

# Map-Based Wikis as Contextual and Cultural Mediators

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## ABSTRACT

In this paper, we introduce map-based wikis describing the contextual and cultural mediation performed by them. Such virtual interactive systems allow users, having different cultural backgrounds, different expertise and roles, and using different devices, to create and manage a shared knowledge base. The mediation activity made by map-based wikis is cultural in that users that belong to different cultures and speaking different languages can access the same knowledge base and share their knowledge with the others, and contextual because of the ability of the system to mediate between users acting different roles and between users that access the system with different devices, mobile and desktop. The discussion is made concrete by the example of Valchiavenna BANCO Prototype.

## Categories and Subject Descriptors

D.2.6 [Software Engineering]: Programming Environments – *Interactive environments*. H.1.2. [Information Systems]: User/Machine Systems – *Human information processing* H.5.2. [Information Interfaces and Presentation]: User Interfaces – *Prototyping, Natural language*

## General Terms

Experimentation, Human Factors, Languages.

## Keywords

Map-based wikis, knowledge workers, mediation, digital annotation, localization.

## 1. INTRODUCTION

The rapid development in international travel over the last few decades together with the vast increasingly world's online population in recent years has led to new forms and methods in the dissemination of knowledge. The most recent advances in technology are playing a particularly dynamic role in changing the nature of information management with regard to tourism. Information is created by individuals and then shared and managed inside and among different communities, like tourists and specialists in different fields related to tourism. The knowledge of these experts covers a wide range of subjects (e.g. economy, geography, geology, history) and the collaboration among them leads to the creation of a shared knowledge base related to the territorial region on which they are working. The tourists also can cooperate in a shared knowledge base

construction, by leaving comments about their impressions and emotions springing from their visits. We call all these persons knowledge workers [1][2], who use a virtual interactive environment with which they can create, share, and update their information. The virtual interactive environment represents, for both knowledge worker communities, a tool of thought which supports them in reasoning on and experiencing different views of a situation [3][4]. The environment allows the knowledge workers to reason on a shared object (a boundary object) by thinking and discussing about it [5]. Particularly, we describe here a specific type of interactive virtual environment, the map-based wiki [6] where the boundary object is constituted by maps.

The map-based wiki acts as a mediator [7][8] in that it avoids conflicts in interpretation among the knowledge workers. The interaction with the map-based wiki is performed on the basis of systems of signs that are familiar to the knowledge workers and that allow them to focus on their reasoning without being distracted by the need of interpreting messages alien to their culture [9].

## 2. DIGITAL ANNOTATION IN MAP-BASED WIKIS

Tools such as Google Maps, WikiMapia, YourHistoryHere share a common feature in that they are map-based wikis [10] for collaborating to create and manage knowledge related to digital maps.

Digital annotation is the basic tool that supports the creation and management of knowledge as well as social interaction on map-based wikis. Additionally, different types of knowledge can be identified based on the content and physical support used to convey it, and how it is perceived and interpreted by users [6].

The creation of digital annotations can be described as a process that is constituted by the following phases: a) The knowledge worker asks for a map, which will be retrieved from the system archive; b) The knowledge worker can then make his/her own annotations on the map; c) If the knowledge worker saves the annotation, it will be stored in the system archive. The digital annotation created by the knowledge worker becomes accessible and modifiable by other knowledge workers. This process allows users such as tourists, once simply passive information consumers, to become active information producers [11].

Annotations associated with a map can be multimodal, in order to support different kinds of interaction and knowledge. Textual and graphical annotations set up a dynamic information space, which encourages further annotation from the community, while the use

of sound and icon annotations sets up an emotion space, which represents different emotional moods.

However, both information space and emotion space are local to the user culture, language and system of signs. The main challenge here is how to deal with the possible cultural barriers and misunderstandings. Therefore, the concept of localization should be taken into consideration [12] and we will present our model according to this approach in what follows. Our proposed solution to such cultural problems can enhance the utility of map-based wikis, since it will give them an extra dimension of being able to mediate between a range of different cultural presuppositions and perspectives.

### 3. MEDIATION IN MAP-BASED WIKIS

The mediation process is defined as a logical process in which two actors are put in relation by a third one avoiding semantical conflicts. Particularly, in this paper we consider a specific type of mediation, that is the contextual and cultural mediation, where by “culture” we mean not only the features related to the community or to the role in the community, but also the features related to the products of human work, thought, and expertise.

The map-based wikis are contextual and cultural mediators in that they reduce the existing gap between the two knowledge worker communities, the expert and the tourist ones, and also among knowledge workers that belong to the same community. Therefore, map-based wikis allow to put in relation persons having different education, skills, and cultural backgrounds.

Four types of mediation in and among the knowledge worker communities can be identified: 1) *Inter-Tourist/Domain Expert Mediation*, defined among users with the same role (among tourists or among domain experts) and by that we mean that knowledge workers can share knowledge between themselves through digital annotations. Knowledge shared by tourists has a subjective character in which it is represented by the emotions and impressions felt by the tourist. 2) *Culture Mediation*, that exists among users of different cultures and by this we mean that the map-based wiki is localized to the culture of the knowledge worker who uses it, in terms of adapting the emotion and information space of the wiki to this culture. 3) *Role Mediation*, that is performed among users with different roles (domain experts and tourists), meaning by this that domain experts and tourists can share information of an objective type (like historical information) about the specifics of the sights on the map. 4) *Platform Mediation*, that is defined among users working with different types of devices (mobile devices and desktops). By that we say that the map-based wiki is localized based on the platform of the device the user is working with.

