A Practical Set of Cultural Dimensions for Global User-Interface Analysis and Design

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Affirmation

I want to affirm that this thesis paper was done independently and without external help. I have used only sources and aids that I have cited and I have identified these sources within the text. This work has not been submitted in this or a similar form to another examination board nor has it been published.

Graz, the 16th of June 2003

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Zusammenfassung

Die vorliegende Arbeit beschäftigt sich mit dem Einfluss kultureller Unterschieden auf das Gebiet *User-Interface Design*. Ausgehend von der Idee, dass unterschiedliche Kulturen über unterschiedliche Verhaltensmuster verfügen und basierend auf der Tatsache, dass bereits zahlreiche AnthropologInnen und KommunikationswissenschaftlerInnen Modelle erarbeitet haben, wie diese *kulturellen Dimensionen* gefasst werden können, wird in der Arbeit versucht, einen Überblick über genau diese Dimensionen zu geben und ihre jeweiligen Auswirkungen im Falle eines *Localization*-Projektes zu beschreiben.

Um aus den insgesamt 29 Dimensionen die für das Gebiet des User-Interface Designs einflussreichsten herauszufiltern, wurde eine Umfrage unter über 50 User-Interface Design ExpertInnen durchgeführt. Planung und Verlauf dieser Studie werden beschrieben, die Ergebnisse diskutiert und anschließend praktische Anwendungsgebiete des resultierenden „Sets" vorgeführt.

Abstract

On many levels, user-interface design is influenced by cultural differences. Cultures around the world have different patterns of social behavior and interaction which have led many anthropologists and scientists of communication to develop models to describe these differences. This paper will focus on these *cultural dimensions* and how they influence user-interface design especially within localization projects.

The main objective of this work is filtering out the most important dimensions. Data collected from over 50 experts in the field of user-interface design will be the basis of this research. This paper will give the results of this survey offering practical use cases and experience of people in the field. Cultural differences, which are often overlooked, are an integral part of user-interface design and should be taken seriously.

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1. Introduction

1.1 Motivation and Objectives of this Work

"Going global" are buzz words in today's business environment. Companies want to gain clients all over the world and have to satisfy the customers' needs of support and information. During the course of my internship at Aaron Marcus and Associates, Inc., (AM+A) California, which is one of the leading companies in the field of consulting for cultural user-interface adaptability, I became involved with the topic of cultural differences within the field of user-interface design. People from different countries/ cultures use user-interfaces in different ways, expect different graphical layouts, and have different expectations and patterns in behavior. Therefore user-interfaces have to be adapted to the needs of different locales.

Localization, i.e., adapting products to a locale of user-interfaces, i.e., web sites or software screens, is often misunderstood as translating text. But in fact the user-interface is not just text, it includes metaphors, mental models, navigation, interaction, and appearance (cf. Marcus, Define, 22ff).

Much research is done on the topic of localization regarding technical approaches (e.g. display different character sets, multi-language handling, and memory-based translation software). To facilitate the work of translators and multi-language site providers, content management systems (CMS) were invented that support different cultures, but only regarding text and translation. In fact, current CMS are not really able to handle most other aspects of content and therefore cultural differences – especially regarding graphical appearance – automatically. Today, if a company or organization decides to adapt a user-interface to a certain culture, much time and money has to be spent to accomplish this task well: besides all the technical factors (including hard facts like appropriate currencies, measurement systems, and the like) and the translation (including adapted terminology, idiomatic expressions, and the like), one has to hire cultural experts of all the targeted countries taking care of appropriate adaptation regarding user-interfaces as described above and later in more detail. Jakob Nielsen admits in his book, "International User-Interfaces," that international usability engineering is a challenging and often avoided area because of the many issues that have to be covered when one wants to serve an international audience. (Cf. Nielsen, Engineering, 1)

To facilitate and lower the costs of "going locale", the development of a CMS that could handle the expanded requirements of localization would be helpful. To support an eventual development of such a CMS I want to identify the most important dimensions of culture regarding user-interface analysis and design. This idea is based on the work Aaron Marcus has done using Geert Hofstede's cultural dimensions and applying them to the field of user-

done using Geert Hofstede's cultural dimensions and applying them to the field of user-interface design (cf. Marcus, Crosscurrents). In my research I want to go further and find out if the dimensions Hofstede found are appropriate to use for culture-oriented evaluation of user-interfaces.

Being an intern in a different culture that seems not so different from my culture of origin (Europe) at first glimpse (as both, Europe and the US are considered as "western"), and figuring out all the minute variations in everyday life that make a huge difference in one's personal life, urged me toward studying this field of cultural patterns and behaviors.

1.2 Methods of Work

As the first step I want to find out what dimensions of culture exist. Many researchers in the field of anthropology have done studies and have come up with patterns of behavior and thinking that differentiate one culture from another. Some of them have compiled these patterns into cultural models. Within this work I want to give an overview of cultural dimensions (or "international variables"[1]), find examples and describe ideas about how the underlying patterns have an influence on user-interface design.

To gather expert opinions about which of these dimensions are important when localizing user-interfaces, I presented the studied dimensions to experts in form of an expert questionnaire. The experts were asked to rank the dimensions according to their importance.

The outcome of the ranking is the basis of my own analysis about which dimensions are important for the field of user-interface design and why they are important. I am aware that the statement "the most important dimensions for the field of user-interface design" can be controversial. Nearly every participant made statements pointing in the direction of this controversy – everything depends on the purpose of the user-interface and the locale itself. Nevertheless, I want to come up with a concrete result that provides a basis for further valuable discussion.

[1] Nancy L. Hoft uses the term "international variables" instead of "dimensions of culture" because she thinks this phrase is "more direct and accurate" (Hoft, Developing, 71)

2. A Brief Review of the Field

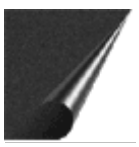
Within this section I want to give a brief introduction to the field of user-interface design in an international context as well as a more detailed description of terms used within this work.

2.1 User-Interface Design

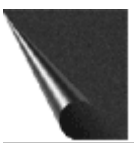
According to Brenda Laurel, an "…interface is the contact surface of a thing." (Laurel, Introduction, xi). In the context of computers we can describe an interface as the place where humans have contact with the software installed on a computer. Creating a graphical surface to meet the user's needs for communication with the computer is the art of user-interface design.

To clarify what elements a user-interface designer has to cope with, I want to use the approach of Aaron Marcus: The five design components which are *metaphor*, *mental model*, *navigation, interaction,* and *appearance*.

Metaphors are "[f]undamental concepts communicated via words, images, sounds, and tactile experiences." (Marcus, Define, 23). Metaphors are "short-cuts" (Booth, Introduction, 75) to get across complex concepts. In computer related context metaphors replace elements and help users understand complex technical operations by transferring them into a different context e.g. using things of the real world's everyday life in the context of a computer interface. The most well known example might be Apple's trash can that is used as a metaphor for deleting files and works like a real trash can: The user drags files on the icon and the "trash" remains in the "can" until the user decides to empty the trash can. A problematic example for using metaphors in international context is the book metaphor: by Western convention, all book chapters begin on the page to the right. Arabic books, however, have their spine on the right and therefore the chapters begin on the page to the left. A metaphor for turning to the next page might look different in different cultures:



Western page curl



Arabic page curl

Figure 1: Metaphors in different cultures

Mental models are concepts people have in mind. According to McDaniel, (cf. McDaniel, Mental Model, online) all mental models have some things in common:

- Mental models include what a person thinks is true, not necessarily what is actually true.
- Mental models are similar in structure to the thing or concept they represent.
- Mental models allow a person to predict the results of his actions.
- Mental models are simpler than the thing or concept they represent. They include only enough information to allow accurate predictions.

An ecellent example for a mental model is the following: When someone says "I ordered a meal in a restaurant" North American listeners might assume that the person speaking was met at the door by a host, seated, and presented with a menu. The speaker did not mention these details but the listener assumes these details because s/he has a mental model of how restaurants operate. Whereas European listeners would have different assumptions: In Europe it is not common to be seated, so they might assume that the speaker seated herself/himself, waited for the waiter to bring him/her the menu, and was then asked for the drinks.

To give an example for mental models in the context of user-interface design, we might think of the controls of a tape recorder:

Figure 2: Controls to interact with a tape recorder

We have a mental model in mind, what the controls do. Transferred to the computer context and used for an application to play e.g. MP3 files, we know how to use them. The user-interface designer has to take care that "…data, functions, tasks, roles, and people in organizations of work…" (Marcus, Define, 23) are appropriately organized and represented. Within the field of mental models we can find different occurrences of models: user models, task models, business models, cognitive models, etc. A user model for instance is a reflection of the users' understanding of a product; task models break the tasks into component parts and describe how they are related to each other; a business model is described as "the architectural configuration of the components of transactions designed to exploit business opportunities" (Amit, Value, 13). All these different approaches to mental models have to be considered by the user-interface development team. In general, we can see them all as "mental" and they must be shown in some way through diagrams, lists, etc.

Navigation can be understood as the "…movement through the mental model…" (Marcus, Define, 24). The user-interface designer has to facilitate this movement by using appropriate menus, dialog boxes, control panels, icons, and tool palettes.

"By *interaction* we mean any communication between a user and a computer, be it direct or indirect. Direct interaction involves a dialog with feedback and control throughout the performance of the task. Indirect interaction may involve background or batch processing. The important thing is that the user is interacting with the computer in order to accomplish something." (Dix, Interaction, 3) Therefore user-interface designers are concerned with „…input-output techniques, status displays, and other feedback, both locally and globally…" (Marcus, Define, 23).

Appearance means how a product appears to the senses. It "…includes all essential perceptual attributes, that is, visual, auditory, and tactile characteristics." (Marcus, Define, 22) The user-interface designer has to make choices of fonts, colors, styles, sounds or tactile perception like vibration modes.

2.2 Usability

After *function* and *design* the attribute *usability* becomes important when speaking of unique selling propositions: In the beginning it was enough to produce devices that offered the basic functions, to get more customers, producers added additional features. After this approach was exhausted in terms of sales, producers focused on design. Everything that looked good and appealing sold better than just raw technical appearance. Now it is usability that sells: Customers want to buy products that are easy to use.

The ISO Standard 9241 defines usability as "the extent to which a product can be used by specified users to achieve specified goals with effectiveness, efficiency and satisfaction in a specified context of use." This definition implies that a system that is 'useable' allows its users to execute their computer-related tasks accurately and comprehensively (*effectiveness*), doing that with ease of learning, use and recollection (*efficiency*), while fulfilling their task-related requirements (*satisfaction*).

2.3 Cultural Dimensions

The meaning of the term *culture* is very complex and used in different ways among many professions. Giving an overview of all the meanings is beyond the scope of this work. One of the many definitions found in the *Merriam-Webster OnLine Dictonary* is the following: Culture is "the set of shared attitudes, values, goals, and practices …" (Webster, online) And del Galdo adds: "In addition, culture can also be affected by nationality, language, history, and level of technical development." (del Galdo, Culture, 78)

We can use categories to differentiate one culture/ country from others. *Dimensions of culture* are "…categories that organize cultural data." (Hoft, Developing, 41) "The notion of cultural dimensions originated in crosscultural communication research done by Edward Hall and Florence Kluckhohn and Fred L. Strodtbeck in the 1950s."(Gould, Globally, 3)

Many anthropologists have done research in the field of cultural dimensions. One of the most cited studies is the one by Geert Hofstede. In the 1970s and 80s he did a survey at IBM that "dealt mainly with the employees' personal *values* related to work situation…" (Hofstede, Cultures, 251). Within this study he covered 72 national subsidiaries, 38 occupations, 20 languages, all in all about 116,000 people. (cf. Hofstede, Cultures, 251). Based on this survey he came up with five dimensions of culture. Other anthropologists and communication scientists also did studies or academic research to come up with different cultural dimensions. All of the models used for this work will be described in detail in Chapter 4.

2.4 Culture and Globalization/ Internationalization/ Localization

Due to the fact that people in different countries/cultures have developed different behaviors and preferences (cf. Chau, Differences, 139), the user-interface designer has to adapt the user-interface when targeting a different culture than the one for which the user-interface was originally designed. Within this context we can say that *international* means: "…available to users beyond the national and cultural boundaries of the site's origin." (Alvarez, International, online)

When talking about user-interface design in an international context, we discover very quickly that terms like globalization, internationalization and localization are core terms in the discussion. Sometimes the acronym GILT (Globalization, Internationalization, Localization and Translation) is used in this context. As Fernandes states (cf. Fernandes, Global 1), there are many different characterizations about the previously mentioned terms out there – this also reflects my own experience and research. Although Fernandes tries to define the terms once and for all, it seems that the community of user-interface designers is using the terms in a slightly different way than Fernandes. The following paragraphs try to give an overview of the terminology[2].

[2] I want to thank the team of AM+A for their help in finding appropriate descriptions of these terms

Globalization can be seen as an umbrella term that refers to all the issues involved in designing or modifying products for audiences worldwide. We can also say that globalization combines all aspects of internationalization and localization. (Fernandes is using Globalization as an equivalent to Internationalization and abstains from using the latter term. (cf. Fernandes, Global, 2))

Internationalization refers to the process of creating a base design that can be modified or augmented for various audiences worldwide. An internationalized product is one with functionality, terminology, and design elements that can be localized for specific countries or cultures. "Internationalization is the process of designing an application so that it can be adapted to various languages and regions without engineering changes." (Sun, Internationalization, online) An essential concept in good underlying internationalization design is that all elements that require localization should be stored separately from site code, in what are often called "Resource Files." Sometimes the term internationalization is abbreviated as i18n, because there are 18 letters between the first "i" and the last "n."

