Chapter 35

Computer–Aided Design as Carrier of Set Development Changes System in E–Course Engineering

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ABSTRACT

The current stage of development of learning management systems is associated with use of opportunities provided by global computer networks and technological standards developed in distance education. It offers structuring of educational material in electronic course and approach to navigation modeling, which are consistent with international specifications of e-learning SCORM and IMS, adding to them specific adaptive algorithms for navigating through training courses based on use of the model of integral evaluation of student’s knowledge. In this chapter professor Irina Sidorkina (Volga State University of Technology) and professor Vardan Mkrttchian (HHH University) using the results previously obtained for the implementation of Computer - Aided Design as Carrier of Set Development Changes System in E-Course Engineering. Dr. Alexey Rybakov (Omega-R Inc.) was a designing a software on the subject of this chapter.

INTRODUCTION

E-learning course design, like technological process design includes analysis, synthesis and optimization of key characteristics for integration with Microsoft Office software. Presentation of a training course as graph significantly improves perception of its structure as a whole and allows to use visual representation effectively for course display, organization of material study process, volume of the material studied, volume of the material studied,
storage of graph traversal history etc. As a result, the model proposed above provides and supports the solution of practical problems rising due to creation and application of CAD e-learning course, namely:

- Selection of sub graphs with subsequent detail in the presented graph course;
- Representation of decomposition process of computer-aided design down to functionally indivisible components with specific algorithmic and program implementation;
- Description of the learning paths based on the use of classical algorithms and simulated adaptive and intelligent learning strategies;
- Presentation and description of adaptive and intellectual sub-processes, accompanying the design process;
- Harmonization of data interfaces among alternative software components of developed CAD;
- Expansion of the operating structure of application software using new technologies and action strategies for implementation project procedures and descriptions of design object with organization of networking solutions at the level of development and use of the course.
- The use of CAD solutions for cognitive tasks depends on many factors.

The first step is to highlight the major tasks for which user accesses the CAD during interactive design of the course, among them:

- Entering initial description of the course and assigning its individual parameters;
- Receiving information about parameters of the object designed;
- Requesting auxiliary information, containing description of CAD functionality and its available resources, use of specific devices in design, as well as background information, tips, describing the range of possible actions of course developer in the current state of the system and application rules of its traditional components;
- Choosing algorithm and formation process of design given the nature of tasks;
- Using interactive tools to evaluate and visualize the properties of individual parameters of the project to determine the values of the generalized quality index that characterizes the success of automatic flow process and acceptability of design decision;
- Selecting and using service editing and design procedures for interactive completion of the project;
- Visual control and managing course of the process of automatic design.

High degree of automation is achieved through the use of design algorithms that reflect the knowledge and experience of teachers. Carrying out the system design includes the following: the original data structure, ensuring solution of typical problems; the programs designed to formalize the steps of synthesis and optimization of set-theoretic models of the object, the programs of documents design guidance.

The use of graphic and theoretic object model allows you to keep clarity and richness of the designed object and to build formal synthesis algorithms implemented in projected CAD. Any set of topics is the set of elements or concepts, or, on which their relationship is based. Hence, the training course can be displayed as a set of elements x1, x2, ...,xn, linked by a single theme or page associated with the element of one set. A similar view is nothing else but a switching circuit. Moreover, each theme is determined by a set of fragments, which are determined by a specified number of concepts. Concepts may be static or dynamic, depending on their function. Static ones belong to one topic, dynamic ones define com-
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