



Luciana Cardoso de Castro Salgado

**Cultural Viewpoint Metaphors to explore and communicate
cultural perspectives in cross-cultural HCI design**

Tese de Doutorado

Thesis presented to the Postgraduate Program in Informatics of the Departamento de Informática do Centro Técnico Científico, PUC-Rio as partial fulfillment of the requirements for the degree of Doutor em Informática.

Advisor: Prof^a. Clarisse Sieckenius de Souza

Rio de Janeiro, April 2011

Luciana Cardoso de Castro Salgado

**Cultural Viewpoint Metaphors to explore and communicate
cultural perspectives in cross-cultural HCI design**

Thesis presented to the Postgraduate Program in
Informatics of the Departamento de Informática do
Centro Técnico Científico, PUC-Rio as partial
fulfillment of the requirements for the degree of
Doutor em Informática.

Prof^a. Clarisse Sieckenius de Souza

Advisor

Departamento de Informática – PUC-Rio

Prof^a. Carla Faria Leitão

Departamento de Informática – PUC-Rio

Prof. Alberto Barbosa Raposo

Departamento de Informática – PUC-Rio

Prof^a. Ana Cristina Bicharra Garcia

Universidade Federal Fluminense – UFF

Prof^a Fernanda Araujo Baião Amorim

Universidade Federal do Estado do Rio de Janeiro – UNIRIO

Prof^a. Maria Elizabeth Sucupira Furtado

Universidade de Fortaleza - UNIFOR

Prof^a. Simone Diniz Junqueira Barbosa

Departamento de Informática – PUC-Rio

Prof. José Eugenio Leal

Coordenador Setorial do Centro

Técnico Científico – PUC-Rio

Rio de Janeiro, April 4, 2011

All rights reserved.

Luciana Cardoso de Castro Salgado

Graduate in Data Processing from PUC-Rio in 1994 and a MSc. degree in Informatics from PUC-Rio in 2007. She currently participates in SERG (Semiotic Engineering Research Group) at PUC-Rio. From 1993 to 2003, she worked as systems developer coordinator at a multi-national company.

Bibliographic Data

Salgado, Luciana Cardoso de Castro

Cultural viewpoint metaphors to explore and communicate cultural perspectives in cross-cultural HCI design / Luciana Cardoso de Castro Salgado; advisor: Clarisse Sieckenius de Souza. – 2011.

228 f.: il. (color.) ; 30 cm

Tese (doutorado)–Pontifícia Universidade Católica do Rio de Janeiro, Departamento de Informática, 2011.

Inclui bibliografia

1. Informática – Teses. 2. Engenharia semiótica. 3. Design multicultural. 4. IHC e cultura. 5. Metáforas conceituais para o design de IHC. I. Souza, Clarisse Sieckenius de. II. Pontifícia Universidade Católica do Rio de Janeiro. Departamento de Informática. III. Título.

CDD: 004

To Ricardo, Daniel e Rafael.

Acknowledgment

I thank God for being by my side at all times. My courage to move on came from my faith in You.

I am very grateful to my husband Ricardo and to my sons Daniel and Rafael. They unconditionally supported me in easy and hard times. They understood when I was absent and they had a lot of patience with my bad mood. They celebrated my victories and success. I love you!

All my gratitude to my mom (Olga). She did everything to give me the best opportunities. Many thanks! I thank all my family: my father (Pedro), my mother-in-law (Norma), sister (Patricia), brothers and sisters-in-law (Marcelo, Marcus, Alice, Hugo, Alessandra). It's great to have you in my life!

Special thanks go to my advisor and friend Clarisse Sieckenious de Souza. I do not have words to express all my admiration and gratitude. From the beginning she was my guru and a great friend. Thank you for everything!

I also thank Carla Faria Leitão, my co-advisor. For much of this work, we had the pleasure of having Carla with us. Her knowledge was essential at every moment. We had great time during this adventure!

I am sincerely thankful to all members of my doctoral committee. Each one of their contributions was very important to improve this final document.

I extend my gratitude to my colleagues at SERG (in alphabetical order, Ana Carolina, Andréia, Ariane, Bruno, Chantal, Ingrid, Juliana, José Antonio, Marcelle, Marcus, Silvia Amélia, Simone, Tomás and Ugo) and to the volunteers that participated in my studies.

I also thank the National Council for Scientific and Technological Development (CNPq) and the Carlos Chagas Filho Research Foundation of the State of Rio de Janeiro (FAPERJ) for financial support at different stages of this thesis.

