Utilization a Courseware WEB Portal for Virtual University Requirements

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Abstract: Paper deals with the convergence of the Internet technologies and education, which create Internet-enabled learning. New challenge "Virtual University" eliminates barriers of time, distance, and socioeconomic status, allowing people to take charge of their own lifelong learning. Paper shows a special vertical portal for virtual university support as a site with comprehensive content from the area of automation and applied informatics and links to other web sites, built around a single topic. Virtual technologies connected with these new trends will cover topics as the shared collaborative learning environment architectures, WEB portals for actual hot links to the main information sources including links to the intranet/internet virtual laboratories, mobile learning systems ("m-Learning") dealing with mobile users, wireless systems, mobile devices and location awareness etc. The specialized portal "e-Automation" (see http://www.e-automatizace.cz) will be shown as an example of virtual technologies with WEB solution for virtual university purposes.

Key-Words: portal, Web support, e-Automation, virtual university, e-Learning.

1 Introduction

Learning technology systems now connected with term Virtual University and computer use in learning have a long history, almost as long as other mainstream computing applications (e.g., business data processing and scientific computations).

One of the hot problems of information society arrival is a people education into such form, so that they can both fully live in information society and further develop it. Among important skills, which a successful member of society should have, belong especially: the ability of creative thinking, team-task solving, system of thinking, the ability of both gaining and distributing correct information in correct time and place, to utilise advantages of modern information technology, the ability to accept full responsibility for his or her decision, a promptness to insist studying new things etc. Educational system should accept and utilise methods of preparing an individual in harmony with the mentioned requirements [1, 2].

Interest in and demand for e-learning technologies have grown dramatically in the last several years, paralleling the widespread deployment of personal computers with access to networks and mainly with WEB. Industry, learners and educators have all recognized that learning technology combined with ubiquitous network and hardware infrastructure, when properly applied, can increase the quality of learning, reduce costs, and improve access to learning.

The WEB is an interactive, dynamic, and rapidly changing new communications medium and every WEB site should reflect this. Well-organized, edited, and timely original content set in an attractive, interactive, and consistent format are some traits of successful Web sites [3].

The expansion of informational and web services and technologies brought to Technical university of Ostrava and Faculty of Mechanical Engineering enormous potential to educate and inform their students and employee with more effective a fastest way over Internet. With increasing amount of published information over WEB is for users harder to find relevant information quickly. The way of published documents also changed from making simple static HTML files towards dynamically driven data taken from databases.

A portal is the starting point for WEB activities. A WEB portal is a Web site that provides a starting point, a gateway to other resources on the Internet or an intranet.

A vortal (vertical portal) is a WEB site that provides a gateway or portal to information relating to a particular industry. It is focused on a relatively narrow range of goods and services.

The goal of the specialized WEB portal e-Automatizace (http://www.e-automatizace.cz) is to create information access point into automation field for students and academic staff and systematize information into logical hierarchy [7].

2 Formulation of Virtual University Concept

Virtual university concept with various forms and properties of X-Learning (E-, M-) offers a unique opportunity for teachers and students in different kinds of learning environment settings. The unique feature of this mode of learning is that it enhances flexibility for students; however, it demands new pedagogies, and new approaches to deliver a course. If appropriately facilitated, M-Learning helps learners in a great way by providing virtual classrooms on their mobile devices. Teachers will ultimately spend more time for course-delivery and follow-up as compared to traditional classroom method. In addition, teachers will have to provide a rich learning resource and environment, which in turn, contributes to the quality of learning. To keep up with these changing phenomenon and to continue to effectively facilitate m-learning, it is imperative that online teachers learn about and adapt to the changing environments, when and where appropriate [6].

Web services provide a means of integrating applications via the Internet. By using XML messaging to exchange data, WEB services allow companies to link applications and conduct e-business regardless of the computing platforms or programming languages involved. WEB services are quickly becoming the way to develop systems, for obvious reasons. They eliminate the major problems associated with network and distributed software, and they can provide a new source of revenue for companies that provide the service. The proposed web services based flexible services architecture could become a new direction for developing web services applications for mobile education.

Very important support for student's individual activity and searching of educational information there is a special teaching portal [7].

3 Improved Services and Functionality of WEB portal

The growing success of web depended on a more dynamic WEB, where content management systems served dynamic HTML web pages created on the fly from a content database that could more easily be changed. New approach called Web 2.0 believes that WEB usage is increasingly oriented toward interaction and rudimentary social networks, which can serve content that exploits network effects with or without creating a visual, interactive web page. Websites become so advanced that users cannot create them, they are only users of web services, done by professional experts however some of the ideas could help to ordinary web creators or small-size web portals explore better user experience.

