The Innovative Methods
for Massive Open Online Course Design

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Abstract. Due to the rapid and continuous change of technological development and fast internet connection, there many possibilities to change the traditional education models and the process of learning as well. Recently, Massive Open Online Courses (MOOCs) gained a huge attention and success. MOOC has inspired discussions among educators and policy makers about the revolution in education nowadays, especially in the vocational and higher education. Massive study application form only proves that the number of students is not limited. Open studies mean that for this purpose only Open Educational Resources (OER) applications and software, various open access information resources are used and everyone can participate. The problem is that there are very little MOOCs in native language (Lithuanian) available and the researchers need to work on the new possibilities of MOOCs localization and implementation in local environments supporting national regulations, technological infrastructure, and pedagogical traditions. The authors are working on the models of MOOC design and implementation to ensure a successful learning process at local communities, where well-selected methods and technologies for different courses should be used.

Keywords: model, learning platform, learning objects, massive course, online course

1. Introduction

Massive Open Online Courses (MOOCs) are free and available for everyone who is willing to take part in that. According to a paper (Rutkauskiene and Gudoniene, 2013) the MOOC movement has been recently developed rapidly. For this reason, organizers, who want to be successful in this field, must challenge themselves to become leaders offering new and innovative courses or methods, taking risks, reconsidering the process of learning in classrooms, getting an attention while using multimedia or some other advanced technologies, having a plan for the future, etc.

Everyone who has an internet connection may choose the best courses provided by the best universities in U.S.A., Canada, Mexico, Europe, Asia and Australia. MOOC are high-quality courses with an enormous audience all around the world. Many authors (Grünewald et al., 2014; Hernandez-Leo et al., 2013; Kop et al., 2011) analyze how higher education becomes available to those, who cannot afford studies or have not had an opportunity to study in elite universities across the world due to economic reasons but now are able to receive the access to the universities' learning resources. However, the majority of MOOC courses organized for those who are still learning, only a few of them enrolled in accredited study programs (Bower et al., 2010).

The paper deals with the main requirements for MOOC courses: accessibility, flexible learner-oriented study process organization at different place and time (Koller et al., 2013; Rosewell and Darco, 2014). The learning process takes place usually in an online learning environment. One of the main factors for successful course development is a sensibly chosen learning platform (Grodecka et al., 2009; Kolowich, 2015), which would ensure the main function in online learning, i.e. communication and cooperation, exchange of documents, storage, and self-regulation or evaluation measures. The main issue analyzed here is the absence of MOOC learning platform for high-quality services online; also there are no scientifically acclaimed and analyzed MOOCs components and course strategy (Rutkauskiene and Gudoniene, 2013; Kay et al., 2014). These issues may have influence to the high-quality MOOCs.

The aim of the paper is to study the designed MOOCs model and present the analysis of recently created platforms and learning environments related to the proposed model. An analysis on the functionality of the model and connection to the personalized online learning environment presented as well.

Mulder and Jannsen (2013) offered a broader view analyzing open education by suggesting a model of the five dimensions: (1) open educational resources, (2) open learning services, (3) open teaching efforts, (4) open to learner needs, and (5) open to employability and capabilities. Under currently understanding the MOOCs may inhabit only part of these dimensions (Meyer and Zhu, 2013). The innovative courses design methods become an important element at the European Union's strategy in order to ensure the educational effectiveness and competitiveness. Since 2007 the use of ICT in education has become one of the key issues (Turcsányi-Szabó, 2012; Bower et al., 2010; Lorenzo and Ittelson, 2005). The digital excellence recognized as one of the eight skills necessary for all knowledge communities. The paper explores the designed and implemented MOOCs models based on open source architecture and collaboration with society.