Resumo

Salgado, Luciana Cardoso de Castro; de Souza, Clarisse Sieckenius. **Metáforas de Perspectivas Culturais para exploração e comunicação da diversidade cultural no design de IHC**. Rio de Janeiro, 2011. 228p. Tese de Doutorado - Departamento de Informática, Pontifícia Universidade Católica do Rio de Janeiro.

Mais do que nunca, um dos desafios para o design de interação hoje é o desenvolvimento de sistemas que atendam às necessidades e expectativas de pessoas de diferentes origens culturais e sociais. A perspectiva mais amplamente adotada é a internacionalização-localização. Internacionalização é o processo de separação do código do núcleo funcional das especificidades da interface do sistema (por exemplo, o idioma, as medidas, etc.). Com a localização, a interface é customizada para um determinado público (através da tradução do idioma, dos marcadores culturais e até mesmo de características técnicas, por exemplo). Internacionalização e localização têm como resultado esconder ou neutralizar diferenças culturais entre as comunidades de usuários e contextos de uso distintos. Estamos, no entanto, interessados nas situações onde a intenção de design é praticamente oposta: explorar a diversidade cultural.

Esta tese oferece conhecimento novo para ajudar designers de IHC a comunicarem sua intenção de design quando querem promover o contato dos usuários com a diversidade cultural. São apresentadas cinco metáforas de perspectivas culturais (CVM) para apoiar o raciocínio e a tomada de decisão sobre dimensões da experiência intercultural. As metáforas derivam de estudos empíricos aplicando Engenharia Semiótica para analisar e re-projetar interfaces de sistemas multiculturais.

A fim de investigar se e como estas metáforas apoiam os profissionais de IHC em tempo de design e de avaliação, realizamos um estudo de caso para avaliar como as CVM podem ser usadas em atividades de re-projeto e avaliação. Descobrimos que as CVM desempenham um papel importante nos estágios iniciais do re-projeto e efetivamente ajudam os designers a raciocinar sobre possíveis experiências interculturais que poderão acontecer em tempo de interação. Além disso, as CVM fornecem uma rica “grade” epistêmica, onde a consistência das escolhas de projeto se destaca mais claramente.

Palavras-chave

Engenharia Semiótica; Design multicultural; IHC e Cultura; Metáforas conceituais para o design de IHC.

Abstract

Salgado, Luciana Cardoso de Castro; de Souza, Clarisse Sieckenius (Advisor). **Cultural Viewpoint Metaphors to explore and communicate cultural perspectives in cross-cultural HCI design.** Rio de Janeiro, 2011. 228p. D.Sc. Thesis - Departamento de Informática, Pontifícia Universidade Católica do Rio de Janeiro.

More than ever before, today one of the challenges for interaction design is the development of systems aiming to attend to the needs and expectations of people with different cultural and social backgrounds. The most widely used perspective in cross-cultural design is internationalization-localization. Internationalization is the process of separating the core functionality code from system's interface specifics (e.g. text language, measures, etc.). With localization, the interface is customized for a particular audience (through language translation, cultural markers and even technical features, for instance). The result of internationalization and localization is *to conceal or neutralize* cultural differences among different user communities and contexts of use. We are, however, interested in another situation: one where the design intent is virtually the opposite: *to expose and explore* cultural diversity. This is the case, for instance, when the purpose of the designed system is to stimulate users to make contact with a foreign culture.

This thesis provides new knowledge to help HCI designers *communicate* their intent when they want to promote the users' contact with cultural diversity. We present five cultural viewpoint metaphors (CVM) to support reasoning and decision-making about intercultural experience dimensions. The metaphors derive from empirical studies applying Semiotic Engineering to analyze and re-design cross-cultural systems interfaces.

In order to investigate if and how CVM actually support HCI professionals/practitioners at design and evaluation time, we carried out an extensive case study to assess how CVM can be used in design and evaluation activities. We found that CVM played an important role in early design stages, helping designers to *reason* effectively about intercultural experiences while determining which cultural perspective they want to adopt. Furthermore, CVM features provided a rich epistemic grid where the consistency of design choices stands out more clearly.