Localization refers to the process of adapting an internationalized product to make it usable and viable in a particular country, culture, or market. Localization takes into account visual design, terminology, culture, date/time/currency formats, and many other technical aspects of a product. At minimum, localization requires choosing appropriate locale-specific values for parameters. Sometimes the term localization is abbreviated as l10n, because there are 10 letters between the first "l" and the last "n."[3]

The discipline of localization can be divided into three sub areas: technical localization, national localization and cultural localization. (cf. Fernandes, Global, 2). The research done within this work is basically concerned with the latter area – cultural localization which deals with how cultural differences impact people and their behavior. Values have an impact on the user's perception of a user-interface. (cf. Fernandes, Global, 87)

2.5 Developing a User-Interface for Multiple Cultures

"Culture, in terms of Web globalization, means how people from certain cultural orientations view and interpret specific images and messages." (Sheridan, Cross-cultural, online)

[3] As Fernandes mentions, the terms i18n and l12n (sic!) are "…monuments to the belief that this issue [globalization] is just a technical one." (Fernandes, Global, 2) He recommends to get rid of these abbreviations to make clear that globalization is much more than technical adaptation.

We can assume that users of different cultures perceive a single user-interface in different ways – due to their cultural imprint. One could argue that each individual person in the world is interpreting a user-interface differently from every other person, however, we know that creating a user-interface for each single user is not possible due to financial constraints. Secondly, we can presume that something like cultural patterns exist (Hofstede, Cultures, 10). Using these cultural patterns in perception and behavior for the field of user-interface design can ease the life of the designer. Thinking about the field of user-interface design for communicational purpose, we can assume that knowledge about cultural habits regarding communication at the work place in a certain culture will facilitate the creation of an intranet communication tool.

3. Review of the State of the Art

The following chapter tries to describe what is accomplished in the field of international user-interface design. I want to give an overview on which approaches have already been thought of and realized.

3.1 Internationalization Issues and Levels

To describe which sub-areas exist in the field of GILT and where within this field the content of this work is located, I want to use the following graphic by Jia Shen:

Objectivity Levels	**Internationalization Issues**	**Example**	**Current Research Examples**
Comprehensibility ↓	Language	Product language localization	Unicode; Machine Translation; Microsoft knowledge base for common computer word translation
Usability	Institutional matters	Time zone, date format, currency, measurement	
↓	Environmental factors	Esthetics, Icons and symbols	ISO symbols for interface; Microsoft knowledge base for international color use
Desirability	Social conventions	Forms and values.	Culture model

Table 1: Internationalization issues and levels (Source: Jia Shen, http://eies.njit.edu/~turoff/coursenotes/CIS732/samplepro/user_interface_internationalizat.htm)

Table 1 describes the range of levels of internationalization issues starting by basic needs like translation and technical issues (comprehensibility). It goes on to more specific issues like adaptation of time zone, data formats, currency, and so forth (usability). Ito and Nakakoji refer to this level as "surface-level adjustment" (Ito, Impact, 121). The model expands to sophisticated issues like satisfying social conventions of a certain target group (desirability).

The idea of three levels of producing international user-interfaces is also described by Nielsen and delGaldo. They describe the first level as "processing and displaying the user's native language, character set, notations and formats" (Nielsen, Preface, vi). They also mention that

this step has been accomplished by most companies. The second level in their model is explained as the production of "understandable and usable" interfaces – it is the adaptation of usability methods for the target culture. The third level is the creation of interfaces that "accommodate user's cultural characteristics."

Within this work I want to give a brief overview of all the issues mentioned in Table 1, but the main focus should be located in lower part of the table i.e., the space between usability and desirability.

3.2 How to Go Global?

Currently most companies know that one can only be competitive in a global sense if one takes care of the end users by offering appropriate tools. After fighting battles over 1) providing the most features within one product and 2) offering the most appealing design, most companies have found out that *usability* is the new "unique selling proposition": "Just as personalization has been the buzzword in the United States, culturization is important around the world." (Sheridan, Cross-cultural, online)

How does a company know that its Web site, its product's software interface is culturally acceptable to its target clients? "Testing is the answer" (Sheridan, Cross-cultural, online) says Sheridan. Sheridan describes a set of logical steps that can be followed to assure that a company's Web site speaks a clear message to its local target audiences. But before you can do testing, you must, at minimum, have a working prototype. Therefore the localization work has to be done before testing is possible.

Fernandes says that the optimal process for going global with a product should be the following:

1) identifying all target cultures,
2) designing and developing a base design,
3) having one interface designer who oversees the design of all localized versions, and
4) testing usability of all localized versions. (cf. Fernandes, Global, 5)

Companies that want to go global with their Web site or software product can hire cross-cultural or global design consultants. One of the problems here is the fact that there are "only a handful of firms in the market today that offer quality cross-cultural analysis of Web site design and content." (Sheridan, Cross-cultural, online)

3.2.1 Globalization Companies

When we use the internet to research so called globalization companies, we find that most of these companies are either located in the field of *translation* or in the field of *technical feasibility* of multi language and/or multi script supporting software.

3.2.1.1 Companies in the Field of Translation

Translation is a very important part in the localization process of a product or a user-interface. If the target audience can not even read what the company or institution wants to communicate, the aim of reaching a new audience is hardly accomplished.

Doing translation work for a user-interface is a much more challenging task than doing "normal" translation: screen real estate plays an important role (e.g. text can expand by about 200% when translated from English into another language (Dray, Observation, 16)); use of multiple writing systems and multiple languages within one interface; text orientation in iconographic use has to fit the writing direction (e.g. image editing tool like Photoshop use an icon for character production – the icons have to be rearranged for use in countries with a different writing direction); maintaining Translations Memory (TM) databases; text-sort orders (e.g. In Finish, A is the first letter but Å comes after Z. In French, Å comes after A (cf. Fernandes, Global, 35) – some items in a menu may be sorted alphabetically, e.g. filters in Photoshop) and so forth. For more insight into this topic see Fernandes, Global, chapter 3.

Companies in the field of translation for global user-interfaces have to deal with Translation Memory (TM) Tools. They allow for re-use of translations and therefore help to reduce costs. Moreover companies use Terminology Tools that enable terminologists, technical authors, and translators to maintain term databases. For more insight into this topic see Kolm, Localization.

3.2.1.2 Companies in the Field of Technical Feasibility

Companies in the area of technical feasibility take care of the following globalization steps:

- Product's source code analysis and adaptation of the source code to platform-specific conventions
- Elimination of language specific elements from the source code

- Re-engineering of source code to support double-byte, multi-byte and bi-directional character set environments, Unicode Enablement
- Data handling - sorting, memory management
- Displaying, formatting and string handling
- Date/time format, currency/numbering system adjustments
- Punctuation/separators adjustment
- Address/telephone format adjustments
- Creation of country-specific tags or functionality
- Database and networking support
- Consistency checks
- Internationalization Sufficiency Testing

3.2.1.3 Organizations concerned with Localization Issues

Many of the players in the field of GILT are members of organizations like LISA or part of the W3C that is concerned with Internationalization issues. Further down I also want to give a brief overview on these organizations.

The **Localization Industry Standards Association** (LISA) was founded in 1990 as a non-profit organization and now consists of over 400 members (i.e. software, hardware, and multimedia companies). The aim of LISA is "promoting the localization and internationalization industry and providing a mechanism and services to enable companies to exchange and share information on the development processes, tools, technologies, and business models connected with localization, internationalization, and related topics." (Fry, Introducing, 1) LISA traditionally focused on the information technology sector providing support for the development of enterprise globalization guidelines, best practices and business standards. (cf. LISA, http://www.lisa.org/, online)

The Institute of Localisation Professionals (TILP), located in Dublin, focus on the needs of individual localization professionals. Recently there has been a merge between this organization and the U.S.-based Professional Association of Localization (PAL). In short order, TILP has developed strong industry partnerships and offers a range of membership services. For more information see the TILP Web site at http://www.tilponline.org.

The World Wide Web Consortium (W3C) develops specifications, guidelines, software, and tools with the aim "…to lead the Web to its full potential." (W3C, online) The *Guidelines, Education & Outreach Task Force* (GEO) of the **W3C Internationalization Working Group** (I18N WG) is currently discussing a document that "describes plans for producing documents that provide guidelines on internationalization of W3C technologies." This document can be found on the web at http://www.w3.org/TR/i18n-guide-framework/.

3.3 Theoretical Approaches

The following chapter contains a description of theoretical approaches to cope with localization projects. I want to give an overview of the current research in this area.

3.3.1 User-Computer Interaction Model and Cultural Impact

Ito and Nakakoji (Ito, Impact, 108ff) describe a model of user-computer interaction and try to find out what impact culture has when applied to the model. The basic idea is to divide user-computer interaction into two different modes: listening and speaking modes. The listening mode is described as the "presentation of information and reaction" and is divided into three phases: 1) Perception Phase e.g. user recognizes a red dot, 2) Association Phase e.g. user associates the "warning" meaning to the dot, and 3) Reasoning Phase e.g. user tries to understand why the warning message appears and how it is related to what s/he is doing. The speaking mode is described as the user's wish to indicate an intention to the system. It is divided into four phases: 1) Affordance Perception e.g. user identifies the clickable element, 2) Applicability Expectations e.g. user reads the label of the clickable element and examines whether the intended action is indicated, 3) Enactment with Expectations e.g. user brings his/her cursor on the element and actually clicks it, and 4) Confirmation e.g. user finds out that the action has (not) carried out what was expected.

As Ito and Nakakoji were engaged with a localization project for the Japanese culture, they tried to apply the factor of culture to the model described before. Concerning the listening mode they found out that the "association phase has more cultural impact than the perception phase, and the […] reasoning has even more" (Ito, Impact, 109). The first phase (perception) has the least cultural impact, because physiological constraints like color or size of shape do not depend on cultural background. Association (second phase) is more culturally influenced as for instance colors have different meanings in different cultures. Due to Ito and

Nakakoji the *Reasoning Phase* is most affected by culture as "…cognitive reasoning depends on social norms and background culture." (Ito, Impact, 112) This is exactly the point where cultural dimensions come into perspective: What something means depends on the cultural meaning.

Regarding the listening mode we can state that the cultural impact increases as the phases proceed. The same is true for the speaking mode: Affordance Perception (Phase 1) is influenced by cultural background because identification of elements is similar to the previously described listening mode and all the influenced applied in this mode can also be applied here. Finding out what is applicable (Phase 2) is definitely affected by culture, as different ways are chosen to perform this task e.g. trial-and-error versus reading manuals. Phase 3 (Enactment) does not seem influenced by culture at first glimpse, but if we look more closely we can identify that the way an enactment is accomplished can be influenced, for instance by time perception, e.g. are things done sequentially or parallel. Time perception is again an important factor in phase 4, confirmation: If something is identified as fulfilled, it depends heavily on how the component of time is perceived: does the user see time as an important factor or is the task also accomplished satisfyingly if it takes more time?

This model by Ito and Nakakoji can form a basis for managing user-interface design processes and provide a method to decide where, within the localization process, the designer has to put in the most emphasis.

3.3.2 Culture-specific Information Retrieval Systems

To get information on targeted cultures many different approaches are possible: talking to potential users of the culture, using questionnaires and surveys to identify needs, or conducting usability tests with existing products or prototypes. One idea for gathering information about certain cultures is to produce a database filled with cultural data. Ito and Nakakoji described this idea in 1996, since that time many approaches have been made to provide such a database online. I want to mention just a few examples in the following paragraphs.

Mark Rosenfelder (http://www.zompist.com/amercult.html) has put together a compilation of statements and values about the American culture. This text named "How to tell if you're American" was transformed to over 25 countries by natives and gives a lot of insight into the values and ideas of different countries.

A more subject-oriented approach was made by Robert Delaney. His Web site "Cross Cultural Comparisons" (http://www.geocities.com/Broadway/1906/culture.html) lists subjects and describes what associations members of certain societies/countries have to these items.

To cover the "hard facts" of 268 countries one can use "The CIA Worlds Factbook": Each country of the world is listed along with pertinent details, including languages spoken, population, telephone use and even how many ISPs are active in the nation. (http://www.cia.gov/cia/publications/factbook/)

3.3.3 Design Patterns and Guidelines

Within a study that included systematic usability inspection of several hundred Web sites from different languages and countries, Barber and Badre tried to find out if there are certain design elements "which can be identified as culturally specific" or "genre specific" and if there is any relationship between culture and genre. They tried to identify "cultural markers": i.e. "elements that are most prevalent, and possibly preferred within a particular cultural group." That could be e.g. national symbols, color, or spatial organization. Their study tried to demonstrate "that the presence and/or absence of cultural markers in international Web sites can affect learning and performance in an electronic environment, as well." The term *Culturability* describes the "merging of culture and usability" and the idea that what is useable in one country isn't necessarily in another.

Barber and Badre describe a so called "Culturability Inspection Method": 1) Foraging (creating a large base of Web sites), 2) Cultural Marker Identification (detailed inspection and cross listing of cultural markers by country and genre), and 3) Pattern Identification (checking for emergent patterns within countries and genres and across regions. (cf. Barber, Merging, online)

This project is in progress and can – when more sites are evaluated – build a base for creating guidelines when doing localization work for a certain region. Barber and Badre also mention the idea of a tool that can offer automated localization.

