An Intelligent Tutoring System for Construction and Real Estate Management Master Degree Studies

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Abstract. Three e-learning Master degree studies were introduced at Vilnius Gediminas Technical University since 1999. In order to increase the efficiency and quality of e-learning studies, an Intelligent Tutoring System for Construction and Real Estate Management Master Degree Studies (ITS-CREM) was developed. ITS-CREM consists of six subsystems: Domain Model, Student Model, Tutor and Testing Model, Database of Computer Learning Systems, Decision Support Subsystem and Graphic Interface. ITS-CREM is briefly analyzed in the paper.

1 Introduction

The e-learning Master degree studies "Real Estate Management" was introduced at VGTU in 1999, Master degree studies "Construction Economics" from 2000, and Master degree studies "Internet Technologies and Real Estate Business" from 2003 (see http://odl.vtu.lt/). There are currently 220 master students from all over Lithuania studying in these three e-learning master programs.

Different multimedia and communication means are used during these studies, namely: electronic format of textbooks, video and audio, as well as computer-software, computer learning systems, intelligent testing systems, intelligent tutoring system, computer conferencing, computer networks, a discussion forum and 'face-to-face' contact. There are currently 220 master students from all over Lithuania studying in the above e-learning master programs. In order to increase the efficiency and quality of e-learning studies, an Intelligent Tutoring System for Construction and Real Estate Management Master Degree Studies (ITS-CREM) was developed.

ITS-CREM is used for the whole master degree study programme, while traditional ITSs are used only for a single subject or module. In this specific case, ITS-CREM was adjusted to two master degree study programmes: Real Estate Management and Construction Economics.

This paper is structured as follows. Following this introduction, Section 2 describes an Intelligent Tutoring System for Construction and Real Estate Management master degree studies. In Section 3 we have provided a description of the System Architecture. Finally, some concluding remarks are provided in Section 4.

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2 An Intelligent Tutoring System for Construction and Real Estate Management Master Degree Studies

The Intelligent Tutoring System for Construction and Real Estate Management Master Degree Studies (ITS-CREM) consists of six subsystems: Domain Model, Student Model, Tutor and Testing Model, Database of Computer Learning Systems, Decision Support Subsystem and Graphic Interface. The subsystems are briefly analysed below.

Domain Model contains information and knowledge that the tutor is teaching. During three semesters in the master student's courses, students complete seven core modules and five optional modules. An elective choice is made from 21 modules within the "Real Estate Management" Master's degree Program and 17 modules within the "Construction Economics" Master's degree Program and students should optionally pass 5 examinations. During the fourth semester master students write a final thesis. After registration, students mark sections of optional modules they want to study in the electronic questionnaires. The system also offers study materials to students according to the repetitive key words in different optional modules (see Fig. 1). A mixed approach is also possible and available. The received information is used for action plans, i.e. "mini curricula" that are used to lead the learner/student.

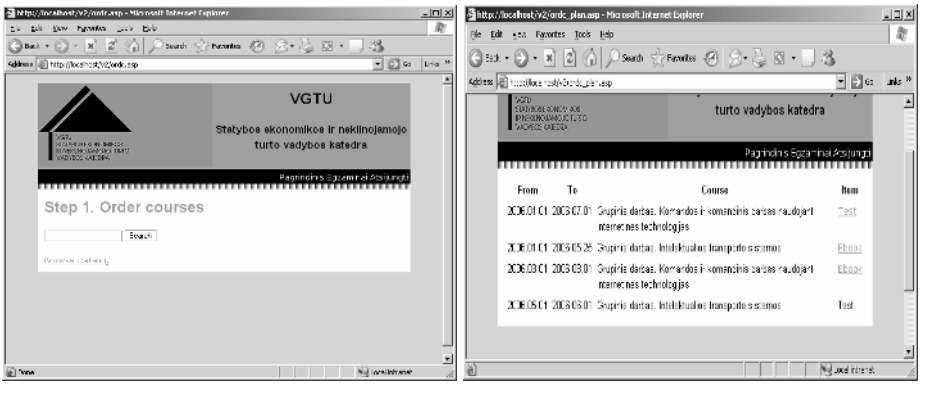

Fig. 1. Search of information for optional module according to repetitive key words (*left*) and selected material for optional module with defined schedule (*right*)

Much data had to be processed and evaluated in carrying out the multivariant development and multiple criteria analysis of an optional module. Numbers of feasible alternatives can be as large as 100,000. Each of the alternatives may be described from various statistical (the repetitive key words) and qualitative perspectives. The problem arises, how to perform a computer-aided development of the alternative optional module variants, based on this enormous amount of information. To solve this problem, new methods of multiple criteria multivariant development and multiple criteria analysis of an optional module was developed by authors (see http://odl.vtu.lt/proj1/md_of_ opt.htm). The development and multiple criteria analysis of an optional module is carried out in 5 stages: forming the table of optional module alternative paragraphs codes; rejection of inefficient versions; computer-aided