

APPLICATION OF VIRTUAL COMMUNICATION ENVIRONMENT IN ENGINEERING GRAPHICS TEACHING

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Abstract. Collaborative content management systems (CMS) are employed to handle large collections of written material concurrently generated by multiple authors. A network based infrastructure allows members of a group to interactively and simultaneously create, review, and edit product documentation, web content, or other interrelated documents on-line and in real time. The tools are ideal for providing information to the students of engineering and computer graphics. The platform also invokes certain ethical considerations, including intellectual property and anonymity, to provide students with a valuable first-hand perspective of these issues as they are being studied.

The paper defines the role of information system at the educational institution, the expedience to the lecturer of engineering and computer graphics the same as usefulness to the student. It also analyses aspects of CMS creation, validates need for system and goals, describes proposals given by the Student Council of VGTU and their needs and system realization tools. System operation is described at the end of the paper together with findings and predictable works.

Keywords: Content management systems (CMS), teaching of engineering graphics.

1. Introduction

Principal goal of the engineering and computer graphics teacher (as any other teacher) is to communicate the knowledge and skills to the students. As we might know, additional hours at auditorium are constantly declining in number. Modern information technologies and expansion of telecommunication systems have already changed the essence of learning, similarly to communication between a student and a teacher. Various distant teaching methods [1, 2] and virtual teaching space are more and more favored. Material for lectures put online is already a common phenomenon. But Internet is already overloaded with information. And even if today's students have never known a world without the world wide web, some of them (at least in the first course of studies) have difficulty to find relevant information online.

Engineering and Computer Graphics at VGTU is a lecture taught in the first semester of the first course and some students do not familiarize themselves or have difficulties in the new environment of university. They lack ways to find material for studies, they hardly understand homework and get lost among vast number of laboratories. Some of them cannot remember information about exams and credits, etc. Only the homework for the first course engineering graphics at Department of Environmental Engineering comprises 700 tasks and therefore, disciplines a compulsory subject for almost every department (a plenitude of 2000 students). Moreover, students would have more free time for creative works and studies than that of routine search operations. In this way, information group staff at VGTU has an idea for designing CMS, to ease communication between a teacher and a student (Fig. 1). Our professors have so many passwords to remember; therefore virtual communication design

group attributed the same log in names and passwords for CMS. Teachers use them to enter exam session results to the information system of VGTU [3].

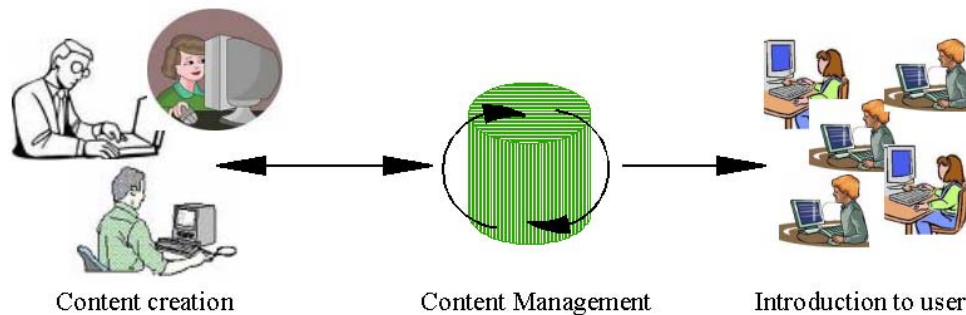


Fig. 1: Collaborative content management systems

2. Usage of Content Management systems and ‘standard’ webs

Presentation of companies, institutions or individuals over WEB is already a common phenomena. Moreover, a lot of water has passed beneath the bridge since the design of WEBS was a difficult task – the top of knowledge conquered only by the professionals in the field. As admins with user-friendly environment have spread, WEB pages can be designed by the PC user himself. In the near future, WEB site design will be as simple as text input by text processor. Definitely, it is the best feature of content management systems.

Content management systems determine valuable means to simplify the design, maintenance, and distribution of content [4]. Most of these systems, however, are entirely based on a client/server model [5, 6].

Lithuanian IT market offers plenty of CMS but mainly for usage of marketing companies and state authorities. Main factor influencing the option – price dividends depends on the frequency of updates to the site. Time consumption as a problem is solved by using ‘unwritten standards’ [7]. Such ‘standards’ seem to be market leader’s websites from an appropriate field which are used for a specialized website.

Initially we chose and tested Moodle (<http://moodle.org>) CMS. But many teachers were dissatisfied with it. The system has abundance of various possibilities and therefore is overloaded and difficult to use. Moreover, the system could not be integrated into the VGTU database – it would be necessary to rewrite the whole code. All open code or commercial CMS have advantages and disadvantages:

- Every company has individual needs, however, some of the CMS are difficult to apply to the specific demands of users;
- Design of individual CMS requires time and cannot distinguish itself by the magnitude of possibilities;
- Not all the structural parts of CMS are related (e.g. system in several languages can only be created page by page in different language).

