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WEB CONTENT MANAGEMENT SYSTEMS AND THEIR APPLICATION  
IN PORTAL E-AUTOMATIZACE

WEBOVÉ REDAKČNÍ SYSTÉMY A JEJICH APLIKACE V PORTÁLU E-AUTOMATIZACE

**Abstract**

The key part of the web pages with an educational purpose is the content. However to achieve successful learning process, the composition needs to cope with different type of media. Web publishing has its own rules and specifics which are different from paper publishing. Authors are usually not familiar with all sets of these conventions. With a Content Management System (CMS) they do not need bother with the way of presentations and can fully focus at content of their educational text. A CMS brought separation of content and graphic design. Texts are saved in databases and structure of the webpage, site navigation and graphic look are stored separately in templates. Templates are samples of HTML pages which use filtered content from database. Web content management is type of process – needs to be planned, thought over and discussed because quality of the complex web page is reflected by its content. There are several roles in the process – web/database designers, content editors, review group with its own specialisation.

**Abstrakt**

Klíčovým prvkem výukových webových prezentací je jejich obsah. K dosažení funkčního efektu je nutné respektovat specifika tohoto média, které se svou povahou liší od tištěných výukových materiálů. Publikování na webu se řídí odlišnými pravidly a autoři výukových textů jsou s těmito specifiky dostatečně seznámeni. Při nasazení publikačních systémů (Content Management Systems) se autoři textů soustředí plně pouze na obsah. Publikační systémy zjednodušují a zrychlují proces vytváření i publikace prezentace a zvyšují míru abstrakce – uživatelé pracují s články na místo s HTML soubory, jsou více odstíněni od technologie. Díky rozdělení uživatelů do skupin jsou možnosti realizace potřeb uživatelů výrazně usnadněny v jedné oblasti, ale omezeny, či dokonce znemožněny v ostatních. Publikační systémy sebou přinesly důsledné oddělení obsahu a grafického vzhledu. Texty jsou uloženy do databáze a struktura stránek, navigace a grafický vzhled je udržován odděleně v šablonách. Šablony mají podobu HTML stránek které jsou naplňovány obsahem dle kritérií stanovených odpovědnou osobou či týmem spravující danou webovou prezentaci.

## 1 INTRODUCTION

Content Management is a general term that refers to the organization, categorization, and structuring of information resources (text, images, documents etc.) so that they can be stored, published, and edited with ease and flexibility.

Content Management System (CMS) is software used to automate the process of creating, publishing, and maintaining content.

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Web Content Management (WCM) is the process of creating, categorizing, managing, delivering, and storing content for the Web.

An LCMS stands for Learning Content Management System. This is a system that is used to create, store, assemble, and deliver personalized e-learning content in the form of learning objects. It is a combination of functionalities of a CMS and an LMS.

The basic idea behind a CMS is to separate the management of content from design. Page designs are stored in templates while the content may be stored in a database or separate files. When a user requests a web page, the parts are combined to produce a standard HTML page. The resultant web page may include content from multiple sources.

CMS allows designers to focus on design by building templates. Subject experts build content in a separate environment. The server takes the content, inserts it into the correct template and sends it all, neatly wrapped up, to end users.

## **2 REQUIREMENTS FOR CMS**

There is no single best list of requirements for a content management system. Every organisation has unique needs. Key requirements may include: [ROBERTSON, 2002]

### **Integrated authoring environment**

The CMS must provide a seamless and powerful environment for content creators. This ensures that authors have easy access to the full range of features provided by the CMS.

### **Separation of content and presentation**

It is not possible to publish to multiple formats without a strict separation of content and presentation. Authoring must be style-based, with all formatting applied during publishing. Final appearance is controlled through the use of stylesheets. This provides flexibility and expandability.

### **Powerful linking**

Authors will create many cross-links between pages, and these must be stable against restructuring.

### **Non-technical authoring**

Authors must not be required to use HTML (or other technical knowledge) when creating pages. Overall page layout is specified via page templates. Ideally, a non-technical interface should be provided for managing this.

### **Ease of use & efficiency**

For a CMS to be successful, it must be easy to create and maintain content.

### **Workflow**

Decentralised content creation relies heavily on a powerful workflow model, that can be easily customised, and is resilient against organisational change.

### **Security**

Adequate security levels and audit trails must be in place to protect the integrity of the content.

### **Support for multiple formats**

The CMS must publish to multiple formats, such as: HTML (web), printed, PDF, hand-held (WAP), and more.

It should be possible to add support for additional formats, which will be necessary as new standards evolve.

In order to achieve high-quality in every format, it is critical that the content be separated from presentation at the time of authoring. This allows distinct stylesheets to be used for each output.

#### **Reporting and usage statistics**

The CMS must provide an extensive range of reports, for both users and administrators. Ideally, the system should pro- actively report on any issues that arise.

