered distance education through radio[7]. In the 1920s, journalists predicted on the future of higher education with regard to broadcasted radio courses: "great universities, or perhaps only one such institution, giving radio courses in every conceivable subject and granting degrees on the basis of subsequent written examination"[8]. Of course, MOOC is not a radio broadcasting course, but reflection on history of distance education with regard to other technological advancements such as television, portable devices, and etc., reminds us that it is not easy to present a disruptive innovation in this field.

2. THE PRESENT STUDY

MOOC is recent phenomenon and as for now the research on this topic is scarce. Authors aim at identification of major barriers which may hamper development of MOOC movement in the higher education. Study is based on the qualitative analysis and identification of current trends and challenges of MOOC with the use of comprehensive review of publications on MOOC including empirical studies, research reports, scholarly blogs, and press releases on the subject. In the study, authors enumerate and distinguish various dilemmas and risks for the development of the MOOC model in the higher education context. In the article we will analyze only xMOOCs, but for the clarity of the article we will use word MOOC.

3. DROP-OUT RATES

One of main challenges for the MOOC model is low percentage of participants who graduate courses. John Hennessy, the president of Stanford University, which was one of the first entrants and proponents of MOOCs, states that it has to rethink its business model due to high drop-out rate, failure for psychological motivation and attraction of unprepared participants[9]. However, seeing high drop-out rate as

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[7] S. Matt, L. Fernandez, *Before MOOCs, Colleges of the Air*, "The Chronicle of Higher Education" 2013, April 23, http://chronicle.com/blogs/conversation/2013/04/23/before-moocs-colleges-of-the-air, [Access date: 26 March 2015].

[8] B. Bliven, *How Radio is Remaking Our World*, "The Century Magazine" 1924, Vol. 108(2), http://www.unz.org/Pub/Century-1924jun-00147?View=PDFPages, [Access date: 25 March 2015].

[9] A. Hill, R. Waters, *Online 'Mooc' Courses Are Too Big to Work, Says Stanford Head*,

a problem might be overestimated as many students are taking on their courses rather as a non-formal or supplementary education tool whereas academic recognition does not play the crucial role. One of first empirical data on the MOOC was provided by the researchers based on data of more than 1 million users of University of Pennsylvania courses[10]. Key findings are that certification rate is low and amounts on average to 4 percent of certificated students (ranging from 2% to 14% depending of course). Most recent data released by MITx and HarvardX on the population of approximately 850 thousand students presents respectively 5% and 6 % certification rate but they likewise vary substantially from 1% on CS50x course to 12% on Poverty course. As for multiple users, only 0,05 percent of students obtained certificates between 2 to 4 courses simultaneously. Only 76 students have received credential for completing 5 and more courses. On the other hand, authors of the report indicate that in case of MOOCs certification rate cannot be measure of course success and we cannot call certificated students as a "successful students" due to the fact that in MOOC there is no signed deal between participant and institution that student must pursue towards certificate reception. Moreover, pressure on higher educational institutions towards increase in their certificate rates in open courses may result in diverse side effects such as: restriction of registration, lowering examination requirements, exclusion of particular groups from recruitment, and other interventions[11]. Issue of non-homogeneity of open courses was raised in the empirical study on MOOC students in 3 selected courses on Stanford University[12]. Authors named four learner engagement patterns: completing, auditioning, disengaging and sampling. Only in case of completing students are focused on reception of credentials, for other three various motivations may occur. Alternative proposition of learner engagement patterns was proposed in HarvardX and MITx report: only registered, only viewed, only explored and certified. The difference between viewed and explored is quantitative, as only

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"Financial Times" 2014, http://www.ft.com/cms/s/0/e711c690–8c2a-11e3-bcf2–00144feab7de. html#axzz2srWzvRn6, [Access date: 26 March 2015].

[10] L. Perna et al., *The Life Cycle of Million MOOC Users*, MOOC Research Initiative Conference, http://www.gse.upenn.edu/pdf/ahead/perna_ruby_ boruch_moocs_ dec2013.pdf, [Access date: 26 March 2015].

