The web as a knowledge representational media for architectural precedents

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1. Introduction

This paper reviews current web sites that are dealing with architectural content. The purpose of the review is to explore the potential of current web-based presentation technologies as a mean for the construction of precedent libraries on the web.

The first part presents the importance of the Internet as a knowledge representation medium. The review of Internet-based representation methods of architectural precedents and architectural knowledge includes 30 existing web-sites. The criteria for evaluating these sites were based on literature reviews. The first one is a theoretical literature dealing with architectural knowledge representation and the second one is a theoretical literature related to the Internet age. The evaluation criteria drawn form these two content resources included subjects such as: knowledge representation methods, precedents display methods, organization systems, indexing, search, etc.

By reviewing the web sites threw these evaluation criteria, we examine and discuss the issues and problems relating to the development of architectural libraries on the web.

2. The Internet as a knowledge representation medium

The Internet, which has undergone a rapid development in the recent years, and the technologies associated with it have been exploited by numerous various bodies for site development dealing with architectural subjects. The Internet gained outstanding popularity and possibilities for offering extensive information in an attractive manner. This new technology allocates web-based libraries in a more advantageous position relative to precedent libraries using textual languages. Conventional display methods based on paper technology are methods in which interaction with the user is based on static presentation of text and graphics. In contrast, existing methods of computerized sampling and presentation support dynamic, interactive display of graphic and textual content. The development of web-based precedent libraries raises a number of questions. The present article presents these problems and discusses them. One of the objectives of this work is to examine how computer media is being exploited in existing web sites in order to create a dynamic interactive information environment to meet new needs and possi-

bilities. The first issues which are addressed in this survey are graphical-visual methods of presentation and questions relating to the organization of architectural knowledge.

3. Selection of Web sites

The preliminary search reviewed more then 80 web-sites. Thirty sites which qualify the following criteria were finally chosen. The selected sites dealt with internal subjects such as: architectural information, precedents presentation, or architectural libraries. Some of them were dealing with a historic period , documentation of famous architects work, town documentation, uniform of building typology, etc. An effort was made to select web sites with rich architectural content, developed organization and indexing of information and large detail or interesting manner of presentation forms. The list of selected sites appears in the appendix.

4. Criteria for evaluating the Web sites

In order to select criteria for evaluation the **web** sites two reviews were conducted .The first one was a review of current theoretical literature covering the subject of information components in architectural precedents. The leading authors dealing with this issue are: C. Alexander (Alexander,77), F. Ching (Ching, 79), R. Clarck, and M. Pause (Clarck & Pause, 85).

   The second theoretical resource was based on the era of computer presentation and the Internet in recent years. The leading authors in this era are N. Negraponte (Negraponte, 95), W. Mitchell (Mitchell, 96), and W. Gibson (Gibson, 95).

4.1   Criteria drawn from the traditional literature

The following selected criteria were based on traditional resources:

a. Definition of basic terms: the first criteria deal with definition of terms, which represent the information. Each of reviewed researchers constructed an architectural language composed of a collection of terms. Each term represents a keyword, which joins other terms defined, forming an organization method. For example the term **Pattern** (Alexander, 77), which defines the participation way of solving an architectural issue or problem.

b. Representation: the next criteria deal with the medium of representation of the knowledge context.

- Verbal Representation: explaining the general theory, the central principles, the terms and the their organization, etc.

- Graphical Representation**: v**arious graphical means were used in the theoretical literature reviewed such as Organization schemes, Hierarchical abstraction, Diagrams, and Analytical schemes.

c. Presentation of the precedents: This criterion evaluates the presentation of the precedents. For example
   Mode of textual presentation of the precedents.
   Mode of graphical presentation of the precedents such as sketches plans, sections, views and photographs.

d. The organizing the information: this criterion inspects the information organization. Organization of the knowledge reflects the way in which the terms are related to each other, and stages of constructing the information. In the reviewed literature several organization methods have been explored.

