Fostering Conversation after the Museum Visit:
a WOZ Study for a Shared Interface.

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ABSTRACT

According to recent studies, a museum visit by a small group (e. g. a family or a few friends) can be considered successful if conversation about the experience develops among its members. Often people stop at the museum café to have a break during the visit or before leaving. The museum café is the location that we foresee as ideal to introduce a tabletop interface meant to foster the conversation of the visitors.

We describe a Wizard of Oz study of a system that illustrates the reactions of people to visual stimuli (floating words, images, text snippets) projected on a tabletop interface. The stimuli, dynamically selected taking into account the topic discussed and a set of communicative strategies, are meant to support the conversation about the exhibition and the visit or to foster a topic change, in case the group is discussing something unrelated to the visit. The results of the Wizard of Oz show that people recognized visuals on the table as "cues" for a group conversation about the visit, and interesting insights about the design have emerged.

Categories and Subject Descriptors

H.5.2 [**Information Interfaces and Presentation**]: User Interfaces – *Evaluation/Methodology, Interaction styles, prototyping, screen design.*

General Terms

Design, Experimentation.

Keywords

Conversation, museum visit, tabletop interface.

1. INTRODUCTION

There have been many research efforts to introduce technological tools to support people during a museum visit: information kiosks, personalized mobile guides, etc. The research trends have mainly focused on personal support for the visitor: e.g. locate a room or provide information about details of interest for the individual. Recently, a new perspective for enhancing the visit has emerged:

the small group dimension. In general people tend to visit a cultural site with a family or a group of friends. Petrelli and Not report that only 5% of the visitors come to the museum alone while 45% come in organized groups, 20% with friends and 30% with children [7]. New possibilities, introduced by the social dimension, can be offered by technology: support communication between users during the visit, seamless interaction with personal devices and public displays [8].

We propose a novel aspect: technological tools that provide support after the visit, when visitors can have a conversation about the experience they lived. In particular we investigate a tabletop application placed in the museum café specifically designed to foster conversation about the visit. The table acts as a 'mediator' for the group by means of images, words, text snippets, which are used in a visually dynamic way, floating on the table, to evoke a discussion about the visit. The importance of after visit conversation to enhance the cultural experience has been investigated in [4]; discussing the subject is a key factor that implies personal involvement and learning

A museum visit is a multifaceted experience, which involves cognitive, emotional and social dimensions. A small group scenario involves specifically a plot of interpersonal relationship, e.g. friends or colleagues. The social dimension helps the development of a perspective shift, where learning is less considered as 'owning' concepts and more close to an 'opportunity' to actively interact [4]. This is often referred to as *constructivist* approach, where knowledge is 'created' rather than 'given'. In such a perspective there are opportunities to interact with visits companions and other 'mediators' like labels and booklets. Adopting this viewpoint conversation, and in general 'opportunities to actively interact', are important during the visit but also afterwards. The museum café is a good setting to share thoughts and impressions about the visit.

The technology we envisage acts as a facilitator for human-human natural interaction rather than providing functionalities to access further information. The scenario is set after the museum visit, or after a first part of a visit. The system supports three phases:

a) a phase in which it tries to promotes conversation about the museum visit experience;

b) a phase that supports conversation by providing contents appropriate for the specific topic being discussed by a group and the state of the conversation;

c)   a phase where users explicitly seek further information about some cultural heritage topics by interacting with the system.

The first two phases do not require explicit user interaction. Yet, the behavior of the interface is influenced by: the profiles of the group members (including their social relations and data related to the visit) and their behavior and conversation at the table. The third phase the system acts as a kiosk, allowing the group to browse information related to the museum.

In phases a) and b), the interface uses visual tools (floating words and pictures) as 'mediators' to foster or support a conversation about a specific topic. These visual tools are meant to create a 'space' for interpretation, which can lead the group to fixate ideas, share impressions, exchange opinions and - in general – get along with the spirit of the visit, promoting an interpretative engagement.

The novel aspects of this type of systems makes difficult to base the design on previous similar experiences. At this stage of the project we do not seek for completeness; we rather try to foster initial design ideas. In this paper we describe a Wizard of Oz experiment aimed at investigating the effect of communication strategies that may be employed in phases a) and b). The results of the study show that people recognized visuals on the table as "cues" for a group conversation about the visit. Subjects sometimes feel the need to interact with the display not only for seeking new information but, for example, to zoom images or to have a more detailed view of a specific visual. In general the role of the table has been recognized to provide 'hints' and to support the conversation though, sometimes, the interface was considered too crowded or some visual effect (e.g. flashing) was upsetting.

2. RELATED WORK

Mankoff and colleagues have investigated the role of ambient displays in different scenarios and have proposed a set of heuristics to evaluate their efficacy [5]. One of the first pioneering works on ambient display of media is Tangible Bits [3], which explored techniques to enable background awareness. GroupCast is an office application that senses people passing by. It has a profile of users and displays mutual interest to people [6]. The goal is to create informal interaction opportunities between people. The information displays shared interests of contrasting attitudes.