[11] A.D. Ho, J. Reich, S. Nesterko, D. Seaton, T. Mullaney, J. Waldo, I. Chuang, *HarvardX and MITx: The First Year of Open Online Courses*, "HarvardX and MITx Working Paper" 2014, No. 1.

[12] R.F. Kizilcec, C. Piech, E. Schneider, *Deconstructing Disengagement: Analyzing Learner Subpopulations in Massive Open Online Courses*, Stanford University Working Papers, 2013, http:// rene.kizilcec.com/wp-content/uploads/2013/09/Kizilcec-Piech-Schneider-2013-Deconstructing-Disengagement-Analyzing-Learner-Subpopulations-in-Massive-Open-Online-Courses.pdf, [Access date: 26 March 2015].

explored is understood accessing of more than half of course material and the opposite in case of only viewed. Frequency and completeness of material viewing has an impact on certification rate: 62% of students who accessed more than half of the course were successful in completing the course. Up-to-date study on MOOC by University of London suggested that planners of the courses should consider preparation of courses not exceeding 5-hour of workload per week[13]. Workload may be one of the key factors of dropping out students during the course as vast majority of participants are employed and treat courses as supplementary tool to foster their career. Higher drop-out rates for enrolled in MOOCs can be explained by the psychological factors, whereas students tend to leave the courses because of no supervision and support from the educators. We can call it "exercise bike effect" where due to social reasons people tend to prefer going to gym instead of doing exercises at home[14].

4. DISRUPTIVE TECHNOLOGY

According to the predictions, MOOCs can become a real game changer in the field of higher education. One of the moderate reports shows that up to 2020 open courses will represent 10% of all higher education courses provided in the world[15]. Idea of revolution in the higher education scared not only traditional but equally well-established distance-learning universities. Martin Bean, vice-chancellor of the Open University, warned that interest in open courses is "irresponsible" and emergence of MOOCs is "Napster moment for higher education"[16]. Universities are cautious to adopt open courses in their institutions and according to survey in 2013, as much as 5% of higher education institutions offered open courses

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[13] B. Grainger, *Massive Open Online Course (MOOC) Report 2013*, University of London International Programmes, http://www.nytimes.com/2013/01/27/opinion/sunday/friedman-revolution-hits-theuniversities. html?pagewanted=1&_r=0, [Access date: 27 March 2015].

[14] R. Nelson, P. Dawson, *MOOCs and Exercise Bikes – More in Common Than You'd Think*, The Conversation 2012, https://theconversation.com/moocs-and-exercise-bikes-more-in-common--than-youd-think-9726, [Access date: 27 March 2015].

[15] *Technology, Media and Telecommunications Predictions: 2014*, Deloitte Touche Tohmatsu Limited, http://www2.deloitte.com/content/dam/Deloitte/global/Documents/Technology-Media Telecommunications/dttl_TMT_Predictions-2014-lc2.pdf, [Access date: 27 March 2015???].

[16] A. Fazackerley, *UK Universities Are Wary of Getting on Board the MOOC Train*, "The Guardian" 2012, December 3, http://www.theguardian.com/education/2012/dec/03/massive-online-open-courses-universities, [Access date: 27 March 2015].

and 9,3% is planning actively to launch it in the forthcoming future[17]. Typical institutions interested in MOOC are large research universities of which 20% already have such offer and the least interested are baccalaureate institutions with around 3% offering open courses. One of probable explanation to such structure of open courses providers' market segmentation is the question how to monetize on MOOC? Only large research universities have enough financial and staff resources for experimentation with this regard. When asked about primary reasons for providing open courses, surprisingly less than 1% indicated generation of income. Marketing reasons were predominant as leaders indicated that 27% wanted to increase institution visibility and 20% drive the student recruitment. After marketing reasons, the strive for innovation was placed high, with 18%, and 17% allotted to innovative pedagogy testing and flexible learning opportunities respectively[18]. Only 23% of the surveyed believed that open course business model is sustainable and as much as 39% did not believe in sustainability of the model. If we take into consideration European institutions, University of London International Programmes announced that three main reasons behind placing its courses on Coursera were: raising its global visibility, potential conversion of MOOC students into regular students, and experimentation with new pedagogical techniques which can positively influence their regular programmes[19]. As it comes to the success in recruitment conversion, out of 210 000 initial registrations and 8 843 students who received completion certificate, only 35 students registered in fee-paying programmes. Although this is one of very scarce studies on impact of open courses on regular programmes, we may consider that MOOCs might be not an effective way to increase recruitment results.

