

On the epistemic nature of Cultural Viewpoint Metaphors

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ABSTRACT

This paper presents the results of a qualitative in-depth study to investigate if and how our previously proposed Cultural Viewpoint Metaphors (CVM) can support practitioners in assessing the quality of HCI design alternatives. The results of the study underline the epistemic value of CVM in cross-cultural system design processes. The metaphors have not only helped participants organize their thinking about how cultural diversity is exposed and communicated through systems interfaces, but also build new knowledge and understanding about *culture* itself.

Keywords

Cross-cultural systems; HCI and culture;
Conceptual metaphors for HCI design.

INTRODUCTION

Today, knowing how to deal with cross-cultural issues, especially when developing wide-access applications for the Web, is beyond any doubt a requirement for interaction design. One of the main challenges for designers is to build systems that aim explicitly at acknowledging the diversity of their users' cultural and social background and attending to a wider variety of needs and expectations. Two paradigmatic examples of such systems are e-government and global e-commerce applications. In the former, an explicit acknowledgment (and design for) socio-cultural variety serves the purpose of communicating to citizens of all segments in society that they will be attended by the system. In the latter, it serves the purpose of communicating to consumers that a particular company cares about each and every customer, individually, even if its business extends beyond multiple national frontiers.

In the last 15-20 years, HCI researchers have been investigating the impact of culture on the users' experience and HCI design process with increased interest. Some have proposed different ways to frame cultural issues in HCI [1, 3, 12, 26]. Others have proposed new alternatives or

additions to existing design and evaluation practices [6, 14, 19, 20] in order to add relevant culture-related issues to the previous spectrum of issues they covered.

Our interest, as our mention to e-government and e-commerce applications anticipates, lies in how HCI design can *express and promote* the users' contact with cultural diversity. At this stage of our research, we concentrate on situations where users get in touch with a different culture through domain-related systems interface signs alone (not, for example, through synchronous or asynchronous communication with co-users from a different culture). We believe that dividing the problem space in two – one dealing with indirect intercultural contact through domain-related signs, and the other through direct communication with co-users with different cultural backgrounds – has the advantage of highlighting how they can contribute independently to the users' experience in cross-cultural settings.

In previous work, we have proposed five cultural viewpoint metaphors (CVM) to support reasoning and decision-making about intercultural experience dimensions [21, 22, 23]. CVM is a conceptual design tool that can be used when cross-cultural system designers explicitly want to support and promote different levels of intercultural contact with cultural diversity. The design intent of such applications is usually to *expose and explore* cultural diversity by providing opportunities for indirect intercultural encounters. In this setting, users get in contact with characteristics of a foreign culture by interacting with systems that explicitly explore differences across cultural variables (*e.g.* beliefs, behavior, morals, social conventions, art, law, language, iconography, communication styles, and so on).

CVM derived from initial empirical studies [21] that investigated if and how Semiotic Engineering [5] concepts and evaluation methods could help designers to elaborate intercultural mediation discourse (*metacommunication*, in Semiotic Engineering terms) in the context of cross-cultural applications. Semiotic Engineering views HCI as a case of designer-to-user *communication about communication*, where designers – through systems interfaces – are indirectly (or at times quite directly) *telling* users how, why, when and where to communicate with the system in order to achieve a number of tasks and effects.

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Thus, when looking at how domain-related interface signs communicate cross-cultural messages (*i.e.* messages about other cultures), Semiotic Engineering helps us to identify and articulate multiple aspects of communicative purposes that cross-cultural interactive strategies can contribute to achieve.

This paper presents the results of an empirical study carried out to assess the potential of CVM in evaluating cross-cultural applications. The study is part of a larger case study [23] extending over design and evaluation activities. In Step One, which we don't report here, we explored the use of CVM in re-designing parts of the AVIS Rent a Car System[©] website¹ (directed to users from different cultures). In Step Two, reported in this paper, participants were asked to use CVM to evaluate design alternatives produced in the previous step. The results of the study underline the epistemic value of our metaphors in this context. They have not only helped the participants to organize their thinking about how cultural diversity is exposed and communicated through systems interfaces, but to build new knowledge and understanding about *culture* itself.

The *epistemic value* of CVM is a notion inspired by Schön's view of the central role of knowledge generation in both research and design processes [24]. According to the author, designers should constantly build a particular kind of knowledge that helps them understand the problem situation, find ways to resolve it, compare alternative solutions, and decide which ones are good, or better than others. Designers should thus be equipped with knowledge that, in Schön's word, amounts to an "epistemology of practice". Thus, the significance of CVM, according to the reported study's results, lies precisely in supporting *reflection in action* [24].

