

ELECTRONIC TEXTBOOK IN ENGINEERING EDUCATION

L.Zaitseva, N.Prokofjeva, V.Popko
Riga Technical University, Mezha str. 1/3, Riga, LV-1048, Latvia
lzaiceva@egle.cs.rtu.lv, natalija@egle.cs.rtu.lv, plovec2002@navigator.lv

Abstract. The paper studies some aspects of developing and using of electronic textbooks. Functions and features of the electronic textbook “Study HTML” developed and used at Riga Technical University in engineering education is described. The architecture of on-line textbook being developed is outlined.

Keywords: electronic textbook, HTML

INTRODUCTION

Nowadays when computers are used in all areas of human activities including education, development of electronic textbooks and other educational materials is the actual problem. Electronic textbooks can be used in different forms of education such as a traditional teaching, distance learning, life long learning, etc. At Riga Technical University main requirements for electronic educational textbooks based on analysis of a series of electronic textbooks [1-10] are formulated and the electronic textbook “Study HTML” is developed.

ELECTRONIC TEXTBOOK STRUCTURE

Electronic textbook provides four main modes: learning, testing, help and reference book. Learning is used to study an educational material usually illustrated by some examples. This mode also provides self-control. It means that a student can do a set of exercises getting detailed explanation on every wrong answer. Testing allows a student to check his (her) knowledge on each theme as well as on a subject at whole. Help mode assists a student in his work with the textbook. Here a student can get detailed explanation of each mode and keys that he sees on a screen. Reference book provides students of necessary information during a learning process, but can be used separately too. The common structure of the electronic book “Study HTML” is shown in Fig.1.

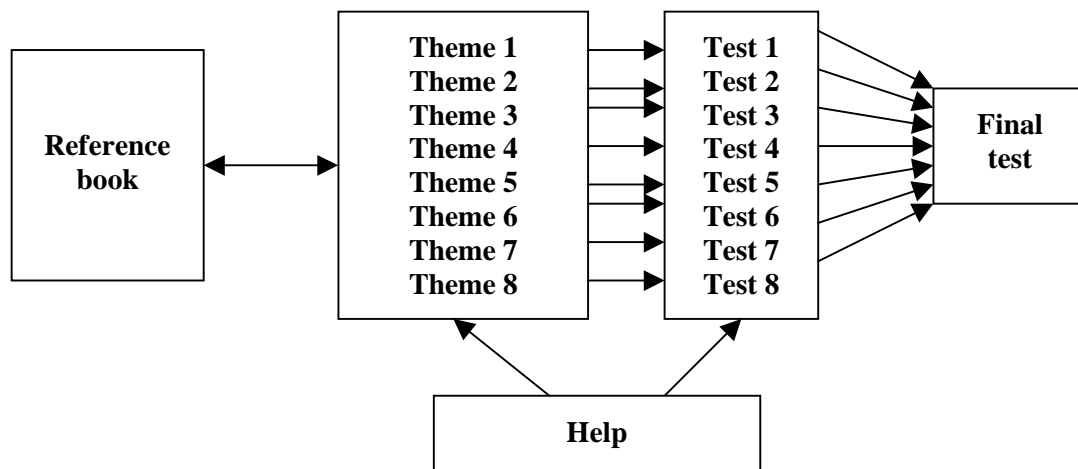


Figure 1. Electronic textbook structure

The electronic textbook consists of eight chapters. They are as follows:

- HTML document structure
- Text formats
- Graphics
- References
- Tables
- Frames
- Styles
- Dynamic HTML.

Some chapters include more than one topic. There are 19 topics in the textbook. Each chapter and/or topic consists of some frames of theoretical material of the theme and some examples that help the student to understand the topic. Example is a sequence of tags in HTML. A student has a possibility to see the result of its execution on a screen. A student can navigate between frames, too. Each chapter also includes a set of questions for self-control. If student would like to check his knowledge five random selected questions are offered to him. Using of help and reference book is allowed answering these questions as well as each incorrect answer is commented in detail. A student can answer questions in any order, navigating between them. When all five questions have been done his work results are displayed. These results consist of: number of questions on which correct answers are got, time of answering for each question, mark. The student also can look over all answered questions, given and correct answers.

There are eight tests on different themes and one final test to control student's knowledge on the subject. Separate test on definite theme consists of a set of questions and tasks of types "menu" and "input word". To control student's knowledge five questions in randomise order are offered to him. Answering questions a student can use help, but using of the reference book is not allowed. After testing results of it (number of correct and incorrect answers, time, mark) are displayed. Final test including questions and tasks from different themes is fulfilled analogously, but contains ten questions.

Reference book is a set of terms of the subject and its detailed descriptions. It contains information about tags of HTML and features of Dynamic HTML, which are grouped according to the themes.

Examples of the textbook's screens are demonstrated in Figures 2 and 3.