A similar idea is mentioned by Aaron Marcus: He combined the scheme of Hofstede's cultural dimensions and the scheme of design components (described earlier in chapter 2), and used a five-by-five matrix that allows for 25 fields of interest:

	PD	IDV	MAS	UA.	LTO
Metaphor					
Mental Model					
Navigation					
Interaction					
Appearance					

Table 2: User-Interface design – cultural matrix

An article by Marcus and Gould (Marcus, Crosscurrents) points out possible implications of Hofstede's dimensions for UI components. During my internship at AM+A I was involved in a study that attempted to find out if these assumptions match with "real life": *i.e.*, can examples be found in localized Web sites? For this analysis, we attempted to be generally inclusive under constraints of time and chose reasonably complex, different "B2B" and "B2C" Web sites from three different continents (North America, Europe, and Asia). The exact circumstances of each Web site design could not be determined; however, we examined evidence from the sites themselves. The results of this study – presented at IWIPS03 (5th Annual International Workshop on Internationalisation of Products and Systems) in Berlin – are the following: 1) The matrix-oriented method helps to organize and analyze data collection and 2) initial observations suggest that cultural habits run deeply and operate even under constraints of global design specifications. In high individualistic and low power-distance countries, variations from standard practice seem likely to be most frequently observed.

4. Cultural Patterns and Their Influence on User-Interface Design

As Fahri Yetim pointed out "…there still are unsolved problems concerning the extent to which culture may affect the usability of the artefacts." (Yetim, Call for papers, online). Within this chapter I want to give an overview of the cultural dimensions used for this survey. I attempt to describe them, give examples and create scenarios when they become important when localizing a user-interface.

4.1 The Authors

As I am of the opinion that it is not unimportant to know in what intellectual environment a cultural model was developed, I want to start with a brief introduction of the authors behind the cultural dimensions used for this survey.

4.1.1 Nancy J. Adler

Nancy J. Adler is a Professor of Organizational Behavior and Cross-Cultural Management. Originally from the United States, she now lives and works in Montreal, Canada. (cf. Adler, Homepage, online) In her book, "International Dimensions of Organizational Behavior," she describes six dimensions of value orientations: *The Nature of the Individual*, *The Relationship of People to Their World*, *Individualism versus Collectivism*, *Doing versus Being*, *Time Orientation*, and *Space Orientation*.

4.1.2 Condon & Yousef

John C. Condon is a writer and teacher in the field of intercultural communication. After being a student in Mexico and the U.S., he taught for more than twenty years in Japan and Mexico and is now a Professor of Communication at the University of New Mexico. Condon was influenced by Edward T. Hall (cf. Kelly, Interculturalist, online).

Condon and Fathi S. Yousef met at the University of Minnesota and realized that their knowledge and backgrounds were complementary. They wrote *An Introduction to Intercultural Communication* in 1972. They took Kluckhohn's five basic values and tried to elaborate on the different categories – they came up with 25 categories.

4.1.3 Edward T. Hall

The anthropologist Edward T. Hall (born 1914) had an important role in the founding of the scholarly field of intercultural communication at the beginning of the 1950's. (cf. Rogers, Hall, 3). Hall never described a complete cultural model (cf. Hoft, Developing, 50) but described various values in his books: *Context*, *Polychronic or Monochronic Time*, *Preferred Message Speed* ('*Beyond Culture'*); and *Space* ('*The hidden dimension'*).

4.1.4 Geert Hofstede

Born in 1928 in the Netherlands, he earned his diploma as a mechanical engineer and a Doctor of Social Science. His five dimensions (*Power Distance*, *Collectivism*, *Femininity vs. Masculinity*, *Uncertainty Avoidance*, and *Long-Term Orientation*) are gained from a study conducted at IBM in the 1970 and described in his book '*Cultures and Organizations: Software of the Mind'*.

4.1.5 Kluckhohn & Strodtbeck

At the time of her study (1953), Florence Rockwood Kluckhohn was a lecturer on Sociology and a Research Associate at Harvard. There is now an institute named after her in Seattle, Washington, which continues her work, The Florence Kluckhohn Center for the Study of Values. Kluckhohn was interested in identifying the specific patterns of behavior that were influenced by culture. (cf. Zaharna, Kluckhohn, online) Together with Fred Strodtbeck she wrote the book *Variations in value orientations* where they describe five dimensions: *Relationship to Nature*, *Time*, *Character of Human Nature*, *Human Action*, and *Relationships to Others*.

4.1.6 Talcott Parsons

The U.S. sociologist Talcott Parsons (1902–1979) began his career as a biologist and later became interested in economics and sociology. He studied in Heidelberg, Germany. Parsons taught sociology at Harvard from 1931 until his death, and set up the Department of Social Relations there. He published more than 150 books and articles. He describes five "pattern-variables": *Affectivity-Affective Neutrality*, *Universalism-Particularism*, *Diffuseness-Specificity*, *Ascription-Achievement*, and *Instrumental-Expressive Orientation*.

4.1.7 Fons Trompenaars

Fons Trompenaars studied Economics at the Free University of Amsterdam (he was a student of Geert Hofstede) and later earned a Ph.D. from the Wharton School, University of Pennsylvania, with a dissertation on differences in conceptions of organizational structure in various cultures. In his book *'Riding the Waves of Culture: Understanding Cultural Diversity'* he describes seven dimensions based on a survey with 18,000 managers from 23 countries: *Universalism vs. Particularism*, *Individualism vs. Communitarianism*, *Specific vs. Diffuse Cultures*, *Affective vs. Neutral Cultures*, *Achievement vs. Ascription*, *Sequential vs. Synchronic Cultures*, and *Internal vs. External Control*.

4.1.8 David A. Victor

Born in 1956, David A. Victor is a Professor of Management at the University of Michigan. His book on *'International Business Communication'* describes the LESCANT model. His dimensions are based mostly on academic research (cf. Hoft, Developing, 55). LESCANT is an acronym that stands for **L***anguage*, **E***nvironment and Technology*, **S***ocial Organization*, **C***ontexting and Face-Saving*, **A***uthority Conception*, **N***onverbal Communication and Face-to-Face Negotiations*, and *Conceptions of* **T***ime*.

4.1.9 Quincy Wright

Quincy Write (1890-1970) is most cited for his book 'A Study of War'. As a Professor at the University of Chicago, he tried to define components that would locate states, nations, governments, and people in an international space ('The Study of International Relations') and named them "capability components": *Rate of Economic Progress*, *Rate of Political Decentralization*, *Degree of Power*, *Rate of Development of International Trade and Communication*, *Rate of Technological Development*, and *Resources*. (cf. Deutsch, Wright, online and Rummel, Conflict, online)

4.2 The Dimensions of Culture

As Hoft describes, cultural dimensions can be divided into two main categories: objective and subjective categories. Objective categories are "easy-to-research cultural differences like political and economic contexts, text directions in writing systems, and differences in the way that you format the time of day, dates, and numbers." (Hoft, Developing, 41) Subjective

categories cover information "…like value systems, behavioral systems, and intellectual systems…" (Hoft, Developing, 42) It is to question, if political and economical contexts are really easy to research.

While compiling the dimensions of culture for use within this study, I focused on subjective categories. As objective categories are easy to extract from a culture, localization approaches already cover these dimensions. Nevertheless some dimensions that seem to be objective at the first glimpse (economical progress, resources a country owns, or a countries degree of power in international comparison) also are of interest for the problem stated here. I included these dimensions for two reasons: First, the objective categories included in this survey are not yet covered by "normal" localization methods and second, I was interested to see if there would be a significant difference in the rating of objective and subjective categories – which turned out to be true, as described in chapter 5.2.5.

The following pages try to describe the dimensions I used for the survey. Each dimension is divided into three parts: 1) background (who "explored" the dimension and how is it described) 2) example (tries to give an example to clarify the meaning) and 3) user-interface design. Within this last part I also try to show, for which user-interface design component described in 2.1 the attention for the dimension might be the most relevant. To clearly illustrate this I use a table described in Table 3. The abbreviations used identify five design components: Metaphor (M), mental model (MM), navigation (N), interaction (I), and appearance (A).

M	MM	N	I	A
x				

x indicates that this component is probably influenced very much by the cultural dimension.

Table 3: Relevance for design components

Additionally I am including examples illustrating the relevance of the dimension in the context of user-interface design[4].

4.2.1 Achievement vs. Ascription

Background: This dimension is described by Parsons and Trompenaars. Basically we can say that *achievement vs. ascription* is about how status is accorded to people. In other words, we can say it is the difference between what someone DOES, and what someone IS. *Achieve-*

[4] In anticipation of the data gained in the study, I want to include examples that were provided by the expert participants of the survey.

ment-oriented cultures value people for what they have accomplished in their lives. In *ascriptive* societies individuals derive their status from birth, age, gender, or wealth.

Example: Assuming an interview situation, the first question in an achievement culture is likely to be "What did you study?" In contrast, this question will more likely be "Where did you study?" in an ascriptive society.

User-Interface Design

M	MM	N	I	A
	x		x	

When designing interfaces this differentiation can become important when using titles e.g. address forms in ascriptive countries would have the need to provide fields for entering titles of nobility, i.e. the interactive component of the design process is influenced.

Tanya Campbell: "The issue of status is also critical to the 'community' elements of Web sites and indeed in very ascribe-oriented cultures having a medium that allows for new ways to achieve status is very interesting and presumably appealing."

4.2.2 Activity Orientation

Background: Described by Kluckhohn & Strodtbeck, Condon & Yousef and Nancy J. Adler. *Activity orientation* refers to the extent to which activity is valued within a culture. Both Kluckhohn & Strodtbeck and Condon & Yousef use the following scale for this dimension: doing, being-in-becoming, and being. *Doing-oriented* cultures are concerned with those activities that are external to the individual and which can be measured - action, efficiency, getting to "the bottom line" is valued, and social interactions are downplayed in the interests of achieving goals. The *being-in-becoming orientation* is about who we are. The *being orientation* is about the expression of what is already in the human personality - taking time to discuss and understand complex issues and to appreciate the moment is important for being-oriented societies.

Example: In a doing-oriented culture thinking will be less valued than painting as painting can be observed and measured. The being-in-becoming orientation is reflected in those cultures that value the pursuit of a better self through contemplation and prayer - Zen Buddhist monks illustrate this. An expression of a being orientation is the Mexican fiesta.

User-Interface Design

M	MM	N	I	A
x			x	

Activity orientation can play a role when designing metaphors. Doing-oriented cultures are likely to prefer working metaphors that show "visible" activities like manual work instead of brainwork.

George Simons: "This is a subtle element that is often addressed by the amount of push and pull found in the interface and the aesthetic quality. If you compare even French and US interfaces you can often see a qualitative difference in this regard, even though the differences in this orientation dimension are not the greatest."

Tanja Campell believes this is important, "but I'd probably see networked communications as leveling the cultural 'approach'" as an interface design's tenet is "that the person using the site is very goal-directed and thus activity is prioritized regardless of the cultural implications."

4.2.3 Affective vs. Neutral

Background: Parson and Trompenaars mention the dimension of *affective (emotional) vs. neutral*. This variable describes how cultures express their emotions. *Affective* cultures believe that all relationships with others are human affairs and that people should express their feelings openly – therefore reactions are shown immediately verbally and/or non-verbally by using mimic and gesture in form of body signals. Physical contact is not avoided. *Neutral* cultures think that the nature of their relationships with others should be objective and detached, they believe that emotions confuse the issues – members of neutral societies tend to hide their emotions and don't show them in public.

Example: Doing business with affective cultures can mean overacting, histrionics, enthusiasm, and readiness to agree or vehemently disagree. Discussions with affectivists are often focused on the persons involved and not so much on the objects or positions. Neutralists tend to be reserved – not an indicator for boredom, but lack of displayed emotion. Discussions focus on the object or proposition being discussed. (cf. Trompenaars, Waves, 79)

User-Interface Design

M	MM	N	I	A
			x	

A software product's tone and content of interactive feedback has to be changed in order to be appropriate for neutral cultures or affective cultures.

Tanya Campbell: "This is a tough question - the UK is well known for its stuffiness, uncomfortable with emotions, stiff upper lip. This is a stereotype, but also rings true so one could draw a conclusion based upon that alone. However nowhere in the world will you find a culture (London at least) that is more obsessed with media, music, electronic arts, etc. For example some of the best online design and best media exists in this 'non emotional' country."

4.2.4 Authority Conception

Background: The dimension of *authority conception* is mentioned by Victor and Condon & Yousef. It reflects the conception of organizational power and leadership common to an organization's members. Condon & Yousef scale ranges from democratic to authority-centered to authoritarian. (cf. Victor, International, 168ff)

Example: A democratic society might have social guidelines teaching young people that they have rights to question authority; authoritarian countries are not likely to have such concepts.

User-Interface Design

M	MM	N	I	A
x	X		x	

Mary Stamboulie: "Interaction approach, grammatical constructs and feedback/confirmation is heavily influenced by this."

Claus Zimmermann: "I think that user-interface design normally involves interface with one person at a time. Poor UI design would affect authority conception because the mistakes made by the employee might be attributed to him as opposed to the UI."

Tanya Campbell: "This is important when there is interaction involved – an online discussion group, depending on the subject matter some participants will want to know that they are receiving 'the official line' or that someone will moderate. This is also a consideration when considering the tone of voice of language style used (technical, field-specific, etc.)"

Laurie Southerton: "Important in defining the user's cultural and social profile when designing an interface. That can help define the tone or voice of the words, images and color schemes."

