Online education models' comprehensive analysis

Segol Radmila1, Parkhomenko Andrii2
Department of Publishing and Editing 1, Department of Technical Cybernetics 2 — Igor Sikorsky Kyiv Polytechnic Institute, Ukraine

Abstract: Nowadays online learning is among the most progressive and most popular educational practices in the world. Both European and United States universities try to implement this way of learning into the educational process. Several models of online education are used in the world's practice. The article aims to analyze online learning models to find a way for the best implementation in higher education based on Ukrainian educational system during COVID 19 pandemic in 2020.

Keywords: BLENDED LEARNING, DIGITAL LITERACY, LIFELONG LEARNING, MASSIVE OPEN ONLINE COURSE, ONLINE-LEARNING.

1. Introduction

In the context of a coronavirus disease pandemic, all processes, including education, move to a new stage. Since the mid-1960s, more and more automated technologies and educational systems have been introduced into the educational process of higher education institutions. Since 2008, the term massive open online course has been established and used, and since 2012 such courses were introduced by top-rated universities in the world. The challenges of 2020 have clearly demonstrated that in the context of global total lockdown, the transition to remote mode is no longer a selective option for organizing the educational process, but a necessity. Without the use of online courses, it is impossible to train a modern specialist. Further developments indicate that the pandemic is not only not over, but also continues and will intensify at the beginning of the new educational year in the fall. Therefore, right now it is extremely necessary to restructure all educational processes to a new model of education - the model of online education and the use of online technologies.

A classifications review for online learning models showed that their authors consider the process of online learning from their own points of view, without proceeding from the established opinion in the scientific community, as currently there is almost no thorough scientific work on this topic. In their research, they use small sets of classification criteria, which are quite one-sided and do not intersect on the scale of different studies.

During the latest Coursera conference held in May 2020, the biggest massive open online course's platform has presented its pandemic statistics clearly showing the new era in online education [1].

- 10.3 million enrollments in 30 days, 644% up compared to last year.
- 5 million+ new user registrations post COVID-19.
- million enrollments in 2020 in Yale’s The Science of Well-Being (this shows how many people need support to their mental health).
- 415,000+ students and 6,600+ unique institutions on Coursera for Campus.

Here are the top five countries:

US — 12M
India — 6.5M
China — 3.2M
Mexico — 3.1M
Brazil — 2.4M

2. Preconditions and means for resolving the problem

Top-rated American universities were the first to respond to the global lockdown and new educational model with online classes only. Six American universities have cancelled in-person classes and have moved instruction online in response to the coronavirus. Stanford University, Northeastern University’s Seattle Campus, Brandman University, Seattle University, Seattle Pacific University, and the University of Washington all announced closures on March 6th and 7th. In general, the transition to online instruction was not smooth given the short timeframe instructors have to make the switch. For example, Stanford University put together a website titled “Teach Anywhere” listing advice and resources for instructors. The website recommends using video conferencing tools like Zoom as an alternative to delivering in-person lectures.

However, noting that “scheduling can be a problem, and only a few students will actively participate (just like in your classroom),” the website recommends that instructors use asynchronous communication tools, like discussion boards, when possible [2]. This has shown educational institutions are not ready to fully embrace online education as the way to proceed.

In Ukraine, quarantine in higher education institutions began on March 12 and is currently ongoing. This has led to the transition to an online format in all institutions using a variety of models and technologies. Among the most popular solutions is the use of universities’ or institutes’ own online learning platform, the use of video services for lectures (Skype, Zoom, Google Meet, Facetime, etc.), the use of free services for training (eg. GSuite for Education), the use of massive open online courses’ platforms.

3. The solution of the examined problem

Phil Hill in his article “Online Educational Delivery Models: A Descriptive View” [3] classifies the models both from the perspective of educational material delivery techniques and the course design approaches. He suggests the following models: ad-hoc online courses and programs, fully online programs, school-as-a-service, educational partnerships, competency-based education, blended learning, and flipped classroom, as well as massive open online courses.

A. W. Bates in his book “Teaching in a Digital Age” [4] provides a classification of design models for massive open online courses such as xMOOCs and cMOOCs. xMOOCs is the common name for courses developed by Coursera, Udacity, and edX. They are based on the use of specialized software platforms based on cloud technologies. In turn, cMOOCs are based on the use of social networks and other means of exchanging content, such as software that aggregates posts from various sources on a certain hashtag, and so on.

Amit Shauhan in his article “Massive Open Online Courses (MOOCs): Emerging Trends in Assessment and Accreditation” [5] provides an even broader classification of mass open online courses (BOOCs, DOCCs, LOOC, MOORe, SPOCs, SMOCs).

We can argue that massive open online courses and their derivatives are the most common model to introduce a full online educational course into the learning process. MOOCs are including video lectures (5-7 minutes long parts of the big lecture or lectures), additional notes, presentations, tests to self-check or lecturer’s check, a discussion board to change thoughts and to ask questions, etc.