2. Overview of MOOCs design

The researchers are working on the prototype of the platform and tools using different technologies and allowing learners to communicate and collaborate with teachers, among themselves and with other internet users. On the technological side, the trends towards high quality, converging, mobile and accessible technologies, together with more sophisticated, user-friendly, adaptable and safe applications and services will integrate technology more and more into everyday life. Therefore, technology will be more smoothly integrated into our daily lives and become a basic commodity (Breslow et al., 2013, Gurbuz et al., 2013; Rutkauskiene and Gudoniene, 2014, Gudonienė et al., 2013) and e-learning is a general term for a variety of ways of combining different elements of online delivery. The use of technology may be integrated within the educational institution, either in class, or within lab work, or the technology use may be restricted to use by the students outside class time, possibly at home. Designing an effective use of technology to support teaching and learning, involves the integration of three different kinds of knowledge presented by Shulman (1987) in TPACK framework: (1) Content Knowledge, (2) Pedagogical Knowledge and (3) Technological Knowledge. According to Rutkauskiene and Gudoniene (2013) the model was adapted for the course "Information technologies" design (see Fig. 1).
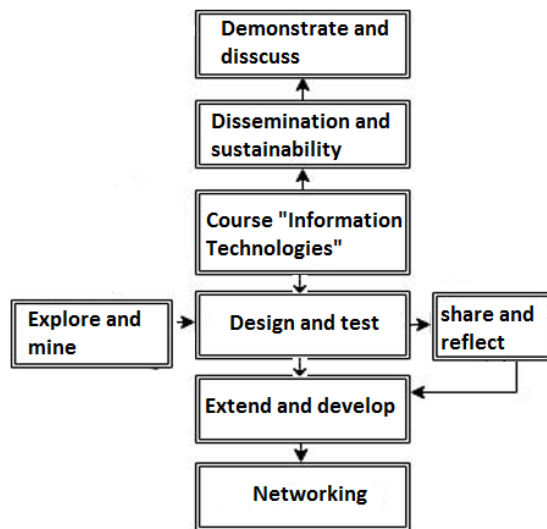
Fig 1. The MOOC model for course "Information technologies" design.

There is growing usability of ICT tools can enhance the learning delivery for learners and their engagement with mainstream education. The great strength of such learning tools is their capacity to support the informal learning, which provides a secure environment for acquiring knowledge and rebuilding confidence among learners. The innovation of web technologies will transform the teaching process into a student-centered learning process. The technology should allow learners to upgrade themselves from being a passive knowledge consumer into an active contributor in a social constructionist process or knowledge building (Redecker, 2009, Targamadze et al., 2011). However, for the new technologies of informatics and computer sciences, a different approach is needed. For scientific collaboration, the possibility to run software developed by colleagues via the internet is essential part. One can test directly results of other researchers by running their software with different data. Therefore, the algorithms, software and the results published in the scientific papers can be investigated independently (Gray et al., 2004; Vitiutinas et al., 2011). The authors discussed if the virtual learning environment can be used as a MOOC platform. The majority have agreed that constructed learning environment is more appropriate for working with classes. For this reason, MOOC platforms are constructed to change this attitude towards the learning process. MOOC platforms have a lot in common with their previous versions, i.e. they are more advanced when talking about evaluation possibilities; have more functions than other MOOC platforms. Recently developed MOOCs have encouraged changing online learning environments, for example, *Blackboard* creators already added new course areas. Even a majority of users thinks that Blackboard can be used as MOOC platform. This platform is not compatible with other popular sites such as *edX*, *Coursera*, because they do not meet MOOC audio-visual sector quality standards and functions. The traditional usage of virtual learning environment forms MOOC technology development.

3. A methodology for MOOC design

Over the last decade, the fastest growing research area is personalised learning. In the technology based learning context, it is related to personalise learning resources, distance learning course search, presentation, Recommender systems, Adaptive Educational Hypermedia Systems, Virtual Learning Environments development, creation and evaluation. A paper (Kay et al., 2014) analyses some MOOC platforms and their adaptation for learners. Most of these platforms have many similar or identical functions, including MOOC feature – short video conferences with integrated questions. This is the most important MOOC platform identification feature. Many of these platforms have a lot in common with virtual learning environments such as Moodle, Sakai, Blackboard and others (Redecker, 2009).