George Simons: "This will say something about how the interface presents material with certainty and authority or with little authority and adscription of the ultimate authority to the user"

Brenda Laurel: "Feeling respected is necessary for pleasure in the context of HCI."

4.2.5 Context

Background: The dimension of *context* is described by Hall and expanded by Victor. Context refers to the amount and specificity of information in a given situation. A *high context* communication is one in which most of the meaning is in the context while very little is the transmitted message. A *low context* communication is similar to interacting with a computer – if the information is not explicitly stated; and the program followed religiously, the meaning is distorted. (cf. Hall, Culture, 89ff)

Example: In high context countries the context of a conversation carries as much weight in the communication as the message itself, if not more; low context cultures expect things to be articulated clearly.

User-Interface Design

M	MM	N	I	A
x	x	x	x	x

The dimension of context influences all five design components. In particular, navigation and interaction can be supported positively with the use of high-context graphic, but only in cultures where high-context communication is common and can be understood.

George Simons: "Given the nature of online interfaces […] a great deal of explicitness is essential in online work. One way of dealing with the difference is to offer layers of interpretation that can be drilled into depending on the user's familiarity with the information and processes."

Laurie Southerton: "Clear understanding of the context in which a user will come to your interface is critical to them having a successful or positive experience."

Claus Knapheide states that regarding an investment product, mainly a hospital information system, the following: "Professional users share 3-10 to 15 years of training. The user-interface communicates only 2%, the rest is professional knowledge."

4.2.6 Degree of Power

Background: This dimension is described by Wright and refers to the degree of strength or weakness of a country/culture in international comparison. *Degree of power* is located in the field of a countries capability.

Example: An international strong country is seen as powerful by other countries and considered as having influence on international developments; weak countries do not have much influence on international issues.

User-Interface Design

M	MM	N	I	A
x				x

The dimension of international power can have influence on user-interface design, but is not a central one. The flag of a country that is internationally regarded as "strong" might bring up different associations in different countries.

Jacques Hugo: "This could be relevant for intercultural (multinational) applications"

Romit Mitra: "It is critical for post colonial states"

Tanya Campbell: "I imagine this is a problem on specific types of initiatives - i.e. highly political, discursive Web sites OR perhaps big sites like Yahoo! or Amazon where people in Denmark might feel slighted if the Norwegian site is better. It's an issue, but probably not common for all UI design."

Claus Knapheide: "For medical systems, participating in a strong culture is what the customer expects."

4.2.7 Economic Progress

Background: This dimension of *economic progress* is described by Wright and refers to the degree of *flexibility* or *rigidity* of a country/culture regarding economic progress. It is located in the field of a countries capability.

Example: Countries with flexible behavior in adapting economical strategies are likely to have a higher degree of economical progress than rigid countries.

User-Interface Design

M	MM	N	I	A
x	X			

Susan Paulsen and Claus Knapheide mention the financial field or an e-commerce site and investment business.

Jacques Hugo: "This could be relevant for intercultural (multinational) applications."

4.2.8 Experience of Technology

Background: *Experience of technology*, mentioned by Victor, describes how technology is perceived by the members of a culture. The scale ranges from *control-oriented* to *harmonization* to *subjugation-oriented*.

Example: In control-oriented societies technology is seen as a positive good; the environment is meant to be mastered; mastery can be accomplished through technology. Subjugation-oriented cultures see technology as being neutral to negative; the environment controls society; it is impossible or undesirable to control the environment. Harmonization means that people are neither masters nor subjects of the environment, but are part of the environment; technology is a subset of the larger system of thought.

User-Interface Design

M	MM	N	I	A
x	X	x	x	x

Amanda Meek: "Our (U.S.) control oriented society causes people to feel that technology is "smart" and "good" and if they find an interface hard to use, they are dumb. Not often do users feel that technology should be intuitive."

George Simons: "Critical for the adoption of the media as well as the interface."

Tanya Campbell: "It doesn't matter if something is well designed if people don't use it in the first place."

Brenda Laurel: "If technology is not seen as empowering, all our efforts are doomed."

4.2.9 Face-Saving

Background: Victor mentions the variable of *face-saving* within his dimension of context. He defines face-saving as the act of *reserving one's prestige* or *outward dignity*.

Example: In cultures with a strong face-saving element, negotiations may end if one party or the other is caused to lose face. In such cultures, face is more important than most business dealings. In cultures with a weak face-saving element, negotiations may continue if one or the other party is caused to lose face. In such cultures business dealings are generally considered more important than face. (cf. Victor, Aspects, online)

User-Interface Design

M	MM	N	I	A
	x		x	

The following elements were mentioned by the participants: "status and community elements" (Tanya Campbell), "delivering of feedback encouraging or insulting the user" (George Simons), and "design system feedback as a friendly help or an error message" (Andreas Beu).

4.2.10 Gender Roles

Background: Hofstede describes *masculinity* as pertaining to societies in which social gender roles are clearly distinct (i.e., men are supposed to be assertive, tough, and focused on material success, whereas women are supposed to be more modest, tender, and concerned with the quality of life). *Femininity* pertains to societies in which social gender roles overlap (i.e., both men and women are supposed to be modest, tender, and concerned with the quality of life).[5] Condon and Yousef use a similar scale ranging from female superiority and equality of sexes to male superiority.

Example: Masculine (male superiority) societies show a more chauvinistic attitude toward women. Men are likely to have a traditional picture of the role of women in society: caring for house and children but not working in a company. Feminine cultures (equality) tend to see social gender roles as overlapping.

User-Interface Design

M	MM	N	I	A
x	x			x

Tanya Campbell: "This should be a very important component of UI design - we know men and women behave differently both online and offline, for example, but we tend to do very little with the insights."

Josephine Scott: "I see technology as a great potential equalizer. Technology has the potential to provide interaction that either provides no gender context, or provides the opportunity

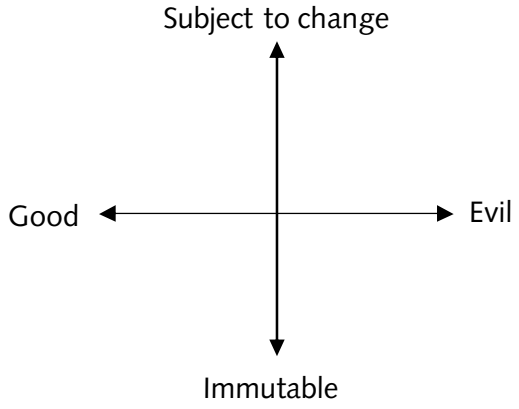
[5] Hofstede assumes that countries that distinct gender roles clearly (and in his thinking that only could mean, men have a more powerful part within society than women) also value achievement and success very high. The MAS category is discussed very controversially, and in my mind it is because two very different things are intermixed: the amount of gender differentiation on the one hand and the way a society thinks about toughness/competitiveness on the other.

to express a behavior that is contrary to cultural expectation, due to the anonymity and non-humanity of the technology. The system has no expectation of masculinity or femininity. However, calls to action (like sales conversion) may require that the page make a direct appeal to gender role. Selling makeup, for instance, will likely be best supported with a Web design that encourages femininity. But it is the product, not the technology that creates the expectation."

Brenda Laurel: "Significant gender differences exist, both cultural and biological, that should be considered. The default design typically privileges the male."

4.2.11 Human Nature Orientation

Background: *Human nature orientation* is mentioned by Kluckhohn & Strodtbeck and Adler. This dimension describes the way people can be seen: *good*, *evil* or a *mixture* of both. In addition they can be seen to be *able to change* or to be *unable to change*. This dimension is in fact a two-dimensional one and can be seen as ranging culture within a field instead of a scale.



Example: Americans see human nature as basically evil but perfectible, members of the Vietnamese culture see human nature as basically good but corruptible. (cf. http://mcel.pacificu.edu/as/students/vietam/aja.html)

User-Interface Design

M	MM	N	I	A
x	x			x

Claus Zimmermann: "Human nature orientation is essential. We have a need to trust the content and what we read. In other words user-interface design especially for information purposes needs to gain the users trust."

Tanya Campbell: "The online environment is all about playing with or 'enhancing' one's identity so I suppose this is an issue, but much more mutable and different from offline. Therefore the design implications might not really exist."

George Simons: The dimension "…may determine the amount of handholding that the use of the interface requires either online or otherwise".

Brenda Laurel: "Accomplishing something is to affect change, therefore change is necessary."

4.2.12 Individualism vs. Collectivism

Background: The dimension of *individualism vs. collectivism (communitarianism)* is cited by Hofstede, Trompenaars, Parsons, Kluckhohn & Strodtbeck, Adler, and Condon & Yousef. It refers to the role of the individual and group, and which interest prevails over the other.

Example: In individual-oriented countries everyone is expected to look after one's self or immediate family. Collectivism implies that people are integrated from birth into strong, cohesive groups that protect them in exchange for unquestioning loyalty. Moreover it is not likely that individuals show strong opinions against their own company. (cf. Ito, Impact, 117)

User-Interface Design

M	MM	N	I	A
x	x		x	x

"User-Interfaces, especially those in groupware category, must be able to deal with varying levels of individuality and anonymity that are required."(Fernandes, Global, 92)

The following elements are mentioned by Ito (Ito, Impact, 117f): groupware, group decision-supporting systems, evaluation systems, and system customization.

Jacques Hugo: "Especially important in CSCW (Computer-supported Collaborative Work)".

Brenda Laurel: "This is a strong element in cultural difference that should be respected."

4.2.13 Instrumental vs. Expressive

Background: The *instrumental vs. expressive orientation* is mentioned by Parsons. This dimension describes the goals which people seek through their interaction with others.

Example: People from a culture where an instrumental orientation to interaction prevails tend to value relationships for what they can do for them rather than for the relationship itself. People from cultures where an expressive orientation prevails do not do this.

User-Interface Design

M	MM	N	I	A
		x	x	

Interaction might have an influence on the design of contact and action functions.

Laurie Southerton: "Particularly in establishing a relationship between your interface and the user or group of users, i.e. in a web site striving to attract and retain a certain group of visitors."

4.2.14 Internal vs. External Control

Background: The dimension of *internal vs. external control (relationship to nature)* is referred to by Trompenaars, Kluckhohn & Strodtbeck, and Adler. This variable describes the relationship a culture has to nature. *Externalist* cultures view nature as a force more powerful than the individual, a force to be feared or emulated. *Internalist* societies see the major force in life, the origins of vice and virtue as residing within the individual.

Example: External-oriented cultures try to harmonize with nature, e.g. in medicine. Internalist cultures want to have control over the environment – conquering illness.

User-Interface Design

M	MM	N	I	A
	x	x		

Members of external-oriented cultures are likely to blame themselves if they cannot use the system, because they are not able to adapt themselves enough to the environment. Internalists blame the designer as they require that nature and technical issues have to be dominated by people.

Ito and Nakakoji mention general computer use and customization as an area of interest when dealing with the dimension of external vs. internal control. (Ito, Impact, 118ff)

Malini: "May be useful in iconography and symbols though"

Claus Zimmermann: "Relates directly to the acceptance / rejection of ergonomics!"

4.2.15 International Trade and Communication

Background: Wright describes the dimension of *international trade and communication* as the rate of development in the field of trade and communication with other countries/cultures. The scale ranges from *isolation* to *cooperation*.

Example: Isolated countries tend not to care about international standards and face on national trade whereas cooperating countries focus on export and communication with other states.

User-Interface Design

M	MM	N	I	A
			x	

This dimension might have an impact on the fields of collaboration and exchange (George Simons) and technological skills (Everyl Yankee).

Claus Knapheide: "A country that buys a Siemens system has already made a statement about this aspect."

4.2.16 Long-term vs. Short-term Orientation

Background: Hofstede's latest dimension is based on the study of Michael Bond in Hong Kong which had noted that Hofstede's previous four cultural dimensions did not adequately reflect Asian perspectives on culture. It also reflects the time orientation of Kluckhohn and Strodtbeck. "*Long Term Orientation* stands for the fostering of virtues oriented towards future rewards, in particular perseverance and thrift. It's opposite pole, *Short Term Orientation*, stands for the fostering of virtues related to the past and present, in particular, respect for tradition, preservation of 'face' and fulfilling social obligations." (Hofstede, Consequences, 359)

Example: Countries with a short-term orientation tend to plan quarterly – sometimes that happens as a result of fast moving markets. On the other hand, in countries with long-term orientation, plans are made decades in advance. This means they are willing to wait for 10-20 years until their investments will return into profit.

User-Interface Design

M	MM	N	I	A
	x		x	

Regarding feedback, the visualization of progress bars, indicating progress in general, can be influenced.

Malini: "I see this as an important factor that may deem how users will live with the product - how willing they are to learn it based on how long they'll stick to it and use it."

Brenda Laurel: "Influences the amount of effort one is willing to make."

4.2.17 Meaning of Life

Background: *Meaning of life* is described by Condon & Yousef. They see it as a variable for how a society perceives the goals of living. The scale ranges from *physical*, material goals to *intellectual* goals to *spiritual* goals.

Example: Members of physical-oriented societies strive for the accumulation of money or material goods. Spirit-oriented cultures do not value money as high as gaining spiritual maturity.

