Chapter 35
Integration of Moodle and Electronic University Systems at BMSTU

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ABSTRACT

The free platform Moodle was integrated with protected University Administrative Information System Electronic University (UAIS EU) of Bauman Moscow State Technical University, which serves to support the administrative work for control of educational process. The following main problems were solved: creation of unified data representation in the two systems; creation of students' and training courses' databases in Moodle based on data from UAIS EU. As result unique software was developed, new quality of service was obtained, namely different sides of University activity such as teaching, learning, and administrative control of educational process were automated and joined together; the time required for information processing and administrative decision-making was reduced; the number of errors in the systems due to the influence of a human factor was reduced. The results obtained can be used to simplify the work of teachers and enhance the performance and operational efficiency of the administrative system at any university.

INTRODUCTION AND BACKGROUND

In most universities the educational process is organized and managed with the help of special information control systems. Some universities use universal Learning Management System (LMS) software platforms adapted for their tasks by the suppliers of the LMS services (Intranet: Academic—Sistema, n.d.; Avtomaticheskaja Sistema, n.d.; University Management System, n.d.; Blackboard Learning Sys-

tem, n.d.; Edmodo, n.d.; Google Class, n.d.; Moodle Docs 2.8., n.d.; Schoology, n.d.). Other universities create their own systems and use them separately or in combination with supplier services (Deligirova, 2013; Kochetov, Krapuhina, & Pronichkin, 2009; Logvinov, & Romanov, 2014; Oliveira, Vasconcelos, Queiroz, Queiroz, & Hékis, 2011; Palahicky, 2014; University Information System, n.d.; F. Alam, Hadgraft, & Q. Alam, 2014). Frequently, especially in engineering education, standard tools do not allow the LMS to perform the necessary activities, such as laboratory work, experiments, etc., which require additional software. Additionally, LMS software does not take into account specific features or needs of educational organizations. So, modifications must be made to the existing university system to enable it to perform functions that are available in other LMS software, or the university may need to make a full transition to a new LMS, which can be very labor-intensive and time-consuming, as well as impractical. Therefore, the preferred method is to integrate the existing university systems software with the LMS software while making minimal modifications to these systems during the integration process.

Bauman Moscow State Technical University (BMSTU) uses the LMS MOODLE system and its own University Administrative Information System called Electronic University (UAIS EU). UAIS EU was created independently and has been in operation for several years. This system is used not only as an information resource, but also as a support tool for adoption and implementation of management decisions at the different levels of the university administration (Ageeva, Baldin, Baryshnikov et al., 2009). The UAIS EU stores all necessary information about the curricula, students, modules they study, and the grades they get, and makes it possible to perform statistical processing of data on a number of parameters, providing the university administration with objective information for managing the educational process. This resource is accessible from the internal network of BMSTU (Electronic University of Bauman Moscow State Technical University, n.d.).

The teaching staff of the university uses a very popular, free, and open-source LMS MOODLE in their daily work, which is primarily oriented towards organizing interactions between a professor and students in the process of full-time, as well as blended or distance, learning (Gardel, Bravo, Revenga, Lázaro, & García, 2012; Poncela, 2013; Swart, 2015). In MOODLE, it is easy to create and store different teaching and learning materials, carry out assessment activities, and store the results.

MOODLE can be accessed from the specialized Electronic Educational System of BMSTU (Electronic Educational System of Bauman Moscow State Technical University, n.d.). Unfortunately, MOODLE and the UAIS EU operate separately due to the impossibility of direct interaction, which reduces the practical value and effectiveness of their use. A professor works with students in the MOODLE environment. For this purpose, he or she has to input all the data about the students, modules, grades, and so on, into the system. A considerable part of this data has to be inputted into the UAIS EU as well. The data are inputted into the two systems manually by a professor. Thus, at the stage of information exchange between MOODLE and the UAIS EU, a human factor occurs. This reduces the operating speed, leads to data transmission errors, and reduces the relevance of the transmitted data, as a professor is forced to input practically the same data into two different systems manually, which inevitably increases the probability of error occurrence. Working hours of a professor are used irrationally, and there is a problem of ambiguity and synchronization of data in MOODLE and the UAIS EU. A temporary delay in data input reduces not only the relevance of the data, but also the effectiveness of adopted administrative decisions.

In order to reduce the influence of a human factor, to ensure unambiguous representation and synchronization of data, it is expedient to integrate the UAIS EU and the learning environment MOODLE.

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