Keywords

Semiotic Engineering; Cross-cultural design; HCI and Culture; Conceptual metaphors for HCI design

Table of Contents

1 Introduction	17
1.1. The research question, objectives and scope	19
1.2. Contributions	22
1.3. Outline	23
2 Theoretical Characterization	24
2.1. Culture and Communication	25
2.2. Semiotic Engineering concepts and cross-cultural design	28
2.3. Conceptual Metaphors	36
3 Related Work	40
3.1. Work devoted to studying challenges in cross-cultural HCI design process	41
3.1.1. HCI methods and practices in the context of cross-cultural design	41
3.1.2. Cultural differences between designers and users in the context of HCI design processes	43
3.1.3. Usability and communicability in cross-cultural HCI design	45
3.2. Work devoted to proposing solutions to the HCI design process of cross-cultural systems	47
3.2.1. Cultural Differences Elicitation	47
3.2.2. Collaborative design across cultures	53
3.2.3. Guidelines for HCI design	54
3.2.4. Culturally adaptive software	55
3.3. Work about the use of metaphors in HCI design	56
3.4. Learned lessons	58
4 Cultural Viewpoint Metaphors	60
4.1. Cultural viewpoint metaphors as a top level frame for cross-cultural HCI design	61
4.1.1. The Domestic Traveler metaphor	65

4.1.2. The Observer at a distance metaphor	68
4.1.3. The Guided Tour Visitor metaphor	72
4.1.4. The Foreigner with translator metaphor	77
4.1.5. The Foreigner without translator metaphor	80
4.2. Metaphors' evolution	85
 5 A Case Study	 89
5.1. Methodology	89
5.2. Case Study: Re-designing the AVIS website	93
5.2.1. Step One – Cultural Viewpoint Metaphors at design time	96
5.2.2. Step Two - Cultural Viewpoint Metaphors at evaluation time	116
5.2.3. Case Study Results Analysis and Synthesis	133
5.3. Triangulation	134
5.3.1. Evaluating the FIFA website with CVM	135
5.3.2. Exogenous Triangulation: contrasting findings from the Case Study and the FIFA experiment	146
 6 Discussion	 149
 7 Contributions and future work	 159
7.1. Contributions to HCI research in cross-cultural design	159
7.1.1. A Unified Theoretical Frame	159
7.1.2. Cultural Viewpoint Metaphors	161
7.2. Contributions to Semiotic Engineering	163
7.3. Conclusion and Future work	165
7.3.1. Future work to improve and evaluate CVM	166
7.3.2. Future work to expand or enhance the Semiotic Engineering account of cross-cultural HCI design	167
 References	 169
 Appendix A How-to-Guide	 178
 Appendix B Participants' discourse evidence in Portuguese	 180

Appendix C Case Study Avis Rent a Car-Metaphors at design time	196
Appendix D Case Study Avis Rent a Car-Metaphors at evaluation time	219
Appendix E Evaluating FIFA with CVM	225

List of figures

Figure 1: Graphic scheme of Jakobson's (1960) model of communication space.	29
Figure 2: The Semiotic engineering design space (de Souza, 2005a).	30
Figure 3: The Semiotic Engineering design space taking into account cultural diversity.	34
Figure 4: Progressive cultural viewpoint metaphors.	62
Figure 5: Metaphors' effects while expressing design intent.	63
Figure 6: The <i>Domestic Traveler</i> metaphor.	65
Figure 7: Screenshot of Recipe.com (last accessed in December 2010).	67
Figure 8: The <i>Observer at a distance</i> metaphor.	68
Figure 9: Global Destination section of www.globalgourmet.com website (last accessed in December of 2010).	70
Figure 10: Screenshot of www.globalgourmet.com , section 'Destination: Austria' (last accessed in December 2010).	71
Figure 11: ScreenShot of www.globalgourmet.com , section 'Recipe: Chocolate Pudding' (last accessed in December 2010).	71
Figure 12: The <i>Guided tour visitor</i> Metaphor.	72
Figure 13: The www.culinary.net website (last accessed in December 2010).	74
Figure 14: The www.culinary.net website (last accessed in December 2010).	74
Figure 15: The www.justbrazil.org/brazil/recipes/ website (last accessed in December 2010).	75
Figure 16: The www.justbrazil.org/brazil/recipes/ website (last accessed in December 2010).	75
Figure 17: The www.Sonia-portuguese.com website (last accessed in December of 2010).	76
Figure 18: The www.Sonia-portuguese.com website (last accessed in December 2010).	76
Figure 19: The <i>Foreigner with translator</i> metaphor.	77
Figure 20: The http://brazilianrecipes.org/brazilian_food/ website (last accessed in December 2010).	79

