Architectural Web Portal and Interactive CAD Learning at "Széchenyi István" University in Győr (Hungary)

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It is high time to speak of the importance of the electronic knowledge-bases in the teaching of Hungarian architects and students, as well its multidirectional possibilities for use. The professional web portal of the "Széchenyi István" University in Győr is introduced, together with some of its subject-matters of instruction. In our time the world has been widely opened, internet gives support in getting acquainted with teaching packages from domestic and foreign sources, professional portals and novel topics, and moreover, it makes possible to effectively cooperate among lecturerss, professors and students, as well as among institutions of higher education. Actuality of this initiative from Győr is best shown by the dynamic increase in the number of visitors since the beginning, and now achieves a rate of as high as 2300 visitors in a month. URL-address of the portal, and links to actual works are incorporated onto the homepages of numerous institutions dealing with the profession or the education in general, however, real acknowledgement is proved by responses from the users – both students and industrial experts.

Our "Database for Architecture" (www.arc.sze.hu/indexen.html) started in 2001 with the target to provide *up-to-date and easily useable, editable* knowledge materials *that can be easily accessed at any time and from any place*, to the education of architects at any level in Győr. A more effective education at a higher level can be achieved with the help of electronic subject-matters following the changes in the profession in a flexible way. Knowledge on the fields of related branches, the most recent aims of science and technique, and examples realized in practical life are dynamically coupled with basic knowledge. Through the step-by-step building up of the complexity-aimed database-concept of several special branches, *versatility and richness of our profession* has also been outlined, and at the same time it was an important point of view to fulfil proper selection by *correct technical content, its perfection levels and actuality of information*.

Realization of the above targets till now means – on the example of the subject Building Constructions – that lecture notes, practical guides and study aids with references, electronic stores of drawings, and planning and construction sheets and brochures of leading companies manufacturing building materials – all that can be achieved at the same place. In addition to that, further homepages of professional and scientific character, journals, reviews and periodicals from Hungary and abroad, as well as a selection of independent articles can be found here.

Successful operation of the Database for Architecture is maintained – beside its logical structural arrangement, good selection of contents and favourable appearance – by *numerous special services* (search possibilities, integrated dictionaries, forum, students' administration, news bar).

In our days, it is a general experience that the county borders are getting more and more permeable within Europe of the regions – thereby making wide-ranging collaborate and cooperation very easy. An important precursor and catalyst of this process is the world-wide web where results of international research and practical achievements can be published, as well. Internet is, however, much more then simply one of the media because cooperation can be established and practised on a daily basis among different institutions of higher education owing to its *interactivity*. There is a possibility to more reasonable sharing of the activities, or publishing the results in a common knowledge base. The electronic type knowledge bases serve – owing to the interactivity they provide, too – as *educational tools of extreme efficiency*.

In the meanwhile it must always be taken into consideration that education of future architects has the characteristic feature of often being highly individual regarding the duties given and solutions obtained therefore a personal master-and-follower contact is and shall be of uppermost importance. The knowledge base provides a very useful background for these works, too, for example in sensible and impressing performing of the variety of good solutions.

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1. ELECTRONIC TEACHING KNOWLEDGE BASES AS ARCHETYPES

Through existing domestic professional databases and ideas there were favourable impulses given for a new viable concept suitable for the above detailed wide-ranging demands at our university. These were then complemented a continuous "evolutionary" development – after the starting period – taking into consideration the users' feedbacks.

We were familiarized with one of the considerable initiatives as early as in 1999, on the XXIV. Conference on Building Construction where the concept of the educational computer program package on building construction (called "FAL", meaning "Wall") developed at the Budapest Technical University was introduced us by Nándor Bártol (see: Fig. 1). The author wished to compromise the electronic lecture aids from the university department and links from outside of the university – representing the professional life – into a common knowledge base. The ideas on the structure of the database, the professional requirements and the way of actualizing were formulated with extreme good sense.