User-Interface Design

M	MM	N	I	A
x				x

4.2.18 Nonverbal Communication

Background: Victor describes the dimension of *nonverbal communication* in his LESCANT model. Nonverbal communication varies across cultures in six major ways: *kinesics* (body movement and facial gestures); *proxemics* (distance); *oculesics* (eye movements and eye contact); *haptics* (touching behavior); *paralanguage* (tone of voice and nonlanguage sounds); and *appearance* (dress and grooming). (cf. Victor, Aspects, 26f) According to Victor, nonverbal communication "may be the most deeply engrained of all cultural variables…" (Victor, Aspects, 27) because it is learned before language.

Example: "If someone were to stand closer to you than is customary in your own culture, you would have an extremely difficult time not moving away. Similarly, if someone were to stand farther from you than is customary in your own culture, you would have a very strong urge to move closer as you talked." (cf. Victor, Aspects, 27f)

User-Interface Design

M	MM	N	I	A
x			x	x

Visual and audio representations of non-verbal communication (Laurie Southerton), appearance (Claus Zimmermann), multimedia, virtual reality (Jacques Hugo), interfaces for novice users (George Simons).

4.2.19 Political Decentralization

Background: This dimension is mentioned by Wright. It describes the degree of *lethargy* or *energy* a country shows towards *political decentralization*.

Example: Countries that aim for political decentralization want to give citizens or their elected representatives more power in public decision-making. Advocates of political decentralization assume that decisions made with greater participation will be better informed and more relevant to diverse interests in society than those made only by national political authorities. Countries with a more lethargic approach towards political decentralization think in the opposite way.

User-Interface Design

M	MM	N	I	A
x	x			

Political or perhaps media-oriented in context (Susan Paulsen), decentralization of work, home (Tanya Campbell).

4.2.20 Power Distance

Background: *Power distance* is one of Hofstede's dimensions and focuses on the nature of human relationship in terms of hierarchy. It describes "the extent to which less powerful members of institutions and organizations accept that power is distributed unequally." (Hofstede, Cultures, 28)

Example: In cultures with large power distance, the relation between boss and subordinate is strictly ruled and dependent on the decisions of the boss. In cultures with low power distance, bosses and subordinates work closely together and consult with each other.

User-Interface Design

M	MM	N	I	A
x	x		x	

Impacted by the dimensions of power distance are the fields of "feedback mechanisms" (Tanya Campbell), "structuring", "open/restricted access", "error messages", and the "use of colors" (Aaron Marcus and Emily Gould).

4.2.21 Property

Background: Condon & Yousef mention the dimension of *property* as the way a society sees property: The scale ranges from *private* to *utilitarian* to *community*.

Example: Societies with a private approach towards property tend to allocate real estate to persons or institutions: they see them as the owner, who has rights and duties towards the land. Utilitarian societies would see land as common good and everyone has to take care of it.

User-Interface Design

M	MM	N	I	A
x	x		x	

George Simons relates the dimension of property to the dimension of space: "I feel they are essentially the same issue when speaking about an interface"

Brenda Laurel: "This is the basis of the whole crisis over intellectual property on the web."

Malini: "May influence the UI branding"

4.2.22 Resources

Background: Wright mentions this dimension that refers to the *resources* a country owns. The scale ranges from resource *poverty* to resource *abundance*.

Example: Countries with a lack of natural resources tend to be more dependent on others than countries with rich natural resources.

User-Interface Design

M	MM	N	I	A
	x			x

George Simons: "People need to feel comfortable that the look and feel of an interface reflect familiar aspirations and generally fit their experience of reality. Differences in images can easily reflect affluence or poverty and hence strengthen the connection for some while weakening it for others."

4.2.23 Space

Background: In 'The Hidden Dimension' (1966), Hall developed the dimension of *space*. It refers to the invisible boundary around an individual that is considered "personal" and the use of physical space within a society. Space is also mentioned by Adler.

Example: An office may be seen as a public space to be entered without permission, or it may be seen as a private space that cannot be entered without first obtaining permission.

User-Interface Design

M	MM	N	I	A
	x		x	

Sound as feedback element (Fernandes, Global, 85), sharing of workstations i.e. individual vs. group access (George Simons), providing personal information e.g. registration dialogs (Susan Paulsen), interfaces in public space (Josephine Scott).

4.2.24 Specific vs. Diffuse

Background: The dimension of *specific vs. diffuse* measures how far people get involved with other's life space. *Specifists* believe relationships with others should be explicit, delineated and regulated as in a contract. *Diffuse*-oriented people emphasize the real and personal contact of the whole person in a relationship.

Example: In specific cultures work and life are sharply separated and a work leader's authority only reaches where his/her work relationship with the subordinate is defined. In diffuse cultures teacher would be treated by the student not only as an instructor in the classroom, but also has certain influence on the student's home life.

User-Interface Design

M	MM	N	I	A
			x	

Taking into consideration the issues mentioned above, we can assume impact on the fields of customer service, customer care, and CSCW-Systems.

George Simons: "It is important to find out how much people are willing to commit to communication and collaboration via any given interface. It often implies less to the design of the interface and more to how and why it is introduced and how the users are introduced and related to each other."

4.2.25 Technological Development

Background: Write refers, with the variable *technological development,* to the rate of technological development and describes the scale from *advancement* to *backwardness*.

Example: The presence of a word processor may suggest increased status in a culture in which such technological devices are rare. By contrast, the same word processor in a culture in which these devices are commonplace may not even be noticed. In yet a third culture, the word processor may even suggest that the owner has no secretary or must do his or her own clerical work.

User-Interface Design

M	MM	N	I	A
	x	x	x	

George Simons: "This becomes a critical technical issue in terms of availability of hardware, software and bandwidth available to the user. If people have it and understand it, they will generally use it."

Laurie Southerton: "Developing an interface for a user that is technologically intermediate to expert is very different from designing for the novice user. You must know this about your users to begin."

4.2.26 Time Orientation

Background: *Time orientation* is mentioned by Kluckhohn & Strodtbeck, Adler, and Condon & Yousef. The dimension refers to the way cultures conform to time. The scale is described as ranging from *past-orientation* to *present-oriented* cultures to cultures that *focus on the future*.

Example: Past Orientation implies a belief that everything that can occur has occurred before, and past patterns will be replicated. Understanding the principles and truths of the past can guide current and future experience. Present Orientation implies dominance of the mental state of the moment, perhaps because that is most real or one cannot depend on the future. Future Orientation implies expectancy of advancement, improvement or progression. It enables prediction, scheduling, planning, and changing forthcoming events.

User-Interface Design

M	MM	N	I	A
x		x		

Navigation can be designed differently depending on the perspective: the already done, the currently presented or the things that may happen.

This dimension becomes especially important when designing "business applications" (Jacques Hugo) or "providing historical or visional background or motivation" (George Simons).

4.2.27 Time Perception

Background: *Time perception* is described by Hall, Trompenaars, and Victor. This dimension refers to the cultures response to time. The two types are *monochronic (sequentially) time* and *polichronic (synchronically) time*.

Example: Monochronic time is characterized by schedules, promptness and compartmentalization or isolation of activities. People tend to do one thing at a time. Staying on schedule is a must. In countries/cultures with polichronic time attention and plans are constantly shifted, and people do not adhere to appointment schedules as rigidly as in the monochronic time cultures. People usually do several things at a time. Time commitments are desirable rather than absolute. Plans are easily changed.

User-Interface Design

M	MM	N	I	A
		x	x	x

Members of monochronic societies might "…prefer writing precise queries for information retrieval, while people [from polichronic societies] prefer browsing through the information space." (Ito, Impact, 115f)

George Simons: "In an interface this will affect how linearly or serendipitously material is presented. The age of the user might be a stronger factor in many cases more than the ethnic or regional cultural background"

Laurie Southerton: "This is very important depending on the task being designed for in the interface. If it is a linear process then it must be presented as such...however, one must also know the user and if there are monochronic or polichronic users, both must be designed for in the structure of the interface."

4.2.28 Uncertainty Avoidance

Background: Hofstede's dimension of *uncertainty avoidance* can be defined as "…the extent to which the members of a culture feel threatened by uncertain or unknown situations." (Hofstede, Cultures, 113) "Cultures vary in their avoidance of uncertainty, creating different

rituals and having different values regarding formality, punctuality, legal-religious-social requirements, and tolerance for ambiguity." (Marcus, Crosscurrents, 39f)

Example: In cultures with high uncertainty avoidance emotions are displayed in the way that everything different is dangerous. They resist in changes and worry about future. Cultures with a low degree of uncertainty avoidance are open for new things and changes. They don't have feelings of uncertainty about future.

User-Interface Design

M	MM	N	I	A
		x	x	

Highly affected can be payment opportunities, and navigational design.

Jacques Hugo: "This would apply to predictability and consistency in applications."

George Simons: "Satisfying the need for certainty will affect the satisfaction that the user experiences on the interface and hence determine its "stickiness" for a particular population"

Bart Schutz: "New media are perceived as uncertain in most countries."

4.2.29 Universalism vs. Particularism

Background: Parsons and Trompenaars describe the dimension of *universalism vs. particularism* as the degree of adhering to agreed standards. *Universalists* believe that good and right are definite and always applicable. *Particularists* place more emphasis on the obligations and the unique circumstances.

Example: Crossing a street at the red light in a universalistic culture may cause frown, even if there is no traffic. On the contrary, particularistic cultures focus on the exceptional nature of circumstances; it is likely to be OK to cross the street if it is a friend that violates the traffic rule.

User-Interface Design

M	MM	N	I	A
				x

Members of universalistic countries might prefer uniformly arranged buttons in the same color. Whereas members of more particularistic-oriented cultures prefer specific style of interface object assigned to each task. (cf. Ito, Impact, 115)

Due to Jacques Hugo "especially business applications" are impacted by the dimension of universalism vs. particularism.

5. Survey, Results and Ideas for Practical Use

Within this chapter, I am describing the way I tried to solve the problem of finding the most important dimensions. First I want to give a little insight on how the questionnaire used to gather expert opinion was designed, how the pretest and the test itself were conducted and the quantitative and qualitative results of the survey. Finally I want to present some ideas for practical use of the findings.

5.1 The Expert Questionnaire

5.1.1 Purpose of the Questionnaire

After having studied the described 29 dimensions by nine authors I tried to compile a questionnaire that describes the dimensions briefly[6]. This questionnaire should form a tool to get expert opinion quickly and in a structured form. Although the questionnaire might look like one produced for a quantitative study (use of a Likert Scale) the real purpose of it is getting ideas about thinking directions of interface designers.

Originally I planned to conduct qualitative interviews with experts in the field of user-interface design, preferred also with expertise in the field of GILT. Due to a lack of financial funding (it was not possible to organize a grant for such a project – to get valuable feedback, it would have been necessary to travel at least two or three continents), I decided to choose the online questionnaire as a way of obtaining expert information.

5.1.2 The Questionnaire Design

The questionnaire is designed in the following way:

1) Background Questions (Name, Company, Position, E-Mail, Country of Birth, Country where you live and work currently, years of experience in the field of user-interface design)
2) Questionnaire

[6] The questionnaire can be found in the Appendix and also on the web at http://mavas.at/val/cultural_dimensions. The survey still can be completed as I see my work as a work in progress and want to gather as much ideas as possible to work with these inputs later on.

a. Brief description of where the dimensions come from and how the survey participant should rate the dimensions

b. List of 29 dimensions (No, **Name of the Dimension**, *Author*, brief description and in certain cases an example to illustrate the meaning, 5 rating fields (very important, important, not sure, not very important, not important), field for additional comments

c. Additional field for extra comments on the survey/study.

5.1.3 Technical Background

The basic information about the dimensions, the authors, and the Likert Scale was stored in an Access Database. Figure 3 shows the basic information about the 5 tables the database consists of (Table "Continent" appears twice in the graphic as this table has a double binding with table "Person"). The information stored in the tables grouped by "Information through academic research" was found by research in the field of cultural dimensions. The right half of the graphic shows the tables filled with data through the online survey.

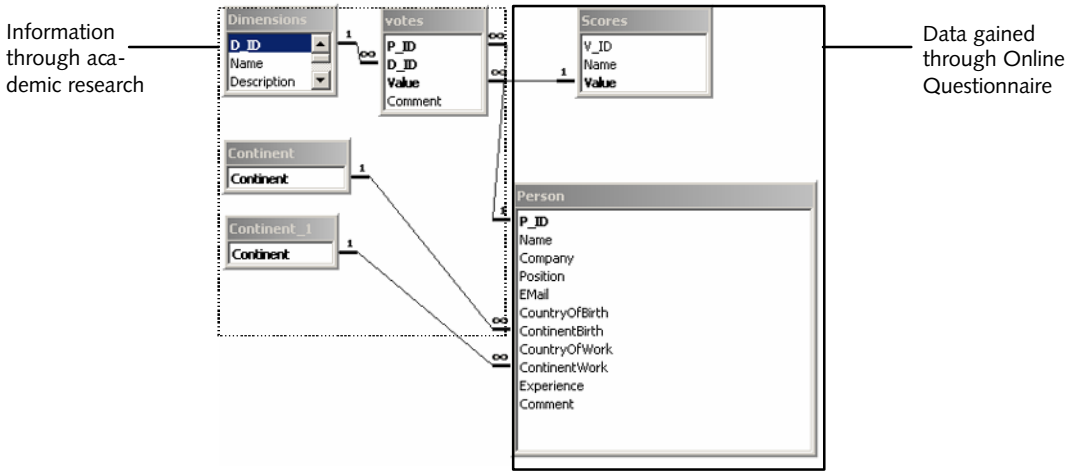


Figure 3: Database structure

To build the website of the online questionnaire, I used a mixture of pure HTML (HyperText Markup Language) and ASP (Active Server Page) coding. With the help of the ASP-Technology I was able to connect the Access Database to use the stored data about cultural dimensions for the questionnaire form. The list of cultural dimensions as well as the Likert Scale items fields, both were created dynamically – which turned out to be a very effective way for implementing changes.

