TÍTULO: Cursos masivos en línea sobre el desarrollo de la cooperación internacional en educación superior.

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RESUMEN: El objetivo del artículo es analizar las tecnologías de la información y la comunicaciones (TIC) en cursos en línea abiertos masivos para el desarrollo de la cooperación internacional en la educación superior. Los autores utilizaron métodos de investigación como análisis teóricos de fuentes primarias, análisis de proyectos de cursos en línea abiertos en masa y productos de software, análisis comparativo, pronósticos de desarrollo de cursos en línea abiertos en masa y el análisis sistemático. La importancia práctica del estudio radica en su uso para el apoyo educativo y metodológico en el estudio de las características de la educación superior moderna masiva en el contexto de los procesos de globalización y garantizar el acceso equitativo a servicios educativos de alta calidad.

PALABRAS CLAVES: educación superior, cursos en línea abiertos masivos, conectividad, conductismo cognitivo.
TITLE: Mass Online Courses in The Development of International Cooperation in Higher Education.

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ABSTRACT: The purpose of the article is to analyze information and communication technologies (ICT) on the example of mass open online courses in the development of international cooperation in the field of higher education. The authors used such research methods as theoretical analysis of primary sources, analysis of mass open online course projects and software products, comparative analysis, mass open online course development forecasting, and the systematic analysis. The practical significance of the study lies in the possibility of its use in the development of educational and methodological support in studying the characteristics of modern higher education in the context of globalization processes worldwide, mass higher education and ensuring equal access to high-quality educational services.

KEY WORDS: higher education, mass open online courses, connectivity, cognitive behaviorism.

INTRODUCTION.
The Russian system of higher education is entering the era of reform, the main goal of which is to improve the quality of education in the process of bringing the system closer to the educational systems of different countries. Along with the state, international organizations of global importance become the subject of transformations in education, promoting the idea of the world educational space and offering a variety of ways to interact in it.
Now, over a thousand universities around the world are working on improving the educational process.

As a result of the joint efforts of universities, in 2008, D. Cormier and B. Alexander, employees of the University of Manitoba created the first Mass Open Online Course (MOOC), whose users were 24 university students and 2,200 registered online users (Mackness et al., 2010). However, the real mass distribution of MOOC was achieved when in the fall of 2011 Stanford University P. Norvig and S. Thrun introduced a free online course devoted to the study of artificial intelligence, which was taken by 160,000 students from different countries. However, only 23,000 students successfully completed the course (Yuan & Powell, 2013).

Russian universities are no exception. Thus, MOOC of the educational type which meet the requirements of the Federal Educational Standard for learning outcomes in programs implemented in universities were created within the framework of the "Open Education" project, initiated in 2015 with the participation of leading Russian universities.

In general, MOOC, being an achievement in the field of application of information and communication technology (ICT) in higher education, is treated as a free form of distance learning, which is a set of freely available online interactive educational courses that can be simultaneously taken by a large number of participants.

According to W. Lawton and A. Katsomitros, MOOC is one of the tectonic shifts in the evolution of higher education, because being a free method of learning for many people, MOOC develop an accessible approach to higher education with a guaranteed assignment of certificates (Lawton & Katsomitros, 2012).
The concept of MOOC creation is based on the key principles of such education management theories as:

1) Connectivity, embodying innovative principles of pedagogy in the framework of a networked organization of learning (plurality of approaches to learning, the main of which is understanding of learning as a process of network formation and decision-making).

2) Cognitive behaviorism, on which the institution-oriented method of organizing training is based, the features of which are insignificant social contacts, localization on the content of video lectures and automated assessment (Altbach, 2011; Dendev, 2013; Bayne & Ross, 2014).

We emphasize that the first MOOC were based precisely on connectivity (they received the name of connective MOOC – cMOOC) and in 2008, were implemented by J. Siemens and S. Downes (Downes, 2008) in their open course "Connectivism" in order to clarify the features of learning in an intensive network environment.

From the very beginning, cMOOC were developed by lecturers with the aim of promoting enrichment, consolidation, creation and dissemination of knowledge between distribution groups that simultaneously interact and communicate online using open source web platforms. cMOOC are structured to ensure minimal intervention and control by the teacher and, consequently, the maximum development of the ability of students to fill the network with educational content by their own means, the ability to learn independently and select the necessary information. It should be noted that the mass nature of these courses consists precisely in the numerous connections of the participants in the learning process with each other, the volume of the content of the courses and the intensity of students’ educational activity, in contrast to the mass nature of students, which is a characteristic difference between the behavioral MOOC of the second type (xMOOC) (Cuban, 2012).

MOOC, based on the behavioral principles of knowledge acquisition through the constant reproduction and control of knowledge, arose in 2011 (Stanford University) based on information
technology courses and was named xMOOC. xMOOC are presented mainly in a lecture format. Their distribution is carried out by private online platforms based on a contract between institutes, teachers and provides for viewing lectures in video format, working with posted texts, as well as completing tasks with automatic verification and passing the final tests.

In contrast to cMOOC, xMOOC are characterized by a greater mass character (as a rule, the number of students amounts to 50,000), focusing on the content of training and the expressive role of the lecturer, who defines the goals of training, performs mainly the controlling function, practically not observing the students' learning process (Hill, 2012). The advantage of the second type of MOOC, according to researchers, is their potential ability to adapt quickly to the constantly changing number of participants, which emphasizes the mission of the xMOOC as a global means of open access to education for a large audience in the world (Knox, 2013). The development of mass online courses led to the predominance of xMOOC over cMOOC and the entire industry began to be associated with them.

A study of sources devoted to the creation and implementation of MOOC allows us to say that at present, scientists and practitioners are developing scientific research in the following areas:

1) Departure from the traditional dual division of MOOC in favor of its new kinds.

2) Rationale for the "hybrid MOOC".

3) Analysis of opportunities for teachers to mediate in the dichotomy xMOOC/cMOOC (Bali, 2014).

In other words, there is now a tendency to move away from understanding the two dimensions of xMOOC/cMOOC in the direction of recognizing the diversity of their design, goals, themes and teaching styles. Often the MOOC acronym is not used at all, but the original notation is used, for example, 1) distributed open collaborative course (DOCC); 2) participatory open online course
(POOC); 3) small private online courses (SPOC); 4) big open online course (BOOC) (Andersen & Ponti, 2014).

In general, MOOC researchers note that they function based on the following four principles:

1) The principle of aggregation, meaning that the materials from different sources are combined together and, usually, organized in the form of a website.

2) The principle of "mixing", meaning that the course materials are interconnected with each other and with materials from other sources.

3) The principle of reuse of aggregated and recycled materials in accordance with the goals of each participant.

4) The principle of advanced exchange of information, meaning the dissemination and mutual exchange of ideas used many times by participants around the world (Kop, 2011).

The aim of our study is to analyze information and communication technologies on the example of MOOC in the development of international cooperation in higher education.

The hypothesis of the study: MOOC are one of the options for international cooperation in higher education and are a promising distance education project.

According to the results of the study, it can be concluded that the goal set in the study has been achieved.

DEVELOPMENT.

Methods.

We used the following research methods in the course of our work:

- Theoretical analysis of primary sources, which included an analysis of more than 20 studies devoted to various aspects of the use of MOOC in the field of higher education in the global market of educational services.
- Analysis of projects and software products MOOC, which included the analysis of the most well-known educational platforms (Coursera, EdX, Udacity) and the main characteristics of the software products presented there.

- Comparative analysis method, in order to compare the main characteristics of the world's leading educational MOOC platforms.

- Method of MOOC development forecasting, which included extrapolating the MOOC development trends, based on the assumption of the continuity of their development. If MOOC in the past were characterized by development at a certain constant speed, then there are grounds to believe that this speed will remain unchanged for a certain period of time in the future.

- Systematic analysis method, in order to establish structural links and schemes in the organization of the educational process on different MOOC platforms.

**Results and discussion.**

From the point of view of technical implementation, MOOC work on platforms created by leading universities in the world, the most popular of which are Coursera (Stanford University), EdX (Massachusetts Institute of Technology and Harvard University), Udacity (Stanford University) and Khan Academy (Harvard University).

A thorough study of the Internet pages of these platforms showed that they all had certain commonality and specificity. Let us review them in more detail. The very first platform that emerged in 2008 was Khan Academy, which began the popularization of the MOOC idea. Now, this resource provides access to more than 3,600 lectures on various branches of knowledge. This platform is ideal for interactive student learning and can be a good assistant for lecturers because the site does statistical research and lecturers can estimate how much time a student spends listening to lectures and completing assignments and how many answers they gave. The student can also view their results and the level of knowledge in a particular area in their profile.
The most popular educational platform of today (about 7,326,000 students from 190 countries of the world) is Coursera, founded in April 2012 as a profitable project based on a venture capital of 16 million USD and 6 million USD subsided by partner universities, which are Stanford University, Princeton University, University of Michigan and University of Pennsylvania. It was constructed based on the subjects taught by 130 leading universities in the world, including Yale University, Stanford University, University of Michigan, Princeton University, University of Zurich, University of London, University of Tokyo, Chinese University of Hong Kong, Tel Aviv University, etc. (Allen & Seaman, 2011).

In Russia, Coursera's partner universities are the Higher School of Economics (NRU HSE), Moscow Engineering Physics Institute (MEPI), Sberbank Corporate University, St. Petersburg State University, Moscow State Institute of International Relations (MGIMO), Novosibirsk State University, Tomsk State University.

As of April 2019, this platform offers 738 courses in art history, natural sciences, business, statistics, computer science and technology, economics and finance, education, energy, engineering, nutrition and health, humanities, mathematics, law, medicine, design, music and cinematography, as well as advanced training for lecturers, where one can currently choose from 59 subjects.

As one can see, Coursera is trying to become the largest and most influential player in the market of online educational services. The platform has signed agreements with 10 major US government institutions on their use of the MOOC for both initial and more advanced professional training. This allows one to create new courses, as well as to adapt existing ones for full-time (offline) and mixed (online + offline) types of training. The greatest attraction of such courses is the creation of the Coursera platform for the automatic (machine) assessment of the knowledge and skills acquired by the students in a more accurate way than it is provided on other MOOC platforms. Recently, Coursera has started rapidly diversifying its mission, including various subjects from school, pre-school and
teacher education into its range of courses. It also establishes cooperation with various centers of pedagogical skills, museums and art funds. This expansion of influence on various educational levels helps to significantly attract new investors and increase the volume of venture capital (Dos Santos et al., 2016).

EdX is an open free online platform created in 2012 with 258 high-level courses from 57 well-known educational organizations, including Harvard University, Massachusetts Institute of Technology and the University of California Berkeley, each of which spent an average of 30 million USD on its operation. Unlike Coursera, this platform is not profitable, although 120 universities from around the world have confirmed their desire to join it as partners. EdH's main partners are five European universities (École Polytechnique Fédérale de Lausanne, the Delft University of Technology from the Netherlands, Karolinska Institutet from Sweden, the Catholic University of Leuven in Belgium, the Technical University of Munich in Germany) and 11 universities from India, China, Hong Kong, South Korea, Japan and Canada (Krause & Lowe, 2014). The courses offered by the platform mainly teach the following subjects: biology, business, chemistry, computer science, economics, finance, electronics, engineering, food, history, humanities, law, literature, mathematics, medicine, music, philosophy, statistics, etc. After completing each course, a student can receive a certificate free of charge, without accumulating a certain amount of academic credits. Most students of EdX courses come from the USA, India, Great Britain, Colombia, Spain, Pakistan, Canada, Brazil, Greece and Mexico. It is important to note that at the beginning of 2014, EdX concluded an agreement with the International Monetary Fund (IMF) for the provision of politico-oriented economic courses for heads of IMF offices in different countries of the world.

Udacity emerged in 2011 as a result of the expansion of the computer science program at Stanford University. It is registered as a profitable initiative of the Stanford University professor S. Thrun, who spent 230,000 dollars of his own savings on its launch. First, the site offered six free courses and
Udacity has around 50 courses available, most of which are devoted to the technology industry (computer technologies, programming, robotics). The main distinctive feature of this educational platform is a truly interactive format of courses since students are usually immediately invited to do several practical tasks during one lecture.

An interesting fact is that Udacity, unlike EdX and Coursera, creates groups of key professional instructors from different areas of knowledge (business, politics, education) who teach several courses simultaneously. This platform was one of the first to offer five credit-funded courses accredited at San Jose State University. Training in such courses costs 150 dollars and is designed primarily for people with special educational needs. The geographical profile of the course participants also demonstrates impressive diversity, namely: 1/3 of students come from the USA, 1/3 from Brazil, Canada and eight countries of Europe and East Asia, 1/3 from other 185 countries of the world. Video lectures are mostly in English; some of them have subtitles in Spanish, Chinese, French, Portuguese. One of the differences between Udacity and other MOOC is that it offers its students to place their resumes on the websites of 20 partner companies as employment assistance for a separate fee. In September 2013, Udacity, together with Google and other ICT companies, founded the Open Education Alliance consortium to provide professional training services and paid courses for in-house employee training (Jona & Naidu, 2014).

The analysis of the main characteristics of the presented largest online MOOC platforms made it possible to compare them by the main indicators: 1) profit/non-profit status, 2) presence of partners, 3) number of students and their geographical profile, 4) tuition fees and forms of financing their activities, 5) specific subject orientation of the education courses.
Table 1. Comparative table of the main characteristics of Coursera, EdX, Udacity

<table>
<thead>
<tr>
<th>MOOC name/Comparison Indicators</th>
<th>Coursera</th>
<th>EdX</th>
<th>Udacity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Profit/non-profit status</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>Number of countries</td>
<td>Most countries of the world 39% from the USA; the rest come from Brazil, India, Canada, UK, Russia, Germany</td>
<td>160+ USA, India, Canada, UK, Colombia, Spain, Pakistan, Brazil, Greece</td>
<td>Most countries of the world 1/3 from the USA, 1/3 from Brazil, Canada and eight countries of Europe and East Asia, 1/3 from other 185 countries of the world</td>
</tr>
<tr>
<td>Origin of students</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tuition fee</td>
<td>Not specified</td>
<td>100 USD for obtaining a certificate</td>
<td>80 USD for the final Pearson Education test (optional)</td>
</tr>
<tr>
<td>Financing</td>
<td>venture capital, financing of partner universities</td>
<td>Harvard University, Massachusetts Institute of Technology and the University of California, Berkeley; Gates Fdn; private capital investments</td>
<td>230,000 USD invested by S. Thrun, capital investments by Charles River Ventures</td>
</tr>
<tr>
<td>Availability of a credit system for obtaining a diploma</td>
<td>No</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>Founding partners</td>
<td>19 higher education institutions, 5 of which are located outside the USA</td>
<td>Harvard University, Massachusetts Institute of Technology, University of California, Berkeley</td>
<td>Pearson Education Exam for students</td>
</tr>
<tr>
<td>Course subjects</td>
<td>Multidisciplinary profile, including medicine, humanities, and creative subjects</td>
<td>Artificial intelligence, computer science, chemistry, electronics</td>
<td>Mathematics, statistics, computer science, scientific research</td>
</tr>
</tbody>
</table>

According to the presented material and the data in the table, the very first and most powerful MOOC are based in the North American countries. However, in 2013-2014. The American initiative was taken up by other countries. For example, in Australia, the Association of Open Universities has
united eight Australian universities, organizing the MOOC platform Open2Study, which hosts online courses in the humanities, technical and natural sciences, economics, management and other areas. Some Australian universities work with foreign platforms. For example, the University of Melbourne became a partner of Coursera, while Monash University entered an agreement with the British platform FutureLearn (Gaebel, 2014).

The popularity of MOOC is also rapidly spreading in Europe, as evidenced, for example, by the following. At the beginning of 2018, European universities were offering more than 90 courses in the technological industry, about 70 in the humanities, 50 in the natural and social sciences, about 40 in business and management and 30 each from mathematics, statistics, art history and other applied sciences (Lapworth, 2018).

At the same time, it is important to note that many European universities from the first days of the emergence of MOOC in the United States entered into partnership agreements with the universities that had founded those platforms in order to participate in their work.

Analysis of the educational process organization schemes on various MOOC platforms, which are now increasingly called electronic universities, showed that they share similar approaches, for instance:

1. Students choose courses on the Internet and go through the registration process. The student’s educational activity consists of working during lectures, completing assignments, passing tests and communicating on discussion forums. Students can get a certificate after passing certification.

2. The lecture material of MOOC is divided into 10-15-minute parts, at the end of each of which, as a rule, testing takes place, a quiz is held, or control questions are asked about the studied theoretical material. The explanation is carried out using a graphic tablet, that is, the teacher delivers educational
information in a voice with a parallel presentation of graphs, charts and drawings. Necessary additions to the study include interactive links to Internet resources.

3. The role of seminars is performed by various interactive tasks, as well as remote virtual laboratories. For the humanities, online discussions in forums are organized as an assignment option. At forums, students ask questions and get answers to them, help each other, exchange opinions about the course, find additional information, as well as unite in groups for training and organize meetings offline.

4. Cooperation of students manifested as Q&A forums, on-line and off-line educational network, as well as group viewing of lectures and completion of assignments, is welcome. The rules of cooperation are usually defined on the MOOC course website. The main idea of student cooperation is the improvement of the education quality.

5. The main efforts of developers of MOOC are aimed at automating the verification of the results of completed assignments since the teacher cannot verify the number of tasks that came up to several thousand. Students perform independent assessment and cross-assessment of each other's work. Only final certification assessment is carried out by teachers in a full-time format in specially organized places when it is necessary to issue a certificate. Intermediate control is carefully planned in time and needs to be implemented precisely by the student.

Some experts note certain problems in the MOOC concept, for example, in terms of conceptual approaches to the formation and dissemination of knowledge. An American scientist, professor of geography at the University of Wisconsin-Madison, C. Olds notes that MOOC are undeniably post-national higher education platforms. They are not tied to a specific locality and the founders of the American MOOC, including Coursera, EdX and Udacity, are immigrants from different countries.
However, these platforms, being international, in many of their aspects are developed based on the specific American context (Olds, 2007).

Similar to the opinion of C. Olds is that of F. Altbach. Altbach notes that, first, the creation of MOOC was an initiative of American teachers and scientists; second, most courses are created and taught at universities in the US or other Western countries; third, MOOC providers are based in the same countries; fourth, private and state-owned companies that are willing to contribute to the development of MOOC through capital (both financial and intellectual), are mainly of American origin; fifth, the content of most courses is based on the American approach to education and pedagogical model. The composition of the recommended literature, as a rule, includes works of English-speaking scientists. All of the above, according to Altbach, can be called "voluntary neocolonialism" (Altbach, 2014), which ultimately will have a serious negative impact on developing countries, since the ease and cheapness of access to American MOOC can greatly inhibit the formation of local academic culture and the development of online courses for this audience.

Experts in the field of educational policy substantiate seven main areas of influence of MOOC on the development of higher education, namely: 1) support for the educational mission of universities; 2) promotion of the internationalization of higher education; 3) diversification of educational trajectories for students; 4) restructuring of education expenses; 5) distribution of educational services; 6) promotion of the development of educational research; 7) reformation of the educational process (Rosewell & Jansen, 2014; Polyakova et al., 2019).

In general, the greatest influence of MOOC on the development of higher education is exercised precisely in the pedagogical sphere, since they represent a new large-scale consortium model for the provision of education. The fact is that leading universities in the world plan to abandon the traditional teaching of introductory theoretical courses in many curricula and convert them into an online format in order to save study time for laboratory classes and interactive forms of work in the classroom. This
practice has been successfully used by Stanford University and the Massachusetts Institute of Technology for the last ten years and is being offered by them to other universities in terms of consortium agreements on the organization of education.

Currently, no special pedagogical approaches to the implementation of MOOC, in other words, the so-called "MOOC-pedagogy", have been developed, and various platforms use their own techniques, in particular: Coursera uses pedagogical techniques of "searching and testing", "learning skills", "peer assessment", while FutureLearn is built around a set of social constructivist principles such as "storytelling", "discussion", "visible learning" and "community-supported learning". However, the interest in the development of general pedagogical approaches is growing every day and is the subject of constant online and offline discussions.

CONCLUSIONS.

Summarizing the analysed material on the research topic, we can conclude, that at present, distance learning continues to develop, and due to the progress in ICT, the project of disseminating information and knowledge in the form of MOOC has arisen.

Intensive development and implementation of MOOC courses are taking place on educational platforms specially created primarily by leading US universities. Their fame and unprecedented audience have led education departments of various international organizations to initiate numerous global forums to discuss numerous pressing issues that arise during the implementation of MOOC and to the adopt documents regulating the quality of educational services provided by MOOC.

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DATA OF THE AUTHORS.