The different types of mediation can be composed as in the case of the communication between a tourist and a domain expert having different cultures. In this particular case, first a role mediation is performed in that knowledge workers with different roles are put in relation by the map-based wiki. Secondly, a culture mediation is also defined in order to put in relation knowledge workers belonging to different cultures. Figure 1 illustrates the relationships between culture and role mediation. A similar model can be described for any two types of mediation.

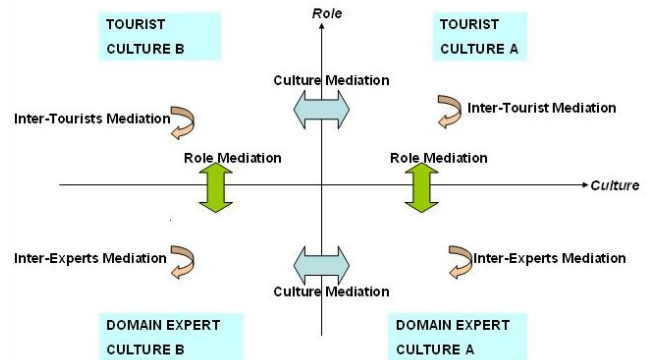


Figure 1. Relationships between Culture and Role Mediation.

### 4. VALCHIAVENNA BANCO PROTOTYPE

The information space and the emotion space of a system should be local to the user’s culture, role and platform as stated in Section 2. For this issue two possible solutions have been used. The first one is to adopt a single globalized language (both textual and visual) to express shared knowledge, in some cases defining a sort of universal icon language. This solution may prove to be overbearing, forcing users to be distracted from their tasks in order to interpret messages that may be alien from their culture and background. The second strategy to overcome cultural hurdles is to localize the whole set of signs used in interaction (not only the spoken or written language, but also the visual language) with respect to the user’s culture and system of signs by adapting the colors, the shapes and the organization of the elements on the screen as well [6][9].

Accordingly to this strategy BANCO framework is defined. A framework is not a usable application. It must be filled in with application-specific implementations before it can be instantiated and used [13]. BANCO framework addresses to “knowledge workers” and its instantiations are designed and developed according to current internationalization and localization techniques so as to be easily adapted to different cultures and conventions – by taking into account the different materialization properties (localization components) of each culture. The ability of a system to be customized to the user’s culture requires an abstraction based on four level specifications: 1) content and organization, 2) localization, 3) materialization and 4) interaction dynamic level. These are made available by the definition of two XML-based specialized languages (IM<sup>2</sup>L and LML) and one SVG-based or HTML-based language, the Template Language [4].

In order to illustrate the characteristics of BANCO framework, we introduce the Valchiavenna prototype, an instance of this framework that allows users to collaboratively build and associate with digital maps not only cognitive but also emotional knowledge through colored emoticons. In that, the prototype is a map-based wiki: Valchiavenna prototype allows users that are experts in different disciplines (e.g. as geology, history) to jointly enrich the knowledge base with certified information in the form of specialized annotations, which illustrate relevant topics referring to the maps. By this, expert knowledge workers together

with tourists contribute to the management of a shared knowledge base.

The system illustrates a specific case of mediation between knowledge workers belonging to different cultures, and also among knowledge workers with different roles. As illustrated in Figure 2, the prototype is localized for (a) the Italian and (b) the Japanese cultures, allowing the system to be materialized differently based on the profile of the tourists. Both the information and the emotion space are adapted.

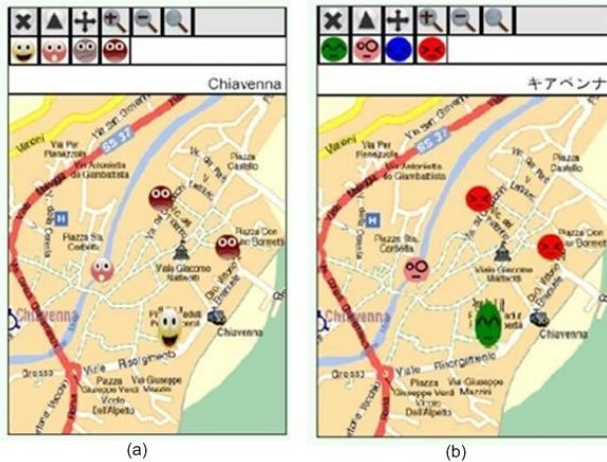


Figure 2. Culture mediation in BANCO prototype.

Localization allows cultural hurdles to be overcome very broadly; the interactive system – internationalized and subsequently localized to different cultures – enables knowledge workers of different nationalities and backgrounds to interact with the map-based wiki and with one another, each of them through his/her own language and system of signs.

## 5. CONCLUSIONS

In this paper, we explore the ability of a system to act as a contextual and cultural mediator by translating the system of signs. We consider a specific type of system, the map-based wiki, and present Valchiavenna BANCO prototype as an example. In the future, we would like to add a further mediation dimension among knowledge archives. In addition, the ability to map space for cognitive knowledge and emotional moods, directly and metaphorically, as well as to localize this representation in order to create a multicultural social network, are important topics that need further and deeper research.

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