The best advantage of CMS is its simplicity. Not all the professors are able to use relevantly complicated commercial CMS, but many of them would like to post information on site. Consequently, our information group decided to design CMS in PHP programming language themselves. The existing CMS is /compatible with Oracle database – bases for the whole information system of VGTU. Information input by the teacher is securely kept in database server. Every teacher has a unique ID number and all material he/she presents is related to it and kept in a 150 MB box. Different types of information (dwg, doc, pdf and other files) are saved at various places on the database and related to the user ID (not seen by the user).

3. Conceptual CMS information architecture model

Harmonious information architecture is considered the foundation of every successful website [8]. The project defines all the aspects of the future website: cells, functions, forms, etc. Later on navigation system, user interface, interactive models and design comes. Website design starts from information architecture in consonance with the possessed user needs. According to J. Shiple [8], methodology for WEB information architecture and conceptual information architecture model (Fig. 2, in accordance with [9]) is designed.

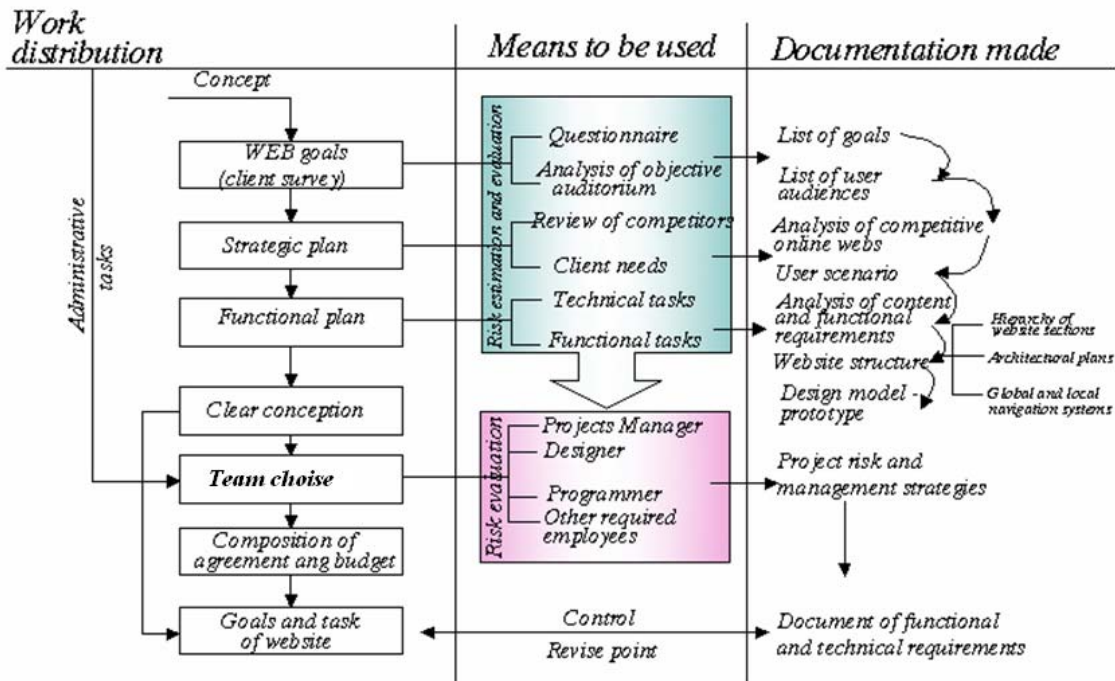


Fig. 2: Conceptual model of information architecture

The model relies on the process of goals and task determination. Quite often clients think of information architecture design as an irrelevant issue with requirements for time consumption. But this kind of attitude is wrong as not only does it save money, but also time for projecting website [8].

4. Major stages of CMS (virtual communication space) design for VGTU

Setting goals (see Fig. 2). Setting goals helps with solving problems during website creation. Goals were determined in accordance to the list of questions which were presented to students and teachers. Results authorized expedience of virtual communication space.

The authors of the article were only concerned in determination of goals for the discipline of engineering and computer graphics. Practice for VGTU engineering graphics are held every other week. Experience of a couple of years indicates that homework tasks should be given during the first class. Sometimes, some of the students are absent in class or loose tasks somewhere. CMS homework tasks are saved (Fig. 3) for the whole semester (may be seen later if needed) and students can take them at the convenient time. Homework and credit works are evaluated and their marks are well seen on CMS. Moreover, before the exam students get information on the accumulative grade point for the exam, in other case (if not all the works are accomplished) – they see tasks remaining and time to hand them in. Analogous goals of virtual environment creation opened up also in other subjects.