The WEB portal **e-Automatizace** is small scale web with specialised group of users (average daily visits are about 40-80 unique users) therefore not every pattern of WEB 2.0 approach is applicable. To achieve maximum of user satisfaction, several of the new web techniques were applied in **e-Automatizace**.

4 Concept of Virtual University Support with Vertical Portal E-Automatizace

We can define conceptual framework of this vertical portal by using five planes - strategy, scope, structure, skeleton, and surface [1].

- **The Strategy Plane** - The scope is fundamentally determined by the strategy of the site. Strategy of portal e-Automatizace is "to create a starting point, a gateway to other resources on the Internet from automation field for students and academic staff of Faculty of Mechanical Engineering and other universities in Czech Republic".
- **The Scope Plane -** The scope defines set of features and functions. For **e-Automatizace** it means:
  - web pages as vertical portal
  - separation of content and graphic form
  - using Cascading Style Sheets (CSS)
  - HTML code in (x)HTML version 1.0 due W3C standard
  - Respect of web accessibility rules
  - Hierarchical structure of links from automation
  - Full-text search
  - Statistics and tracking popular links
  - Users evaluation quality of links
  - English-Czech/Czech-English dictionary
  - Automation encyclopedia
  - Administration of portal
- **The Structure Plane** – The scope is given structure on the software side through interaction design, in which we define how the system behaves in response to the user.
- **The Skeleton Plane** – the placement of buttons, tabs, photos, and blocks of text. The skeleton is designed to optimize the arrangement of these elements for maximum effect and efficiency. [Fig. 1]
- **The Surface Plane** – On the surface you see a series of WEB pages, made up of images and text. [Fig. 2] The important items there are:
  - Main page, My profile
  - Catalogue, Vocabulary
  - Automation encyclopedia
  - Address list
  - Forum, Data edition

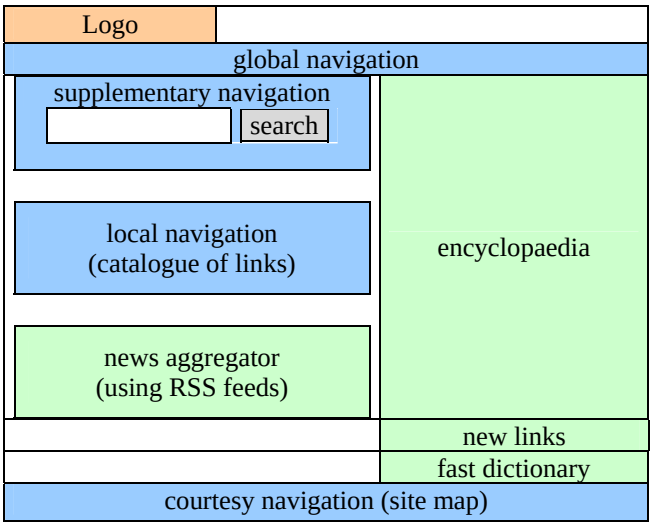

Fig. 1 Part of interface design of vertical portal e-Automatizace

- **The Surface Plane** – On the surface you see a series of WEB pages, made up of images and text. [Fig. 2] The important items there are:
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  - ❖ My profile
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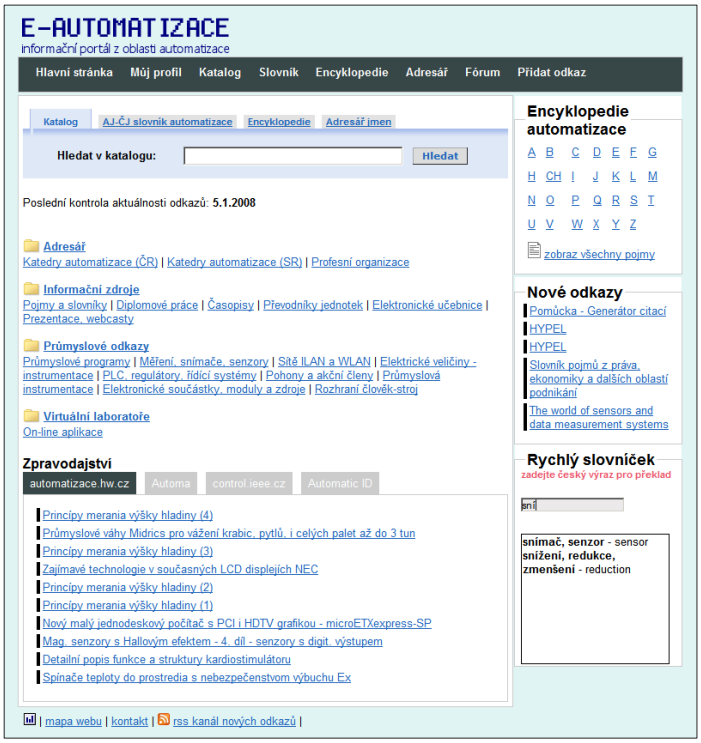