Praised by many as the flagships of democratization of education and next big thing allowing people from developing countries to receive state-of-the-art education at no cost, surprisingly, MOOCs came under criticism from particular researchers as a way of cultural colonialism or neo-colonialism[20]. Such conclusion is drawn on the basis that courses are provided mostly by the leading Western universities and funded by the venture capital (as for instance Coursera and Udac-

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[17] I.E .Allen, J. Seaman, *Grade Change: Tracking Online Education in the United States*, The 2013 Survey of Online Learning conducted by the Babson Survey Research Group, http://www.onlinelearningsurvey.com/reports/gradechange.pdf 2014, [Access date: 27 March 2015].

[18] Ibidem.

[19] B. Grainger, op.cit.

[20] N. Sonwalkar (moderator), J. Wilson, A. Ng, P. Sloep (participants), *State-of-the-field Discussion*, "MOOCs Forum" 2013, Vol. 1(P), pp. 6–9, http://online.liebertpub.com/doi/pdfplus/10.1089/mooc.2013.0006, [Access date: 27 March 2015].

ity) and therefore not interested in not-for-profit activities once the new business model is worked-out[21]. Universities in the developing countries may be at risk as every student will be able to grab on free and massive free education from the Ivy League universities. In this way, role of higher educational institutions in the poorer countries may be downgraded to distance education centers, where only tutoring and assistance in examination process (as for instance in the case of examination centers for language tests). However, it can be also a disruptive technology towards foreign educational aid sector, as Thomas Friedman states: "imagine how this may change U.S. foreign aid. For relatively little money, the U.S. can rent space in an Egyptian village, install two dozen computers and high-speed satellite Internet access, hire a local teacher as a facilitator, and invite in any Egyptian who wanted to take online courses with the best professors in the world, subtitled in Arabic"[22]. In fact, first hybrid programmes are already launched, an NGO "Generation Rwanda" launched in 2014 its first competence-based hybrid programme based on open courses and project-based lessons on the site supporting online education. In this blended learning mode, 2-year blended mode associate degree will be offered thanks to partnership with College for America at Southern New Hampshire University[23]. Another initiative is Edrak – Queen Rania of Jordan Foundation which partnered with edX to provide its Harvard and MIT courses translated into Arabic.

Theoretically, it can also endanger particular university staff members in the developed countries, e.g. one of the recent case studies at San Jose State University where Philosophy faculty members refused to use materials from course on edX platform. They stressed out that they see MOOCs as endangerment for their faculty position and social injustice. As stated by one of the San Jose State University faculty member: "It is great to have Professor Sandel's lectures available free online, to use if we want. But if we buy them from edX as the basis for our classes, we would suddenly be second-class citizens. I would basically be a teaching assistant, and my students, unlike those at Harvard, could not question their professor"[24]. Open and free massive online courses may in this way endanger social position

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[21]   Ibidem.

[22]   T.L. Friedman, *Revolution Hits the Universities*, "The New York Times" 2013, January 27, http://www.nytimes.com/2013/01/27/opinion/sunday/friedman-revolution-hits-the-universities.html?pagewanted=1&_r=0, [Access date: 28 March 2015].

[23]   M. O'Neil, *Rwandan Degree Aims for a 'University in a Box'*, "The Chronicle of Higher Education" 2013, September 16, http://chronicle.com/article/Rwandan-Degree-Program-Aims/141631/, [Access date: 8 March 2015].