The remainder of this paper is structured as follows. In the next section we briefly expand on how our research relates to other work involving culture in HCI. Then, in the third section, we present the gist of the Cultural Viewpoint Metaphors. The fourth section of the paper reports the details of our experiment and discusses our findings, and the last section presents our conclusions and future work.

CULTURE IN HCI

The interest in culture and its impact on the users' experience dates back to the 1980's with the development of multilingual versions of software applications and the advent of *visual* interfaces (GUIs) [14]. Since the mid-1990s, with wide-spread online communication and collaboration among people from all over the world, cross-cultural communication has increased dramatically and many new research challenges for HCI have emerged.

¹ From now on we will refer to it as simply "the AVIS website" (<http://www.avis.com/>).

We can broadly classify previous research devoted to taming cultural issues in HCI in two groups: work devoted to finding new challenges brought about by cross-cultural HCI design processes; and work that proposes new alternatives to carry out HCI design and evaluation in order to add cultural aspects to the existing problem space.

In the first group, there are various cultural studies focused on how current HCI methods and knowledge are (or can be) used in cross-cultural HCI design [16, 28]. A cultural evaluation of Usability Engineering in the Namibian context [28], for instance, points at a cultural appropriation of the software development process itself, suggesting that methods, concepts and project goals need to be redefined within local contexts, in a kind of 'sustainable software development' process.

Other research deals with the need to redefine usability. Yeo [29], for instance, conducted studies about usability techniques in non-Western cultures. Results of usability evaluation were found to be inconsistent. Yeo suggests that cultural factors related to the social *status* of participants might partially explain why lower status participants expressed contradictory opinions about the software under evaluation. This phenomenon was not observed with higher status participants.

The need for finer awareness of cultural differences in design has also been discussed in previous research. Several subfields in HCI, such as Participatory Design [25], End-User Programming [9] and User Modeling [13], support the idea that "in the design stage, various viewpoints of stakeholders have to be identified and managed" [27]. Typically, these will not deal with cultural differences in terms of nationality or ethnicity, but mainly in terms of other culture-defining variables such as shared behavioral practices, assumptions and values, patterns of thinking, and communicative style.

In the second group of our broad classification, a number of projects have been using and developing theoretical or practical approaches to tackle cultural aspects in cross-cultural website design processes. Cultural models [10, 11] for instance, have been supporting the development of conceptual models to measure cultural influences on the users' experience [31].

Some other approaches, in turn, derive new methods and perspectives by adapting or simply transferring existing HCI evaluation practices to culturally-marked contexts. Usability [6, 19] and Culturability [1] evaluation, for example, are the most popular methods for eliciting localization requirements. The contributions of this kind of research are mainly centered on recommendations and guidelines for HCI design [6, 14, 19].

We should note that practically all of the research done to-date about culture and HCI has typically been focused on two main topics: the internationalization-localization (Int-Loc) of software; and the analysis of users and systems in

order to tease out cultural differences that affect human-computer interaction. The Int-Loc approach leads HCI designers in deciding whether to *design for all* (aiming to neutralize or minimize cultural differences) or *design for each* (aiming to provide specialized interfaces for users from different cultures). One way or the other, the result is that the end users will probably not know which (or that) cultural differences exist among the targeted user population.

The wide-spread popularity of the In-Loc perspective has created a gap in HCI research that our work aims at addressing by proposing a solution to *increase visibility and awareness of cultural diversity*. As explained in the next section, our work explicitly uses metaphorical reasoning to explore cultural perspectives in a cross-cultural HCI design process. CVM help designers and evaluators to frame and analyze cultural issues in new ways (compared to previous work in HCI), and to communicate cultural diversity through their designs.

Our work also contributes directly to addressing some of the issues created by inevitable cultural biases of HCI practitioners with respect to an application's domain and user population. As we will show, the use of our viewpoint metaphors increases designers' and evaluators' awareness of the effects of cross-cultural differences in HCI design.

In the next section we briefly present our conceptual metaphors, setting the ground for the presentation and discussion of the empirical study that constitutes the gist of this paper.

CULTURAL VIEWPOINT METAPHORS

CVM can be seen as what Fineman [8] calls *invention metaphors*. Invention metaphors help designers come up with ideas during the design process. They may never be explicitly understood by the user, and in fact aren't intended to be. Their primary purpose and function is to help the designers see (old) problems in new ways.