Figure 21: The http://brazilianrecipes.org/brazilian_food/ website (last accessed in December 2010).	79
Figure 22: The <i>Foreigner without translator</i> metaphor.	80
Figure 23: The www.onlinerecipeguide.com website (last accessed in December 2010).	81
Figure 24: The amazon.com home page.	83
Figure 25: Footer of an amazon.com webpage with links to international sites.	83
Figure 26 – Research Steps	90
Figure 27: AVIS website in the USA (http://www.avis.com , last accessed on January 3, 2011).	94
Figure 28: AVIS website in Israel (http://www.avis.co.il/ , last accessed on January 3, 2011).	95
Figure 29: AVIS website in China (http://www.avischina.com/), last accessed on January 3, 2011).	95
Figure 30: The structure of the task model for making a car reservation in the AVIS website.	96
Figure 31:P1.1's mockup guided by <i>Foreigner with translator</i> metaphor: 'Select a car' webpage.	109
Figure 32: P1.1's mockup with <i>Guided tour visitor</i> metaphor: 'Home page'.	110
Figure 33: P1.1's mockup with <i>Guided tour visitor</i> metaphor: 'Select a car' webpage.	111
Figure 34: P1.2's mockup guided by <i>Observer at a distance</i> metaphor: 'Home page'.	112
Figure 35: P1.2's mockup guided by <i>Observer at a distance</i> metaphor: 'Do you Know section'.	112
Figure 36: P1.2's Mockup with the <i>Guided tour visitor</i> metaphor: 'Home page'.	113
Figure 37: P1.2's Mockup to <i>Guided tour visitor</i> metaphor: 'Select a car' page.	114
Figure 38: P1.2's Mockup guided by <i>Foreigner with translator</i> metaphor: 'Home' page.	114
Figure 39: P1.2's Handmade mockup.	117
Figure 40: P1.2' Balsamiq mockup.	118

Figure 41: Videos of click-through Balsamiq mockups.	120
Figure 42: Exogenous triangulation: CVM at evaluation time.	135
Figure 43: FIFA website in English (http://www.fifa.com/index.html?language=en).	136
Figure 44: FIFA website in Arabic (http://ar.fifa.com/index.html?language=ar).	136
Figure 45: 2010 FIFA World Cup South Africa's portion of FIFA website (http://www.pt.fifa.com/worldcup/archive/southafrica2010).	138
Figure 46: Peirce's semiotic triangle.	149
Figure 47: A physical outdoor posted near a dangerous place (Photo by photoeverywhere.co.uk: http://www.photoeverywhere.co.uk).	151
Figure 48: Indexical representation in Rio-Niteroi Bridge website (http://www.ponte.com.br/).	152
Figure 49: Detailed information about traffic in Rio-Niteroi Bridge website.	152
Figure 50: Symbolic representation to 'danger' (image by dreamstime.com: http://www.dreamstime.com).	153
Figure 51: Screenshot of www.globalgourmet.com , section 'Destination: Austria' (last accessed in December 2010).	154
Figure 52: The www.culinary.net website (last accessed in December 2010).	155
Figure 53: Continuum of cultural approximation with different levels of cultural perception.	157
Figure 54: Metaphors' signification and effects while expressing design intent.	157

List of tables

Table 1: Categories of work devoted to taming cultural issues in HCI.	40
Table 2: The <i>Domestic Traveler</i> Metaphor expression and the effects on the organization of Interactive Discourse.	66
Table 3: The <i>Observer at a distance</i> metaphor expression and the effects on the organization of Interactive Discourse.	69
Table 4: The <i>Guided tour visitor</i> Metaphor expression and the effects on organization of Interactive Discourse.	73
Table 5: The <i>Foreigner with translator</i> metaphor expression and the effects on the organization of Interactive Discourse.	78
Table 6: The <i>Foreigner without translator</i> metaphor expression and the effects on the organization of Interactive Discourse.	80
Table 7: Cultural Viewpoint Metaphors current version (version 4).	84
Table 8: Cultural Viewpoint Metaphors' Evolution.	85
Table 9: Cultural Viewpoint Metaphors Version 1 (2009).	86
Table 10: Cultural Viewpoint Metaphors Version 3 (2010.2).	88
Table 11: Participants' cultural background and corresponding targeted user.	98
Table 12: The distribution of alternatives and scenario among participants.	119