[24]   T. Lewin, *Professors at San Jose State Criticize Online Courses*, "The New York Times"

and economic position of the professorate, whereas there will be little left to vast majority of faculty members all over the world, the new celebrities and megastars of education will emerge who will teach thousands of students, taking away jobs from faculty at small universities. In this way education may tend to become more "edutainment", where there will be no space for traditional mentor and student relationship[25].

Universities face the challenge of fast adjustment to potentially disruptive technology which is expected to change for good the structure of global higher education market and endanger traditional brick-to-mortar teaching. As indicated by the Australian Minister for Broadband and Communications Senator Conroy: "It's only taken us 112 years to get a national curriculum. I don't think we've got 112 years to work out what we want to provide in the globalised digital education world. …What is a lecture worth if the best lecturer in the world at MIT is online for free for all to access"[26].

It came to large surprise that Wharton Business School recently published its complete MBA Foundation course plus 5 electives for free on Coursera. Now, people from all over the world can receive signature certificates for MBA as low as $49 per course comparing to spending around $ 200 000 of receiving degree at Wharton (including relocation costs, accommodation, and etc.). Of course, degree is more valuable than series of certificates and being part of elite MBA gives you lots of additional services such as networking, career guidance, alumni club, and etc. But with regard to educational content, Don Huesman – director of Innovation Group at Wharton – admits: "we're taking our core required classes in the MBA program, with the same instructors, to provide those same core concepts"[27]. Clay Christensen, who invented theory of disruptive technology, clearly states that higher education business will change in the next 5 years completely and the most fragile are business schools which offer uniform product at very high prices, he predicts: "you guys need to stay tuned because it's happening to the Harvard

2013, May 3, http://www.nytimes.com/2013/05/03/education/san-jose-state-philosophy-dept-criti-cizes-online-courses.html?_r=1&, [Access date: 27 March 2015].

[25] F. McCluskey, M. Winter, *MOOCs, Ethics and Economics of Higher Education*, "E-mentor" 2013, No. 4 (51), http://www.e-mentor.edu.pl/artykul/index/numer/51/id/1050, [Access date: 27 March 2015].

[26] M.A. Gregory, D. Glance, *Security and the Networked Society*, Cham–Heidelberg–New York–Dordrecht–London 2013, p. 279.

[27] L. Lavelle, *Wharton Puts First-year MBA Courses Online for Free*, "Bloomberg Businessweek" 2013, September 13, http://www.businessweek.com/articles/2013–09–13/wharton-put-s-first-year-mba-courses-online-for-free, [Access date: 27 March 2015].

Business School. It truly is and nobody at Harvard even thinks of it"[28]. In his opinion, the future for higher education is hybrid university based on traditional content and licenses content from MOOC providers. Other trend is competency-based programmes at companies who will provide in-site higher education, thus diminishing the costs of hiring expensive MBA-graduates.

In the conclusions of recent report on experiences of first year of HarvardX and MITx within edX platform, authors conclude: "Open online courses are neither useless nor the salvation of higher-education. Large-scale, «low-touch» learning platforms will have sectors and niches where they are very useful and others where they are less so"[29].

5. GEOGRAPHY

If we look into current state of the affairs in terms of geolocation of MOOC courses, we can take a look on findings on sample of 1 million Coursera students[30]. Top 10 countries in terms of registered participants are only OECD and BRIC countries, with respectively the USA, India, and Brazil holding places on the podium. In case of HarvardX/MITx venture, the first 5 places were occupied in following order: the USA, India, United Kingdom, Brazil, and Canada[31]. We can find in top ten such countries as Pakistan and Egypt, but surprisingly China was ranked only 18th, with constituting only 1,2% of participants (correspondingly to far smaller Colombia). Based on existing big data issued by Penn State and HarvardX/MITx, the basic findings are: most of the participants come from countries where English language is commonly used, after the USA – India and Brazil are the most promising countries for the MOOC courses as the interest is very high, French-speaking countries of Africa are the most under-represented on the map of course participants[32]. Situation may change very rapidly, as publicly-funded France Université Numérique starting from January 2014 opened first 20 courses in French language.