CVM thus constitute a conceptual tool whose purpose is to inform and to guide interaction design and evaluation whenever explicit communication about cultural diversity is part of the design intent [21]. They are meant to support designers and evaluators while reasoning and making decisions about different levels of intercultural contact *through system domain signs*. Designers' choices may increase or decrease the users' perception of cultural diversity in the particular domain that the system refers to. In this sense, the targeted *users of CVM* are HCI reflective practitioners [24] and researchers.

Our general metaphorical structure interaction projects with cross-cultural systems *as a journey*, and users *as travelers*. The five metaphors express five distinct conceptual perspectives on **traveling** through a cross-cultural territory, and can be plotted upon a *continuum* of cultural approximation established with reference to a presumed user's native culture [22].

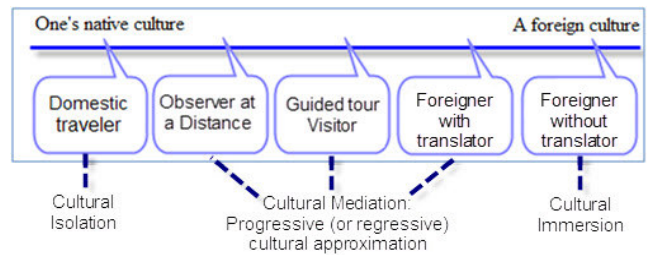


Figure 1: Progressive cultural viewpoint metaphors.

The adoption of each metaphor, thus, entails different cultural mediation rhetoric in the system's interface language. The *continuum* of cultural approximation (Figure 1) shows that at both ends there is no mediated cultural contact. At one end, the *domestic traveler* metaphor does not intend to expose and explore cultural diversity; instead it intends to *conceal* it. So, in this context the designer's intent is not to promote any kind of intercultural user contact with signs from a foreign culture. At the other end, the *foreigner without translator* metaphor leads users into complete cultural immersion. In this case, intercultural contact does exist, but without intermediaries. No explanations or orientations about cultural signs are given to foreign users.

If metaphors between the two extremes are used in design (the *observer at a distance*, the *guided tour visitor*, and the *foreigner with translator* metaphors) the system's interface language may communicate cultural diversity with different levels of cultural *mediation*. In other words, the designers (through the system's interface) *tell* the users (and enable them to *experience*) different things relative to a foreign culture.

The intended effect of the *observer at a distance* metaphor is to expose the user to other cultural contexts gently. The concept behind this metaphor is that the cultural markers² [1] of the foreign culture are presented to the targeted user as 'information', not as 'experience'. That is, they are *told* about foreign practices and meanings, but cannot experience them. With this metaphor, the users' native culture dominates. The metacommunication features only allusive references to a foreign culture's signs.

The intended effect of the *guided tour visitor* metaphor on the expression of design is that of stronger cultural mediation. The foreign culture is presented through interface signs and interaction forms *borrowed* from it. Cultural markers from the foreign culture appear to users from another culture as an 'illustration'. That is,

² "The detailed list of cultural markers corresponding to web design elements contains color, spatial organization, fonts, shapes, icons, metaphors, geography, language, flags, sounds, motion, preferences for text versus graphics, directionality of how language is written, help features and navigation tools." [1, p.1]

metacommunication should ideally contrast the two cultures by showing the user a comparative interpretation of the foreign culture. The designers' selection, view and commentary about cultural differences achieve the illustrative effect. Different cultural variable values are presented, discussed and explained in the targeted user's language. *Interface signs* and *interaction forms* borrowed from the foreign culture's practices give the users a *flavor* of what the other culture is like, and how it feels to adopt some of its values, practices, etc.

The intended effect of the *foreigner with translator* metaphor on the expression of design is that of weaker cultural mediation. When designing guided by the *foreigner with translator* metaphor, designers will give the targeted users a *preview* of what it is like to be totally immersed in a foreign culture. The only scaffold provided for this experience of foreign values, practices, and perspectives is a *translation* of textual material into the users' native language. Everything else comes from the *foreign* (the users' non-native) culture.

Metaphor Expression	Effects on organization of Interactive Discourse		
	Metacommunication features	Cultural variables	
		Language	Cultural Practice
DOMESTIC TRAVELER. No markers from the foreign culture.	Design neutralizes cultural differences and makes the user's culture dominate.	User's	User's
OBSERVER AT A DISTANCE. The cultural markers of another culture are communicated as 'information' (not as an experience the use can feel).	Interface elements which represent cultural practices are presented according to the user's culture. Narrative about the foreign culture provides factual information about what is different from one's own culture.	User's	User's
GUIDED TOUR VISITOR. Cultural markers from another culture are 'illustrated' to the user (aspects of cultural issues are exemplified and explained in the user's language).	Design provides contrast between the two cultures. An interpreted view and commentary on the foreign culture mediates the user's approximation and contact with cultural diversity. The user's own culture is dominant and serves as reference.	User's	Foreign
FOREIGNER WITH TRANSLATOR. Cultural markers of another culture can be directly 'experienced' by the user, although in the user's own language.	Communication content is presented in the same way it as to the native users from the foreign culture. Only linguistic translation is done.	User's	Foreign
FOREIGNER WITHOUT TRANSLATOR. Users are addressed as a foreign culture's natives.	The culture of others is offered as it is.	Foreign	Foreign

Table 1: Metaphors expression and the effects on organization of Interactive Discourse.

Table 1 summarizes the proposed CVM effects on the interactive discourse (a combination of metacommunication features and cultural variables selection). Although 'language' is a cultural variable, CVM isolates 'language' from the other variables. This is also done in internationalization processes, where language is usually singled out as the most prominent cultural marker of the user's cultural experience. Our *choice* to organize the spectrum of cultural variables in this way is motivated by the fact that language refers to a complex semiotic system that can actually *describe and narrate* all the other variables (including itself). This unique feature helps us explore *language* as a special resource in cross-cultural communication, which it undoubtedly is. But besides language, there is a wide variety of cultural practices from specific domains that directly impact the user's contact with cultural diversity, and that can be very productively explored in isolation as well.

CVM are not meant to *elicit* cultural content and variables, however. Linguistic and domain-dependent cultural variables and their values must be elicited using other resources (like ethnography, for example). CVM comes into play when cultural content is already available and designers must then decide what they will use. The mediated conversation with (and about) the system through the interface is achieved by interactive signs intentionally selected by designers to provoke different kinds of intercultural contact.

USING CVM FOR EVALUATION PURPOSES

The purpose of this experiment was to evaluate the potential of cultural viewpoint metaphors as an inspection tool for early formative HCI evaluation in a re-design process. The general research question we were asking was: How can CVM support HCI professionals/practitioners (if at all) at evaluation time?

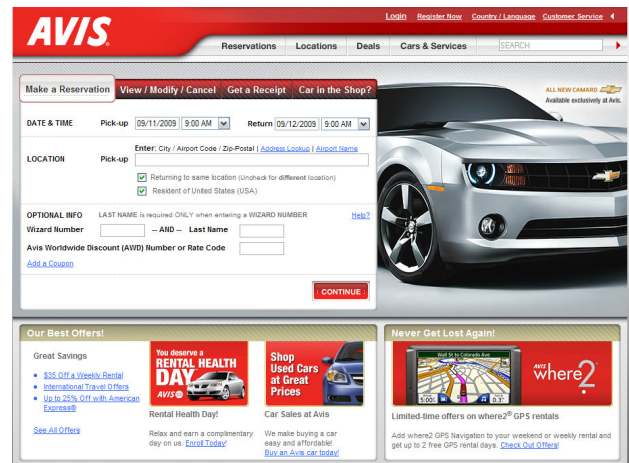


Figure 2: AVIS website in the USA
(<http://www.avis.com>)

This experiment is part of a broader case study in two steps, using CVM to re-design the AVIS website (shown in Figure 2) and then to evaluate re-design alternatives. In

Step One of this case study [23], six participants proposed three re-design alternatives to the Avis website by sketching handmade mockups guided by the following metaphors: *observer at a distance*, *guided tour visitor* and *foreigner with translator*.

In order to run the experiment described in this paper we, then, selected two sets of alternatives elaborated by two of the six participants. Each set includes three sketches, one for each metaphor chosen for the study. We wanted to see how HCI evaluators interpret designs produced using CVM. The criterion for selecting which one of the six sets would be used in Step Two of the overall study was the richness of the sketched solutions with respect to providing evidence of underlying metaphors, as well as the communicated opportunities for intercultural contact.

We reproduced the handmade mockups with Balsamiq Mockups³. Well-finished mockups had the advantage of standardizing the visual quality of designs and preventing judgment that might be influenced by the designers' ability to draw nice sketches. Figure 3 and Figure 4 show an example of a handmade and its corresponding mockup, respectively.

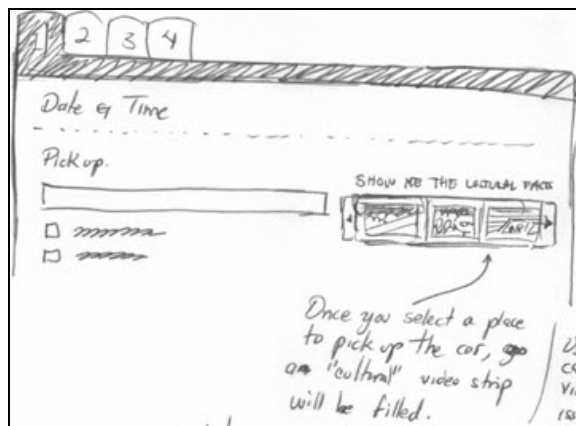


Figure 3: Mexican Participant Handmade mockup.

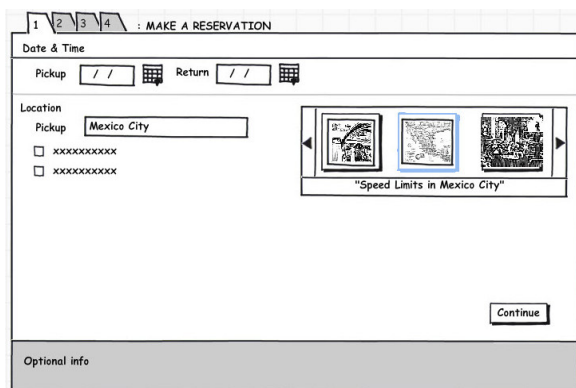


Figure 4: Mexican Participant Balsamiq mockup.

³ Balsamiq Mockups is a sketching tool for HCI design produced by Balsamiq Studios (<http://balsamiq.com/>).

Balsamiq lets us generate click-through mockups. So, for each group of three sketches in a selected participant's solution from Step One, we produced a corresponding *interactive* version. As a whole, we created three Balsamiq interactive mockups for each of the two selected re-designs, one for each specific metaphor, namely: the *observer at a distance*; the *guided tour visitor*; and the *foreigner with translator*.

In order to avoid distractions introduced by potential interaction issues while manipulating Balsamiq mockups, we produced videos of a hypothetical user interacting with the click-through Balsamiq mockups. So, the videos were the material evidence used in the evaluation process. Participants could thus focus exclusively on analyzing this material representation of the re-designs.

Methodology

We used a qualitative approach because it is especially appropriate for studies like ours [4, 7], which explores intensively and at greater depth a specific research question. Our primary data was produced by four participants. The main empirical evidence was collected in post-evaluation interviews: the participants' *discourse* about the evaluation process and the results they achieved, as well as their impressions and opinions about CVM and its use. Secondary empirical data was collected from the evaluation reports, which provided evidence of how CVM-related meanings contributed to making a qualitative assessment of cross-cultural interaction design alternatives.

Our analysis focused on the identification of meanings and interpretation thereof. In other words, by identifying various meanings that the participants assigned to CVM, we investigated how they elaborated and used them in their evaluation of the designers' metacommunication. We should underline the fact that our aim was *not* to analyze the quality of the evaluation *product* (the evaluation reports). They just provided the necessary context and helped us to interpret the participants' *discourse* about the evaluation activity as a whole.

The participants' *interviews* were analyzed separately, using discourse analysis techniques [18]. The analysis consisted of a systematic exploration aiming to find out major meaning categories in discourse with iterated intra-participant analysis (*i.e.* an examination of categories in a *single* participant's discourse) and inter-participant analysis (*i.e.* an examination of categories across multiple participants' discourse). Finally, we carried on an exogenous triangulation [30], a scientific validation of our qualitative research using elements of CVM evaluation in another closely related context: the evaluation of an existing cross-cultural application from a different domain

Participants

This experiment involved four nationals of the same country (Brazil). All of them (P1, P2, P3 and P4) have good HCI knowledge, as well as reading fluency in English. Moreover, P1, P2 and P3 have further professional

experience, having worked in practical HCI projects. The entire experiment had a duration of about 150 minutes.

Procedures

The four participants listened to a tutorial introducing CVM (explaining the underlying concepts and giving examples). They then inspected a set of three videos with Balsamiq mockups, for which they had a proposed scenario. As already mentioned, each video had a set of re-design alternatives, generated in accordance with a specific viewpoint metaphor.

The evaluation scenario proposed that its main character (the participant's role) worked in a project to re-design the Avis website. The character's goal was to evaluate a set of alternatives elaborated in a previous design step (by analogy with Step One, in our longer study). He should take into consideration that designers tried to use a predominant (non-exclusive) cultural viewpoint metaphor in each of the alternatives, and that their explicit design intent was to *promote* different levels of awareness about cultural diversity among users. The participant should bear in mind following inspection context: "*an American residing in the USA chooses a foreign location for rental car pick-up*". The set of re-design alternatives were distributed to participants as presented in Table 2.

Id	Alternatives proposed by a...	Inspection Scenario: an American residing in the USA chooses a place in...
P1	Mexican designer	Mexico for car pick-up.
P2	Mexican designer	Mexico for car pick-up.
P3	Brazilian designer	Brazil for car pick-up.
P4	Brazilian designer	Brazil for car pick-up.

Table 2: The distribution of alternatives and scenario among participants of the evaluation experiment.

Participants were invited to answer three evaluation questionnaires, one for each interaction video. The answers stood for the result of their evaluation. Our goal with questionnaire was twofold. First, we intended to guide the evaluators throughout the inspection by asking questions about the fundamentals of CVM, the cultural variables and metacommunication features. When reporting evidence of a specific metaphor, the evaluator should be able to answer which cultural variables were expressed through the "interface", and which interface elements were used to communicate cultural differences. Second, we wanted to capture the expression of the evaluators' preliminary interpretation of the quality of metacommunication, regarding specifically the intent of promoting the user's contact with cultural diversity.

After completing their evaluation, participants reported verbally on the evaluation process, as the researcher conducted the post-activity interview. This stage aimed at collecting mainly the following empirical data: the evaluators' discourse about their evaluation results and the

evaluation process (*i.e.* how the proposed metaphors helped them, if at all, in focusing and reflecting on the quality of metacommunication; what they found easy or difficult to do; and what they learned with the experiment).

Results

As mentioned before, the empirical data collected in this step was examined using a discourse analysis technique. It generated a set of analytical categories which are part of the broader results of our research. One of the main categories that emerged from our data was the epistemic nature of CVM in evaluation activities. By epistemic we mean that the metaphors helped participants in building new knowledge and understanding about the HCI design process. This was referenced specifically to the context of cross-cultural applications that aim at promoting intercultural contact mediated by interface signs about the involved cultures. Therefore, all of the following should be taken within the limits of this particular context.

We found evidence that the metaphors led participants into: thinking and reflecting about how cultural diversity was communicated; exploring the implications of such communication; and narrowing and keeping the focus of the evaluation centered around intercultural issues while contrasting re-design alternatives.

With CVM, participants could reason about five possible intercultural contacts while evaluating which cultural perspective was adopted by designers. So, the value of different design choices stood out more clearly throughout the whole evaluation activity. Moreover, participants gained awareness of their own cultural biases, thinking about their own stance in the process of evaluating intercultural systems of the sort we used.

CVM also helped participants to explore the design space of cross-cultural Web applications in a more structured way. They systematically guided evaluators while they inspected and assessed the communicability of cultural diversity, keeping their perspective more rigorously centered on this segment of analysis (instead of mixing various issues and dimensions into a single heterogeneous collection of judgments).

We arrived at the epistemic nature of CVM based on evidence provided by three specific subcategories of meanings: (i) the participant's perception of her/his own growing ability to name his/her findings and frame them into cultural categories of problems; (ii) the participant's perception that cross-cultural content and communication strategy may be addressed separately at re-design time; (iii) the participant's analysis of communicative strategies and new possibilities in cross-cultural HCI design.

As evidence for (i), we see in the following discourse excerpts that CVM framed P2, P3 and P4's interpretation, giving them conceptual scaffolds to organize the problem space.

P2: *“If you hadn’t given me anything, nothing of the kind, [if you had] just got me sitting here in front of the computer, saying ‘Evaluate this!’, the result wouldn’t have been as rich as that which came out. Because you gave me a tool to think. You didn’t just throw me here and said: Do this evaluation! It helped me to reflect about the cultural issues.”*

P3: *“Oh, yes! Because [the metaphors] guided me regarding the type of interpretation that I would make out of the signs [...]. They helped me like that. Because they called my attention to this other class of signs, and also guided me regarding the types of interpretation I was about to make.”*

P4: *“The questions [from the questionnaires] help you think. And then, there is no way out, you end up coming at here [the metaphors table]. We can see, that is, in the end, we end up learning the idea of the metaphors. Just by looking and analyzing them you can already identify which metaphor the designer wanted to follow.”*

Additionally, participants not only identified the interface portions where the designer was communicating cultural diversity, but they could name the object of inspection by using metaphorical references.

P1: *“I found that the first video was more ‘guided tour visitor’ than the ‘observer at a distance’, and this video more ‘observer at a distance’ than ‘guided tour visitor’. This because there [in the first video], I saw more comparisons”.*

P4: *“When I got to option C, when I saw ‘the AVIS Brasil flag’, and Brasil written with an S, then I immediately thought: this is going to be total immersion. But the language was English! Then, I thought: Ah! Then this is the ‘foreigner with translator’, most definitely.”*

As evidence for (ii), we see in the following excerpts that CVM helped participants to understand that HCI evaluators must have a certain level of ‘awareness’ about cultural diversity, although they need not know all of the existing differences among the cultures they are dealing with. CVM concepts helped participants in understanding that culture is part of the metacommunication process.

P1: *“So, I think I should know, at least, a little of each one of the cultures to be able to answer question 3 [question 3 in the evaluation questionnaire asks the respondent to tell if a cultural variable used in the interface belongs to culture A or B].”*

P3: *“The metaphors called my attention to which ones are cultural signs. I interpreted these signs according to the metaphors: [I tried to say] if they inform, compare [or] only transcribe [cultural elements] into another language, into another culture. It helped me a lot in this sense.”*

Participants realized that cultural gaps are inherent to the design problem, and not something that CVM should resolve.

P3: *“I think the difficulties... It is inherent to the problem itself, which is to evaluate some ‘thing’ that involves different cultures that the evaluator does not know [...] I do not know whether this is a more difficult problem than [having] knowledge of the domain”.*

As evidence for (iii), we see in the following excerpts that the very concept of five cultural viewpoint metaphors opens up different cross-cultural possibilities in cross-cultural HCI evaluation. Participants reflected about five different ways of communicating culture:

P1: *“I found it very interesting to divide [the problem space using] these metaphors, to have this vision, rather than to be only in his culture or in ours, to have these intermediary levels. It is much better than to have it only in his culture or in mine.”*

Participants also reflected on how metaphors can help them to address solutions for the HCI re-design process. P1, for instance, claimed that CVM can help to identify which specific portion should be re-designed:

P1: *“The fact that they are well defined helps me to detect this difference even more [clearly] when I am comparing one [alternative of re-design] that refers to one type [of metaphor] with the other that refers to another type. For example, in one re-design, I could see that if I had... [if] my first system were system A [in one specific metaphor] and I wanted that it were of type C, I would immediately know what I had to work there, I know this is a characteristic of that spot and I can change it for this one. So, I think that it can help me in this way.”*

In conclusion, from subcategories of analysis showing different aspects of the participants’ insights and impressions during and about the evaluation process, we drew evidence of the epistemic nature of CVM. We saw that CVM not only helped participants “tune in” to cultural issues and their implications for HCI design, but also that CVM concepts and dimensions (cultural variables, metacommunication features) provided a structure for interpretive processes involved in evaluation activities.

Triangulation

Triangulation is a standard procedure in the validation of qualitative research results [7]. So, we did another (briefer) evaluation experiment with CVM in different domain: the Fédération Internationale de Football Association website© (www.fifa.com)⁴. This website was not elaborated with CVM, and it is clearly a cross-cultural application that could be re-designed to promote cross-cultural contact. So, we recruited two participants for the triangulation experiment, and followed the same procedure as in the evaluation experiment whose results we wanted to validate (we will call it the base experiment to facilitate reporting the triangulation procedure).

⁴ From now on we will refer to it in abbreviated form as “the FIFA website”.

In order to generate different perspectives on our research question, we compared and contrasted results from both experiments looking for consistency and congruence among them (as is typical in validation of qualitative research). We found consistent evidence that, just like in the base experiment CVM guided participants of the triangulation experiment while they were thinking about the communication process of culture. Likewise, they also acknowledged the value of having the conceptual metaphors and the continuum of cultural approximation to help them analyze the problem and think about different levels of intercultural contact.

As evidence for the consistency among the results, we see in the following discourse excerpts that that CVM guided participants while they were thinking about the communication process of culture in both experiments. The participant 2 (P2T) of the triangulation experiment, for instance, appreciated having the metaphor concepts and the continuum of cultural approximation to help him in mapping the problem, to learn and to think about different levels of intercultural contact.

P2T: *“I think it is interesting because you place yourself a little in that continuum of cultural approximation... because it is a role, isn't it? The role of traveler. Then you even put yourself in that role, and then here am I, lost, needing a hand to pull me up. Then, in somewhere else you say: I am comfortable here, I am at peace here... I think it is even a state, but it is the situation you find yourself in at a given moment. (...) I was trying, really putting myself in the traveler's shoes, trying to fit in the options of the continuum, inside the visitor's grading.”*

Furthermore, as was the case in the base experiment, during the evaluation process participants got in touch with their own culturally-determined assumptions, which turned cultural differences into a topic of reflection per se. Also, CVM led the triangulation experiment participants to reflect about their own cultural positioning as evaluators of cross-cultural systems.

We also found consistency in how CVM helped to organize the evaluation of cultural diversity communication. For instance, CVM helped the participant 1 (P1T) acting as a guide to mapping the problem space.

P1T: *“I think this is very positive because it gives you a guide about what you have to evaluate and already gives you a position to say whether the site is more for this side or for that side. If we did not have that, we would not know, for sure, as the site would be behaving itself as a whole.”*

However, the challenge of focusing solely on cultural issues throughout the whole evaluation process became apparent with the FIFA website. Because this was a real achieved website, and not only a partial design mockup, the evaluators could inspect the interface in greater detail and amplitude. As a consequence, the evaluators encountered usability problems more easily and frequently, for example.

Nevertheless, even if they mentioned usability problems in their evaluation more frequently than was the case in the base experiment, participants of the triangulation experiment gave us evidence that CVM concepts helped them track cultural design issues in the FIFA website.

CONCLUSIONS

This paper reports results from an empirical study carried out to investigate the evaluators' understanding and use of CVM. The evidence collected suggests that CVM has an epistemic effect at evaluation time. It helped evaluators in interpreting their findings and reflecting about communicative strategies and new possibilities in cross-cultural HCI re-design.

The five metaphors were not used directly to produce the answer to the problem, but we have evidence that the participants improved their own understanding of the problem, explored their implications, and tried the alternatives solutions against each other in light of CVM. Thus, CVM can frame, organize and structure the HCI evaluators' thinking in at least two ways. Firstly, CVM separate possible questions regarding direct (user-to-user) and indirect (user-to-interface signs of another culture) intercultural contact in human-computer interaction. So, CVM help them focus on indirect contact among cultures mediated by interface signs about the involved cultures.

Secondly, CVM segment the continuum of cultural approximation in five perspectives, each of them with distinctive characteristics defined by each metaphor. So, evaluators can explore different levels of progressive cultural approximation. Besides that, each metaphor defines how much the amount of help and scaffolds varies in relation to cultural approximation. This segmentation, then, helps evaluators to take the overall view of the problem, so, they can evaluate if and how designers may exposing the users to content from other cultures through the interface language.

CVM may, then, be used as base to formative and summative HCI evaluation, since they help HCI evaluators to inspect and evaluate the communicability of cultural diversity. CVM also have the epistemic value of helping evaluators in interpreting their findings and reflecting about communicative strategies and new possibilities in cross-cultural HCI re-design.

We have gained an understanding of how CVM help evaluators assess the quality of actual HCI re-design alternatives made with CVM. Now, we want to see how users receive a designers' message built with CVM.

We also captured evidence and tips on how to turn CVM operational to support cross-cultural design and evaluation. Evidence shows us that the designers' intent of promoting intercultural contact should be more detailed, because evaluators should know what was really expected by designers and customers. So, in order to avoid difficulties during the evaluation process the scenario should have

other ingredients such as the design goal. Thus, although CVM have been considered by participants as a useful conceptual tool, more work needs to be done in order to propose a CVM-based evaluation method with systematic and detailed procedures.

It is clear that CVM help to keep the perspective centered on cultural issues. By adopting each metaphor, evaluators and designers are invited to follow a specific combination of metacommunication features and cultural variables to achieve effects on interactive discourse. However, this is not enough. As happened in our triangulation experiment with a real website, the challenge of focusing solely on cultural issues is complex, and makes it clear that we need scaffolds at various levels of abstraction.

At this stage, CVM promotes a higher level of reasoning abstraction, providing metacommunication features and cultural variables. Further theoretical and empirical research should be conducted to provide scaffolds for other reasoning levels. One of the more important ones seems to be a clearer and detailed association between each metaphors and specific classes or categories of interface signs. We do not know yet which class(es) of signs are appropriate to characterize and distinguish the various metaphors. Neither do we know the potential consequences of using them to assess the users' levels of sign perception and knowledge about cultural diversity. So, future work should be done to investigate their practical effects in design and to address how to protocol cultural components in the interface.

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