The CMS must allow comprehensive usage statistics to be gathered, including: most popular pages, daily usage, and search engine usage.

This information allows the success of the site to be tracked, and any usability issues identified.

#### **Usability**

This covers aspects such as ease of use, learnability and efficiency. Usability can be assured by conducting tests on the prototype designs with real users. Usability heuristics (guidelines) must also be followed. Users must be provided with consistent, comprehensive and usable navigation aids.

#### **Cross browser support**

The pages must be viewable in all major web browsers (Internet Explorer, Netscape, Opera, etc). Need to be specify which browser versions are to be supported.

#### **Training and documentation**

The vendor must list the training materials that exist for the CMS, and the training services that they can provide. The CMS must be supported by adequate documentation: for users, administrators and developers.

#### **Resources required**

The hardware, software and operating systems required by the CMS. Specify any pre-existing hardware or software that the CMS must interface with, or run on. This includes specific operating systems, databases or web servers. The load levels that the CMS supports and the additional resources (hardware & software) required for increased usage.

### **3 WORKFLOW**

The systems also often include some sort of concept of the workflow for the target users, which defines how the new content is to be routed around the system. Workflow involves the passing of content between people in a chain that abide by a predefined set of rules. However, workflow automation in a content management system (CMS) is not only about using software to facilitate or automate the transfer of content from person to person, but it is also about tracking and recording the progress of an activity, delivering the work to any of the appropriate and available users, archiving work when necessary, and providing a framework for what actions are to take place in predefined scenarios.

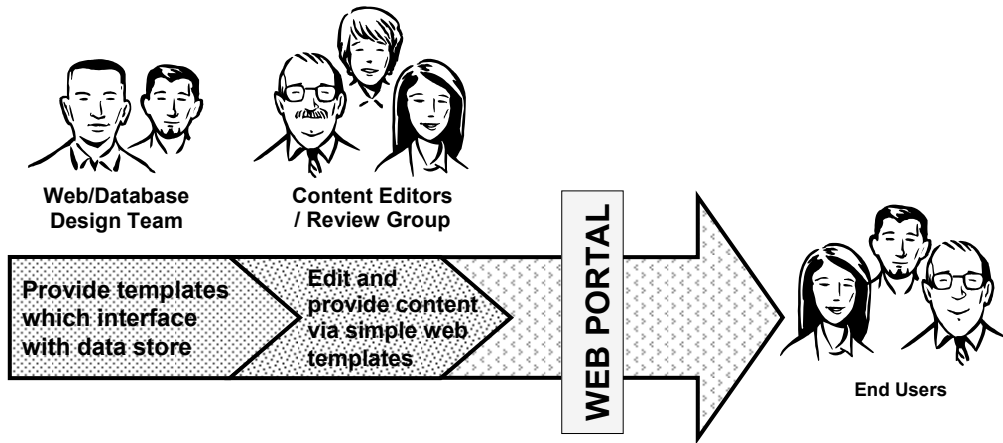


Fig. 1 Workflow in a CMS

#### 4 PROCESS OF IMPLEMENTATION OF A CMS

1. **Content definition** – particular information, data, services which are presented to users via World Wide Web.
2. **Content structuring** – divide content into logical structures, chapters, sections.
3. **Hardware procurement** – purchase of a web server with support of a CMS platform.
4. **Layout definition** – sketch of suitable combination of graphical and text elements, set of screen elements that allow the user to move through the information architecture.
5. **Implementation** – creation of database structure, installation of the CMS, HTML templates, definition of user's rights.
6. **Content integration** – transformation of old content into new structure defined by the CMS or filling database with new data.
7. **Training** – teaching users how to operate with the CMS and explaining all necessary functionality.

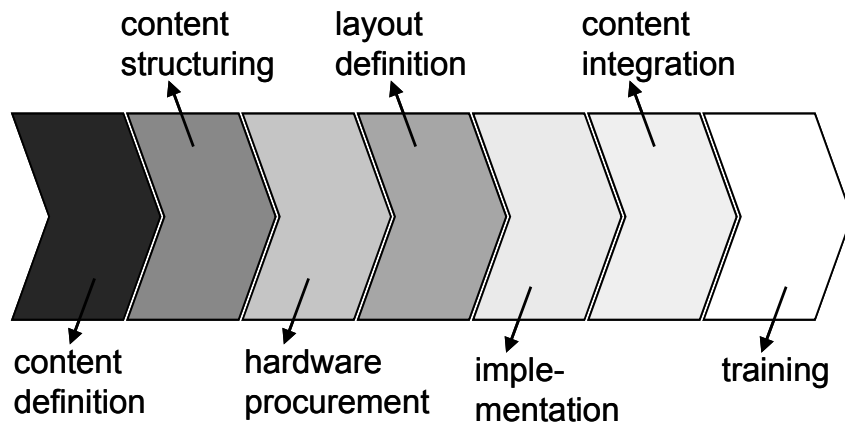


Fig. 2 Steps to implementation of a CMS

## 5 USE OF CMS IN PORTAL E-AUTOMATIZACE

Two options were considered during preparation of the web portal e-Automatizace. One was to create brand new content management system or adapt existing CMS for portal purposes.

