Software localization to gender and culture: fostering female participation and creativity in the Web

Abstract
In this paper, the use of software internationalization and localization techniques is presented as a solution to the issues that arise in global access to the Web. Culture and gender are two of the aspects that should be considered in design and development of interactive systems. Addressing these two aspects could help in fostering female participation and creativity in the Web transcending cultural boundaries.

Keywords
Interaction design, internationalization, localization, gender, culture, creativity, participation

ACM Classification Keywords

General Terms
Human factors, design, languages
Introduction
Web 2.0, social media and information technologies continuously evolve becoming more and more sophisticated, distributed and affordable. Web contents are worldwide accessed by a multitude of people who come from different countries, speak different languages, belong to various cultures and have different traditions. The observation of use and design of software system in a globalized scenario highlights new and new challenges that need to be faced. First of all the communication among users should be supported and, in some extent, mediated by the interactive systems (e.g. with tools for annotation and translation). Then, also system customization should be implemented in that the interactive systems should be adapted to the user’s profile, both in terms of contents and layout.

In user’s profile identification, not only her/his language and the country where s/he is living should be considered: other aspects deeply influence the way users interact with software systems, and gender is one of the main ones. Nowadays, gender is a factor that should be seriously taken into account: globalization allows the diffusion in the whole world of traditions and cultures that not so long time ago were just local (to countries or regions) and only partially known to the rest of the world. In such traditions and cultures the roles played by women and men in society are profoundly different and this affect not only the social interactions in the real and daily life, but also the way in which the virtual life on the Web is perceived, lived and managed.

Therefore, in order to foster the participation of users, geographically distributed, into virtual communities in the Web, the so-called user diversity phenomenon has to be considered and the interaction design approaches should be oriented to the development of highly adaptable and adaptive software systems [6]. Providing users with software systems customized to their profile, does not only favor what Fischer in [8] calls cultures of participation, but also allows users to express their creativity: accessible and usable interactive system permit the user to develop a comfortable experience, feeling in a virtual space that supports her/him to recognize as useful the tools offered in it. Creativity is therefore easily exploited in such spaces, that become spaces of opportunities.

In what follows, first globalization and its influences on the role of women in society and on their participation are presented. Then, internationalization and localization activities are briefly illustrated and proposed as technical solutions to solve the issues arising from gender- and culture-biased interaction design. To support this position, a case study in which localization to gender was implement is presented.

Globalization, gender and cultures of participation
Nowadays, several organizations and movements commit themselves to promote the introduction and integration of women into scientific context, both in academy and in industry. Some of these organizations are more consumer oriented (e.g. Girl Geek Dinners [10]), others to academic and research context (e.g. ACM’s Women in Computing [1], IEEE Women in Engineering [12]), and others to management and private sectors (Systers Anita Borg Community [13]). These movements play a fundamental role in the modern society because they aim at developing
feminine awareness and at granting equal opportunities and rights to everyone. However, their commitment is focused on social interaction in real world and not on the concrete interaction with devices, software and technology.

Often people are interested in technology, because they need it for their work or just because of curiosity, but after negative experiences caused by wrong interaction design they give up in learning and in using them. To avoid this failure and to support creativity and successful participation of all the interested people it is important to design the interaction considering the various aspects that may vary in the different cultures and in people belonging to different gender.

In the next section, the use of internationalization and localization techniques is proposed as solution to the issues deriving from the use of software that is not adaptable to gender and culture.

**Internationalization and localization**

Very often, interactive systems are designed and developed according to the designer’s mental model and not on the target user’s ones. In this way, people belonging to different cultures, speaking different languages and belonging to different gender are discriminated. Participation, communication and collaboration in the Web are made difficult by the communication gaps existing among the users. The problem is thus how to allow the users to interact with the software system according to their own style of reasoning and to their mental models of the activities to be performed.

In the context described in the previous section, the World Wide Web plays the fundamental role of medium for international communication, participation, and transaction. It stimulates in fact the evolution of methods and techniques for interface design for multi-cultured environments [2].

The design and the development process of internationalized products passes through the performance of four distinct activities [7]: globalization, internationalization, localization, and translation. Globalizing means extending a product to different international contexts making it usable by the different potential users. Internationalization is the process of generalization of a product so that it can handle multiple languages and cultural conventions without the need of being redesigned. Localization regards not only the product itself, but also the entire documentation related to it and consists in making a product linguistically and culturally appropriate to the target. Translation is included in localization, in that it represents just one of the actions required to localize a product. While translation is aimed at maintaining the meaning of original information by exposing them in different languages, localization transforms the information in equivalent ones but adapted to a different culture.