Fig. 2 Final graphic design of vertical portal e -Automatizace

4.1. Address list

Searching for information and a contact belongs to one of the most common activity on Internet. With expansion of electronic devices connected to Internet - electronic version of the phone or contact book became fastest, relevant and up-to-date source for finding the person's contact details. There is list of Automation and Cybernetics University Departments in the Czech and Slovak Republic is a fundamental part of a link catalogue but there was not chance to look for academic personal contact details.

Important part of the web portal e-Automatizace a contact list with search function was set up. Data for contact (address) list was used from periodical publication which is published in cooperation with Principia Cybernetica Conference. User of web portal can search contacts using different parameters:

- Search people by surname and first name.
- Search people by department.
- Search people by first letter of alphabet of their surname.

4.2. WEB Version of the English-Czech Automatic Control Terms Dictionary

WEB based dictionary of the English-Czech automatic control terms proceeds from course book [2, 3] and is intended for bachelor and master students of automation and technical cybernetics study programme. Dictionary is divided into three parts:

- English-Czech dictionary of the fundamental automatic control terms is devoted to basic and most common terms from classic and current literature.
- Commonly used abbreviations explain its origin and describe Czech equivalent.
- Dictionary of antonym terms provides help during preparation of professional papers when use of antonym is needed and it is not possible to find it in general dictionary.

A new approach sometimes called as "web 2.0" believes that WEB usage is increasingly oriented toward interaction and rudimentary social networks, which can serve content that exploits network effects with or without creating a visual, interactive web page. Web 2.0 applications are built of a network of cooperating data services. Offer web services interfaces and content syndication, and re-use the data services of others. [7]
Improved web version of the English-Czech automatic control terms dictionary includes references into two other knowledge sources.

- o Ninjawords [7] is an English online dictionary and it provides quick definition or list of definitions. It is based on the Princeton WordNet project and also from Wictionary. Ninjawords allows user to look up multiple words in the same search - separated by

commas, and in the URL. It comes also with a spell check and synonyms.

- Wikipedia [5] is a multilingual, open content encyclopedia project.
- Every term in dictionary at e Automatizace portal contains now [Fig. 5]:
  - Czech translation of term.
  - Service represented by icon to search quick English definition of the term in Ninjawords website.
  - Service represented by icon to search encyclopedia article in the English version of the Wikipedia website.
  - Service represented by icon for copy term into clipboard in plain text without any formatting from any web browser under Windows operating system.

4.3. WEB Portal Utilization for Virtual University Purposes

The realisation of the Web portal **e-Automatizace** is to create a meeting point for easier and quick way to find out resources from the automation field for bachelor's and master's students and to help them get through lectures and in thesis. There is very important part of Virtual University aims for individual and goal-directed students preparing [5].

Even the character of the is small scale and is specialised for group of users from automations and cybernetics to achieve maximum of user satisfaction, several of the web techniques called as Web 2.0 were applied in it (RSS, AJAX). Improved web version of the English-Czech automatic control terms dictionary. Adding other functionality with direct hyperlink connection to knowledge base of Wikipedia, Ninjaword and supporting OpenSearch - users can more easily search and learn vocabulary from automatic control field and use it in user interface of their favorite web browser or web service

4 Flexible services architecture for Virtual University Support

The designing principle for Virtual University has to be on the premise that the technology and the developing tools had to be integrated within the principles of the open, component based, modular architecture which will permit the reusability of the modules in various training scenarios and operations, with wide acceptable standards, are to be used to permit the interoperability with the existing hardware and software ('see Fig. 3).

Hypertext processing of the educational texts enhances its educational impact, providing users with structured information. Links are often directed to individual topics within a single module. Links that point outside the module make access directly from the explanatory text to other elements of the whole multimedia tool - animations, video sequences, calculation programs, exercises.