5.1.4 The Pretest

To find out if the structure of the questionnaire was appropriate and the estimated time to fill out the form was correct, a pretest was conducted with a group of interface design students at the FH JOANNEUM. Regarding the estimated time (5-10 min) I found out that the estimated amount of time needed should be increased to 10-15 minutes. The questionnaire itself was described once as "difficult" to fill out because of the "lack of experience" of the participant. Following an idea of Aaron Marcus, I decided to include the names of the originators of the dimensions into the questionnaire, because many reviewers will be familiar with the concepts and scientists behind the dimensions. This could support the understanding efficiency of the questionnaire.

5.1.5 Getting the Survey Out

In order to get valuable input for the survey, I used four different ways to contact experts: 1) Research within specialized literature to find expert's names combined with internet research for email addresses, 2) mailing lists in the field of user-interface design and cultural matters 3) companies in the field of GILT and, 4) conferences in the field of Globalization, Internationalization and Localization. Regarding the feedback it turned out that (1) personal contact and (2) contact via expert mailing lists were the most efficient and effective ways.

5.1.6 Processing the Data

As described in 5.1.3 the Access database was populated with the names of the researched dimensions and their descriptions. This data was used for an automatically generated form (Active Server Pages, ASP) that was presented on the web. After the experts filled out the form, the data was sent to my email address as an email. This data was transferred via Excel into the database. I chose this way (instead of putting the data directly into the database through the web interface) because of the fact that this procedure gave me more power to review the data and to prevent errors from erroneous data input.

5.2 The Data Gained from the Survey

5.2.1 Participants

The objective for the survey was to get 30 expert opinions. By the deadline for the survey (8th of May 2003) 57 experts had completed the questionnaire.

The participants are from 21 different countries across the world (Australia, Austria, Belgium, Canada, China, Cyprus, Egypt, France, Germany, Hungary, India, Japan, Mexico, Netherlands, Pakistan, Scotland, South Africa, Switzerland, Sweden, UK, and the United States). 19 respondees work in a different country from which they were born (and raised) in.

The following diagrams show the amount of participants who work in the same cultural environment as they were born versus the amount that moved and therefore have personal intercultural experience.

Figure 4: Distribution of participants regarding their location of work compared with location of birth

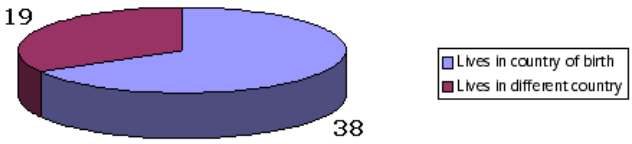


Figure 5 shows the continents the participants stem from and the prorated allocation.

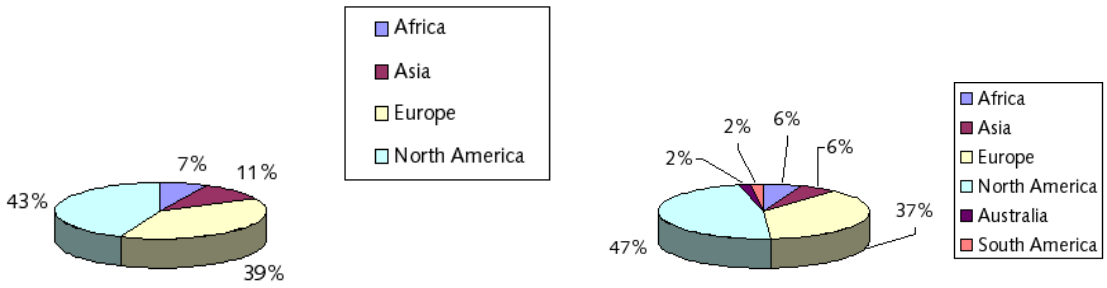


Figure 5: Participant's origin and current location of work

Regarding the participants experience in the field of user-interface design, we can find the distribution displayed in Figure 4.

Years of experience	Number of participants
0-3 years	6
3-7 years	27
7-11 years	14
11-15 years	4
More than 15 years	6

Table 4: Distribution of experience in the field of user-interface design among the survey participants

The participants are from more than 40 different institutions including global companies (e.g. Siemens, Peoplesoft, and Ogilvy), universities (Kanda University of International Studies, Stanford University, The George Washington University) and many smaller, specialized companies.

5.2.2 General Feedback

The main tenor of the expert's comments on the survey was positive. Many mentioned that the set of 29 dimensions itself will form a helpful tool in their future work to take care of cultural differences. The statement "None of them seemed unimportant" (Mary Deaton) confirms this impression. Nevertheless I do not want to conceal that at least three experts stated that these cultural dimensions do not really have influence on their daily work. Personally I am of the opinion that this attitude can be mainly ascribed to cultural ignorance, but in fact this is a judgment that has to be validated through further research.

As already stated, nearly everybody mentioned that "everything depends" on the purpose of the interface itself and the domain the users are located in.

5.2.3 Statistical Evaluation

To look at the data from a solely statistical point of view is a risky approach. As stated earlier, the study is basically a qualitative one and not a quantitative one. Nevertheless I want to show the raw data:

	No	Name	Sum	Av	Min	Max	Med	Deviation	Variance
01	D05	Context	209	3,73	1	4	4	0,56	0,31
02	D08	Environment and technology	185	3,30	0	4	4	0,97	0,94
03	D28	Uncertainty avoidance	180	3,21	1	4	3	0,80	0,64
04	D25	Technological development	178	3,18	0	4	3	1,06	1,13
05	D27	Time perception	176	3,14	1	4	3	0,86	0,74
06	D04	Authority conception	160	2,86	0	4	3	1,00	1,00
07	D03	Affective vs. neutral	157	2,80	1	4	3	0,86	0,74
08	D23	Space	154	2,75	0	4	3	1,07	1,14
09	D09	Face-saving	153	2,73	0	4	3	1,07	1,15
10	D02	Activity orientation	153	2,73	0	4	3	1,07	1,15
11	D18	Nonverbal communication	152	2,71	0	4	3	1,17	1,37

	No	Name	Sum	Av	Min	Max	Med	Deviation	Variance
12	D24	Specific vs. diffuse	149	2,66	0	4	3	1,08	1,17
13	D12	Individualism vs. collectivism	149	2,66	0	4	3	1,12	1,25
14	D13	Instrumental vs. expressive	143	2,55	0	4	3	1,11	1,23
15	D26	Time orientation	137	2,45	0	4	3	1,23	1,52
16	D16	Long-term vs. short-term orientation	136	2,43	0	4	3	1,20	1,45
17	D29	Universalism vs. particularism	136	2,43	0	4	3	0,97	0,94
18	D15	International trade and communication	135	2,41	0	4	3	1,19	1,41
19	D10	Gender roles	131	2,34	0	4	3	1,18	1,39
20	D17	Meaning of life	126	2,25	0	4	2	1,15	1,32
21	D01	Achievement vs. ascription	118	2,11	0	4	2	1,29	1,66
22	D20	Power distance	116	2,07	0	4	2	1,11	1,23
23	D21	Property	116	2,07	0	4	2	1,06	1,12
24	D07	Economic progress	107	1,91	0	4	2	1,15	1,32
25	D14	Internal vs. external control	103	1,84	0	4	2	1,16	1,34
26	D22	Resources	96	1,71	0	4	1	1,23	1,52
27	D06	Degree of power	94	1,68	0	4	2	1,15	1,31
28	D11	Human nature orientation	89	1,59	0	4	2	1,11	1,23
29	D19	Political decentralization	81	1,45	0	4	1	0,99	0,98

Table 5: Statistical results

Table 5 shows the ranking of cultural dimensions regarding their importance for the field of user-interface design due to the survey. Ranked by values "very important" (4), "important" (3), "not sure" (2), "not very important" (1), and "not important" (0) the column *Sum* shows the total of all voting. *Av* shows the average (Sum over number of participants), *Min* shows the lowest score given by all the participants, *Max* shows the highest score given by all the participants. The columns *Deviation* and *Variance* show those values. Unfortunately they do not really have a meaning in this context as we have to cope with ordinal values instead of metrical. This is the reason why I also want to include a factor analysis – which can be seen in Figure 6.

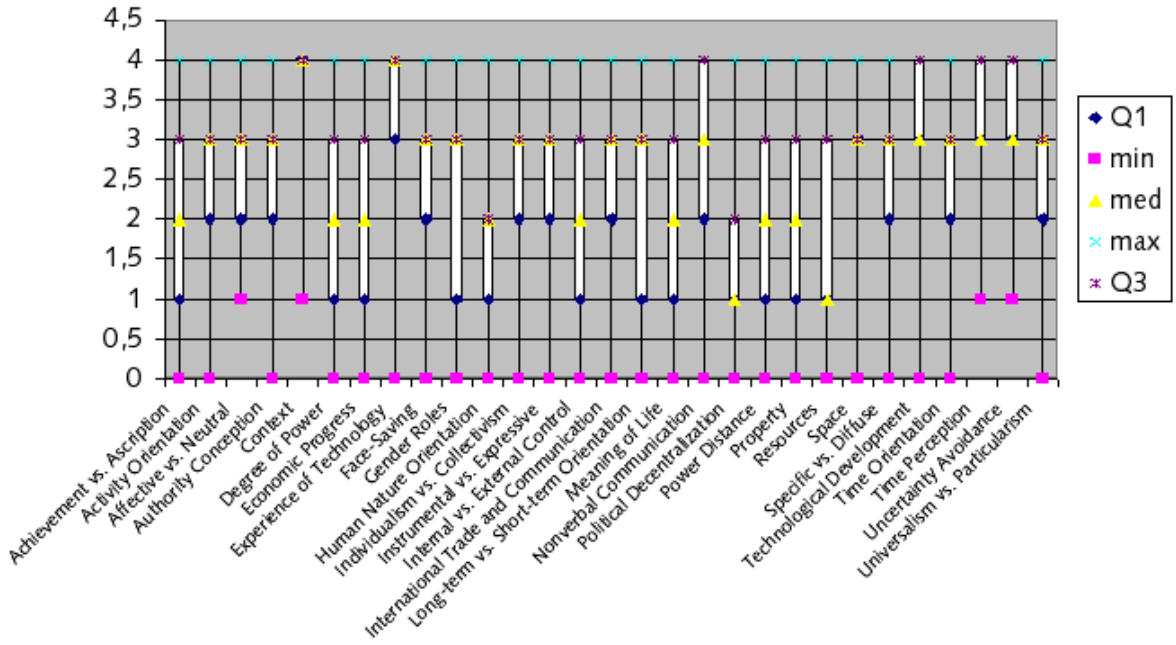


Figure 6: Boxplot or whisker diagram of the data gained through the questionnaire

The boxplot in Figure 6 tries to visualize the distribution of expert votings. To analyze ordinal values parameters like first quartile (Q1), third quartile (Q3), minimum (min), median (med), and maximum (max) are used. A boxplot provides a simple graphical summary of a set of data. It shows a measure of central location (the median), two measures of dispersion (the range and inter-quartile range), the skewness (from the orientation of the median relative to the quartiles) and potential outliers (marked individually). Boxplots are especially useful when comparing two or more sets of data. To explain the method used would be beyond the scope of the work, important is how this chart is to be interpreted – that will be done in the following chapter.

5.2.4 The Most Important Dimensions

As already stated the survey conducted should deliver directions of thinking – it is not mainly a quantitative survey. The comments most of the participants offered were very valuable – many of the examples offered found there way into Chapter 4 – and gave insight into the expert's mental models and experience. Nearly all participants pointed out that a general opinion on this topic is very hard to provide – "everything depends" was a very common comment. Nevertheless each of the participants provided a ranking of the dimensions – the statistical evaluation of these rankings can be found in the previous chapter.

To filter out the most important dimensions in a general sense, I was forced to draw a line: Using Table 6 this line is in my opinion after the dimension of *Authority Conception*. The statistical reasoning for this decision is the following: As we can see in Table 6 there are just five dimensions that are clearly located in the space between "very important" (4) and "important" (3): 1) context, 2) environment and technology, 3) technological development, 4) time perception, and 5) uncertainty avoidance. As authority conception is in the average still very high and in the statistical ranking of the experts with more than five years of experience even at rank 5, I suggest including this dimension in to the top five dimensions.

The following list tries to summarize the results for the most important cultural dimensions:

1. Context	**1. Context**
2. Environment and technology	**2. Technological development**
3. Uncertainty avoidance	**3. Uncertainty avoidance**
4. Technological development	**4. Time perception**
5. Time perception	**5. Authority conception**
6. Authority Conception	

Table 6: Ranking of the most important cultural dimensions

The dimension of **context** heads the ranking shown in Table 6 . Described as "the amount and specificity of information in a given situation" this dimension has an average rating of 3.73 among all participants and an average of 3.79 among the participants that have more than 5 years of experience in the field of user-interface design. Among the latter group nobody rated this dimension lower than 3 out of 4 possible grades.

The second most important dimension is *Experience of technology*. I want to combine this dimension with *Technological development,* which is rated on position four, and name this dimension **technological development**. Both dimensions are rated as very important (3.30 and 3.18) for user-interface design and have to do with the development and attitude of the members of a certain society towards technological development.