Contrary to mission of Coursera on empowerment through provision of education to the poor global communities instead of a selected few, actual numbers do

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[28] M. Nisen, *Clay Christensen: GE and Perdue Farms Will Disrupt Harvard Business School*, "Business Insider" 2013, March 1, http://www.businessinsider.com/harvard-business-school-disruption-2013–3#ixzz2rVl2EWg4, [Access date: 27 March 2015].

[29] A.D. Ho et al., op.cit.

[30] L. Perna et al., *The Life Cycle of Million MOOC Users…*, op.cit.

[31] A.D. Ho, op.cit.

[32] M. Perna, op.cit.

show little participation of the global poor in the MOOC phenomena. In case of Africa, only 14 out of 54 countries have any noticeable number of participants. Even in case of these 14 countries, only 5 of them managed to exceed 1000 registered users, namely Morocco, Egypt, Nigeria, Ghana, and South Africa. However, recent findings show that students originating from BRIC countries and developing countries who undertake registration in the courses are representing the wealthiest and most educated part of society[33]. In these countries, around 80% of the participants have already post-secondary degrees, comparing to just around 5% of general population. Taking into consideration MITx and HarvardX courses, only 2,7% of participants originated from the UN list of 49 least developed countries of the world[34].

Commenting the findings, director of open-course initiatives at Penn State remarked: "in order for MOOCs to reach their full potential, institutions need to supplement their online learning ventures with on-the-ground, in-person partnerships and instructions". In the line with these expectation goes the newest deal of Coursera with Carlos Slim Foundation of Mexico. Potential of MOOCs has been recently noticed by the richest person of the world – Carlos Slim, whose Foundation signed a deal with Coursera to provide extending its offer in Spanish language by translation of up to 50 courses into Spanish till the end of 2014 and enable specializations mode to be available for Mexican participants. He announced that Coursera courses will be available in Learning Centers created on the basis of 3000 Digital Telmex Libraries and through his video-on-demand system Clarovideo[35]. Carlos Slim Foundation follows the paths of innovative start-up company Veduca, which emerged on the Brazilian educational market and offers courses of international universities translated into Portuguese, as well as courses of leading Brazilian universities such as University of Sao Paulo. Veduca together with University of Sao Paulo offers MBA in Engineering and Innovation of 360 hours at free of cost. Students have to pay only if they require certification and then price is approximately 2000 EUR, which is few times lower than the price of other MBA programmes in Brazil. India is becoming runner-up in the global participation in the MOOC courses and it is also setting up a new initiatives towards development of own competitive offer. Seven leading Indian Institutes

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[33] E.J. Emanuel, *Online Education: MOOCs Taken by the Educated Few*, "Nature" 2013, Vol. 503(7476).

[34] A.D. Ho et al., op.cit.

[35] M. Lloyd, *Slim va por la educación superior en línea* [brak tłumaczenia tytułu na j. ang.], "Campus Milenio" 2014, No. 546, http://campusmilenio.com.mx/index.php/template/opinion/item/1248-slim-va-por-la-educacion-superior-en-linea 2014, [Access date: 27 March 2015].

of Technology (IITs), together with business corporations such as Infosys and Cognizant, formed a partnership towards offering certified massive open courses. In February 2014, they offered their first certified 10-week specialization course in Programming, Data Structures & Algorithms[36]. Course will be offered through National Programme on Technology Enhanced Learning (NPTEL), which offers diversity of open source lectures in engineering, science and humanities accessible freely online for the viewers. New partnership aims to structurize courses in specialization and provide certification opportunities which were not present within NPTEL programme. IITs through their joint venture incline toward catering to the needs of booming software industry for programming engineers.

MOOCs are thought to be globally accessible, however the U.S. Office of Foreign Assets Control (OFAC) banned provision of MOOC courses to Cuba, Iran, Syria, and Sudan on the grounds of embargo on service import into countries falling into the category: state sponsors of terrorism. In the aftermath, Coursera blocked access to its courses to participants residing in above mentioned states, but its main competitor, edX, managed to receive license and Anant Agarwal, president of company, announced that "at edx, we are pleased to announce that no one, in any country, is blocked from taking one of our courses, and we have never blocked students from receiving education on the edX platform because of where they live"[37].