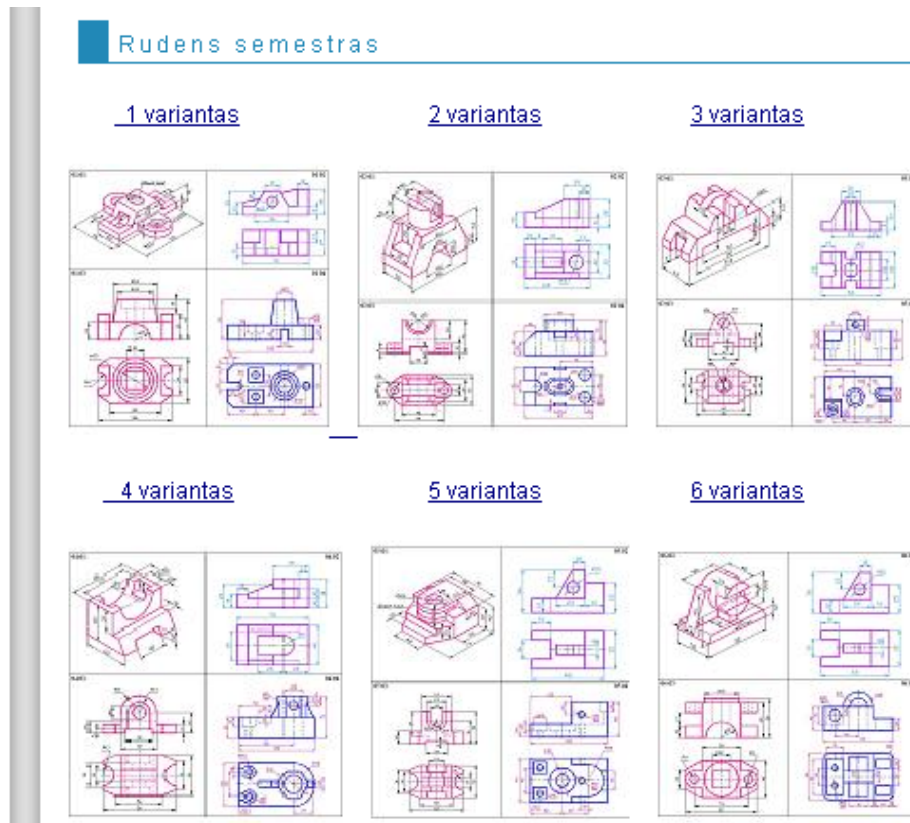


Fig. 3: Homework saved in CMS

Determination of the purposive user auditorium. Some individuals think of auditorium as depending on the selectable technologies permitting access to website. Such provision is wrong. Realistic process of determining your auditorium consists of the following analysis: what are the users of the site, what goals and intentions they have. Virtual communication space at VGTU is firstly appointed for the university professor (content designer) and students (as users) (Fig. 1), but majority of such information is available for other online visitors. For this reason, it is not ethical to present results of credits in academic group for all the visitors of the site. Professor can create log in names and passwords for an appropriate group (Fig. 4), stream or the whole course. Website of every professor indicates his/her e-mail address where student gets additional information. Vast majority of information is provided to all visitors, as standards (or other materials) of engineering graphics can be required by the students of second, third or fourth course year. Therefore, there is no need to hide any general information.

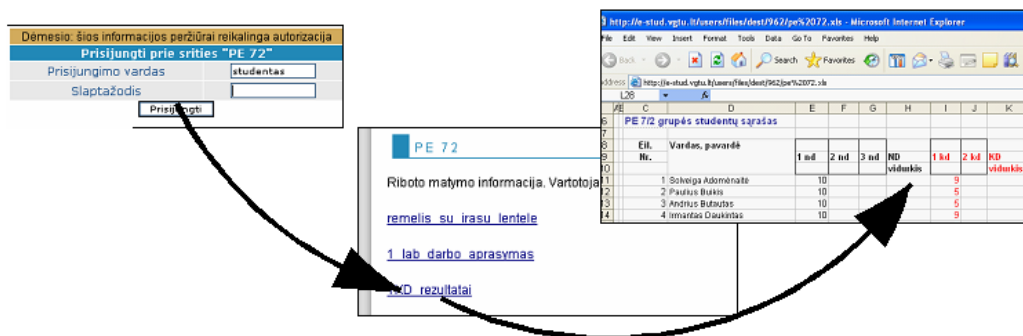


Fig. 4: Log in name and password are attributed to the group PE 72

Collection and specification of user needs. At this stage user scenario-document (with indication of the website usage rules) is designed. Such document should be useful to the planner in the same way as to a client who is able to determine the purpose of site and its possible user.

