Chapter 16
Use of Digital Objects for Improving the Learning Process

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ABSTRACT

Effective integration of virtual technologies is aimed at improving the quality of education. It is very important to form trends of study at the initial stage of education. This document presents the first steps in the project “Development of a Virtual Learning Environment in Technical Higher Education,” jointly funded by the Erasmus program, which includes institutions from four countries: Estonia, Lithuania, Turkey, and Poland, for 24 months. It aims to create a digital house simulator and a set of training materials for construction specialties freshmen. The tasks of this simulator are to give a learner the opportunity to independently obtain knowledge about the details of the structure through the internet without special equipment. Learning through the virtual house model will help students develop spatial thinking, which is necessary for success in graphics and engineering in general. This, in turn, will increase their professional competence, since spatial visualization refers to the curriculum for all industrial technologies and engineering programs.

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INTRODUCTION

Qualitative changes taking place in education should be directed to meet the requirements of the labour market, which requires a competitive specialist with a high-level professional qualification, who has sufficient competence and is able to quickly adapt to the constantly changing conditions of the production process. The priorities directions for the development of professional engineering education at the present stage are using modern information technologies and active learning. The last was included in Engineering Education programmes following recommendations from the European Society for Engineering Education (SEFI, 2018). Active learning engages students in the process of obtaining new knowledge. Students should not just listen, but analyze, summarize and evaluate the information received, what was noted at the BEST Symposium on Education in Porto (2006, May 1-6).

In the conditions of fast information transfer, rapidly developing technologies, high competition, it is necessary to ensure effectiveness and high quality of the educational process (Higher Level Group on the Modernisation of Higher Education, 2013).

At the same time, the educational process in higher technical educational institutions is becoming more and more compressed, which means more intensive both classroom and homework.

In this case, there is a need for educational material, which should be primarily available to learners, that is, without using licensed programs, contain the necessary information and functions, being easy to use.

Game training materials have the appropriate qualities, and the most effective are various simulators. Game effects are associated with the participation of a user in the interactive process and provide a high interest in the information offered. Getting feedback in a game process is an accurate indicator of the success of the educational process and the same time it is a guide in the step-by-step movement of a learner in the learning process.

Creativity and originality in learning using digital media is not an easy achievement. A modern teacher must constantly be up to date with modern technological advances in order to involve students in a learning process, to evolve constantly and create relevant and interesting learning materials.

BACKGROUND

Using models in the learning process is not considered a new method. Models have been used for a long time and are well-established features in education (Bartlett, & Amsler, 1979). Simulators are used in all branches of the educational process, from elementary grades to higher educational institutions. The education goal of this practice is to give students better comprehension of the studying materials in a “real environment” (Oberhofer, 1999). Currently, almost all simulators are computerized and include multi-step algorithms that evaluate the effectiveness of actions based on decisions made. Most simulators are based on real industrial processes, and therefore they use real data to be as accurate as possible and provide a realistic experience. As a consequence, simulations and games make the learning process more efficient (Akinsola, & Animasahun, 2007) and significantly reduce learning time (Allessi, & Trollip, 2001).

The last 20 years there are many simulations and modelling, which covering virtually every phase of the specific construction product development (e.g. planning, design, cost estimation, scheduling, fabrication, construction, maintenance and facility management) in the construction industry (Whyte,