Drift table is an eccentric experiment of interactivity that displays an aerial photo of England through a hole in a table [1]. The image pans according to the weights on the table. It has been designed to support ludic activities, to stimulate curiosity, exploration and reflection. A qualitative observation highlighted that people got engaged by experimenting weights and narrating about the places spotted.

Hello Wall is a digital wall made of a grid of lights [9]. Depending on the distance of people the wall changes communicative function (ambient, notification, interaction). Abstract light patterns convey information about mood, presence and crowdedness.

3. COMMUNICATION STRATEGIES

Communication strategies tested during the WOZ are inspired by the world of advertisement, where the form of the presentation and the layout play an important role. The message conveyed by an advertisement has to be clear. General guidelines are: a clean layout helps locating what is crucial (usually at the center) and what is peripheral (close to borders); a good contrast of color helps to read and figure out the difference between objects and a non-crowded scene helps focus better on fewer objects.

Alternative approaches make use of semiotics theory and rhetoric. Slogans and catchphrases, for example, are conceived to be easily memorable. Rhymes, verses and words that carry musicality are simple to understand and remember. Rhetorical figures are meant to catch attention by exploiting a deviation from the standard meaning of words. For example *metaphor* exploits analogy to explain an unknown thing through the comparison with another familiar thing. Our graphical interface exploits spatial patterns of elements floating over the surface. Such patterns have been devised to exploit graphical metaphors, used by the system to display the state of the conversation, the relations between the topics discussed and to evoke discussions about the visit.

We have implemented and tested with users the following strategies:

Orbiting. *An image rotates on itself in the center of the table while another image, smaller, rotates around it.* This pattern is meant to convey the idea that there is a semantic relation, e.g. they represent a similar scene in two different frescoes. The orbiting image can also work as a potential topic for the next discussion. This strategy exploits the metaphor that physical proximity between objects indicates semantic closeness. The semiotic code behind this strategy is to recall the same pattern that occurs between a planet and its satellite.

Closeness. A similar strategy, which exploits patterns in the positioning objects, is built on the idea of *objects, which rotate around a point*. This spatial pattern is meant to communicate a group relationship. The idea behind this strategy is related to the sharing of a feature, in our case a point, between a set of objects.

Attention grabbing. Since our system is dynamic, in that stimuli can change according to the conversation, we also consider Weber's law as a relevant idea to account for. Weber's law describes the relation between the extent of a stimuli and the perceived intensity of it. To induce the perception of a change, the trigger stimulus has to be proportional to the current intensity of the stimuli perceived. For example, if a display is empty (e.g. black background) the introduction of a graphical object is easily perceivable. In contrast, on a display crowded of floating words the addition of a new word, especially if similar in size and color, is more difficult to recognize. The implementation of *flashing and pulsing is meant to shift the attention of the subjects from the current stimulus to the one highlighted.*

Not related content. To create curiosity and grab attention a non-related object can be used. In our implementation we introduced *a word that was not related to the frescoes of the visit*. This is a technique borrowed from advertisement, which exploited the contrast of an object in an unrelated scenario.

Dimension. *To highlight the relevance of an object to the ongoing discussion the object is enlarged, to have a greater size with respect to the others shown on the table.* The semiotic code behind this metaphor is meant to convey the idea that more relevant stimuli are more visible and emerge from the rest.

4. WOZ EXPERIMENT

A Wizard of Oz experiment has been performed to study the reaction of the users to an active table in the museum café. We focused on two phases of the tabletop application: foster a conversation about the visit and provide support when it is already occurring. We hypothesize that data available to the system are: images and words about the exhibition. The image repository includes overall representations of exhibits and some closer view of relevant details. Words have been extracted from exhibits' labels. Moreover, an automatic speech system is able to detect the occurrence of a number of words and allows the system to understand the topic of the conversation.

Three groups of four people were invited to visit a reconstruction of a painted room at the FBK-Irst. People were asked to visit the exhibition as if they were a group of friends. We did not provide any indication about the way to conduct the visit, nor we set up a time limit. Subjects were given a four-page booklet to help them during the visit. Each group took from ten to twelve minutes to visit the four frescoes.

Figure 1. A picture of the setting.

After the visit people were conducted to another room and they were invited to sit at a table while waiting for the experimenter to come back. Some coffee was offered (see Figure 1). A beamer had been installed on the ceiling to display the visual stimuli directly on the table. A camera positioned on the ceiling was used to observe the subjects and a panoramic microphone was installed to listen to the conversation. The wizard, located in another room, was therefore able to monitor the group behavior and control the presentation of the visual stimuli projected onto the table. During the conversation the wizard tested the strategies presented above in different situations: e.g. group talking about the visit, about a single exhibit and about topics unrelated to the exhibition

4.1 Analysis of the Observations

The start state of the system was a black background with no information displayed. Reactions of people when the first visual effect appeared were meaningful. Regardless if the stimulus was a word or a picture, people noticed the presence of an object almost immediately and they talked each other about that.

