# PRINCIPLES OF COMPUTER REFERENCE SYSTEM CREATION

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The role of information technologies in educational process undoubtedly increases nowadays. Traditional information sources have a number of drawbacks, such as complicated and prolonged search, low update rate, limited number of copies, rather high cost. Moreover, there are no ways for a reader to influence the content.

Web-based systems can improve learning, put it to the new level, and make it more convenient and flexible as they may be used from anywhere at any time. Many people turn to online learning to maintain their professional skills and employability at a high level [1]. There are examples of such systems from electrical engineering and other fields [2]. However, Internet systems have their own vices, such as difficulties of relevant search, different material quality and its high dispersion that impacts comprehension. Our aim was to create an application that is free of described shortcomings. It must contain and provide access to systematized comprehensive information on most important physical effects.

The first version of the system is a standalone Delphi-coded application. It provides textual information about an effect accompanied with up to two images that may contain various graphs. Description of the effect is divided into a number of fixed categories. The program has a built-in tool for DB editing. There are a few dozens of effects in DB currently.

The next generation is a web-based PHP+MySQL system. It uses the client-server architecture and is accessible via Intranet/Internet networks. Thus it provides a wide audience of users with necessary info. Moreover, it significantly extends facility of data verification and update. Effects are gathered in sections and are described as in the first version.

The currently developing project has a number of significant enhancements. Firstly, it is universal, not limited to any specific field of knowledge. Then, we use the concept of an article instead of a fixed set of fields. Articles are arranged in the sections that make up a multilevel hierarchy. The structure of information in the article is flexible and not strictly predefined. Each article contains one or more tabs that represent its structure in a convenient way and therefore improve its comprehensibility. Text portion of the material is stored in HTML format instead of a plain text. Thus, authors can use the full power of HTML to present information in the best way. The system features the possibility to attach files to the article and refer them in its HTML content. So articles are displayed with inline multimedia and active content that considerably improve the perception of materials. Students can leave their comments on the article and thus influence the material quality.

The search system allows user to find articles by title, keywords or author's name.

All articles' keywords are gathered in the glossary. By clicking a keyword in the glossary, the user gets a list of hyperlinks to articles that contain the keyword. Thus, the required article may be easily found in two clicks only.

The system was projected using RUP methodology. Modern Java technologies, such as Java Servlets 2.3 and JSP 1.2 are used for the implementation. MySQL 3.23 database is used.

The system is accessible via any up-to-date Internet browser and may be used both for the general learning purposes and as a study guide or tutorial for laboratory works.

The presented systems are being successfully used in the learning process at the Faculty of Radio Physics and Electronics, Belarusian State University.

1. S. Kariya. Online Education Expands and Evolves. IEEE Spectrum, May 2003, P. 49-51.

2. Han-Pang Huang, Chiou-Hwa Lu. Java-Based Distance Learning Environment for Electronic Instruments //IEEE Transactions on Education, Vol. 46, No 1, 2003. P. 88–94.