One of the best examples in the world is “Computer Science 50 (CS50)” by Harvard University. They state it is “introduction to the intellectual enterprises of computer science and the art of
programming” for majors and non-majors alike, a one-semester amalgam of courses generally known as CS1 and CS2 [6, 7]. The course was introduced at Harvard in 1989 and taught by David J. Malan since 2007. In 2014 David J. Malan has introduced this course in the form of a massive open online course shot in the auditorium with a live audience and installed at edx.org for free access.

In the latest course’s version that was firstly presented at Harvard and Yale during the autumn semester in 2019, David J. Malan made a lot of changes compared to the 2018 version. First of all, the course was completely re-shot and changes were made in all the testing materials. This course includes 18 hours of video lectures, notes for every lecture. Self-check tests and additional tasks to understand how students have learned material [8].

Andreas M. Kaplan and Michael Haenlein provide a nuanced analysis of the phenomenon of online distance learning and conclude that the only thing MOOCs cannot provide is socializing which has become over the years one of the top reasons to enroll in the institution and universities for young adults.

Sharing of resources and metadata is a central principle in scientific and educational contexts, especially in our research that is based on open source technologies for education.

However, not every lecturer can switch to this format during a pandemic. To do this, he or she must already have previously created and developed an online course, which is installed on the platform and is in the active phase of learning. It usually takes 6 to 9 months to develop a full-fledged massive open online course. Each lecture should be turned into a script developed into small fragments for video recording. The lecturer needs to submit a synopsis and test tasks for each lecture, develop a set of exercises and assessments. After that, the course must be shot, edited, and placed on the platform, and then thoroughly tested. As of today, only about 20 lecturers of higher education institutions in Ukraine have their massive online courses, but during the pandemic, the demand for courses’ creation has increased significantly.

The second model to use during the pandemic is a blended learning format. The blended learning technologies introduction enables the lecturer to focus on communicating with students, assessing their skills and abilities, rather than presenting information material, which is sometimes difficult to hold in classroom. In a blended format, the student can spend time by himself at home or dormitory to learn the material and, during a problem-oriented lecture held online via video communication services, present new materials and examples for both students and the teacher. Using media content increases the visibility of the material provided, develops associative relationships, which, in turn, increases the remembering new information quality. The materials availability online simplifies the learning process in general — no barriers and full access make it possible to master the discipline in a student-friendly manner and in a convenient place [9].

The blended format allows you to take previously created massive open online course or part or several courses and, with the author’s of massive open online course permission and the platform’s permission to implement it in the learning process. In this case, the lecturer or professor no longer has to spend time creating their own online learning product, but must comprehensively master the course, which he or she introduces in a blended form.

The blended learning provides an opportunity to overcome the general lack of skilled staff in all areas of knowledge in Ukraine. Specialists in Ukraine do not have free access to most of the world’s scientific developments, but due to the openness of massive online courses and the possibility of using lectures by leading specialists in the field, it is possible to overcome the gap in knowledge and provide students with relevant and substantiated material from the world’s experts. A serious human resource problem in regional higher education institutions in Ukraine can be overcome by creating professional courses at higher education institutions that are leaders in Ukrainian education in training [10, 11].

However, the proposed models give only a general idea of how to implement online learning in the current environment. We believe that within each individual educational institution it is necessary to analyze the available courses and human potential and develop our own approach and our own model, based on world practice and approaches. This requires further in-depth analysis, development of concepts classifications.

4. Results

To further analyze the models of online learning in terms of the degree of automation of learning and assessment of students, personalization of the presentation of materials, and increase the motivation of students developed their own classification. The classification is based on the following criteria.

- Use of automated incentive systems.
- Using motivational elements of the interface.
- Using gamification.
- Use of social networks.
- Use of third-party online services.
- Use a closed forum or other types of bilateral.
- Use of manually assessed tasks.
- Use of “big data” analytics tools.
- Use of automated systems to create recommendations for students and personalize the content of courses.

Since the start of the COVID-19 quarantine in Ukraine the biggest Ukrainian massive open online courses platform Prometheus has opened 9 new online courses, 4 are in development. The average web-traffic of the platform has doubled in the first 3 weeks of quarantine and at the time of writing is 1.5 times bigger than it was in the last three pre-quarantine months.

Over 300 Ukrainian universities have implemented online education process, either based on their own web platforms and online courses or using the courses and platforms of bigger universities and open online courses platforms, such as Prometheus, Coursera, edX, etc.

Fast implementation of online education models in Ukrainian universities helped to overcome the crisis of Ukrainian higher education, which could be caused by the COVID-19 quarantine.

5. Conclusions

Although mentioned online education models’ classifications are successfully used within the tasks for which they were developed, in general they cannot be considered complete, and do not provide generalized understanding of the concept of online education model.

Our own classification for further analysis of online education models in terms of the degree of learning and assessment processes automation, course materials automatic personification, and use of students’ motivation increase technics is being developed.

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