

Interface design and usability testing in the digital facsimile of map of Mexico 1550

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This paper describes the usability test carried out as a part of the interface design to further develop the Digital Facsimile of Map of Mexico 1550. The working method used brought insights regarding the social and individual subjective experience involved in navigating an interactive piece. It also defined the guidelines for the design of a second version of the Digital Facsimile presented from May of 2003 at the Gropius Bau Museum in, Berlin, Germany. The Digital Facsimile of Map of Mexico 1550 is a work in progress of Systems of Representation research group in Media Lab (See: http://cipher.uiah.fi/Systems_of_representation). The Facsimile is being designed by Lily Díaz-Kommonen, Janne Pietarila, and Mariana Salgado.

Background: the map of Mexico

The map is one of only two known maps that give a fairly accurate picture of the city of Mexico and its surrounding regions in the mid 16th century. The map also gives information about the ethnography and the flora and fauna of the region. The population is shown performing a variety of activities, such as woodcutting, canoeing, hunting, and fishing. [Larsson, 2002, 492]

Printed and material facsimiles of historical and archival artifacts are frequently used by scholars for research, as valid replacement for working with the original. For reasons of security and preservation, facsimiles are also routinely used in exhibitions by museums and libraries. In contrast, researchers and audiences frequently raise questions about both the accuracy and consistency of digital artifacts, with regards to their material counterparts. In spite of the fact that digitalization could solve many problems regarding access to rare and unique archival materials, traditional image scanning techniques do not properly address many of the needs and issues of archives, museums, and research libraries. For one, these methods cannot accurately transfer radiometric and volumetric properties of archival items made of organic materials, such as parchment and vellum, and which through the passage of time have acquired an almost three dimensional topography. [Brown, 1994, 95] A sizable amount of archival artifacts in European libraries belong to this category of parchment items.

Usability testing at the museum of cultures in Helsinki

The gap that exists between the model in the designer's mind and a final product that can be successfully employed by people has been a subject of research for quite some time. [Norman, 1990] In spite of the very thorough usability testing that can be done, at a more basic level, there is the situation of being confronted with the indeterminacy emerging from a complex system of interaction. [Nielsen, 1993, 10].

The usability test described in this essay was conducted in March 2003 during four consecutive days at the Museum of Cultures, Helsinki. The main objective of the test was to evaluate and improve an already existing interface. A detailed user test plan was created before the interviews. The people interviewed included especially invited guests as well as normal visitors to the museum. For each of these two groups, we prepared a differentiated set of tasks and questions. Some of the people invited were experts in anthropology, history and education. All interviews were video recorded for later analysis.

General characteristics, usability, and functionality

The usability goals were to make the navigation easy to understand. In the case of the application, this translated into being able to find details of special interest while at the same time preserving a mental image of the whole map.

XXXCaption: Clockwise starting at upper left corner: the Zoom-in button, the Moving button, the Intro button, and the Zoom-out button.

The older version of the application contained only two display screens: A Title page and the actual application with the image of the map and the interface tool, or Button Area.

Inside the Button Area, there was a reduced map image with a rectangle framing the area currently displayed on the screen. Touching a section of this map image also allowed the user to move from one section of the map to another, while maintaining the same magnification level. This was supposed to help to orient the user in the navigation of the map. Outside the Button Area, there was also the functionality of being able to select and drag the entire map to all sides of the screen.

Observation and concrete problems identified

These observations are based on testing and discussion of the older version of the interface. Here is a list of some of the problems that were identified:

Lack of clarity with respect to functionality: The Moving button had an icon whose meaning was unclear. Also, the Intro button suggested to most users that it led to more information about the map. Instead it led to the Title page that contained the name of the application and developers information. This was problematic, since most of the interviewees were very curious about the map.

Most of the people tried to drag the small rectangle that was in the Button Area while doing so they touched different points of this small map. The delay in this function provoked people to continue touching in this area without understanding the results. The program remembered all the points touched and began to jump, confusing the user.

Incorrect positioning of the interface elements: The whole Button Area was positioned in the bottom right corner of the screen, with the button in the upper left corner being the most visible. In the old version the Intro button was in the upper left hand corner. This seemed to suggest to some users that they should press this button before the others with the result that the first interaction would bring them back to the Title page.

