The use of renewable resource in architecture: new teaching methodologies

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The program is organized into four parts. Each is very much connected, both logically and methodologically, so that the unit as a whole consists of a content and method of access that are not divided up.

This method is not in a chronological order that simply goes in one direction, rather it allows the user to “refer back”, in real time and in different directions.

For the simple purpose of explanation, the sections of the program are listed as follows:
- “Basic information” concerns the basics of bioclimatic and timber architecture. Without this knowledge, the other two sections would be difficult to understand;
- “Actual buildings throughout the world”; give examples of architectural quality; they concretize the basics of bioclimatic and timber architecture;
- “Students’ Masters Theses”, that follow on from the basic information and the learning experience “in the field”, and guided by the lecturer, have a critical approach to actual buildings throughout the world.
- A multimedia data-sheet organized to ensure a clear and straightforward presentation of information about the construction products. It relies on a tab-based navigation interface that gives users access to eight different stacked windows.

Keywords: Architecture, multimedia, timber, bioclimatic, classification.

Introduction

Various types of more traditional instruction methods, whether of an oral or written nature, are not as easy or as effective to use. This is almost invariably due to the rigid division of the topic and the different means the user needs to access it. Computer technology permits an easy and speedy consultation, even when dealing with different aspects of the same topic, as is also the case with this work.

The general theme of bioclimatic and timber architecture may come up against difficulties when only one system of communication is used, given the different aspects that the overall theme contains. In the current work film clips, photos - including large format - written text, tables, graphics, diagrams and animation (that is comparable to a video cassette without the viewing sequence, however) have been used. It is worth remembering that the passage from one system of communication to another takes place in real time, depending on the requirements and interest of the user.

The program includes four main sections. It is designed for optimum flexibility so that, at any time, it is possible to move instantly from one section to another.
The “Information” section.

The “Information” section includes access to general, pertinent information about timber and bioclimatic aspects related to building.

The “Platform-frame” section of the program details how to build timber-frame buildings with an industrialised system.

It consists of:

- 8 “chapters” illustrating building units: foundations, floors, walls, roofs, cladding, stairs, plumbing, insulation
- bibliography
- step-by-step construction pictures
- information on tree species found in Italy
- dimension-elements tables
- 2 multiple-view movies
- 3 movies about logging, sawmills, and plywood mills.

The bibliography lists 23 keywords which allow users to search a 900 items annotated bibliography of books and articles dealing with construction strategies and problems related to timber-frame buildings. The step-by-step construction shows a building under construction in consecutive steps with full-screen pictures of work-in-progress. The Italian trees’ species portion contains texts and pictures which give information about species, trunks, leaves and uses of trees found in Italy. The dimension-elements tables show joist spacing, dimensions, and relative spans depending on the use and the loads required for different commercial designations, grades of lumber and ceiling types. The two multiple-view movies show 3D side elevations and aerial perspectives; they also recreate interior views as if a person is travelling through the building. The flexible three-dimensional character of this feature gives students access to all views of the design projects. The three movies about logging, sawmills, and plywoodmills feature QuickTime movies with sound and text explanation.

The “bioclimatic” section of the program details the information about active and passive system and methodological approach with 120 keyword.

The “Actual buildings throughout the world” section

The “Buildings throughout the world” section is illustrated by full-screen pictures and text.

Actual buildings throughout the world referred to and those in the Students’ master’s theses, have a timber structure. Thus, an uniform picture is reconstructed, since wood is a material that requires very little energy to produce, is ecological, renewable, and its technology has been “sustainable” over various eras and in different countries in the world.
The “Students’ Masters Theses” section.

The projects include traditional drawings (plans, sections, details, pictures of the models) and innovative mode (QTVR) to illustrate what students might design as timber structures. The Master designs by students are not only displayed with the usual graphics, but are translated into virtual reality, that is able to simulate how the building responds to climatic effects. The illustration of the Masters theses in this work explains the teaching methods carried out and the quality achieved in the technological and formal results.

The “construction products” section.

The search query selection.

The search window, called in this system “Selettore”, is the part of the system that has the first relation to the user and the one that provides a switch from natural language to an artificial language suitable for computers.

The “Selettore” retrieval system prototype has access keys for searching, depending on which information about the product you already know.

Search options with “Selettore”:

- If you know the name or the producer of a building product you can use a free text field;
• If you know the name or the producer of a building product and would like to know about alternatives you can use a free text field;
• If you don’t know the name you can select the function and/or the shape and/or the material, according to EPIC classification plan;
• If you are searching a product with special attributes not included in previous options, you have an extra-attributes field for it;

We used, as controlled language retrieval, EPIC´s (European Product Information Cooperation) construction-product grouping. EPIC product grouping is characterized by taking the function facet as the first classification criterion. Further subdivision is achieved by reference to shape and material. This multi-faceted approach lets the user make combinations of different properties and allows identification of a building product from different points of view. Different approaches to classification in the building context are discussed by Ekholm (Ekholm 1996).

When the user selects the products in which he is interested, the selection goes through the Internet to a central database in the Construction Product Browser Web Server. Obviously this server doesn’t contain all the information related to a specific product; instead, it should be the place where the query from the user can be readdressed to the right address (URL) on the Internet.

SSS The display of the product information.

Traditionally, paper-based product catalogues describes a range of product from a company and are designed to satisfy the different needs and wishes off all the different target users with only one catalogue (Follin 1994). A component such a door is of interest for the final user as it is for the architect in charge of the design of the building in which this door will be placed: the former user is more interested in how the component looks, its dimension and colours, while the latter needs more technical information to select the proper door and to include the component in a CAD drawing.

In order to satisfy both needs, paper-based product catalogues often contain an overload of information, which is time consuming for both users. Obviously the definition of a general structuring model of the technical documentation is a demanding task, considering the huge number of the available products; the differences of their related information; and the different needs of the various actors of the building process in term of information. To answer to this we propose a multimedia data-sheet that works at the level of meta-contents instead of specific product-related information. Thus the same data sheet layout will be suitable to describe different classes of products (e.g. a door, a painting, an elevator). This
will allow our data sheet to be at the same time independent of the information available on the products, and open to the addition of new types of information and navigational paths.

The layout will:

- provide users a consistent organization of the information;
- avoid information overload to the user by displaying homogeneous group of data;
- enable users to make comparisons between different products;
- enable users to import all this information directly into their own documents.

The multimedia data-sheet is organized to ensure a clear and straightforward presentation of information. It relies on a tab-based navigation interface that gives users access to eight different stacked windows, in order to avoid the cluttering of the small monitor’s space with an information overload (Anceschi 1997). Each window covers homogeneous headings from the CIB Master List and UNI 9038; thus ensuring completeness and consistency of the displayed information. A side effect of this consistency is the ability of the product data-sheet to generate comparison tables between two or more products. Another side effect is that the efforts of a manufacturer to document in a complete way his products will be considered a bonus by the potential customer who will probably choose the better described product. The result will be an increase in comprehension, e.g. of
the mechanical behaviour of a product; of the assembly instructions; or the different versions, designs, or product combinations.

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