Free open courses have also very important feature in terms of building the global society of understanding different nations and cultures.

6. PLAGIARISM

Question of plagiarism and assessment are also a stake in the recognition of the MOOCs education[38]. Although there is no available research on plagiarism in massive courses, case study of "Fantasy and Science Fiction" course on Coursera

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[36] R. Bhattacharyya, *Seven IITs, Infosys, Cognizant and Nasscom Team Up to Provide Free Online Courses* "The Economic Times. India Times" 2013, July 19, http://articles.economictimes. indiatimes.com/2013–07–19/news/40681617_1_seven-older-iits-nptel-andrew-thangaraj, [Access date: 29 March 2015].

[37] A. Agarwal, *We're Not Blocking Anyone: edX Still Educating Students from Iran, Syria, Sudan and Cuba*, https://www.edx.org/blog/were-not-blocking-anyone-edx-still, [Access date: 29 March 2015].

[38] B. Oliver, *Credentials in the Cloud: How Will MOOCs Deal with Plagiarism?*, The Conversation, https://theconversation.com/credentials-in-the-cloud-how-will-moocs-deal-with-plagiarism-8581, [Access date: 27 March 2015.

provides a general overview of existing problem. Laura Gibbs of University of Oklahoma, who participated in the course, became a whistle-blower of plagiarism issue and she criticized company for slow reaction and lack of guidelines with regard to the issue[39]. As for now the only response for fraud is the necessity of signing to the code of honor in which each participant obligates oneself to ethical conduct in the learning environment. Nevertheless, introduction of anti-plagiarism systems in the future is highly possible. Solution in this regard comes from the NPTEL in India, where future software programmers must undergo proctored final specialization exams in one of the spread examination centers in India. Therefore, MOOC providers who will succeed in building a large network of examination/ study centers can go one step toward the recognition of their certificates through provision of supervised examination which can be more valuable for the employers.

7. FINANCING

One of major challenges for the open courses in higher education is finding efficient models of financing. Some researchers tend to treat courses as a product of gift economy and predict that one of major factors for higher educational institutions to enter the open course market are altruistic values[40]. However, most of the scholars and higher education managers tend to think that MOOC providers must work out the sound business model which is at current uncertain and its emergence will be a key for development of innovation[41]. We will make overview of existing modes of financing, however none of the existing models alone is sufficient to enable open course business to reach the breakeven point as for now.

Primary source of financing at the starting phase of MOOC start-ups is venture capital. In case of Coursera, in 2012 it received $16 million initial financing from Kleiner, Perkins, Caufield & Byers – one of the most renowned Silicon Valley-based venture capital firm, which previously backed such giants as AOL, Amazon.com, Google, or Zynga[42].

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[39] J.R. Young, *Dozens of Plagiarism Incidents Are Reported in Coursera's Free Online Courses*, "The Chronicle of Higher Education" 2012, August 16, https://chronicle.com/article/Dozens-of-Plagiarism-Incidents/133697/, [Access date: 27 March 2015].

[40] A. Janowska, A. Kania, *Otwarte zasoby edukacyjne jako przejaw altruizmu w gospodarce, czyli ekonomii daru* [brak tłum. tytułu na j. ang.], "E-mentor" 2013, No. 3(50), http://www.e-mentor.edu.pl/artykul/index/numer/50/id/1018, [Access date: 27 March 2015].

[41] A.D. Ho et al., op.cit.