Range of available solutions was limited by the platform - web portal e-Automatizace runs on faculty web server with Windows 2000 and Internet Information Services (IIS) with support of scripting language Active Server Pages (ASP). For the best solution was chosen content management system from Iatek company (<http://www.aspapp.com/>) which offers basic edition of their web application PortalApp as an open source system.

This web application uses scripting language ASP and Microsoft Access 2000 database for storing data. Portal is created in English language therefore Czech localization was made. Other changes were made to original version of PortalApp to suit more for project purposes.

According to user testing based on student survey from June 2003, the main Web page was changed to be more useable for users – emphasis was put on full text search and search form field was moved to main page. Other changes were implemented at page with catalogue of links. Hierarchy of links is at the top of every catalogue page and is visibly separate from list of links. Additional information (rates & views of a link, report errors) were unite into one group. Also title of link was highlighted.

Today's market consists of different browser technologies, some browsers run Internet on computers, and some browsers run Internet on mobile phones and hand helds. The last-mentioned do not have the resources or power to interpret a "bad" markup language. Therefore - by combining HTML and XML, and their strengths, we got a markup language that is useful now and in the future - XHTML. XHTML pages can be read by all XML enabled devices and while waiting for the rest of the world to upgrade to XML supported browsers, XHTML gives us the opportunity to write "well-formed" documents now, that work in all browsers and that are backward browser compatible.

Sites designed with Cascading Style Sheets (CSS) will look good in all modern (post 2002) and yet-to-be browsers, can often rank better in search engines than the same site made with tables. Web pages using CSS can often load a little faster than similar table-based pages and will often display perfectly fine in PDAs, cell phones, and screen readers for the blind without any additional development costs.

Sites designed with tables will on one side look "pixel-perfect" in all present and old browsers no matter how complicated the design, but on the other side are on their way out. Within several years, table-based designs will start to break in yet-to-be browsers. Websites with table design are more expensive to maintain, especially for large sites and are a little bit less loved by the search engines.

PortalApp is based on table design. From reasons mentioned above the process of recreating web portal e-Automatizace to new CSS layout and using XHTML syntax already began.

At present time catalogue with 35 categories contains 196 links to teaching texts and publication, list of Master's and Bachelor's final projects, links to all automation university departments from Czech Republic, Slovakia, links to on-line magazines and important companies from automation industry, fulltext search in catalogue of links and Czech-English / English-Czech glossary from automation field.

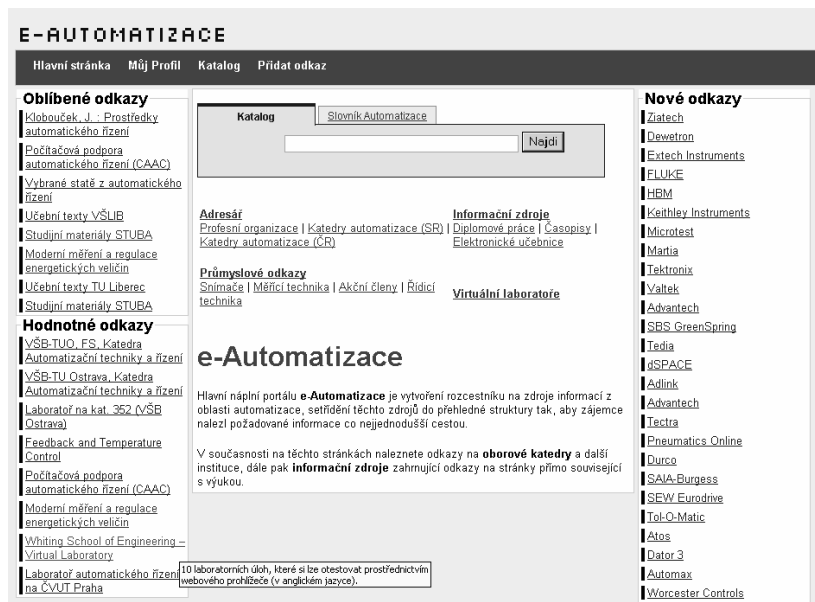


Fig. 3 Reworked main page of portal e-Automatizace according to XHTML 1.0 Strict standard

## 6 CONCLUSIONS

Content Management Systems are used for publishing information via web and they are used in a large extent in business sphere. Functionality of these products is concerned to business problems and needs. Step by step they are also used in different areas including education. Initial idea for CMS came from news servers – they initiated creation of system which could easily publish information in form of article, archive these articles and to make a fulltext search. Similar approach is now needed in other areas, users and creators have different requirements and Content Management Systems have to reflect these changes.

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