

CULTURAL ASPECTS AFFECTING USER INTERFACE DESIGN FOR VIRTUAL LEARNING COMMUNITIES

Abstract: Virtual Learning Communities become very popular in the global society, but their sustainability is a big problem. Teo et al. considered the role of extended Technical Acceptance Model in sustaining VLC [9]. This paper deals with user interface design process which have a big influence on information accessibility – one of the elements of extended TAM. There are two ways for fulfilling user requirements on user interface usability. First one lets the user adopt its interface according to individual requirements, but it seems to be expensive. Another attitude suggests dividing people into groups and designing user interface in accordance to their requirements. We present physical and cultural aspects that may influence interface design process with an impact put on miscellaneous parts of this process, by specified cultural aspects. The research is based on Socrates Minerva funded CAB project communities.

Keywords: user interface, culture, information accessibility, virtual learning communities

1. Introduction

Internet technologies enabled the development of distance learning and the creation of Virtual Learning Communities, but sustaining them becomes still problematic. According to Technology Acceptance Model adapted for VLC, the key role for their sustainability plays information accessibility [9], which can be achieved by designing the interface, that fits user's requirements. Brenda Laurel says that interface is the contact surface of the thing [6]. However in computer case, it can be treated as a place where user has contact with the software. This place should fulfil user's needs for communication with the computer. Projecting of this communication platform is called user interface designing art.

In Socrates Minerva funded Collaboration Across Borders (CAB) project there exist four different virtual communities, each of which assumed to be international. However sustainability of them depends mostly on pedagogic benefits and social aspects, the significance of information accessibility cannot be overestimated. In the paper we consider user interface elements and cultural dimensions that may have influence on usability of CAB portal <http://www.cabweb.net> and collaboration spaces.

People representing different cultures (countries) use user interface in different ways, they expect different graphical layouts, they have different expectations and patterns in behaviour. The user-interface designing process should take into consideration these needs and expectations .

The previous research mostly focused on adopting user interface to specified culture by investigating technical factors (appropriate currencies, measurement systems) and the translation (language, adapted terminology, idiomatic expressions). But for a thorough analysis of user-interface design, we will go further and will consider broader context of cultural aspects. We will start with describing main user interface elements then coming into investigations of dimensions of culture that may affect user interface design. We will finish with the directions for the future research concerning culture dimensions in information accessibility, particularly for CAB communities.

2. User interface elements

User interface consists of five elements: metaphors, mental model, navigation, interaction and appearance [1].

Metaphors are “short-cuts” [2] to get across complex tasks. In computer related context metaphors help users understand complex technical operations. This is achieved by finding analogy of processes coming out of everyday life in computer interface. The most well known example is a trash can metaphor derived from Apple interface which is used for deleting files and works like a real trash can. The user drag the file to the trash can and the file remains in the can until the user decides to empty the trash can. Second famous example for using metaphors in international context is the book metaphor: according to Western convention all books are opened to the left but in Arabic countries books have their spine on the right and that is why they are opened to the right.

Mental model is the concept people have in mind. According to McDaniel [8] all mental model comprises the same elements:

- 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.

The excellent example of a mental models in context of user-interface design are controls of a tape recorder (Fig.1).



Fig. 1 Controls of Windows Media Player™

Everybody has a mental model in mind, what the controls do. Above symbols user in a context of computer multimedia player can be very easily operated.

Navigation can be understood as the movement through the mental model [7]. The user-interface designers in order to facilitate navigation process introduce appropriate elements like menus, dialog boxes, control panels or toolboxes. The most classical user interface forming certain standard of navigation and described later interaction is the WIMP (windows, icons, menus, pointers) interface.

Interaction is any mean of communication between the user and the computer. It can be realized both in direct or indirect manner. Such an activity is always performed in order to accomplish something [3].

Appearance means how the product appears to the senses. It can appeal to human senses by means of visual, auditory or tactile characteristics. On this field of user interface design appropriate factors like: fonts, colors, styles, sounds and tactile perception must be considered.