The majority of educational institutions already have virtual learning environments integrated in the information systems, which used for the organisation process of learning together with the systems of institutional needs: student database, virtual learning environment, social media, video conferencing, and other systems according to the needs of institution. Some authors suggest (Grodecka et al., 2009), the learning platforms that enabling not only to develop teaching skills for lecturers and teachers, but also teach how to use online learning educational material and evaluation measures to evaluate material and methodology, use communication and cooperation measures. Traditional pedagogical activities must be repeatedly evaluated, authorized and adapted to create a flexible, functional and innovative learning material. In some cases all of it ensures personalized learning platform. Authors (Rutkauskiene and Gudoniene, 2014; Turcsányi-Szabó, 2012) often analyse some of the most developed platforms for MOOC construction. The most popular are edX and Coursera. They are oriented into online courses together with integrated tests and questionnaires. It provides a possibility for the user to overview online course material or answer some of the questions provided, which are later automatically evaluated and instantly provided results ensures a positive feedback between teacher and learner. This breaks all the walls for traditional lectures.

MOOCs make the learning process more dynamic, offering brilliant cooperation and communication possibilities for students to discuss material used for the particular course. What is more, MOOCs enables university or college, which provides courses to create their timetables for a broader audience. This helps to eliminate all barriers in the learning process.

4. A model of MOOC design

The technological possibilities to design online course were analysed. The authors (Mockus, 2008; Kuzucuoglu and Gokhan, 2011; Vitiutinas et al., 2011; Lorenzo and Ittelson, 2005) noticed that the technologies played an important role for the study process in the organizations. ICT becomes an essential as the contemporary education system is focused on preparing learners for daily life and problem solving. Education should be adapted to volatile circumstances in a fast moving world: follow the changes of the new and upcoming ICT. Modern economy encourages global competition and education should not be limited to a traditional school environment. The popularity of ICT changes how people communicate, find information and gain knowledge (computers, internet, radio, TV in various forms); Appropriate and competent usage of ICT improves education system. Nowadays this process is almost inevitable.

According to Rutkauskiene and Gudoniene, (2014) more specific points about the importance of ICT in the learning process (studies) are:

- Learning can be interactive and based on communication if ICT is used. This way a wider and more motivated learning environment in an education institution and beyond could be created. The learners solve problems communicating or working together;
- ICT usage allows learning to be applied according to the individual needs, learning content (what do we learn?) and methods (where and how do we learn?);
- Learning can be done anywhere, using a computer, mobile phone, etc. In this situation, it is important to make individual tasks for learners with special needs (blind, deaf or very talented ones);
- No need to teach all learners at once, as ICT can control the process; this is very convenient for the adult learners who have a job or look after their children.

In addition, there is a subset of educational institutions in the world that have not applied (or just starting) ICT in classes. To tackle this problem, a topic about ICT and institution integration should be discussed. The authors are analysing how teaching about information communication technologies, using information communication technologies in various lessons or lectures can be based on newest technological solutions in the management of educational institution, creating a virtual learning environment (Redecker et al., 2010; Targamadze et al., 2011). Another important thing about ICT is that it has many useful features, related to continuous learning:

- Flexibility in respect of time and place (learning at home, using a virtual learning environment or distance learning).
- Flexibility in respect of learning material (courses are prepared for example, according to organization needs).
- Easy access to information and other people.
- Convenient communication with other people using online resources.

A new approach to organizing learning (individualization of the process, better preparation and control of the learning material).

When the student database is extremely large, lecturers sometimes become dependent on social media, which encourages cooperating, participating and working in teams. This has a huge advantage in learning to be responsible in classrooms not only with the help of lecturers. Some of the ICT students may be seeking only evaluation, other are seeking to learn more about profession, there are also people of different ages, place and culture. The course becomes useful because many ideas from different people can occur. The technologies involve four important steps: (1) arrangements, (2) registration of participants, (3) course management and (4) MOOC evaluation.

