

DESIGNMAP: CAPTURING DESIGN KNOWLEDGE IN ARCHITECTURAL PRACTICE

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ABSTRACT

Within the conceptual phase of design, architects (and designers in general) collect and look at design documents. These design documents are sources of knowledge and inspiration for designers. In order to support knowledge representation and information organization in an integrated manner during the conceptual design phase, an information model named Architectural Information Map (ArcIMap) has been developed. Four prototype applications of this model have been developed and tested; three in architectural education and one in architectural practice. This paper presents the ArcIMap model, its application in architectural practice, the evaluation of this application, and its final version. The paper is concluded with a discussion of the results and future work.

Keywords: architectural design, conceptual design phase, design correspondence information modeling, knowledge representation

In the conceptual phase of design, architects develop one or more concepts that must prove to be valid throughout the lifecycle of the project. In order to do so, they gather information and study relevant precedents (Akin 2002). This information is usually represented as design documents of any format, and they convey a specific aspect and viewpoint. Furthermore, architects often work in teams, also in the conceptual phase of design. Correspondence among the team members, and with members of other disciplines involved in this phase, is crucial, because in design, designers learn from and with each other. Finally, the knowledge created within any community, for instance an architectural office, needs to be captured and reused for future projects and new team members.

A computational environment for a collection of design documents that supports the recording and reuse of

knowledge, and the organization of information, that can be searched and browsed, and the organization of the knowledge that resides in these documents that can be searched and browsed, is essential. This environment must be robust, but also flexible, extensible, and easy to use.

In order to support knowledge representation and information organization in an integrated manner during the conceptual design phase, an information model named Architectural Information Map (ArcIMap) has been developed. The goal of ArcIMap is to define a framework for creating digital applications for designers to use in the conceptual phase of design. In this way, extensible libraries of design documents can be created, and knowledge structures of designers can be recorded. This framework can be used for educational as well as professional contexts. In this model, two distinct

activities are investigated in the context of conceptual design: information organization, and knowledge representation and reuse. This model acts as a framework for the definition and implementation of computational systems, and applied in specific contexts. The ArcIMap model creates a methodology for the separation of the organizational structure and the document structure. ArchIMap has two main components: a semantic structure (Novak and Gowin 1984, Sowa 1991, Sowa 1984, Pepper 2002) and a document structure (Figure 1).

A prototype application of ArcIMap, named DesignMap, was developed in order to test the validity and applicability of the model in a practical context. DesignMap implements parts of the ArcIMap model in a flexible and extensible web-based collaborative environment. It targets middle and small-size architectural offices.

DesignMap was applied in an architectural office, Mecanoo, in Delft, The Netherlands. This prototype application has been used for approximately 3 months, followed by an evaluation workshop. A final prototype has been developed according to the findings derived from this workshop.

A number of improvements would increase the chance of success of an application of ArcIMap, especially in the context of an architectural office. One important requirement for an information system to be used in practice is that it should have as little impact on daily work as possible. The main problem of attempts to capture and make available knowledge during design is the additional workload that is generated by the capture process and how one can justify this to designers and managers. In order to decrease this workload, a number of tools must be developed and implemented.

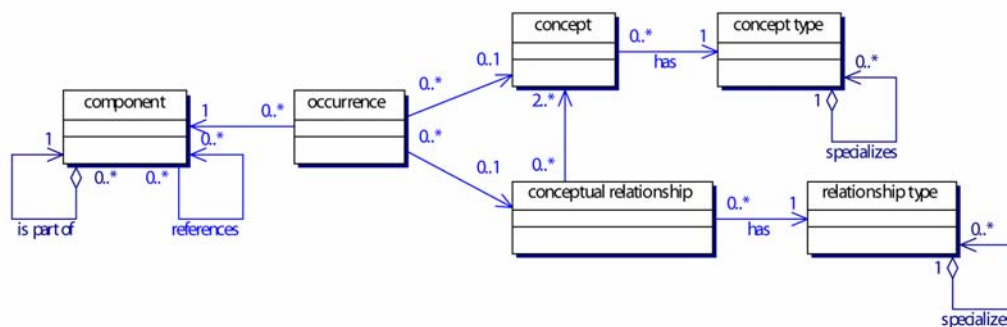


Figure 1: The ArcIMap model as a class diagram represented in UML.