In literature several sets of cultural dimensions have been proposed. For example, Yeo [14] categorizes the factors that need to be addressed in the internationalization process of a software into covert, publicly observable elements (e.g. date, calendars, time, address formats, character sets, punctuation, currency) and over, intangible and culture-dependent elements (e.g. colors, sounds, metaphors).
The most adopted and discussed classification of cultural dimensions is the one proposed by Hofstede [11]. He recognized these five main dimensions: 1) Small vs. large power distance (measures the extent to which the less powerful members of organizations and institutions accept and expect that power is distributed unequally); 2) Individualism vs. collectivism (measures the degree to which members of organization and institutions are integrated into groups); 3) Masculinity vs. femininity (measures the distribution of roles between the genders); 4) Weak vs. strong uncertainty avoidance (measures to what extent a culture prepares its members to feel either uncomfortable or comfortable in unstructured situations. Uncertainty-avoiding cultures try to minimize the possibility of unknown and surprising situations by strict laws and rules, safety and security measures, and on the philosophical and religious level by a belief in absolute Truth. Uncertainty-accepting cultures are more tolerant of opinions different from what they are used to; they try to have as few rules as possible, and on the philosophical and religious level they are relativist and allow many currents to flow side by side.); 5) Long vs. short term orientation (measures to what extent a culture respects values associated with long term orientation or short term orientation. Long term orientation values are thrift and perseverance, while values associated with short term orientation are respect for tradition, fulfilling social obligations.).

In the last six years, my research has been focused on design and develop a Web architecture [3, 4, 5] that supports 1) an interaction localized to user’s culture and 2) the collaborative creation and evolution of shared knowledge. The languages used in the current implementation of the architecture have been defined in [5, 9]. These languages permit to describe an interactive system dividing contents, layout and dynamics and therefore facilitate the internationalization and localization process.

A case study developed on the Web architecture and its languages is presented in the next section.

**Gender and culture localization: a case study**

This case study is developed in the frame of the SCV (Sistema Culturale Valchiavenna) project. The project is funded by Fondazione Cariplo and is carried out by the Territorial Community of Valchiavenna valley together with Università degli Studi di Milano and other partners.

The SCV project aims at coordinating, planning and promoting tangible and intangible assets relating to artistic, historical and cultural heritage of a well-defined geographic area in the north of Italy: the Valchiavenna valley. The final goal of the intervention in this case study is the exploitation of interdisciplinary capabilities and experiences developed by lecturers and researchers of several institutions to show how the use of digital communication methods can enable experts from different disciplines to work together for creating a continuously updated knowledge base. The contents stored in the knowledge base are immediately available for dissemination and for guiding tourists that wish to discover the area. At the same time, also another community is considered, the one of the tourists, that aims at accessing the domain expert knowledge base and at collaboratively commenting the maps and the points of interest of the Valchiavenna valley. The comments on the maps are created by associating an emoticon to a point of interest. The emoticon is representative of the emotion felt by the tourist when
visiting the point of interest (figure 1). Since shapes, symbols and colors acquire different meanings in the different traditions and cultures, all the interactive systems developed in the frame of this project were internationalized and localized. As example for this paper, three distinct localizations are compared: one for Italian and two for Japanese tourists.

Figure 1 shows the scale of liking used by the tourists in the case study. The four emotions are appreciation, surprise, disappointment, and sense of danger and are represented with different shapes and associated to different colors. The specific case of Japanese culture is representative because the shape of an emoticon should change according to the gender of the user. In fact, the traditional Japanese culture, prohibits to women to show their teeth while smiling.

![Figure 1](image.png)

**Figure 1.** The scale of liking used in the SCV case study. Four different emotions are materialized with different shapes and colors according to Italian and Japanese cultures [3].

**Conclusions and future works**

Many cases in which interaction should be designed differently on the basis of the users’ gender are easily encountered in everyday life and in the whole world. The case presented in the previous section is just one example of the importance of localization and internationalization of interactive software in the global context in which we live. Future developments of this research will consider an evaluation of the use of the emoticons and other graphic widgets in several cultural and application contexts.

In particular, it would be interesting to analyze the use of internationalization and localization techniques on avatars in order to show them to users according to their culture and therefore preventing possible misunderstanding and preserving Web reputation.

**Acknowledgements**

This work is supported by the Initial Training Network “Marie Curie Actions”, funded by the FP7 People Programme (reference: PITN-GA-2008-215446) entitled “DESIRE: Creative Design for Innovation in Science and Technology”.

**References**


