Information design in interactive applications for unfamiliar cultural domains

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ABSTRACT

The design of interactive applications for the culture domain has specific issues due to the width and diversity of the domain, and to the spread of users education and skill. Exposing knowledge in cultural domains unfamiliar to users requires a careful design of information content and flexible exploration styles to match the needs of users with different backgrounds and goals. In this paper we’ll discuss some issues and lessons learned in an interdisciplinary project for improved art fruition with interactive mobile guides.

Categories and Subject Descriptors

H.5.2 [Information Interfaces and Applications]: User Interfaces; J.5 [Computer Applications]: Arts and Humanities—Fine arts

General Terms

Design, Experimentation, Human Factors

Keywords

Information design, mobile art guide, navigation, user logging

1. INTRODUCTION

In his recent book Living with Complexity Donald Norman illustrates some examples of systems that appear complex to the majority of persons not educated in specific fields, but are well mastered by experts, and situations that are indeed complex but, being part of our everyday life, we have learned to face and master [4]. Paraphrasing one of Norman’s examples, related to the complexity of an airplane cockpit [4, page 3], to meet the domain of contemporary art, we could say: “To the average person, a work of contemporary art is hard to understand and confusing. Not for the art critics: to them, the work of a contemporary artist is logical and nicely fits the artist life, his/her cultural background and the social and historical context in which it has been conceived.”

The expert of a domain has a different view on an object, a concept, a situation, because is able to view all the aspects that contribute to its meaning and, in case of art, to its value. Educational software applications aim at reducing the gap between the user culture and a domain expert culture by properly organizing and presenting information which is, initially, unfamiliar to the user.

Matching the design of an artifact with its expected use is the foundation of industrial design; information and interaction design are no exceptions. Each knowledge domain has, anyway, its own issues depending on the perspectives under which it is approached: information content, exploration, presentation and interaction.

In this paper we discuss issues about designing information content, structure and interaction in personal interactive applications for delivering knowledge in domains unfamiliar to most users. The discussion is based on the experience gained at Ca’ Foscari University in Venice in an interdisciplinary project for improved art fruition leading to the development of mobile guides for exhibitions in several art domains.

We experienced the design and delivery of cultural information with interactive mobile devices during several exhibitions curated or hosted by Ca’ Foscari University in 2009 and 2010, in the context of the Interactive Multimedia Art Guide Project.

The most relevant exhibitions are three: Nigra sum sed formosa: sacred and beauty of the christian Ethiopia, held in 2009, featured about one hundred objects of the Christian art and tradition in Ethiopia during a time span of four centuries, coming for the most part from private collectors. Russian! Memory, deception, imagination, held in 2010, was devoted to the Russian art of the XX Century, from the Socialist realism to the Underground experience, to the new generations of artists. Russian Avantgarde: experiences of a new world, held between 2011 and 2012, organized by Banco Intesa San Paolo and CSAR Ca’ Foscari, showed for the first time in Western Europe masterworks from Regional Russian museums related to the most important artists of this movement.

For all the exhibitions we designed and tested interactive mobile guides on Apple iOS devices of the iPod/iPhone class, with contents defined and designed together with the curators. A fourth experience involved the François Pinault Foundation for contemporary art, for which we conceived a framework for developing interactive mobile guides based on the involvement of domain experts in all phases of design and production of multimedia content and structure, according to the End-User Design paradigm [2]. This experience focused on the development of personalized tours in the Punta della Dogana museal spaces in Venice, instantiated by the user during the visit through a dialogue metaphor. In this experience only a prototype was delivered. In the following the exhibitions and the guides will be denoted by a shorthand of their title.

An overview of the project and the rationale behind it is in [1]. The technical aspects of the project are described in other articles listed in the project web site [3].

The paper is organized as follows: Section 2 discusses the prob-
lems raised by designing applications for the culture domain. Section 3 presents four different ways to organize knowledge suited to different domain complexity. Section 4 discusses some results from our project related to observed user behavior during the use of interactive multimedia guides in the art exhibitions organized by Ca’ Foscarri University.

2. UNFOLDING CULTURE DOMAINS UNFAMILIAR TO USERS

The design of interactive mobile applications for the culture domain presents specific issues due to the width and diversity of the domain, and to the spread of users education and skill [5]. Educating to a culture unfamiliar to the user may require an information architecture suitable for personalized content exploration at multiple levels of detail, to adapt to the cultural gap between users with different backgrounds and goals.

The domain of art is a good example: even the most famous masterpieces, universally known and widely commented in many educational environments, are difficult to explore under different perspectives, and understanding their meaning and value requires a good preparation in art history and criticism.

Contemporary art is still more complex, because of its multidisciplinary nature and the lack of historical perspective, which prevents the development of a common understanding and consensus; not to speak of the provocative nature of some contemporary art as a reaction to more objective expressions of the human creativity, often with strong social implications. Providing didactic information is not sufficient to induce new knowledge in the user unless the information perspective is clearly exposed.

A personal guide for an art exhibition should fulfill several different goals, weighted according to the designer’s and the exhibition curator’s focus. It should help the visitors by assisting them like a human expert companion. It should deliver propedeutic knowledge before the visit, additional insight on the exhibition themes besides the exemplary content shown, and should be a follow-up for the visitor to help her/him to proceed after the visit. It is easy to understand that designing an interactive art guide for a wide audience is a difficult task, due to the wide range of goals and users.

In our project we decided to limit the context to temporary art exhibitions. Differently from most museums, temporary exhibitions are small, allowing a visitor to complete the visit in a reasonable time, a task impossible in a large museum where different collections/rooms, selected according to the degree of popularity attributed to them. In most cases the design is a compromise and addresses an “average” user, who often turns out to be an abstract figure with little correspondence to the reality. Often there is little or no integration among the presentations of different artworks, nor comparisons with other artworks or artists: the audio medium alone is not suited to comment and compare objects which are not in user sight.

As a second remark, current research on interactive guides approaches problems deriving from the large museum context: user profiling, identification of the user expectations, selective tuning of interesting tours, etc. Many experimental systems address the problem of interacting with the visitors to propose what they could find interesting based on simple predefined profiles, with limited semantic analysis, related to the visitor context during the visit [6, 7, 9]. A more relevant educational goal, which is to address the visitor with content worth to be explored according to the curator, is ignored most of times. A drawback of the “I like it” personalization is keeping the user on her/his knowledge, loosing the opportunity to transform the visit into an active improvement built on a novel, often unexpected, content.

As a third and more general remark, the literature has deeply explored the interaction with applications and functions, concerning the way users can execute operations and visualize information in the most effective way. The problem of how to design and organize information to get the most of knowledge when interacting with it has been investigated less, and mostly in the context of communication, such as writing for the web vs. paper, or for small screens vs. desktop. In other words, the research has explored this issue mostly in terms of content style and rhetoric, than in terms of design, structure and presentation of the involved knowledge.

We chose to design the guides to present the knowledge specific to the exhibition at a quite deep level, instead of relying on more comprehensive but shallow presentations. Our target users are not expert but educated, and a proper organization of information could help them to gain from an interactive guide as much as from a personal expert human companion.

With such a target in mind, two almost opposite goals must be mediated: at one side, giving users a large amount of information, letting them the task (and the burden) to select and filter it according to own interest and background; at the other side, giving users a guidance that, while leaving them freedom in choosing the paths to follow, faces the inherent complexity of an unfamiliar knowledge domain with a selection of guided tour and thematic sections coherently grouping the exhibition material. Rich content can better satisfy educated users’ goals but requires a complex set of indices to clearly organize and properly access heterogeneous information under different (and sometimes conflicting) perspectives; a guidance system helps the user to get information in the proper context, but constrains the user to fit into a set of anticipated profiles.

3. DESIGN FOR UNFAMILIAR CULTURAL CONTENT

The design of applications for conveying unfamiliar knowledge to users of different cultural level, skill and interest has different
facets that, as commented in previous section, are often conflicting. The balance between efficacy, modularity, simplicity and completeness of an educational application for the art domain, is a compromise where the development and maintenance costs play a major role together with the standardization of a repeatable structure.

In this section we'll present some reflections based on our experience on the use of different approaches to present the contents of art exhibitions. In particular, we will focus on four main models to design interactive tools: information content design, knowledge disclosure, navigation and interaction style. Results from the analysis of user behavior in a couple of cases are discussed in the next section.

Information content design. A first important note concerns the temporary and episodic nature of the exhibitions. Even when they are instances of a periodic event their life is limited to a few months and their content and profile are specific to the instance, i.e., every year a possibly different curator gives a personal connotation to that edition. This is an advantage in terms of information coverage and consistency, but presents some drawbacks in terms of content design: not only the guide content but also its organization have to be re-designed each time without adopting a recurring template, the opposite to what most mobile applications do. We used the exhibition material as a thread to match the guide content with the visible content during the visit, aiming to provide a wider perspective by revealing to the unfamiliar visitor the correct key for decoding the exhibition knowledge.

For example, in the NigraSum exhibition, the complex historical and geographical relationships that guided the development of a Christian religion as an enclave of a Muslim world are a key to understand the repetitive schemas of sacred objects, like crosses and icons, derived from very few samples imported by travelers. In the Russias! exhibition, the strong influence of the political power on the development of art during the so-called Socialist Realism period can be understood only if examined under different perspectives such as the role of the leader, the importance of the monumental architecture, the life of youngsters, etc.. In the Avantgarde exhibition the relations between the development of Russia and Europe at the beginning of the XX Century are a key to understand the reciprocal influence in visual art evolution. A bare catalog of the exhibition content, integrated by a few notes for each section cannot provide such context.

Knowledge disclosure. There are four main models to design information delivery, related to the way the knowledge is progressively brought to the attention of the user.

In a linear disclosure model the knowledge chunks are sequentially presented following a predefined order. It is the structure of the conventional audioguides and its effectiveness is maximized when the content is designed as a continuous narration, proceeding through the exhibition content by following the path designed by the curator, for example according to an historical development. We used this model in the last exhibition, Avantgarde, where the guide content is exposed as a sequence of multimedia narrations made by one of the curators, each to be listened in front of a specific artwork acting as a paradigm of that section of the guide. The guide is linear not only in its structure but also in its content, delivered according to a historical perspective illustrating the development of the Avantgarde movement during the years.

The main advantage of this model is the simplicity for the user, who needs not to decide how to select her/his own visit path; the main disadvantage is the difficulty to provide different levels of deepening matching previous user knowledge.

In an indexed disclosure model the knowledge chunks are indexed by a list, a menu, leaving to the user the task to select his/her own interest without constrains, at some extent, on the visit order. The advantage is the ability to meet the user will, but the user must have a minimum knowledge level to understand and to anticipate a content hidden under a bare list of titles. The main problem is that the overall knowledge is not perceivable in any of the chunks, in which it has been divided, and any chunk, in principle, must be self-contained, a difficult task for non trivial cultural applications. It was adopted in almost all the guides as a secondary structure to provide general indexes to allow visitors to deviate from a linear path (in the Avantgarde guide) or from a thematic organization (in the NigraSum guide), to meet the actual visit path in a more articulated exhibition layout (in the Russias! guide), and to give visitors a way to skip unwanted sections, even for practical reasons, e.g., the short time available.

Thematic disclosure is similar to the indexed disclosure, the difference being a strong correlation inside subsets of the information, visible through a structured index whose items have clear different meanings. It is the structure more suitable for educational purposes, but seldom used in the domain of art, probably because it needs a strong effort in making the themes sufficiently independent to be approached in non-linear order. We used this model in the Russias! guide for the the supplemental material explaining the various contexts (mostly from a historical and social point of view) for interpreting the exhibition sections, and in the NigraSum guide, because the exhibition was not organized along a linear path but scattered according to a set of thematic rooms, with intermixed artwork types, giving a global view on the many facets of the Ethiopian sacred art and the way it was (and still is) lived.

In a progressive disclosure model knowledge is presented in sequential levels of deepening, starting from overviews to details. The user is faced with a clear vision of the progression through knowledge, and of the borders between different topics. This model must not be confused with hierarchical indexes since the progression is not at the index level but sparse along the content. In the Pinault Foundation guide we designed the content as a collection of tours based on structured sets of questions, multiple choice criteria that allow the visitor to enjoy a dynamically configurable visit based on her/his own interaction with the system. The visitor becomes an active user who employs a mixture of emotional and rational approaches to the exhibition content to set up her/his own knowledge progression.

Navigation and interaction style. Cultural applications, leading users to navigate in a partially unknown set of information, have also the problem that such information can be explored under different perspectives. Giving the user a set of perspectives induces reflection but also disorientation due to the need of different indexes to access the ultimate content.

The four models of information delivery discussed above match different interaction styles, mostly on modern mobile devices which provide a set of gestures that should ease the execution of different tasks and the information navigation. We have anyway observed that rich gesturing can interfere with information exploration, leading some visitors to exceed in gestures as they discover them, disorderly moving between information, more inclined to explore the application itself than the information it delivers. This phenomenon was observed in the early guides, and was probably due also to the new devices, usually not seen in art exhibitions. On the other side, people less used to technology, such as aged visitors, are intimidated by the visual and gestural richness of the interface with respect to the more calm, yet limited, audioguides that have accompanied them for years.
4. EVALUATION OF USER BEHAVIOUR

To evaluate the actual use of the guides developed in the project we did not perform controlled studies, but real on-the-field observations of the guide use through an embedded gesture-logging function. The function would log every user interaction to a file, creating a time-stamped trace of the guide use. We collected in this way several thousands traces, and some interesting results emerged from the analysis. Figure 1 illustrates the relative number of connections between the most important sections in the NigraSum guide. The line width is proportional to the number of connections traversed; grey lines denote backward links. The three circles attached to the Sections, Artwork and Rooms map items denote self loops, transitions between pages of a same chapter, such as the sequential browsing of artworks or the exploration of the map details; the radius of the circle is proportional to the number of transitions.

The guide design was based on two different content organizations: a thematic grouping of the artworks based on their typology: crosses, icons, devotional objects, etc., augmented with introductory multimedia presentations of the themes, and a linear catalog, supported by a map. The thematic structure was judged the most suitable to understand the exhibition. From the analysis, instead, we got the result that most visitors did not follow the thematic organization of the guide but the spatial partitioning of the exhibition by consulting the maps most of the time and accessing the artworks by room, then sequentially in each room.

Figure 2 shows the number of accesses to introductory presentations (actually videos) in the eight sections of the Russias’ guide. For each section, a decrease of interest is clearly visible from the first presentation on, but also a new rise of interest when moving to another section. The decrease of interest is sensible (about one third) after the first video, which is an introduction to the section content. This behavior is largely independent from the content and is mirrored in the analysis made on the artworks. It seems to suggest that most of visitors have a limited interest for supplemental information as time proceeds, probably because the amount of time allocated is largely fixed in advance and does not depend on the real interest aroused. The guide, indeed, was very rich, featuring more than one hour of video; we expected, anyway, more individual choices in adapting the guide use to the available time.

A similar behavior is observed in the guide for the Avantgarde exhibition; this exhibition has closed at the end of February 2012, so at the time of writing we have only partial results from the analysis of a part of the logs, related to about 500 different user for a total of about 4300 accesses to the guide videos. The guide being organized according to a historic perspective, there is a more perceptible continuity between the narration fragments (which were indeed recorded as a unique continuous comments, later split into sections): the interest decrease is more moderate, both within a section and across the sections, with an increase in correspondence of the titles recalling the most known artists (such as Kandinskij).

5. ACKNOWLEDGMENTS

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6. REFERENCES