The implementation of educational concepts or models and the new learning and teaching methods, based on modern ICT, needs an involvement of competitive teachers and support staff. This is particularly very important where the investments in infrastructure and the new equipment should be planned together with the large scale of ICT users on how to use ICT, based on innovative learning and teaching methods in their learning practice.
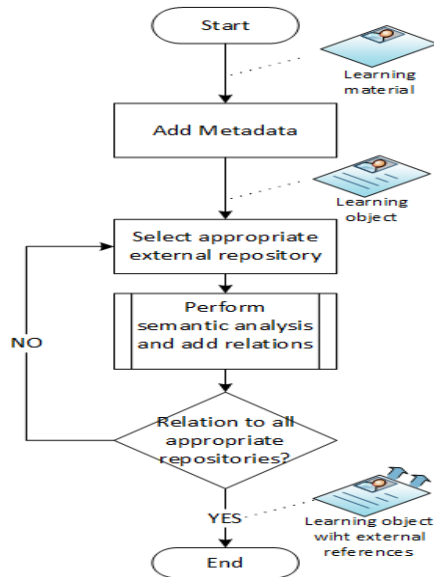
Fig. 2. A model for MOOC design.

Table 1. The evaluation of course organizing.

Category	Sub-category in percent	Examples
Positive evaluation	Excellent (42)	Administration of the course was high quality, it was able to get the newest information; Everything is perfectly organized; Thank you for the courses, I have gained a lot of knowledge; Excellent work. All the information presented clearly and conveniently.
	Very good (17)	Very, very good organizing; I received all the necessary information via e-mail, it was very informative; Very good, hope for the best future improvements;
	Good (61)	Good, I enjoyed the possibility to discuss what was important to me, also I do not have anything bad to say about the administration staff, I got detailed information; I evaluate it positively – information got from curators detailed.
	Satisfactorily (16)	Not bad – there were too many students for teachers. Those who have Skype could communicate directly with lecturers. They would only need to set a time and date. How many students can you contact during courses?
Negative evaluation	Several problems occurred (15)	The lack of information feedback was visible; There were several problems related to document processing. Instructions are unclear for students who participate in such courses for the first time. I guess everything is clear for IT specialists and teachers.

5. The case on experiment

The first MOOC in Lithuanian language was organized in the end of 2014 with totally 2009 participants (116 HE students in it). Looking to the course evaluation and students feedback we can identify that this was very successful process and very important nationally and internationally as well (totally 42 participants Lithuanians from other countries).

Analysing the results in the table (Table 1, p. 2010), we can identify that it was well-organized preparation period, design and delivery process giving us good learning results and successful implementation. Totally, the certificates awarded 14.9 percent of participants. This is a great number of participants showing the success of the first MOOC in Lithuania.

With the help of this completely free learning model, it was easier to gain knowledge and learn via internet. The course in Lithuania organized for the first time. The course delivered in the virtual learning environment Moodle using open registration with the social networks accounts. For this reason, the investigation was held to reveal the opinion of learners about this type of learning courses in order to see what could be improved or changed.

The majority of respondents the administration of the course evaluated positively, several excluded some problems, which they noticed. At the time of course administration, the attention was mainly set on feedback: "There was a lack of feedback", "Answers from lecturers not always were fully informative."

The main disadvantages included no direct communication with lecturer; sometimes you have to wait longer for the answer to the question of find out by yourself. In traditional learning you get the answer immediately. Due to a huge number of participants it is hard to sign in for everyone at the same time and upload documents in the same website.

Conclusions

The research shows that new designed models successfully contributed to the course implementation process giving a good feedback from learners and showing a positively selected way of course design and delivery process.

Designing an effective use of technology to support MOOC's teaching and learning, involves integration three different kinds of knowledge were selected: Content Knowledge, Pedagogical Knowledge and Technological Knowledge.

One of the main successful course administration reasons is appropriately chosen learning platform to ensure the most effective online learning features such as communication and cooperation, exchange of documents, storage, and self-control or evaluation measures.

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