[42] A. Palin, *Making the Mooc Pay: Fresh Partnerships Offer More Than Financial Survival*,

In 2013 it raised another $63 million venture capital from GSV Capital Corporation and International Finance Corporation of The World Bank, which also decided to support MOOC initiatives[43]. Pioneer in MOOC business, Udacity, raised through venture capital financing led by Andreessen Horowitz as much as $15 million. In case of university-owned open source portal edX, it is Harvard University and MIT which declared investment of $30 million into platform, backed by partner universities including UCLA and Georgetown University which put so far $20 million in financial or in-kind contributions. Different model of start financing is used by France Université Numérique, which received 20 million EUR starting funding from public investment provided by French Ministry of Higher Education in order to raise competitiveness of French higher education, targeting above all francophone countries of Africa. Creation of platforms can be also financed by large NGOs like in case of Carlos Slim Foundation for Mexico and Queen Rania Foundation in case of Arabic market[44].

Another source of revenues for open course providers is the option of authorized certification. Coursera was first to introduce its premium offer of signature certification and new service generated $1 million revenues in 9 months. EdX offers ID-verified certificate of achievement to its students and certificates are also provided by Udacity. MOOC operators also launched first specializations; it means a series of several courses on particular topic with special certificate. Number of courses within the specialization varies from 2 to 7 and following service is named "Specializations" in Coursera and Xseries at edX. Students can, for instance, finish a 2-year programme on "Foundation of Computer Science" at MIT paying as low as $425 total for whole Xseries. Both firms support students from the least developed countries who can apply for the waiver of certification fees and according to Coursera, in 2013 as much as 2500 students received fee-waiver.

The most spectacular deal up to now was signed by Georgia Institute of Technology, AT&T and MOOC provider – Udacity. Georgia Tech agreed to offer fully equivalent to its on-campus offer, online master's degree in computer science at the price of $7 000 per programme (comparing to traditional brick-and-mortar around $40 000). Deal backed up financially by AT&T will enable to educate 10 000 students within 3 years to supplement AT&T demand for qualified staff[45].

"The Financial Times" 2013, March 11, http://www.ft.com/intl/cms/s/0/b1afadf6–800e-11e2–96ba--00144feabdc0.html#axzz2tQM3AKFn, [Access date: 27 March 2015].

[43] M. Wingfield, *Monetising MOOCs*, Global University Venturing, http://www.globaluniversityventuring.com/article.php/3226/monetising-moocs, [Access date: 27 March 2015].

[44] A. Palin et al., op.cit.

[45] R. Rivard, *Massive (But Not Open)*, Inside Higher Ed, http://www.insidehighered.com/

Although, opinions vary on the question if graduates of such massive course will be equipped with exact same qualifications as their on-campus counterparts, this partnership may introduce a new massive model of academia-business partnership. Udacity will receive 40% of the revenues of the programme and remaining share will be monetized by Georgia Tech.

8. RECOGNITION

Amongst most important challenges of MOOCs education is the issue of certification and recognition of the acquired skills. L. Rafael Reif, president of MIT, predicts that in the forthcoming future we will have a split into degrees and credentials. Degrees will be connected with traditional bricks-and-mortar education provided in the on-site campuses. However, we will soon encounter the emergence of so-called credentials, collected and certified through MOOCs, and once the question of plagiarism will be resolved, credentials can play enormous role especially on the job market. Recent report shows that the most important factor for boost in open courses is the question of recognition of at least one of the following groups: government, employers, and educational establishments[46]. With current situation, most likely is the recognition coming from the job market and governments who thrive to resolve huge academia–business skills gap.

Responding to fast changing demands of the market, open courses as a form of non-formal supplementary education may become a solution for the graduates whose skills became obsolete or who need additional training. Main open course providers partnered recently with the world's largest professional network LinkedIn, who as a part of agreement introduced new service Direct-to-Profile Certifications enabling students to show off their credentials to their professional peers[47]. As it comes to the participants own perspective on relevance of MOOC in their career, study of University of London International Programmes displays that around 60% of students consider lessons of this kind as relevant and correlated with their work[48].

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news/2013/05/14/georgia-tech-and-udacity-roll-out-massive-new-low-cost-degree-program, [Access date: 27 March 2015].

[46] *Technology, Media and Telecommunications Predictions…*, op.cit.