As professors of different subjects see the site diversely (Fig. 5), we decided to provide material for engineering and computer graphics in the following order: information, homework, theoretical material, and lecture summaries. In section ‘Informacija’ (Information), the sequence of material provision depends on the sequence of material taught during practice sessions. We talk of processing standards, examples of homework and control works, exam tickets and their solutions, deadline terms, evaluations of homework and control works and other requirements.

Professors of engineering graphics have determined user needs according to the subject module because user (student) himself can determine only some general needs for the websites of all teachers.



Fig. 5: The examples of the CMS first page of different lecturers

Website structure. A well organized structure aids simpler and faster creation of navigation system. In case when navigation system already exists, one may easily create website patterns and design.

Virtual communication space of VGTU allows creation of personal CMS for different professors at a time according to the desired structure, but limitations impose. Sections are designed; they can have further inside sections with the whole required information. Although student sees professor's websites as different, but actually their navigation tools and information accessibility remain similar. As material is provided on the virtual space and is related to the subject of engineering graphics, important role is given to the visual aids – website of the professor looks lively and simple to orient (Fig. 6).

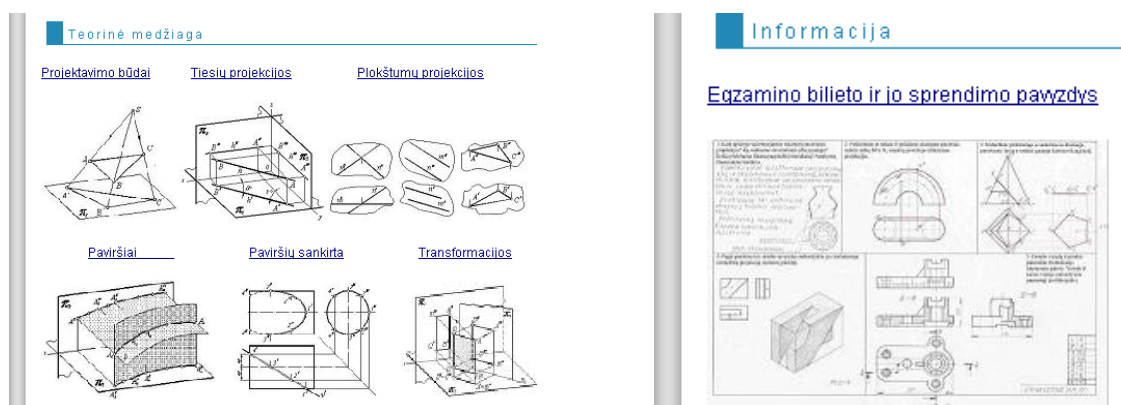


Fig. 6: Visual provision of information (the material of lectures and the examples of exam)

5. Conclusion:

CMS on the market is applicable to other needs and resources than that of virtual communication space for VGTU. Our CMS is simple to use – any staff member with basic knowledge is able to use it, while group of system designers also created instruction manual, conducted training on the issue and is able to give consultations to the professors at any time.

Virtual communication space for professors and students functions as content management system and solves many organizations, information, technical and teaching problems.

Analogous website to the students is in our future plans, but it has other goals. It would be a temporal student database where they could put homework, laboratories or course papers because rewriting tools are not fully reliable and moreover we have human oblivion factor.

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WYKORZYSTANIE ŚRODOWISKA KOMUNIKACJI WIRTUALNEJ W NAUCZANIU GRAFIKI INŻYNIERSKIEJ

Systemy zarządzania treścią, czyli w języku angielskim Content Management Systems (CMS), to aplikacje internetowe pozwalające na łatwe tworzenie serwisu WWW oraz na jego dalszą aktualizację i rozbudowę przez każdego, niekoniecznie profesjonalnie przygotowanego do pracy informatycznej, użytkownika. Publikacja treści na tak zbudowanej platformie odbywa się za pomocą prostych edytorów, a sposób prezentacji wprowadzonych treści jest zaprogramowany przez autorów systemu. System CMS stworzony w Uniwersytecie Technicznym w Wilnie (Litwa) w języku PHP i współpracuje z istniejącą w uniwersytecie bazą danych Oracle. Autorka opisuje etapy tworzenia systemu CMS dla przedmiotu grafika

inżynierska jakimi są: zdefiniowanie celów jakim ma służyć tworzone środowisko wirtualnego nauczania, określenie odbiorcy przekazywanych treści, w tym uwzględnienie etycznych problemów rozpowszechniania bazy danych oraz ochrony danych osobowych. Kolejność wprowadzania informacji jest uzależniona od sekwencji występującej w czasie wykładu. Praca została zilustrowana wieloma „zrzutami” z ekranu.