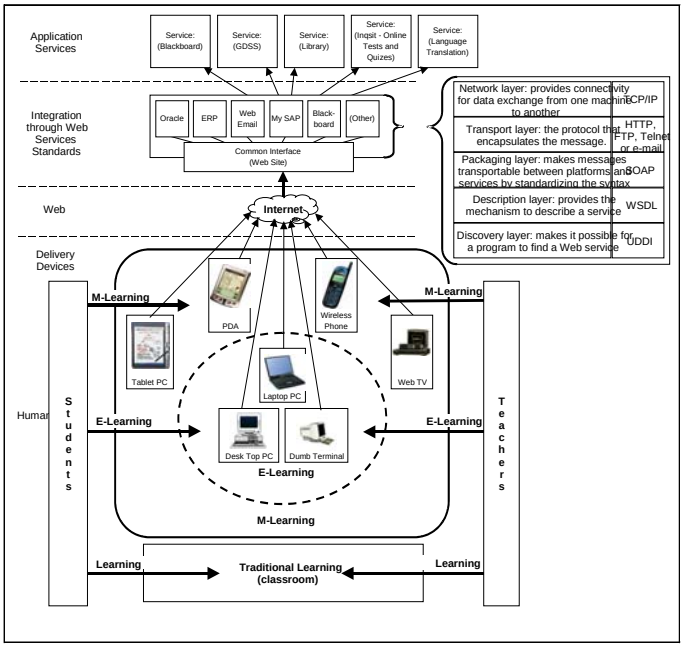

Fig. 3 Flexible services architecture for web services

In the WEB portal e-Automatizace there are also presented e-textbooks from Czech and Slovak Technical Universities Departments of Automation (see Fig. 4).

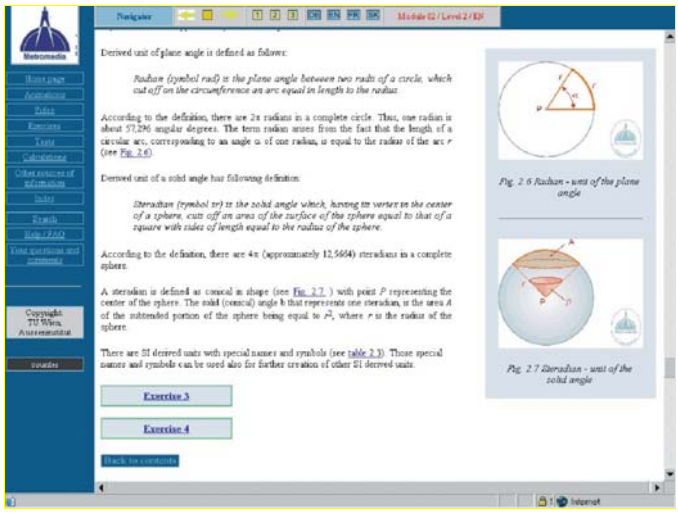

Fig. 4 Example of the e-textbook from area of sensors and measurement with text information, figures, animations, exercises and self-tests [7].

The e-learning methods and tools for Virtual University goals can solve these problems and designed to develop a learning environment that gives users remote access to a virtual workspace for collaborative inquiry-based learning using experimentation and modeling. In parallel with the technical development of the new virtual learning environment mainly on Web environment, a comprehensive support system is developed to help

learners in their experimentation, collaboration and assessing activities [3].

5 Conclusion

In today's working environment, employees have to collect, make sense of and use more and more information to keep up with developments in their field. To make the most of this information they need to acquire new knowledge and skills and develop better ways to collaborate with fellow workers based at different locations. The e+m-Learning methods and tools can solved these problems and designed to develop a learning environment that gives users remote access to a virtual workspace for collaborative inquiry-based learning using experimentation and modeling. In parallel with the technical development of the new virtual learning environment mainly on Web environment, a comprehensive support system is developed to help learners in their experimentation, collaboration and assessing activities (see http://www.e-automatizace.cz)

Engineering students have many learning resources available to them. They have syllabi, lecture notes, interactive homework problems, virtual labs, and other course resources available on the Internet. Textbooks come with tutorials, software, and web sites offering supplemental material and activities [1]. In view of the number and variety of supplemental resources, several questions arise when implementing these resources: will students use the resources; how do they use them; and will use of these resources assist in learning the course material

Using electronic media for learning and teaching is widespread. E-Learning offers opportunities for staff to convey material in a variety of ways and ultimately on 'anytime, anyplace' basis. E-learning materials and Web technologies can range from the simple act of putting lecture notes on line to simulations of real life. This means that distance learning (both off and on campus) is a realistic possibility, with students able to take part in class discussions via email and online discussion forums, and at the same time being able to remotely access materials and information. These materials do not need to be static web pages, as technologies such as broadband improve audio and video may be made available on a faculty Intranet/Internet allowing students to review material already covered, or prepare for lectures and tutorials.

The computers may be used to enhance the effectiveness of the learning experience through data acquisition and control software and also to extend its interactive capabilities through use of the Web pages supplied (special SaM Laboratory portal http://352lab.vsb.cz).

Any e-Learning system is valuable only if it is able to facilitate learning through leveraging of Information and Web Technology to achieve high efficiency, reduce cost and increase the opportunity for learning for its users.

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