[47] A. Baird, *Introducing a New Way to Add Certifications to Your LinkedIn Profile*, http://blog.linkedin.com/2013/11/14/introducing-a-new-way-to-addcertifications-to-your-linkedin-profile/, [Access date: 27 March 2015].

[48] B. Grainger, op.cit.

The recent study amongst 2800 U.S. universities and colleges' leaders, shown a lot of concern for the issue of recognition of higher education outcomes of students. As much as 64% of administrators think that explosion of MOOC credentials will lead to confusion about higher education degrees received by students[49]. And they might by right, as points out Dave Wilson, former CEO of GMAC administering GMAT tests: "the next degree may not be a degree but portfolio of certificates. The market will determine worth of it"[50].

9. DISCUSSION

The aim of this article was to analyze key issues in development of Massive Open Online Courses in the field of higher education. Authors' purpose was to identify the major challenges and barriers which may hamper development of MOOC movement in the higher education. Authors analyzed mainly the pioneering U.S.-based providers such as Coursera and edX and research is needed into European and other local MOOC providers. Taking into account major challenges of education through MOOCs such as the issue of certification and recognition of acquired skills, open courses as a form of non-formal supplementary education may become a solution for lots of graduates who need additional training. MOOCs continue on the upward trend in the field of higher education as new initiatives spread out through. MOOC can be a disruptive technology for higher education, and business schools (including MBA providers) are currently exposed at the most risk due to new business model in education. However, MOOCs as for now fail to provide students with so-called tacit knowledge including access to social capital in networking, which is one of the largest advantage of, for example, large MBA providers. As for now, higher education model is not endangered by MOOC market as it was predicted by some experts, however some MOOC providers and their competence-based model (for example Udacity) get high recognition from the employers. MOOC is definitely the field which needs more observation and research in the forthcoming time, however it is still too early to call it "the game changer" in the higher education system.

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49   I.E .Allen, J. Seaman, *Grade Change…*, op.cit.

50   D. Catropa, M. Andrews, *Coming to Business School Near You: Disruption*, Inside Higher Ed, http://www.insidehighered.com/blogs/stratedgy/coming-business-school-near-you-disruption, [Access date: 27 March 2015].
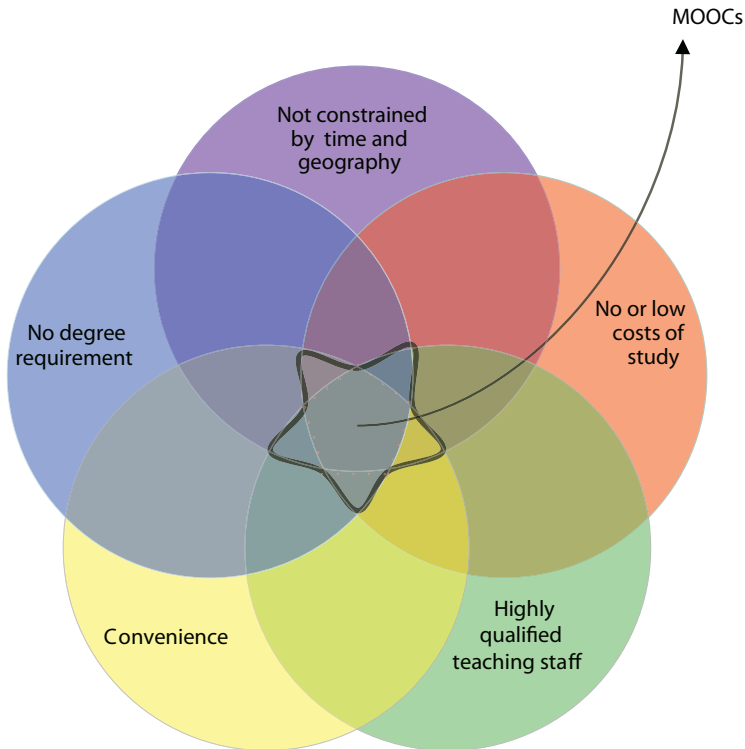
Figure 1. The main components of MOOCs

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