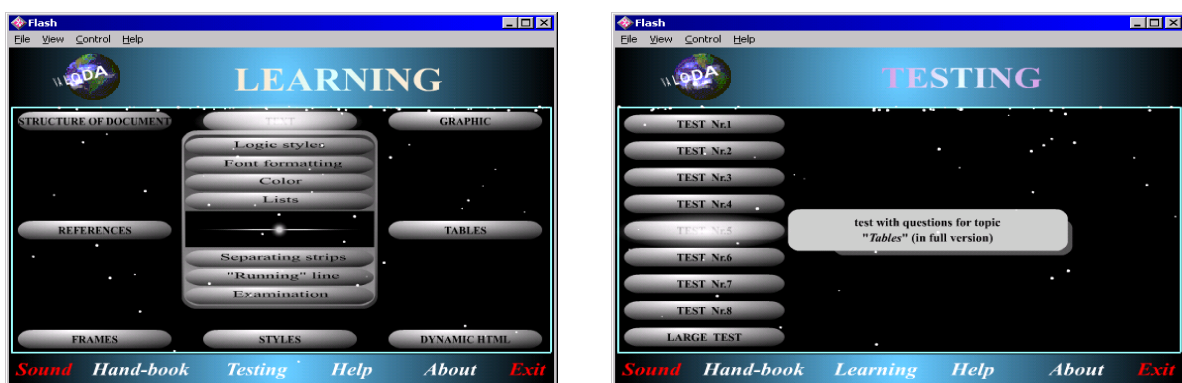


Figure 2. Learning and testing main screens

Electronic textbook "Study HTML" is off-line software implemented using technology Flash and programming languages HTML and JavaScript. From 2003 this textbook is successfully used in practice at Riga Technical University (RTU) – Faculty of Computer Science and Information technologies to teach the subject "Web-application development". Approximately 100 students of

Bachelor's programme regularly use it. The textbook is available on CD's and in local network at computer's rooms of RTU.

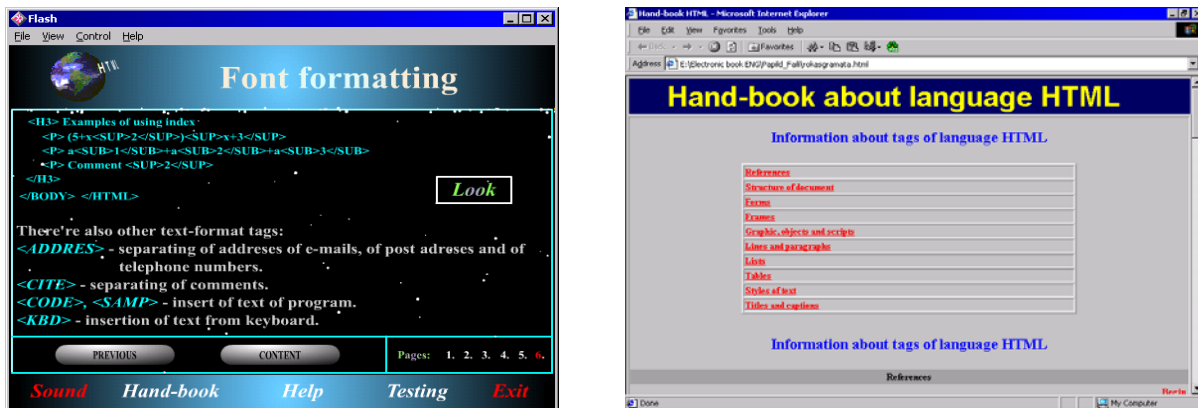


Figure 3. Learning and reference book screens

There are two versions of electronic textbook: Latvian and English. Latvian version includes 8 chapters, but English – 5 chapters only.

ON-LINE ELECTRONIC TEXTBOOK DEVELOPMENT

In spite of many positive features and good response from students electronic textbook used at present has two main disadvantages:

- it's software for one user and not available through Internet;
- results of student's activities (testing, etc.) are kept only while he works with the textbook.

Therefore new universal electronic textbook based on client-server technology is being developed. It will provide the registration of students as well as the information about students and results of their activities are saved into database. A theoretical material, questions, tasks and reference book are placed into knowledge base (Fig. 4).

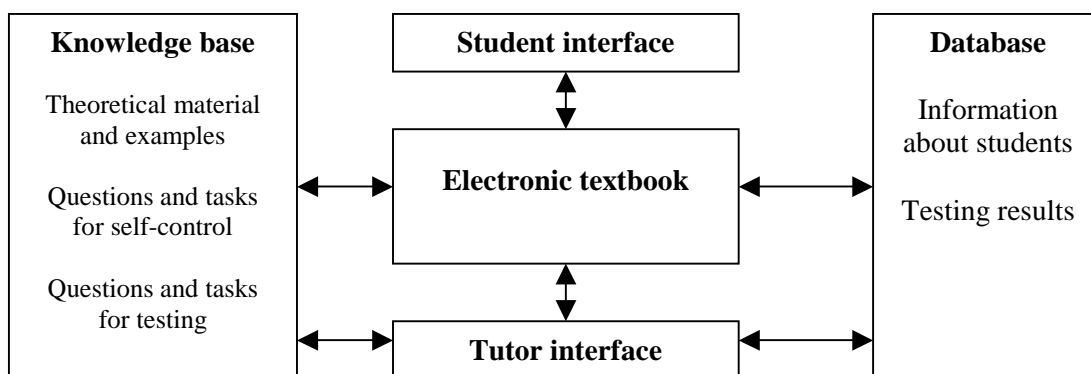


Figure 4. On-line electronic textbook structure

Such approach on one side allows a student to use the textbook anywhere and at any time, on the other side tutor has a possibility to get the information about student's work and also he can add or modify theoretical materials, questions etc. stored in knowledge base.

Software being developed will allow to create easily electronic textbook on any subject. For this purpose it's necessary to prepare a theoretical material, questions and tasks, etc. and to save them in knowledge base.

CONCLUSION

The developed electronic book “Study HTML” is used at RTU as a part of the subject “Web-application development”. It allows a student to acquire elements of creating of HTML documents and develop his personal HomePage. The aim of the experiment hold now is to investigate efficiency of the textbook using. Results of this experiment is planned to get in June, 2004. Preliminary analysis showed the electronic textbook is very popular among students and teachers of other subjects are interested in it.

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