The dimension **uncertainty avoidance** is number three on the list of important dimensions. An average rating of 3.21 out of 4 and nobody rated the dimension as "not important," we can assume that nearly every interface has to take into consideration the behavior of the user regarding uncertain or unknown situations.

Time perception is also ranked among the top six – an average ranking of 3.14 and again nobody considered this dimension as unimportant.

Authority conception got an average of 2.86. It is very interesting that the concept of *Power distance* which is very similar is statistically ranked only at position number 22. A very simple explanation of this contradiction could be the wording: *Authority conception* specifies just

with its name what this dimension is about; *Power distance* does not fulfill this need. We can also assume that the idea of how people think of authority heavily influences their behavior in handling a user-interface.

5.2.5 Subjective versus Objective Dimensions

As described in chapter 4.2 on page 20 I focused on subjective dimensions but also included objective cultural dimensions within this survey to find out if there is a general difference in the impact of objective and subjective dimensions on user-interface design. These relatively objective, and rather political dimensions are: *Degree of power* (D06), *economic progress* (D07), *international trade and communication* (D15), *political decentralization* (D19), and *resources* (D22).

Regarding the statistical average we can state that all of these dimensions are located in the lower ranks of the result list. The experts judged the dimensions as not very important for the field of user-interface design in general. If we look at the examples provided we can see a tendency pointing in the direction of intercultural communication tools and media. Most experts mention that these dimensions mainly influence content creation issues.

Basically we can draw the conclusion that the objective dimensions not yet covered in today's localization approaches do not have a heavy impact on the design of user-interfaces.

5.3 Practical Use of the Set

One purpose of this work is to present ideas for how the findings of this survey can be used for practical work. Within this chapter I want to introduce some methods of how the results of the survey could form a basis for practical use.

5.3.1 Proposal for Practical Grouping of Cultural Dimensions

As already stated, it is a very difficult venture to really point out THE most important dimensions for user-interface design in general. I tried to do that in the last chapter but I am aware of the fact that nearly every one of the participants mentioned: "Everything depends." More research has to be done on filtering out which dimensions are the most important for special fields of user-interface design: the design of medical investment products might demand different cultural emphases than a communication tool for use in the World Wide Web.

Generally it would be great and wishful if every localization project would take all 29 dimensions into consideration, but due to time and financial constraints this is not always possible. Therefore I try to provide a grouped and ranked list of dimensions:

No	Name
1	D05 Context
2	D25 Technological development, D08 Experience of technology
3	D28 Uncertainty avoidance
4	D27 Time perception
5	D27 Authority conception, D20 Power distance
6	D03 Affective vs. neutral
7	D09 Face-saving, D24 Specific vs. diffuse, D13 Instrumental vs. expressive
8	D02 Activity orientation, D17 Meaning of life
9	D18 Nonverbal communication, D23 Space
10	D12 Individualism vs. collectivism
11	D26 Time orientation, D16 Long-term vs. short-term orientation
12	D29 Universalism vs. particularism
13	D15 International trade and communication
14	D10 Gender roles
15	D01 Achievement vs. ascription
16	D21 Property
17	D07 Economic progress
18	D14 Internal vs. external control
19	D22 Resources
20	D06 Degree of power
21	D11 Human nature orientation
22	D19 Political decentralization

Table 7: Grouped and ranked dimensions

The list above tries to give an overview of how the dimensions are related to each other and how they could be grouped together. Listed in the order of their statistical average – gained through the expert questionnaire – and grouped together – the reason of the groupings will be described later – they can form a practical tool to decide which dimension has to be focused on in the next step to cover the most important differences. When we think for instance of a localization project, one has decided to focus on the top six dimensions of the list. Suddenly – due to unknown reasons – more money is available for this part of the project and now the project manager must decide which dimension should be focused next – the list offers a helpful decision support.

Within the work of trying to group the dimensions above I figured out that this is a very difficult task and actually there are missing more empirical studies about how cultural background influences user-interface design. Currently most of the ideas on this issue are based on assumptions. There are still tests and studies to be done to really provide valuable material. Nevertheless I tried to provide groupings and within the following paragraphs I want to describe the reasons for the groupings. The groupings are based on the idea that the problems

the user-interface designer has to face by paying attention to the dimension might awake similar thoughts and directions of thinking.

Grouping 1 - D08 Experience of technology, D25 Technological development: Already described in 5.2.4.

Grouping 2 - D27 Authority conception, D20 Power distance: As Hoft (Hoft, Communicating, online) describes these two dimensions as very similar. Although the two dimensions have not been ranked by the experts on similar levels (probably due to reasons described in 5.2.4.), we can assume that cultural differences in this field have the same impact on user-interface design as they are so similar.

Grouping 3 - D09 Face-saving, D24 Specific vs. diffuse, D13 Instrumental vs. expressive: all three dimensions cope with the problems of interpersonal relationships. The user-interface component influenced mainly by these dimensions – described in 4.2.9, 4.2.13, and 4.2.24 – is interaction and the examples mentioned within the very same chapters point in the direction of community tools. Same impacts on the design of the user-interfaces design are therefore to expect.

Grouping 4 - D02 Activity orientation, D17 Meaning of life: Regarding metaphor building we can assume that societies that focus on material goals value doing more than being, the opposite might be true for spiritual oriented cultures. As already stated, this is just an assumption and has to be verified through more research and convenient tests.

Grouping 5 - D18 Nonverbal communication, D23 Space: The dimension of space is mentioned within the dimension of nonverbal communication, named proxemics.

Grouping 6 - D26 Time orientation, D16 Long-term vs. Short-term orientation: In a way these two dimensions are complementary: The first mainly affects metaphors and navigation, the latter mental models and interaction. Within the statistical ranking of the average value the two dimensions are followed by each other. I think the dimensions cover different fields of a society, but some implications on user-interface design might be the same e.g. future-oriented cultures are likely to be willing to learn how to use an interface if they know that it will be necessary to know how to use it in the future. The same can be true for long-term oriented societies.

5.3.2 Visualizing the Dimensions

If – the beginning of this sentence already shows the fact, that much more research is needed – we had empirically researched values for all the cultural dimensions mentioned above of a certain country, it would be very easy to generate a tool that could answer the question: "Is it necessary to chance the user-interface for a certain culture/country?" and "Regarding which dimensions changes have to be considered?." The basic idea for this tool is the use of star charts.[7]

The basis of the diagram could be a pentagon, as we have five cultural dimensions. Actually the idea is expandable to more dimensions if needed – depending on how deep a localization project wants to go. This pentagon is shown in Figure 7.

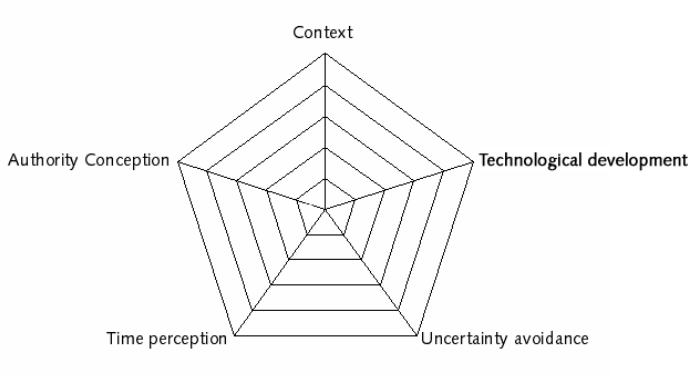


Figure 7: Cultural pentagon

The idea is to create a diagram that illustrates the cultural values of the targeted countries. In a second step these diagrams can be compared to find out if changes are necessary and in what field. I want to give an example to exemplify this concept.

[7] The basic foundation to follow this idea was laid in personal discussions with Aaron Marcus.

5.3.2.1 Example

Assuming cultural values would be available – gathered through empirical studies like Hofstede did for "his" five dimensions – we can imagine the following example: Given *Country 1* with the values as shown in Table 8 we can build a shape that visualizes the parameter value of each dimension.

Country 1:

Context	100
Technological development	34
Uncertainty avoidance	54
Time perception	27
Authority Conception	38

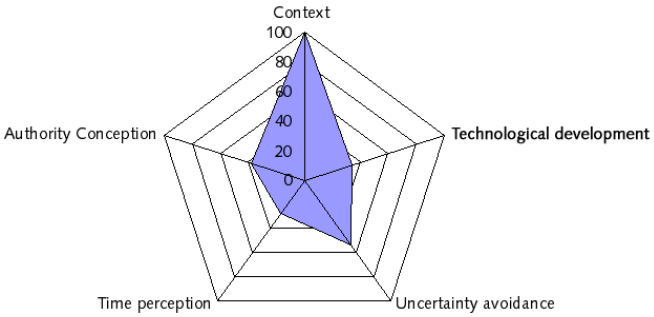


Table 8: Cultural values of a certain country

Given the values of *Country 2*, we can compare the shape formed by the parameter values of the dimensions as shown in Table 9.

Country 2:

Context	1
Technological development	56
Uncertainty avoidance	37
Time perception	28
Authority Conception	90

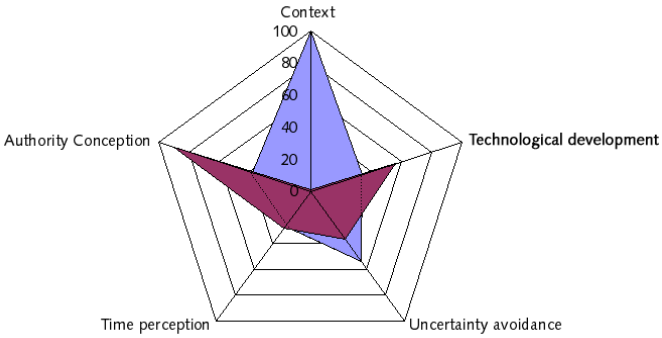


Table 9: Comparision of cultural values

As we can see in Table 9 the two countries have a similar value in the dimension of Time Perception, therefore there is no need to change the user-interface regarding this field. As the area concerning the dimension of context is the one that overlaps the least, this field is probably the most important one to change and adapt to fulfill the needs of the targeted audience.

5.3.3 Culturebase and Cultural-Components-Matrix

I want to pick up the idea of a cultural-design matrix originally mentioned by Aaron Marcus and Emily Gould and briefly described in chapter 3.3.3. The top five dimensions extracted in chapter 5.2.4 (or up to 29 dimensions, depending on the cultural depth of the localization project) can form the basis of filling a "Culturebase" with examples for further use in a CMS that is capable of handling cultural differences on a desirability level (see Table 1 on page 9). Such "Cultural Content Management Systems" could eventually work as depicted in the diagram of Figure 8.

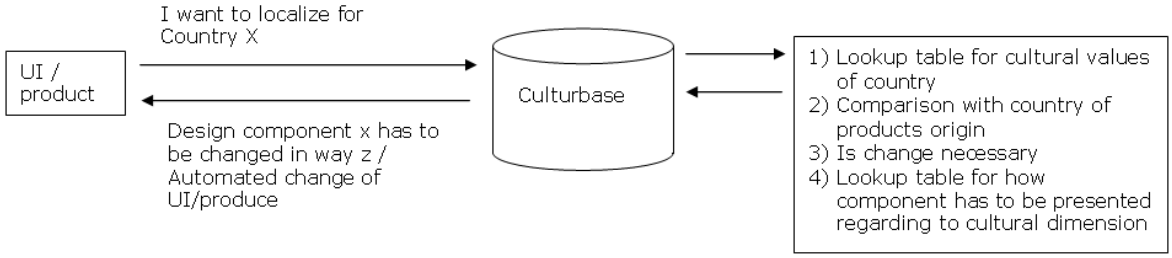


Figure 8: Flowchart of a culturebase

Assuming a user-interface for a product that is supposed to be localized for a certain country, we can think of a database that handles this localization process by (1) looking up a table for the cultural values of the target country. In a second step (2) a comparison with the country of origin is made and (3) the tool has to decide if a change for a certain feature is necessary. If such a change is needed, a lookup table (4) – described in the next paragraph – can provide the information, what the changes are to build an appropriate interface.

The lookup table mentioned in step 4) of the culturebases workflow could have the following structure shown in Table 10.

	Context				
	very low	low	medium	high	very high
Metaphor					
Mental Model					
Interaction					
Navigation					
Appearance					
	Authority Conception				
	very low	low	medium	high	very high
Metaphor					
Etc…					

Table 10: Structure of cultural-component lookup table

6. Conclusions and Recommendations for Further Research

It turned out that generating a set of cultural dimensions in the size of 7 +/- 2 items – representing the most important ones when localizing user-interfaces – is a very difficult undertaking. The experts asked for their experienced opinion answered in a general tenor: "Everything depends" – it seems to be extremely important to know the domain and purpose the interface is designed for.

Nevertheless I tried to generate a ranking of cultural dimensions showing the impact on user-interface design components and filter out the most important ones which turned out to be the five dimensions of *context*, *technological development*, *uncertainty avoidance*, *time perception* and *authority conception*.

Moreover this work provides a compilation of 29 cultural dimensions annotated with detailed descriptions and examples. They also include concrete examples of what influence they have on certain domains of user-interface and show the components of user-interface design that are especially affected.

The practical use of the findings is introduced by some examples. I am providing a grouped and ranked list of cultural dimensions that could form a decision making tool kit in a localization process. A second possible use of the findings is the idea of a diagram tool that could answer the question if cultural value related changes for localizing to target a specific country are necessary. Last but not least I am describing the idea of a culturbase that could automatically or semi-automatically handle cultural changes for content management systems.