They almost always recognized that the visual effects were somehow related to the topic discussed. For few seconds some group shifted the discussion to the behavior of the table,

wondering why the system selected that information. Some people tried to touch the table and interact with the graphical interface.

The need of interaction was sometime driven by curiosity but in some occasion it was motivated by an attempt to organize the space on the table, in particular to isolate the objects related to the discussion. One subject also has tried to sweep away a group of objects to clean the stage.

A recurrent pattern, which happens across all groups, is the following. There are some stimuli on the stage; subjects start a discussion about one (always an image); the wizard moves that stimulus in the center of stage, enlarges it and makes it rotate slowly. This pattern shows the employment of two of our strategies applied: the center of the table as a shared place, the dimension of an object to show its relevance to the discussion. In this situation subjects have been talking about the image for a while (two or three minutes, depending on the group). The image in the center has also been exploited to highlight and propose new details to discuss or used as a frame to refer to a part of the fresco.

To provide more evidence about the effectiveness of this pattern we also tried to watch the effect created by its 'negation'. In some situation, when subjects were involved in a discussion supported by an enlarged image rotating in the center, the wizard made it progressively disappear through a fade effect. This behavior created disappointment to all the member of the group ("why? We were talking about that!"). They often tried to justify it as a malfunction of the system.

The wizard also tried to experiment some technique to allow a shift in the topic of the discussion. The first technique exploited makes use of catching effects, like flashing and pulsing. During ongoing discussion, with the relevant image in the center, the wizard has applied a flashing or pulsing behavior to one object already on stage. Subjects noticed the behavior almost immediately but clearly stated disappointment. One subject tried to quit it by touching and asked explicitly to turn it off.

Another technique meant to allow a topic change exploits an orbital pattern of movement. This is supposed to make the subjects recognizing the relation between two objects. The wizard makes an image to orbit around the image being discussed in the center. Subjects do not seem influenced by such a behavior and keep talking about the same topic.

When a topic is concluded, people sometime try to exploit the data on the stage to propose a new discussion. This often happens when a subject points at a visual data close to her and tries to catch others' attention (e.g. "look at this?" or "this is a scene of the first fresco").

Every group, at some stage of the experiment, has tried to "test" the system. This usually happens at the beginning when people try to find out the behavior or the "logic" behind the system. At least a subject for each group tries to say a word and expects the system to show it, sometimes indeed bending to get closer to the table.

Finally people noticed the stimulus that was not related to the domain of the visit (the word "hay making"). Some subject tried to discuss if it was a detail not noticed in the fresco, but nobody was able to find a relation with the current context.

5. INTERVIEWS

After the study, an experimenter debriefed the group about the purpose of the study and conducted a semi-structured interviewed aimed at eliciting the subjective impressions of the group

regarding: the roles of the images and the words displayed, the need of interaction and the role of the system in guiding a conversation.

The system was recognized as a useful tool to wrap up a visit, especially in case people were not acquainted with the exhibition. All the subjects expressed the need of an explicit interaction with the table. This confirms our observation: interaction is not only needed as a way of browsing for more information but also as a way to manipulate objects and organize the space.

Subjects reported the feeling that the table sometimes 'follows' the conversation and tries to propose new hints. They also said to be upset in case of weird behavior, especially when the image supporting the conversation disappears.

As for the conceptualization of the table we can report contrasting opinions. Some subject has considered the table as a tool to satisfy a "knowledge need", e.g. understand better a detail or find further information. Others, instead, have considered the table as a tool to support the sharing of the experience during the visit. The same subjects, in fact, would have liked more images and texts, besides those strictly related to visit, as a way to expand the discussion.

An important discussion emerged about the crowdedness. Sometimes stimuli have been perceived as too many and led to some confusion or indecision on the topic to discuss.

All the groups reported that when the discussion of a topic was finished they exploited the stimuli on the table to start a new conversation.

Finally, graphic-intensive effects like pulsing and flashing, have been considered too upsetting, especially when there is an ongoing conversation. Some subject reported the feeling to be 'forced' to look at those stimuli.

6. CONCLUSION

In this paper, we have presented communication strategies of a system aimed at supporting the conversation of a small group of visitors after a museum visit. The system is designed as a table for the museum café. The aim of this work was to develop and test initial ideas about the impact of such a system may potentially have on the museum visitors.

The results of a WOZ confirmed the communicative efficacy of the prototype and provided some interesting hints for the design. In particular, we realized that interaction could be useful throughout the scenario in order to organize the space or to promote a new topic of discussion. Furthermore, we learnt that users, once a conversation has started and the system supports it

through related images, feel upset and irritated if the system changes the contents displayed.

This work represents only the first step of the design process and the results here need to be validated in a more ecological study possibly with different classes of users.

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