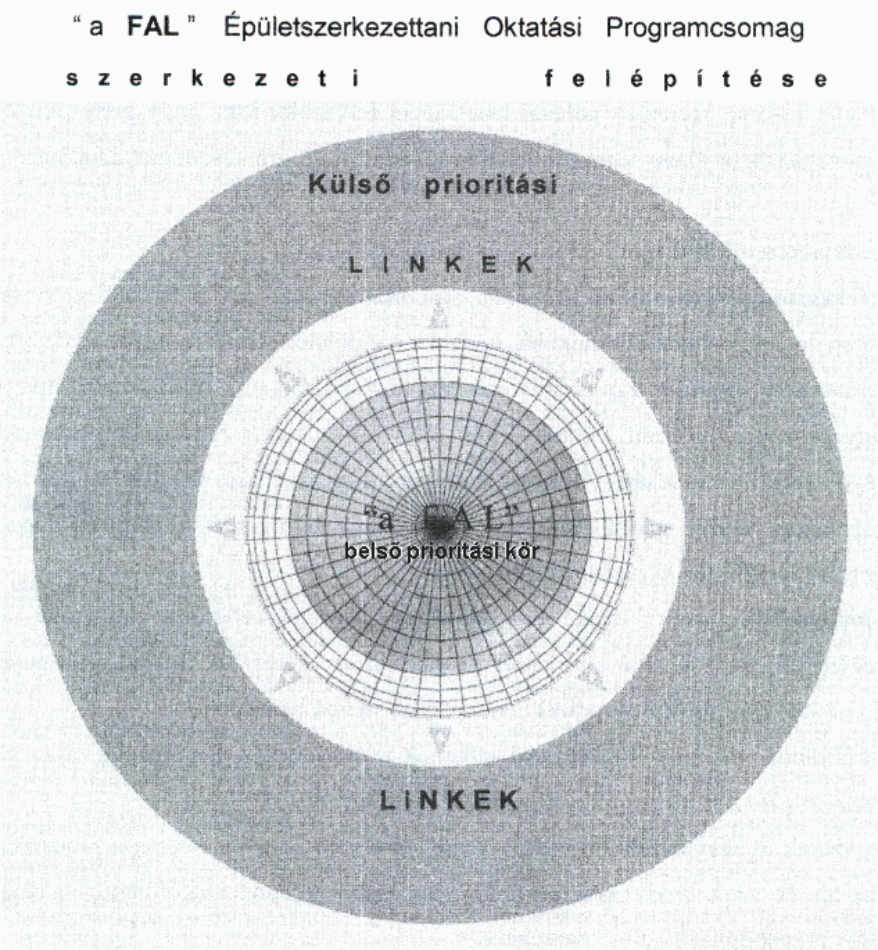

Fig. 1: "FAL" – An Educational Program Package on Building Construction developed at the Budapest Technical University

Another ingenious and since lots of years successfully used example for the professional knowledge transfer is the motion of Dr. József Orbán from Pécs, a catalogue on building materials published by the company Orisoft in Pécs (see: Fig. 2). Professional knowledge and skill offered with excellently suited measure can be accessed in a clearly and distinctly detailed hierarchy. This compilation is perfectly passed and utilized both in the practical life and education, owing to its encyclopaedia-like structure.

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After having selected the main theme desired, the subgroups in the Orisoft Catalogue are provided in *matrix-array* thereby making it possible to choose from the secondary and tertiary points of view of information collecting. So it can be decided whether to choose from different company information within one single product group, or to choose a product group within an actual company.

Another advantage of the matrix principle is compactness, i.e. being unexpanded. Activities of a great number of companies become easily perspicuous and comparable. However, in the small grid field there is only place enough for one link therefore information attached can be seen when the mouse cursor on top of the link moves and displays an information windows with variable content besides the matrix. In case more information should be needed you can click onto the link in the grid field and navigating away onto a new page.