Due to the fact that the area of globalization, internationalization and localization is a relatively new one regarding the impact of cultural patterns on user-interfaces I want to state that much more research has to be done here. The issues that were raised within this work need to be settled by research, focus groups, etc. about the end user culture and preferences.

Finding "top dimensions" for special fields of user-interface design would be also an interesting study that could contribute and verify the findings of this work.

Developing a database with examples for the implication on each design component by each cultural dimension and gathering cultural values of each country/culture through empiric research could be a supporting work for the culturebase idea.

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7.2 Links

7.2.1 Organizations

http://www.w3.org/TR/i18n-guide-framework/

Framework Document for Internationalization Guidelines 1.0 by the World Wide Web Consortium (W3C).

http://www.lisa.org/

Localization Industry Standards Association (LISA) is "promoting the localization and internationalization industry and providing a mechanism and services to enable companies to exchange and share information on the development processes, tools, technologies, and business models connected with localization, internationalization, and related topics."

http://www.tilponline.org/

The Institute of Localisation Professionals (TILP) is a non-profit organization focusing on the needs of individual localization professionals.

http://www.pal10n.net

The Professional Association of Localization (PAL) – recently merged with TILP.

7.2.2 Culture

http://www.cia.gov/cia/publications/factbook/

The CIA Worlds Factbook: Each country of the world is listed along with pertinent details, including languages spoken, population, telephone use and even how many ISPs are active in the nation.

http://www.zompist.com/amercult.html

"How to tell if you're American": Compilation of cultural values, edited by Mark Rosenfelder.

http://www.geocities.com/Broadway/1906/culture.html

Cross Cultural Comparisons edited by Robert Delaney

8. Appendix

8.1 The Online Expert Questionnaire

See following pages. Due to space constraints and in order to represent the format of a computer screen – the questionnaire was presented to the experts online –the questionnaire is designed in landscape format.

Questionnaire - Thesis: A Practical Set of Cultural Dimensions for Global User-Interface Analysis and Design

by Valentina-Johanna Baumgartner (valentina.baumgartner@fh-joanneum.at)

Background Questions

Name:

Company:

Position:

E-Mail:

Country of Birth:

Country where you live and work currently:

years of experience in the field of user-interface design

Questionnaire

The following table lists 29 dimensions which describe how countries/cultures can be differenciated. These dimensions where found by studying the work of Hofstede, Wright, Parsons, Adler, Condon & Yousef, Victor, Hall, Trompenaars, and Kluckhohn & Strodtbeck.
Please try to **rate** which of these dimensions are **important for the field of user-interface design** based on your own experience as an interface designer.

No	Dimension	Description	Importance for the field of user-interface design	
D01	**Achievement vs. Ascription** *(Trompenaars, Parsons)*	refers to how a status is accorded to certain members of a society. In achievement-oriented cultures, individuals derive their status from what they have accomplished. In an ascriptive society, individuals derive their status from birth, age, gender or wealth.	very important ☐ important ☐ Not sure ☐ Not very important ☐ not important ☐	Comment (optional)
D02	**Activity orientation** *(Kluckhohn & Strodtbeck, Condon & Yousef)*	refers to the extent to which activity is valued within a culture. Human activity can focus on doing, being or being-in-becoming. Doing-oriented cultures are concerned with those activities that are external to the individual and which can be measured. E.g.: Thinking will be less valued than painting as painting can be observed and measured. The being-in-becoming orientation is about who we are and is reflected in those cultures that value the pursuit of a better self through contemplation and prayer. The being orientation is about the expression of what is already in the human personality. E.g.: The Mexican fiesta is an expression of a being orientation.	very important ☐ important ☐ Not sure ☐ Not very important ☐ not important ☐	Comment (optional)
D03	**Affective (emotional) vs. Neutral cultures** *(Parsons, Trompenaars)*	describes the way how cultures express their emotions. E.g.: Affectivists believe that all relationships with others are human affairs and that people should express their feelings openly. Neutralists believe the nature of their relationships with others should be objective and detached, that emotions confuse the issues.	very important ☐ important ☐ Not sure ☐ Not very important ☐ not important ☐	Comment (optional)
D04	**Authority Conception** *(Victor, Condon & Yousef)*	describes the degree to which people favor an authoritarian, egalitarian, paternalistic, or participative management style.	very important ☐ important ☐ Not sure ☐ Not very important ☐ not important ☐	Comment (optional)

No	Dimension	Description	Importance for the field of user-interface design	
D05	**Context** *(Hall, Victor)*	refers to the amount and specificity of information in a given situation. A high context communication is one in which most of the meaning is in the context while very little is the transmitted message. A low context communication is similar to interacting with a computer –if the information is not explicitly stated; and the program followed religiously, the meaning is distorted.	very important ☐ important ☐ Not sure ☐ Not very important ☐ not important ☐	Comment (optional)
D06	**Degree of power** *(Wright)*	refers to the degree of strength or weakness of a country/culture in international comparison - perceived by other nations.	very important ☐ important ☐ Not sure ☐ Not very important ☐ not important ☐	Comment (optional)
D07	**Economic progress** *(Wright)*	refers to the degree of flexibility or rigidity of a country/culture regarding economic progress.	very important ☐ important ☐ Not sure ☐ Not very important ☐ not important ☐	Comment (optional)
D08	**Environment and technology** *(Victor)*	refers to the culture's attitude toward the use of technology for solving problems in the work environment. In control-oriented societies technology is seen as a positive good; the environment is meant to be mastered; mastery can be accomplished through technology. Subjugation-oriented cultures see technology as being neutral to negative; the environment controls society; it is impossible or undesirable to control the environment. Harmonization means that people are neither masters nor subjects of the environment, but are part of the environment; technology is a subset of the larger system of thought.	very important ☐ important ☐ Not sure ☐ Not very important ☐ not important ☐	Comment (optional)
D09	**Face-Saving** *(Victor)*	may be defined as the act of reserving one's prestige or outward dignity.	very important ☐ important ☐ Not sure ☐ Not very important ☐ not important ☐	Comment (optional)

No	Dimension	Description	Importance for the field of user-interface design	
D10	**Gender Roles, Masculinity vs. Femininity, Sex** *(Hofstede, Condon & Yousef)*	portrays the extent within cultures to which social gender roles are clearly distinct. E.g. In highly distinct (aka masculinity or assertiveness) cultures men are supposed to be assertive, tough, and focused on material success, whereas women are supposed to be more modest, tender, and concerned with the quality of life. Low or no distinction (aka femininity or modesty) pertains to societies in which social gender roles overlap. Both men and women are supposed to be modest, tender, and concerned with the quality of life.	very important ☐ / important ☐ / Not sure ☐ / Not very important ☐ / not important ☐	Comment (optional)
D11	**Human Nature Orientation** *(Kluckhohn & Strodtbeck, Adler)*	describes the way people can be seen: good, evil or a mixture of both. In addition they can be seen to be able to change or to be unable to change.	very important ☐ / important ☐ / Not sure ☐ / Not very important ☐ / not important ☐	Comment (optional)
D12	**Individualism vs. Collectivism (Communitarianism)** (*Hofstede, Trompenaars, Parsons, Kluckhohn & Strodtbeck, Adler, Condon & Yousef)*	refers to the role of the individual and group, and which interest prevails over the other. E.g. in individual-oriented countries everyone is expected to look after one's self or immediate family. Collectivism implies that people are integrated from birth into strong, cohesive groups that protect them in exchange for unquestioning loyalty.	very important ☐ / important ☐ / Not sure ☐ / Not very important ☐ / not important ☐	Comment (optional)
D13	**Instrumental-Expressive Orientation** *(Parsons)*	describes the way which goals people seek through their interaction with others. People from a culture where an instrumental orientation to interaction prevails tend to value relationships for what they can do for them rather than for the relationship itself. People from cultures where an expressive orientation prevails do not do this.	very important ☐ / important ☐ / Not sure ☐ / Not very important ☐ / not important ☐	Comment (optional)
D14	**Internal vs External control, Relationship to nature** *(Trompenaars, Kluckhohn & Strodtbeck, Adler)*	refers to the relations a culture has to nature. Externalist cultures view nature as a force more powerful than the individual, a force to be feared or emulated. Internalist societies see the major force in life, the origins of vice and virtue as residing within the individual.	very important ☐ / important ☐ / Not sure ☐ / Not very important ☐ / not important ☐	Comment (optional)

No	Dimension	Description	Importance for the field of user-interface design					
D15	**International trade and communication** *(Wright)*	refers to the rate of development in the field of trade and communication with other countries/cultures (isolation versus cooperation).	very important ☐	important ☐	Not sure ☐	Not very important ☐	not important ☐	Comment (optional)
D16	**Long-term (time) orientation vs. Short-term orientation** (*Hofstede)*	describes the way cultures think about time. E.g. LTO plays an important role in Asian countries that have been influenced by Confucian philosophy over many thousands of years. Long- and short-term countries seem to divide between East and West.	very important ☐	important ☐	Not sure ☐	Not very important ☐	not important ☐	Comment (optional)
D17	**Meaning of Life** *(Condon & Yousef)*	describes how a society perceives the goals of living: material goals - intellectual goals - spiritual goals.	very important ☐	important ☐	Not sure ☐	Not very important ☐	not important ☐	Comment (optional)
D18	**Nonverbal communication** *(Victor)*	describes what kind of nonverbal communication is important: kinesics (body movement and facial gestures); proxemics (distance); oculesics (eye movements and eye contact); haptics (touching behavior); paralanguage (tone of voice and nonlanguage sounds); and appearance (dress and grooming).	very important ☐	important ☐	Not sure ☐	Not very important ☐	not important ☐	Comment (optional)
D19	**Political decentralization** *(Wright)*	describes the degree of lethargy or energy a country/culture show towards political decentralization.	very important ☐	important ☐	Not sure ☐	Not very important ☐	not important ☐	Comment (optional)
D20	**Power distance** *(Hofstede)*	refers to the extent (high or low) to which less powerful members of institutions and organizations within a country expect and accept that power is distributed unequally.	very important ☐	important ☐	Not sure ☐	Not very important ☐	not important ☐	Comment (optional)

No	Dimension	Description	Importance for the field of user-interface design					
D21	**Property** *(Condon & Yousef)*	describes the way a society sees property: private - utilitarian - community.	very important ☐	important ☐	Not sure ☐	Not very important ☐	not important ☐	Comment (optional)
D22	**Resources** *(Wright)*	refers to the resources a country/culture owns (resource poverty versus abundance).	very important ☐	important ☐	Not sure ☐	Not very important ☐	not important ☐	Comment (optional)
D23	**Space** *(Hall, Adler)*	refers to the invisible boundary around an individual that is considered "personal" and the use of physical space within a society. E.g.: an office may be seen as a public space to be entered without permission, or it may be seen as a private space that cannot be entered without first obtaining permission	very important ☐	important ☐	Not sure ☐	Not very important ☐	not important ☐	Comment (optional)
D24	**Specific vs. Diffuse cultures** *(Trompenaars, Parsons)*	refers to the degree of how closely people get involved with one another. E.g.: Specifists believe relationships with others should be explicit, delineated and regulated as in a contract. Diffuse-oriented people emphasize the real and personal contact of the whole person in a relationship.	very important ☐	important ☐	Not sure ☐	Not very important ☐	not important ☐	Comment (optional)
D25	**Technological development** *(Wright)*	refers to the rate of technological development (advancement versus backwardness).	very important ☐	important ☐	Not sure ☐	Not very important ☐	not important ☐	Comment (optional)
D26	**Time orientation** *(Kluckhohn & Strodtbeck, Adler, Condon & Yousef)*	refers to the way cultures conform to time. Past Orientation implies a belief that everything that can occur has occurred before, and past patterns will be replicated. Understanding the principles and truths of the past can guide current and future experience. Present Orientation implies dominance of the mental state of the moment, perhaps because that is most real or one cannot depend on the future. Future Orientation implies expectancy of advancement, improvement or progression. It enables prediction, scheduling, planning, and changing forthcoming events.	very important ☐	important ☐	Not sure ☐	Not very important ☐	not important ☐	Comment (optional)

No	Dimension	Description	Importance for the field of user-interface design					
D27	**Time perception** *(Hall, Trompenaars, Victor)*	refers to the cultures response to time. Monochronic (sequentially) time is characterized by schedules, promptness and compartmentalization or isolation of activities. People tend to do one thing at a time. Staying on schedule is a must. In countries/cultures with polichronic (synchronically) time attention and plans are constantly shifted, and people do not adhere to appointment schedules as rigidly as in the monochronic time cultures. People usually do several things at a time. Time commitments are desirable rather than absolute. Plans are easily changed.	very important ☐	important ☐	Not sure ☐	Not very important ☐	not important ☐	Comment (optional)
D28	**Uncertainty avoidance** *(Hofstede)*	can be defined as the extent (high or low) to which the members of a culture feel threatened by uncertain or unknown situations. Cultures vary in their avoidance of uncertainty, creating different rituals and having different values regarding formality, punctuality, legal-religious-social requirements, and tolerance for ambiguity.	very important ☐	important ☐	Not sure ☐	Not very important ☐	not important ☐	Comment (optional)
D29	**Universalism vs. Particularism** *(Trompenaars, Parsons)*	describes the degree of adhering to agreed standards. Universalists believe that good and right are definite and always applicable. Particularists place more emphasis on the obligations and the unique circumstances.	very important ☐	important ☐	Not sure ☐	Not very important ☐	not important ☐	Comment (optional):

Room for more comments: