Development of a Digital Model for the Educational Process: a Review of Problems and Solutions

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ABSTRACT
The article presents the experience of using information technologies in the management of the educational process at Samara Polytech. The factors to facilitate the digitalization of the educational process and constraints to the introduction of information technologies in higher education are presented.

Keywords
Educational process, online learning, digitalization.

1. INTRODUCTION
According to the Network Readiness Index, which is a comprehensive indicator characterizing the development level of information and communication technologies in the world, proposed by the World Economic Forum for assessing the readiness of countries for the digital economy, Russia ranks 41st among other countries [1]. However, according to experts, Russia has the potential to increase the speed of digitalization. At the state level, it is characterized by the development of the Digital Economy of the Russian Federation program, which was approved on 28/07/ 2017 [2].
The project of the Ministry of Education and Science Modern digital educational environment in the Russian Federation means the creation of conditions for improving the quality of education by the development of the digital educational environment and implies an increase in the number of students, who are trained online up to 11 million by the end of 2025 [3].
As part of the Samara State Technical University (SSTU) development as a flagship university, the priorities of the promising activities of the educational digitalization include attracting talented students and retaining outstanding alumni, implementation of large international projects to attract leading foreign and Russian experts, developing and implementing APE programs, educational programs in a network form and developing advanced technologies of education.
The development of digital technologies contributes to reducing the cost of educational services and removing the language barriers.

2. PROBLEM STATEMENT
The analysis of the directions of the educational process transformation under the conditions of digitalization raised the following number of questions needed to understand the readiness of learning factors for changes:

equipment availability (computers and software) at university;

an adequate number of classrooms;

a level of digital competences of scientific and pedagogical staff and their readiness to change the traditional model of education.

Willingness and readiness of the companies to develop network projects of interaction with universities (creation of joint corporate educational programs; recognition of universities as centers of expertise; applied baccalaureate; technological magistracy) [5].
All of these issues require analysis and finding solutions for the project realization at each individual university. The development of digital education at world-class universities is a serious challenge to regional universities. But competent combination of online and offline formats of education allows the regional universities to offer and implement high-quality, educational programs.

3. DETAILS
Information and educational technologies changing the «landscape» of education at the university include:
Multimedia technologies;
MOOC (Massive open online courses);
Flipped Classroom;
Online assessment;
Augmented and virtual reality;
Gamification;
Simulators;
Interactive content;
Project activities;
Learning communities and LMS to support students;
Mobile and cloud technologies;
Blended learning [4].

The digital model of the SSTU educational process is based on:
Interactive information platform STARTPOINT for applicants;
"Core" of the Bachelor program;
Interdisciplinary magistracy;
Excessive educational environment;
Autonomous management of educational programs;
Modularity of the educational program;
Online courses;
Advanced learning technologies;
LLL program.
The required vectors of changes to facilitate the implementation of the digital model of the educational process:

Educational process parameter	Established practice	Vector of changes
Educational content	Regular educational programs	Modular educational programs that integrate the resources of faculties, research centers, universities, industrial partners
Scientific and pedagogical staff	Distribution of the academic load at the department	Selection of the scientific and pedagogical staff for the objectives of the educational program and educa-

		tional technology
Administration of the educational process	программы Localization of students within the educational program	Selection of individual learning paths, redundancy of the educational environment, introduction of advanced learning technologies

It should be noted that meeting the requirements of the Federal State Educational Standards of Higher Education in the functioning of the electronic information and educational environment also contributes to the formation of a digital model of the educational process at the university because the organization's electronic information and educational environment should provide:
access to curricula, work programs of disciplines (modules), practical studies, to publications of electronic library systems and electronic educational resources specified in the work programs;
documentation of the educational process, results of midterm assessment and the results of study of the basic educational program.
teaching of all kinds of classes, conducting the procedures for assessment of learning outcomes, which are provided with using e-learning and distance learning technologies;
formation of the student's electronic portfolio that documents educational progress and keeps reports on all student's work including reviews and assessments made by any participant of the educational process;
interaction among the participants of the educational process including synchronous and (or) asynchronous interaction via the Internet.

4. RESULTS AND CONCLUSIONS

One of the results of the educational process transformation on the basis of information and educational technologies is the joint Master's educational program "Human Resource Management in the field of customs and foreign economic activity" of two leading universities - State University of Management (Moscow) and the flagman university SSTU (Samara). The implementation of the Program at Samara State Technical University is expected to use online courses hosted on the Moodle platform and available to learners.
The list of resources used in the implementation of the Master's educational program "Human Resource Management in the field of customs and foreign economic activity" (online courses hosted on the Moodle SamGTU platform) includes the following:
1) Current technologies of conflict and stress management in the customs bodies;
2) Current problems of digitalization in management of the customs bodies;
3) Budgeting and management in the customs bodies;
4) Professional ethics for decision-makers in the field of customs in the Russian Federation;
5) Management of labor potential of customs officials;
6) Personnel risk management in the field of foreign economic activity;
7) Time management technologies in personnel management of companies - participants of foreign economic activity;
8) Formation of the management team in companies - participants of foreign economic activity.
9) Current problems of improving management in the customs bodies;
10) Development of the customs service within the EAEU;
11) Customs protection of intellectual property rights.

In the structure of the Master's program, online courses account for 38 credits, which do not exceed 16% of the total Master's program.
Formally, the implementation of the Master's program does not contradict the Federal Law "On Education in the Russian Federation" dated December 29, 2012 No. 273-FZ (Art. 15) and creates conditions for individual learning. Online learning does not replace the traditional one but creates conditions for changing in a positive direction:
convergence of formal and non-formal education;
elimination of boundaries between blended, online and face-to-face learning;
changes in the role of a teacher from knowledge translator to educational partner, to the mutual exchange of knowledge;
development of the quality of education on the basis of educational analytics.

The Moodle platform (Modular Object-Oriented Dynamic Learning Environment) was chosen to host online courses at the university. Using Moodle, the teacher can create courses filling them with content in the form of texts, auxiliary files, presentations, questionnaires, etc. To use Moodle, it is enough to have a web browser, which makes the use of this learning environment convenient for both the teacher and the trainees.
According to the results of the tasks performed by the students, the teacher can give marks and comments. Thus, Moodle is both a center for creating educational material and ensuring interactive communication among participants of the educational process.
Moodle belongs to the class LMS (Learning Management System). Moodle provides an opportunity to design, create and further manage the resources of the information and educational environment. The system has a convenient intuitive interface. The teacher independently (by resorting only to the help of the Directory System) can create an electronic course and manage its work.
The platform structure provides flexibility in the formation of an online course and filling it with various elements: a lecture, a task, a forum, a glossary, a chat, etc. For each online course there is a convenient page for viewing recent changes.
Thus, LMS Moodle provides the instructor with an extensive toolkit for presenting educational and methodological materials for the course, conducting theoretical and practical classes, and organizing educational activities both individually and in a group.
Moodle learning management system oriented to distance education, has a large set of communication tools. This is not only an e-mail and the exchange of attachments with the teacher, but also a forum (general news on the main page of the course, as well as various private forums), a chat, private messaging and blogging.
Moodle has a multi-functional test module. Since the main form of knowledge control in distance learning is testing, LMS Moodle has extensive tools for creating tests and conducting training and control testing. Several types of questions are supported in test tasks (multiple choice, matching, true / false, short answers, essays, etc.). The system contains advanced tools for statistical analysis of test results.
The structure of online courses hosted on the platform meets the requirements of the Russian National Open Education Platform and includes [7] the following:
video lectures;
textual materials;
practical tasks;
assessment tests;
discussions, forums.

The advantages of the chosen form of implementation of the Master's network program include:
simultaneous involvement of a large number of participants in the educational process;
24/7 availability (open access via the Internet);
a complete kit of training materials on one platform: the basis is video lectures, a system of tests for current and intermediate control, a support system (maintaining student motivation);
possibility to start and complete the course at any time.
On the basis of the accumulated experience of using mass online courses by Russian universities [8, 9, 10, 11], Samara Polytech considers the following models for embedding MOOC into basic and additional professional programs:
- MOOC as a web-based support for the basic educational program; MOOC as the additional material for the principal educational program with its "traditional" (offline) implementation;
- Blended learning: MOOC provides a partial replacement of classroom activities (mainly lectures);
- Online training: MOOC replaces the traditional education with the advisory support of the teacher.
Problems in the implementation of educational programs using online courses in most cases are conservatism of the academic environment:
reluctance of teachers to change something in their activities and lives;
the shortage of trained personnel for creating online courses, the need for the rapid and continuous development of teachers and specialists' competencies in the field of technologization of education;
teachers' distrust of online (fear of being "replaced" by online courses);
the lack of mechanisms (regulatory, financial, methodological) of introducing online courses and blended learning;
university administration's fears not to be accredited because of using online training;
insufficient level of self-organization of students;
redistribution of the academic load - the need to change teaching activities in the absence of remuneration mechanisms for teachers, who use online courses in the educational process;
difficult adaptation of the university's organizational structure to changes;
inadequate resource capacities for the implementation of the financial support for the development of online learning.
In Samara State Technical University, this list of problems is considered as challenges of a new phase in the University development and new objectives developed will contribute to the formation of a digital academic environment.

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