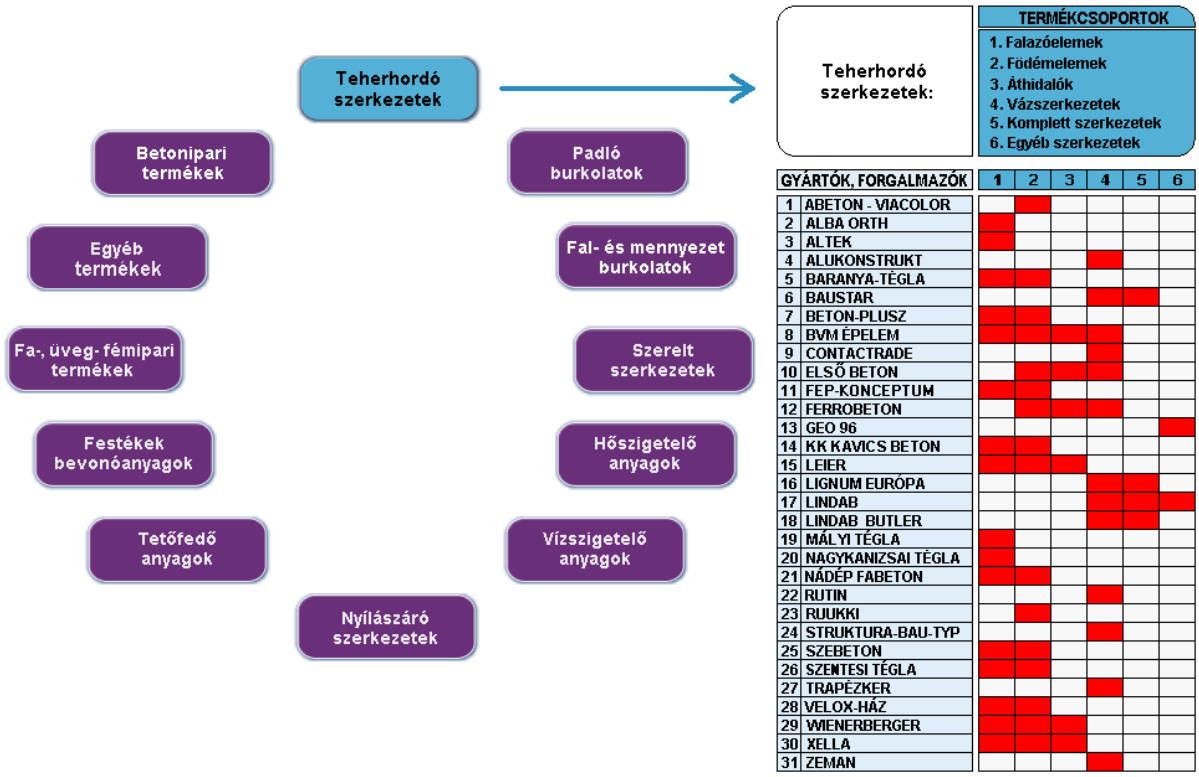

Fig. 2: Scheme of a catalogue on building materials (company: Orisoft in Pécs) organized by main themes, and one selected of the subgroup matrices.

2. STRUCTURE AND USE OF THE KNOWLEDGE BASE FROM GYŐR

At the time of establishing the Architectural Database in Győr (Figures 3 and 4) our target was not only to utilize already available experiences but to implement a lot of new solutions.

Visitors are greeted on the main page showing a mosaic in details from the most beautiful sceneries of the town then there comes a picture dissolution directing onto a webpage with professional information. Catching the eye of our visually susceptible students, their interest is going to be increased by a header toolbar in individual design showing animation over the main themes.

In the database, university lecture notes, additional supporting materials, and selected outside homepages, documents and videos (of informative, research, company information, etc. character) are available. It has a distinctly theme-oriented structure, and even more, *it is quite unique among domestic (Hungarian) web portals since its main structure orientation is subject to that of the university lectures of the teaching students of architecture*. This organizational construction is one of our targets in achieving complexity-oriented education because all of the main segments and parts of our profession compose true unity beside each other as elements of the same importance.

