

# On E-Learning in Cyberspace

## A Collaborative Construction of Knowledge of Places in Cyberspace

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*The paper describes an experimental program whose objective was to identify generic design concepts of “virtual place”. The design of virtual space constitutes a special and new class of design in which the visual constituents of place and their symbolic construction should be pre-defined and specified in order to enable design. A goal of this work has been to make a conceptual mapping of Cyberspace. The experiment was carried on in an e-learning environment in which a design class collaboratively constructed a generic knowledge base for the design of “virtual place”. We present the basis for the conceptual mapping employing the ICF formalism as an e-learning environment in making the survey, analysis and the categorization of relevant sites.*

*Keywords: E-learning, Conceptual Mapping, Virtual Place*

### Introduction

Cyberspace and the Internet have changed and restructured relations between people and place. New media and spatial metaphors are being employed in changing our conceptual understanding of what Cyberspace actually is and may become. The conceptual space that is Cyberspace is extending both our functional and social life through interaction and communication. Currently there are two basic metaphors for place: “The “document” metaphor, or information-based models of place – this model is analogous to Web Pages and navigation and interaction are supporting documents and the “physical place” where metaphors analogous to our real experience with the world are employed (Kalay, 2000).

In order to go beyond these two dominant models and provide a sense of place in the virtual world, it requires physical setting, a functional

context, a social setting, and interactivity (Gu and Maher, M.L.2002). With these general requirements in mind, the objective of our research has been to determine and define the generic requirements of place from a design point of view. This new concept of place seeks to combine aspects of various models. It includes navigation and browsing concepts from information-based models, social interactions from the social model, and orientation and belonging from the physical model. In combining the physical presence attributes with the conceptual and informational attributes it is truly unique.

Online activities of diverse functions such as shopping, banking, and travel planning are occurring more and more often in virtual environments (Mitchell, 1995). Currently, these are commonly “information environments” rather than spatial experiences. However, as beside the physical environment, networked environments become an

important part of our actual daily experience, the design of virtual space may enhance our presence and functionality in the new world of information.

Our main research objective has been to determine how interaction with virtual architecture contributes to experiences of place in Cyberspace. This has been undertaken through a survey of, and experimentation with, existing sites that exploit the virtual architecture metaphor.

In order to enrich this experimental work we have also attempted to map the relevant activities that are dealing with the conceptualization of Cyberspace as well as to learn from existing precedents in the media. The theoretical aspect of the survey has provided the definition of a range of significant issues to be solved in this emerging field. The survey and experimentation with precedents has provide a specific set of concepts and solutions to these issues which are characteristic of the current state of the art. Given the relative newness of this as a field of design, and given the uniqueness of the design field, both of these methods, the theoretical as well as the experimental, have proved to supplement one another.

### **E-learning through the collaborative construction of knowledge**

The conceptual characteristics of virtual place as a generic space constituted the subject matter of a research study in which students participated as a team working collaboratively in an E-learning environment of “distributed locations”. The goal of the experimental program was to identify and define generic design concepts of “virtual place”. The experiment was carried on in an e-learning situation in which students collaboratively constructed a generic knowledge base for the design of “virtual place” from remote places.

The provisions for the collaborative construction of the knowledge base and the methods of knowledge collection, and our findings were based on the ICF formalism (Oxman, 1996). It is

based upon a prior work and has been exploited as a basis for knowledge formalization of design precedents. The method is relevant to the study of design precedents, in this case, of designs of virtual architecture. Examples of the designs that were considered of significance as exemplifying the generic characteristics of virtual place were assembled to form a conceptual structure. This method includes the construction of a semantic net of design concepts as a basis for selecting, storing and retrieving precedent knowledge.

Employing a common method, and the ICF formalism for the documentation of knowledge derived from case studies of web sites, the group of researchers developed a semantic net of concepts related to the constituents of place in virtual architecture. This tri-partite schema has implications for memory organization, indexing, and search in the knowledge base collecting the examples from the sites. It provides a method for documenting and storing the knowledge derived from the analysis of precedent sites, and of structuring that knowledge into a semantic net.

In addition, the method has provided a framework for the collaborative construction of knowledge in a collaborative process. In this framework we have employed the WebPAD tool. The WebPAD is a tool, which is employed in our research (Oxman and Shabo, 1999). It provides an environment in which new knowledge can be input by independent agents using the system. It provides certain utilities that support discussions and sharing of knowledge, in a collective construction and modification process of a case-base. To our knowledge this is a unique property of the WebPAD system. This property addresses one of the inherent possibilities of E-learning and the construction of knowledge in cyberspace.

The selection of precedents was based on site types that have a natural reference to architectural place-based models rather than to document-based models. Those selected for study

were further processed to emphasize sites with maximal emphasis upon applications of spatial representation and the presence of the constituents of place. The initial selection determined the following types to be most promising for additional detailed analysis: virtual museums and exhibitions, virtual learning environments, virtual shopping centers, virtual meeting-rooms, etc.

The following precedents are representative of the material studied in the survey and analysis:

Virtual Museums:

- Virtual Museum of Arts El Pais  
<http://www3.diarioelpais.com/muva2/#>
- Art Museum.net - Van Gogh's Van Gogh  
[www.artmuseum.net/vangogh/gateway.asp](http://www.artmuseum.net/vangogh/gateway.asp)
- Math Museum – interacting with objects by video clips  
[www.math.brown.edu](http://www.math.brown.edu)
- Virtual Learning Environments, Alfy  
[www.alfy.com](http://www.alfy.com)

## Mapping Cyberspace

Mapping Cyberspace was reported in the literature to be an extremely complex task (Dodge and Kitchin, 2001). In our approach, it is the structure of the conceptual method that provided a common basis for the analysis, evaluation, and documentation of the relevant material gathered on the sites. The common method also provided a “collaborative framework” for collaboration on group integration of the separate modules of knowledge that were collected by the individual researchers.

In encoding design knowledge, selected websites provided a basis for the acquisition of conceptual knowledge. This was accomplished through content analysis of design issues, concepts and forms in each of the sites. The virtual design domain has raised several generic issues. Among them are the following: how the collapse of temporal boundaries can be experienced in a new way in virtual space, how the collapse of spatial boundaries makes physical boundaries more

interesting, and how the collapse of social boundaries can contribute to new experiences in virtual places?

Metaphors function as a “form solution” in many of the virtual places. By using a conceptual metaphor a new meaning is perceived which changes the root concepts. For example a spatial metaphor can introduce visualizations, pictures and images of the real world to the user in order to create a sense of place. However, by interacting with these metaphors a new experience can be achieved. For example, in the museum of Van Gogh we are introduced to an exhibition hall and pictures on the walls. However, while we navigate we experience new kinds of relations between time and space. First, we navigate through a domestic space of the exhibition hall directly into a mental space of a picture that was painted by Van Gogh. Secondly, we visit both in the same time – the space today and the space in the past. A conceptual mapping of places on cyberspace was mapped employing the ICF structure. This is illustrated in Figure 1.

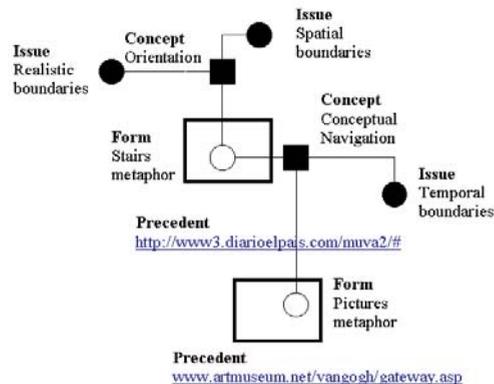


Figure 1. An example of a conceptual mapping of places in cyberspace

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## **Summary and Conclusions**

We have described the experimental program, which was carried on in order to identify and define generic design concepts of "virtual place". The experiment was carried on in an e-learning situation in which a design class collaboratively constructed a generic knowledge base for the design of "virtual place". We described the experimental program and the tools that were used for the collaborative construction of knowledge. The gathered knowledge has provide a specific set of concepts and solutions which are characteristic of the current state of the art.

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