4.2 Criteria drawn from the review of the Internet era

The theoretical review on the Internet age added the following new evaluation criteria of knowledge representation. The questionnaire, which was developed, examined the degree to which the site makes use of the conditions and characteristics of the electronic age.

a. New virtual presentation tools: this criteria inspects how new virtual display methods have been applied on the site.

b. Hyper- linking of the information: this criterion inspects the connection of type of information to another type of information on the web. The connectivity characters of web-based documents, is due to the development of languages based on hypertexts.

c. Indexing Keys: this criterion inspects the indexing keys. Developing of various hyper-linking tools has accelerated the information keying methods. These tools replace conventional means, which base on a numerical code, chronological order, or alphabetical sequence.

d. Search: this criteria inspects the search methods suggested by the site. The development of information search engines created fast search modes that are presented in a dynamic, and user friendly manner.

e. Dynamic presentation of information: this criteria deals with presentation tools which make use of the development of hyper-linking text and images, in a dynamic manner.

f. Interactivity: this criteria inspects the mode of Interactivity i.e. the cooperation of the user and the returned feedback which is in contrast unidirectional presentation of information in the conventional literature. These possibilities of associative connections simulates the way of thinking of the human brain

g. Collaboration: this criteria inspects the potential of creating databases in collaboration.

5. Findings of the review and conclusions

The main foundlings of the review, conclusions and future aspects are brought in the following list:

5.1 The sites characteristics

Subject of the information – Only in two web sites, the precedents is presented for visualizing a subject of theoretical knowledge.

5.2 Information presentation

a. Method of defining terms: most of the sites reviewed confine themselves to displaying architectural precedents and do not display information subjects. Hence they do not contain term definitions, on the basis of which knowledge is constructed. Only four of the web sites reviewed contained term definitions.

b. Verbal representation: while the conventional literature makes extensive use of verbal description of information, it was carefully used in the web sites reviewed. This is mainly due to the fact that most of the web sites do not present theoretical architectural information.

c. Graphic representation: only few sites reviewed used graphic representation tools, which constitute on analysis and insight into the precedents, in contrast to the conventional literature.

5.3 Presentation of precedents

a. Verbal presentation of precedents: in many web sites a narrative verbal presentation constitutes a significant part of presenting the precedent. On the other hand the details of the precedent are not always mentioned.

b. Graphic sampling of precedents: the preferred mean of graphic presentation was photographed pictures. The medium of photography does not provide insight into the planning principles. It seems like some of these graphical means are

being replaced by computerized means such as animation, 3D models, virtual tours and applets.

5.4 Links to additional information sources.

The potential of linking the site information to other web sites and information sources has not been used in most of the web sites reviewed.

5.5 Methods of organizing the information.

The survey pointed out that most of the sites built a structure of precedents by using hyper-linked indexing not a structure of knowledge.

5.6 Search and indexing

In many web sites the interaction with the information is still in a static and passive phase. The web has problems of access, navigation, and information search.

Most of the sites used one or more Criteria keys. In many cases there was a Leading key and an additional secondary key.

5.7 Dynamite and Interactivity

Information presentation is in most of the sites too static the means that were used by the sites to course dynamite and interactivity were hyper-linked tools, animation and applets.

5.8 Collaboration

The collaboration tools in the sites reviewed were structured almost only to the user side.

6. Conclusions and future aspects

Most of the terminology existing at present in the Internet has been driven from web terminology and not necessarily from the theoretical nature of the architectural content. Most sites present information, but no knowledge that could proceed a background and a basis for understanding the principles of design. Establishing a uniform language of architectural concepts would facilitate the use of the web as a global source of available architectural knowledge, for study as well as for designing current projects. The time has come to create a universal web-based library of architectural precedents. The linkage between many kinds of information sources can crate a rich precedent library. Such a library that includes knowledge-based keys will serve as a design aided tool. This library will also serve as an "Electronic meeting Place" for the designers community, as was vision by Mitchel (Mitchel, 96).

New representation technologies of the net should adopt and upgrade conventional representation methods such as solution schema and abstractive plans or by alternative ways like animation and 3D models. The potential of the search engines should be used to build a search structure by knowledge terms that will support intelligent search according to the knowledge characteristics. By establishing an indexing system of architectural knowledge, terms and disciplinary key system a global architectural library will be developed which supports a common architectural language.

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