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At the starting location of the professional surface, one of the following main themes can be selected:

- GENERAL
- BUILDING DESIGN & CONSTRUCTION, AND CAD
- URBAN & SETTLEMENT DEVELOPMENT, AND HISTORY
- HISTORY OF ARCHITECTURE, AND PROTECTION OF HERITAGE
- BUILDING CONSTRUCTION SCIENCE, AND BUILDING EXECUTION
- ECOLOGICAL (GREEN) BUILDINGS, BUILDING INSTALLATION, AND BUILDING PHYSICS
- DESIGN DRAWING AND DESCRIPTIVE GEOMETRY
- SUPPORTING STRUCTURES

If one may change the main theme selected before, it is not necessary to go back to the top of the homepage because there are direct links for the main themes on the side bar, too. At the very beginning of the professional surface, but distinctly separated in graphical way from the main themes, certain emphasis is given to the access to some of the most important homepages (e.g. Department of Architect Engineering, PhD Education, Professional Practice Abroad, College "Baross Gábor" for Advanced Technical Studies, or a link to the homepage of the Association of Building Construction Science Branch in Győr).

The structure of the database is *similar to a site-map* (a kind of link-maps) which results in choice able *to demonstrate nearly at the same time* from all the main theme blocks down to the links representing in this meaning the smallest building elements. A novel kind of solution used that links are not listed featureless but are organized into five subgroups kept apart by *spectacular colour markings*.

The following subgroups can be found within all of the main themes:

- Education material (lilac);
- Useful professional links (blue);
- Domestic and foreign periodicals, journals, etc. (red);
- Articles written by university lecturers (green);
- Certain articles of higher importance written by authors “from the outside” (brown).

Owing to this multi-level grouping, it is much easier to search for something, and at the same time, a requirement set by the lecturers’ community is also fulfilled, i.e. *engineering ability and sense of our students in making things more reasonable and rationalized must be developed, and the way from great agglomeration (clusters) to the smaller sections of elements must be observed and realized*.

This site-map principle makes – similarly to the matrix-principle – several information gaining strategies possible. It is also possible to decide whether to choose from the five subgroups within each main theme, or the subgroups with the same colour (i.e. periodicals, journals, etc.) represent the primary point of view for the search and the selection of a certain main theme (i.e. a given field of profession) remains at the second level (secondary point of view).

Since there are several links in the cluster selected on the basis of both the primary and the secondary selection point of view (i.e. several journals on building construction), thereby a third level of differentiation should be derived.

Through modification of the link names, a quaternary differentiation may partly also be realized:

- Separation of lecture notes from education supports and aids with the help of determining additional words;
- Discrimination of the most important document owners with supplemental words (authors, universities, countries, etc.);
- Emphasized display of the names of periodicals and journals from foreign countries by capital letter;
- Separation of periodicals and journals with on-line full-text from those with only content information (these latter-mentioned are distinguished with the supplementary word “info”).

Since these spectacularly coloured site-map markings can be easily overview through a simple mouse scrolling, therefore the last mentioned particular points of view can even be chosen as primary selection feature (and thereby it is possible to browse only e.g. the cluster of foreign periodicals, or that of the university lecture notes, etc.).

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This *multi-differentiated site-map* as shown can flexibly be developed; however, it is our important target to support our students only with well pre-selected mass of information that can be reviewed at a glance. Sometimes – when an extension of the material happens – certain other elements are removed, or links that are close to or in strong relationship with each other (e.g. practical guides and helping supplements for building construction) are compiled onto a single independent page to be opened by a single click.

3. SPECIAL SERVICES OBTAINABLE FROM THE KNOWLEDGE BASE

Through these special services, efficiency of use and up-to-date information transfer are significantly increased.

Previously, possibility of multiple-purpose selection of the line for the points of view for access to information has been mentioned. It is then associated with the feature that the links already visited are displayed in and distinguished with a slightly changed background shade thereby systemic (or on the contrary, "on the random basis") browsing of the database items, and the return onto a former item are greatly facilitated.

Not only "search what you see" but some kinds of *"computer-aided search"* can also be chosen. A simple quick search (CTRL+F) is used for search among link names, and an individually modified purpose-oriented Google-service (under "Search" of the side bar) helps in finding something within the full content of the university's web-documents (when choosing the so-called "browse in saved content" the exactly matched places of occurrence of the search words can be seen within the document brought into eye-catching coloured limelight). This menu point is also suitable not only for search on the internet but for use with the Google Scholar search machine developed for educational and scientific purposes.

From the side menu it is possible to enter the recently developed "*Forum*" page. This is a kind of interactive discussion surface where students and teachers, lecturers and "outside" participants working in the line of business can communicate with each other. Themes of this "virtual round-table" are determined by the user, and anybody can add a comment to them. At the very beginning, some themes were designated as start-up topics by the lecturer in order to facilitate deeper discussions and formation of professional directions (e.g. Designers' Forum, Forum for Urbanists and Heritage Protection, Forum for Building Constructors). This is also the very forum that can create a community, a kind of society among our students who stay in different foreign countries under the work with "Erasmus" program.

A prompt help can be achieved during browsing homepages in foreign languages when the *on-line dictionaries* (developed by SZTAKI) in five languages and in both translation directions are turned on through clicking on the bottom part of the side bar menu.

On the lowest part of the side bar menu, *actual and latest news* are temporarily running (e.g. about certain lectures, exhibitions, conferences, "Day of Open Gates", admission information).

From the homepage "*Neptun*" (*an administrative service for students*) can be accessed where information regarding different subjects and time schedules are published. This is one of the ways for the students to register themselves for learning a subject and later for exams, and here they can also check their graduation notes. This kind of information on documents and graduation is subject to change only with password of the university department.

Scrolling down onto the bottom of the database, the Database for Architecture can be set with a single click as start page in the internet browser; and there is the possibility to jump onto a download page of free software for the most commonly used file types (extensions .pdf, .doc, .ppt, .xls).

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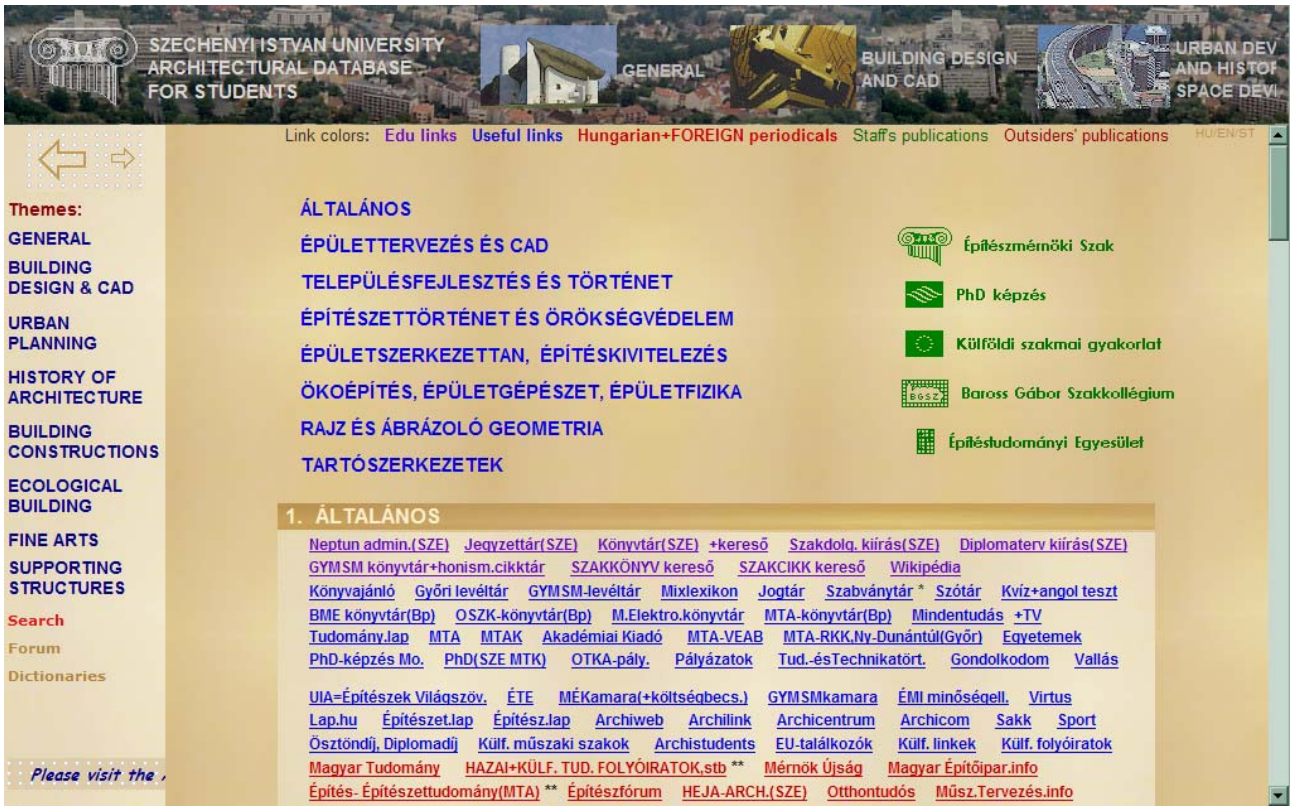

Fig. 3: Architectural Database for Students (designed in Győr)

4. HAVE A TASTE FROM THE CURRICULAR SCHOOL-WORKS OF THE KNOWLEDGE BASE

In case of certain subjects – for example, building construction, building execution, history of architecture – curricular school-works were published on a CD good ten years ago. Owing their format HTML they could easily be inserted functionally into the internet knowledge base, too; their menu system should have undergone a modernization process. Through the recently used side bar menu and read-windows the notes became easier to overview, and their use is also more convenient. Other school-works can be accessed not in HTML but the also most popular PDF format (e.g. Organization of Building Activities, Planning of Buildings).

Our newest (and also on CD accessible) school-work is "Computer-Based Architectural Modelling" in order to support ArchiCAD teaching. Important roles are here given – besides the texts and pictorial information – to *educational videos* and *interactive practicing examples*. This material was prepared in 2006 within the framework of HEFOP-program, and its realization was also supported by the company Hyperionics with its "HyperSnap" screen capture software and "HyperCam" screen recorder software.

In the videos, example solutions can exactly be documented, the oral explanation of the lecturer can be heard, and the places of mouse clicks are also marked with colours. This educational film can be run by the students parallel to the CAD-software; it can be stopped and re-started, etc. These films are never-stopping educational supports to learn step-by-step the examples. The students can thereby more efficiently learn the special knowledge than earlier. When using ArchiCAD, preparation of technical drawings is similar to a certain extent to the classical and traditional drawing on tracing-paper with china-ink but spatial modelling requires a specific way of ArchiCAD-Thinking, therefore greater emphasis has been laid opon this.

In our days, numerous architect offices prepare own homepages, and even accept orders not only for architectural planning but webdesign-type works, thereby turning visual art abilities to business. In accordance with the challenges of our time, in the above mentioned lecture note on CAD there is a short summary given about publishing of vision schemes on an internet webpage, with interactive webdesign-examples (when modifying the software lines written in HTML in the practical examples, different results as reactions can be displayed).

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Fig. 4: On-Line Lecture Notes and Practical Aids for each semester on Building Construction and Building Effectuation

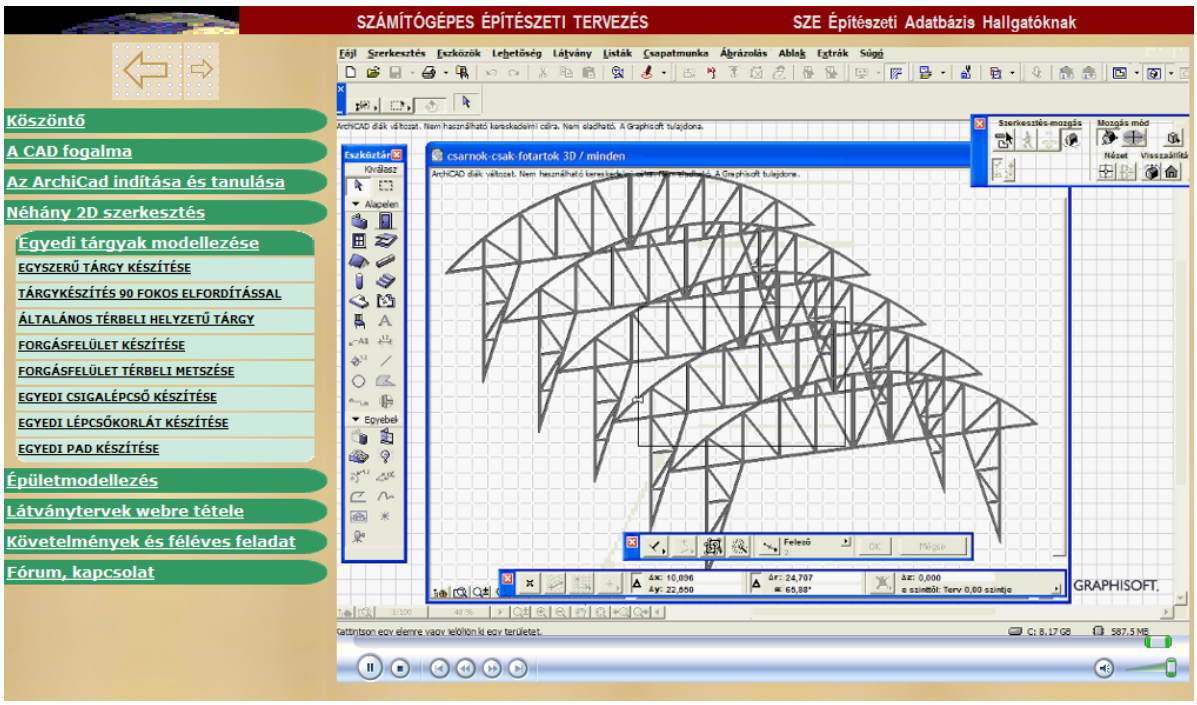

Fig. 5: Computer Aided Architectural Modelling (online lecture notes)

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5. MAINTENANCE OF THE KNOWLEDGE BASE; FURTHER DEVELOPMENTS

Construction and editing of the internet knowledge base is based in general on html-knowledge, but is accompanied with numerous Java Script applications (animations, interactive VR-panorama, on-line dictionary request, etc.). Both editing and automated looking for link-failure are realized with free softwares. During steady maintenance and actualization, ideas, proposals and opinions of the users are taken into account. Our students give reports on the great help this knowledge base provides them in learning and being informed, and the visitor-statistics give also high *access figures as feedback*.

The Database for Architecture has been and is continuously developed and its content actualized. It is our plan to prepare further school-works, and we try to utilize the new possibilities created by computer science. The database is already pre-edited for incorporating later additional educational materials of the English-language teaching.

Our professional webportal is truly integrated both into the homepage of "Széchenyi István" University, Department of Architecture and into those of the related special departments. So this Knowledge Base provides *new opportunities for both the students and their lecturers for thinking together*. Our portal can, maybe, give motivation to others who wish to learn out of their professional feeling, and may, as we do hope, help them after obtaining a diploma, as well.

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