Unclear use of the interface elements: The buttons should work only when they are touched in the center. As the borders between the buttons and the small map were thin, there were misunderstandings. For example, sometimes users wanted to push the button and they went to the corner of the screen because in fact they were touching one point inside the small map of the Button Area.

Because it was not done from the Button Area, some people did not find at all the function of dragging and moving the map. This state of uncertainty may also be related to the fact that for the test, we used a very large touchable screen. Since this is an unfamiliar gadget for general users, they did not realize that they could touch it unless they were specifically invited to do so.

Unclear indication of current application state: The map could be left in a position occupying only a quarter of the big screen. This sight can make the map uninteresting for the next visitor, who sees only a quarter of image of the map on the screen.

From the observations to the new version: A deep, and thorough analysis of the video data gathered still remains to be performed, however the usability test has been a useful way to identify problems. Here is an example of how a problem was identified that was extracted from an interview:

Subject 1: Intro...; subject 2: Yes, Intro.Interviewer: Where do you think this button will lead you?; subject 2: Something about the history of that... the background of the whole project. [She presses it and arrives at the Intro screen.] Subject 1: No, it is just the beginning.”

Additionally, some of the suggestions that came from the users were implemented. This was the case with the changes made to Intro screen:

“Interviewer: When you go to the Intro, which kind of information would you like to have?”

Subject 3: Not just the date... the actual material, the physical material, the size, basic data so that you can relate this version to the original artifact. Interviewer: Do you think it was difficult to understand how to navigate it? Subject 3: It was easy.”

General description of principal changes in the new version

After these observations we defined aspects that could be improved for a new version. The new design includes: **Home** screen as first page, **Information** screen with data about the original, **Help** screen to guide the users in their first steps, and a new design of the Button Area that positions buttons according to importance of task. For example, the Zoom-in button, which is also the one used at the beginning, was placed on the upper left hand corner. A Reset button has also been added. This button resets, or returns, the application to its initial state that shows a view of the whole map.

XXX **Caption:** Revised interface design for Button Area. Clockwise starting on the upper left hand corner: Zoom-in button, Intro button, Home page button, Reset button, and Zoom-out button.

The functionality previously assigned to the Moving button is clearer: It is now placed on the top bar of the Button Area and arrows to indicate directionality have been added. The rationale for this change is that this task affects only the Button Area and not the image of the map on the screen.

The color that the buttons assume when they have reached their operational limits, such as is the case when you cannot zoom in any further, has been changed from blue to gray. Also, since it was deemed to be confusing, the function of moving from one section of the map into another by touching inside the small map in the Button Area has been eliminated.

Social and individual subjective experience:

We think that there are two ways to experience the map, social and individual. The social experience occurs when there is more than one person in front of the map. For example, it can be that the other person, the one not touching the screen, enjoys it passively, or gives suggestions of how to use it. In both of the cases, s/he is actively participating enjoying and navigating the map, with the rhythm of the one that is actively interacting. In some cases it happened that two or more of the users wanted to interact with the map at the same time. (Perhaps the big touchable screen motivated several users to approach simultaneously.) The application, however, is a single user application, so it was not prepared for this kind of use.

Conclusion

The Digital Facsimile intends to give the user the experience of being in front of an augmented version of the original map. The current design represents the culmination of the first stage of the project. It allows the viewer an extreme close up view of the details, provides the feeling of touching the map, and aims to create the feeling of being in front of an augmented version of the map. During the second stage, a 3D stereographic model incorporating volumetric data derived from the already existing photographs of the map is being produced. The potential future directions are to propose product solutions that involve the creation of a museum piece, a professional research instrument, and an educational tool. As a museum piece and as an educational tool, the objective will be to extend the project into an interactive media exhibit that includes data related to Mexico City, thus tracing a link between the historical features and the current daily life in the city. As a professional tool for the researcher, the Digital Facsimile will have the three-dimensional aspect that is part of the original version. We would also like to add some type of sound feedback. The results of this evaluation validated the three potential future directions for the project since the user test indicated the necessity of having differentiated interactive products for the three probable contexts of use. At the same time, it confirmed that the expectations of different users couldn't be fulfilled in a universal efficient tool.