

## CONTINUING IT ENGINEERING EDUCATION MANAGEMENT SYSTEM BASED ON MOOC PLATFORMS: FIRST IMPLEMENTATION AND RESULTS



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### ABSTRACT

This paper describes the results of the implementation of the experimental Management System for Continuing Engineering Education in IT, introduced by the Secondary Vocational Education Faculty of ITMO University, St. Petersburg, Russia. The system concept, presented at the 15th World Conference on Continuing Engineering Education, IACEE 2016, is based on open educational resources.

The system development is divided into two parts depending on the source of motivation, including motivating teaching environment and motivating learning environment. This paper focuses on the results of creation of motivating teaching environment that is based on special labour contracts with teachers. The contract stipulates integral evaluation of teacher effectiveness based on the set of quantitative indicators for directions of teachers' work. These directions were outlined as a result of expert assessment performed by the Faculty Academic Board. The higher effectiveness may be achieved if the directions of teachers' work are differentiated and the measured indicators are nonlinearly assessed, including either inversely proportional or exponentially dependent correlation.

The main results of the two-year experiment:

- Teachers' involvement increased by 75%. However, only 50% of pedagogical staff is involved;
- The most significant KPIs of students relate to MOOC (Coursera, edX, Stanford Online, etc.).

At the moment, the system is under development. The next steps are to create a motivating learning environment and to adapt its components to be able to conduct effective transfer from teaching of separate key themes of a subject to complex programs in the area of specialization (or competence).

### Keywords

Management in education, employee motivation, MOOC-platforms, continuing education.

## **INTRODUCTION**

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This paper describes the results of the implementation of the experimental Continuing IT Engineering Education Management System introduced by the Secondary Vocational Education Faculty of ITMO University, St. Petersburg, Russia [1]. The system concept, presented at the 15th IACEE World Conference in 2016 [2], is based on open educational resources.

## **THE RESULTS OF THE ENVIRONMENT CREATION WITH SPECIAL CONTRACTS WITH TEACHERS**

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The system development was divided into two components to create two separate models, one for teaching motivating environment and the other one for learning motivating environment. This paper focuses on the results of the first environment creation that started off with special contracts with teachers. The contract stipulates integral evaluation of teacher effectiveness based on the set of qualimetric indicators for directions of teachers' work. These directions were outlined following expert assessment performed by the Faculty Academic Board.

Directions of teachers' work were as follows:

- Teaching
- Methodological activities
- Faculty development activities
- Scientific activities
- Extracurricular activities that engage teachers and students and are aimed at achievement of formal performance indicators
- Upbringing of students
- University applicant support
- Professional development

For each direction, a group of the respective indicators was created. Individual expert assessment of the directions allowed setting the planned values of indicator normalizing constant achievability. Teacher remuneration was calculated based on their contribution to achievement of the planned values. To this end, a mathematical instrument was invented. Detailed description and first results were presented at the 15th World Conference of International Association of Continuing Engineering Education 2016 [2].

To obtain the highest effectiveness, the directions of work were significantly differentiated and qualimetric indicators for directions were nonlinearly assessed. These indicators were either inversely proportional or exponentially dependent.

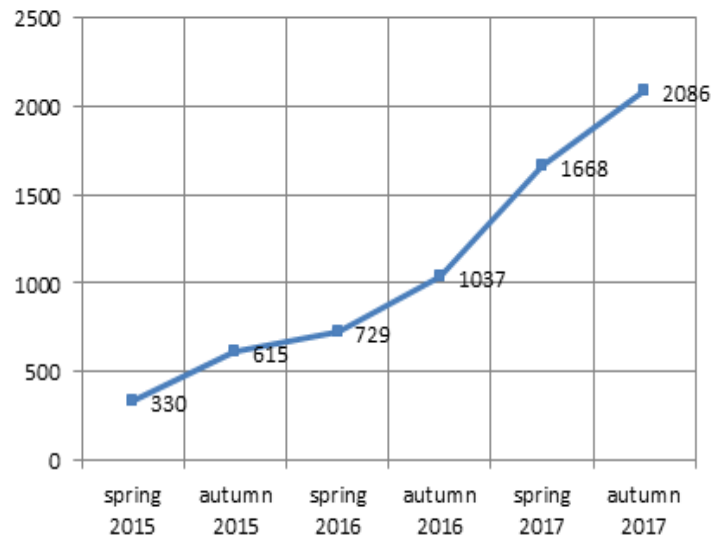
The main results of the three-year experiment:

Teachers' involvement increased by 75%. However, it is only 50% of pedagogical staff.

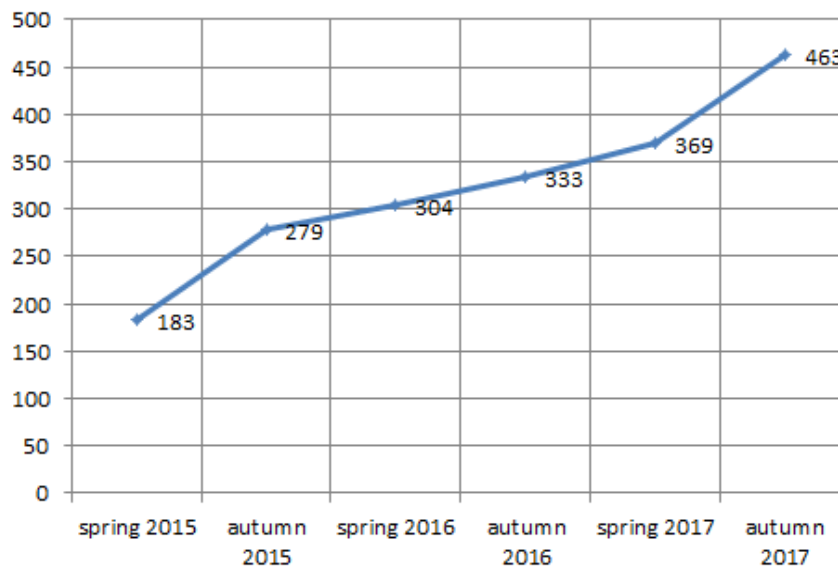
The most significant KPIs of students relate to MOOC (Coursera, edX, Stanford Online, etc.), which is in line with global trends [3-5].

The line chart below shows the number of online courses studied and successfully passed

by the students of the Secondary Vocational Education Faculty of ITMO University within the period from 2015 to 2017.



The second line chart shows the number of internationally certified students.



As can be seen from the line charts, the number of internationally certified students has increased by 2.5 times, and the number of online courses studied and successfully passed has grown 6 times in the last three years.

It is noteworthy that, in ITMO University Faculty, students of all years of study took part in the international certification: 59 percent of first-year students, 63 percent of second-year students, 76 percent of third-year students, 65 percent of fourth-year students. Additionally, more than a third of Faculty staff helped the students and consulted them.

The shift from the quantitative to qualitative model made a major move forward. Moreover, the decision was made for the changeover from individual course study to the entire

specialization completion. Due to that, the first 13 students successfully completed the Python for Everybody Specialization (University of Michigan) in the spring of 2016-2017 academic year and, in the autumn of 2017-2018 academic year, three different specializations were completed by 50 students.

## **CONCLUSIONS**

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Currently, the System is being further developed. The next steps are to create a motivating learning environment and to adapt both components to a shift from teaching separate key themes of a subject to complex programs in the area of specialization (or competence).

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