3. Cultural aspects

The meaning of the term culture is very complicated. One of the definition says that culture is a set of shared attitudes, values, goals and practices [11]. However another author [4] adds that culture might also be affected by nationality, language, history and level of technical development. The categories to differentiate one culture from another are called dimensions of culture.

Many research was done in a field of cultural dimensions. However one of the most cited studies is the one by Greet Hofstede [5]. He did a survey at IBM dealing mainly with the employees. Based on this survey he presented five culture dimensions. Other scientists also did thorough studies what resulted with many other cultural dimensions. At the same time authors proved the existence of something like cultural patterns. Using these patterns, based on knowledge about cultural habits regarding communication, will facilitate the process of user interface design.

In the next part of the paper exemplary culture dimensions and the way of affecting user interface design would be presented.

Achievement and Ascription – This culture dimensions reflects the difference between what someone DOES and what someone IS. In interface designing this differentiation can be important when using titles, i.e. in ascriptive countries it would be probably the need of providing fields in forms for entering titles. These aspects affect mental model and interaction of the interface.

Activity orientation – This culture dimension reflect extent to which activity is valued within a culture. In interface design process it can play the role while metaphor designing, i.e. in doing-oriented cultures working metaphors with visible activities are rather preferred. These aspects affect metaphor and interaction of the interface.

Affective and Neutral – This culture dimension describes how cultures describe their emotions. Affective cultures think that people should express their feeling openly but natural cultures think that emotions confuse the issues. This aspect affects interaction with the interface and should be appropriately considered when designing.

Authority conception – This culture dimension reflects the conception of organisational power and leadership. Democratic societies think that they have rights to question authority when authoritarian countries do not have such concepts. This aspect affects strongly mental model but interaction and metaphor is influenced as well.

Context – This culture dimension refers to the amount and specificity of information in a given situation, i.e. in low-context societies things should be articulated clearly, while in high-context cultures the sense of information is mostly retrieved from the context. This factor affects all of the user interface elements.

Degree of power – This dimension refers to the degree of strength or weakness of the society in international comparison. This factor might affect metaphor and appearance aspects of the user interface however they can not be treated as central one.

Economic progress – refers to the degree of flexibility or rigidity of a country regarding economic progress. It may affect metaphor and mental model aspects.

Experience of technology – describes how the technology is perceived by the members of the culture. Control-oriented societies treat technology as a positive good while subjugation-oriented societies treat it neutrally or negatively. The importance of this dimension causes that it affect all user interface elements.

Face-saving – is defined as the act of reserving one's prestige or outward dignity. It can affect mental model and interaction.

Gender – refers to the social gender roles. Masculinity or femininity determines the role of genders in society. Women and men behave differently online and offline. That's why this factor may affect metaphor, mental model and appearance of the user interface.

Human nature orientation – describes the way people can be seen: good or evil and able to change or unable to change. These essential factors may affect as previously metaphor, mental model and appearance of the user interface.

Individualism and Collectivism – refers to the role of the individual and the group. As the user interface must be able to deal with various levels of individuality and anonymity these factors affect all interface elements but navigation.

Instrumental and Expressive orientation – describes the goals the people seek through the interaction with others. It may affect navigation and interaction process.

Internal and External control – describes the relationship a culture has to nature. External-oriented cultures try to harmonize with nature but internalist societies want to have control over the environment. This aspects may affect mental model and navigation in the interface.

International trade and Communication – describes the rate of development in the field of trade and communication with other countries. It ranges from isolation to cooperation. This dimension may have impact on the fields of collaboration and exchange and technological skills so it regards interaction in the user interface.

Long term and Short term orientation – Long term societies are oriented towards future rewards and short term cultures concentrate on virtues related to the past and present. This factor may affect mental model and interaction process so it may have impact i.e. on the visualisation of progress bars.

Meaning of life – reflects the feeling how a society perceives the goals of living. It comprises intellectual and spiritual goals to physical and material goals. Such factors may have impact on metaphor and appearance construction.

Nonverbal communication – this factor is realised on six major fields [10]: *kinesics* (body movement and facial gestures), *proxemics* (distance), *oculesics* (eye movement and eye contact), *haptics* (touching behaviour), *paralanguage* (tone of voice and non-language sounds), *appearance* (dress and grooming). These aspects may affect metaphor, interaction and appearance of the user interface.

Political decentralization – describes the degree of lethargy or energy a country shows towards political decentralization. This factor may affect metaphor and mental model of user interface.

Power distance – describes the nature of human relationship in terms of hierarchy. Impact of these factors may result in different structuring, error messages, open/restricted access and even the use of colors. It affects metaphor, mental model and interaction aspects of the user interface.

Property – describes the way a society sees the property. It ranges from private to community. This point of view may affect metaphor, mental model and way of interaction in societies.

Resources – describes attitude towards resources the country owns. People with inferiority complex like to be dependant on authorities. It affects mental model and appearance of the user interface.

Space – refers to the invisible boundary around the individual or personal space and the use of physical space in a society. It has influence on aspects like: sharing of workstations, providing personal information or interfaces in public space so it determines mental model and interaction of the user interface.

Specific and Diffuse attitude – measures how far people get involved with other's life space. Diffuse-oriented people emphasise personal contact of person in a relationship while specificists prefer sharp separating life from work. Such factors may affect fields of customer service and customers care but it belongs to the interaction aspect.

Technological development – describes the rate of technological development. It is scaled from advancement to backwardness. Such aspects may have influence on straightforwardness of solutions according to the saying that: "If people understand it they will use it". Such elements regard mental model, navigation and interaction aspects of the user interface.

Time orientation – refers to the way cultures conform the time. It ranges from past-oriented cultures to the focused on the future. It may reflect metaphors and navigation aspects and it is very important in a business applications or when providing historical or visional background.

Time perception – refers to the cultures response to time. Monochromatic people tend to do one thing at one time, act following schedules and separate activities. Polichronic people usually do several things at one time. Such aspects may affect precision of asked queries and how linearly material is presented. That is why these aspects affect navigation, interaction and appearance of the interface.

Uncertainty avoidance – describes the extent to which the members of a culture feel threatened by uncertain or unknown situations. Such factor should be taken into consideration while designing predictability and consistency of the application. That is why it affects navigation and interaction process in the user interface design.

Universalism and Particularism – refers to the degree of adhering standards. Universalists believe that rights should be always applicated while particularists put more emphasis on unique circumstances. For instance members of universalistic countries may prefer uniform arranged buttons while particularistic countries prefer specific style of interface assigned to each task.

Presented above cultural dimensions have wide influence on different aspects for the user interface designing.

4. Summary

Cultural dimensions analysis is a very important aspect of user interface designing process. The quality of the user interface localisation may affect readability and accessibility of the information. Cultural aspects, collected and described in this paper, help while forming users' profiles and help with assessing their attitude towards different user interface elements. Cultural dimensions give an answer which aspects of the interface play the main role in designing process and which of them could be neglected.

In case of virtual communities ease of use and intuitiveness of the interface may have influence on sustainability of these communities. That is why this paper is an ideal background for conducting future researches on interface localization for Polish citizens. Most of the software on Polish market come from the America. This software probably is developed with an American bias. When the software became a global product, designers have to make changes corresponding to specific cultural preferences. Such investigation have not been performed yet so it can be the ideal topic for the next article.

5. Bibliography

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Streszczenie: Proces globalizacji sprzyja tworzeniu wirtualnych społeczności, jednakże ich czas życia bywa wielokrotnie bardzo krótki. Problemami podtrzymywania i żywotności wirtualnych społeczności zajął się Teo (TAM model) [9]. Poniższy artykuł rozpatruje problem czynników wpływających na projektowanie interfejsu użytkownika, co może mieć znaczny wpływ na dostępność informacji dla wirtualnych społeczności. Istnieją dwa sposoby dostosowywania interfejsu do potrzeb użytkownika albo dostosowuje się go do indywidualnych potrzeb, co jest bardzo kosztowne, albo klasyfikuje się oczekiwania reprezentatywnych grup użytkowników i pod ich kątem dostosowuje się interfejs. W artykule zaprezentowano fizyczne i kulturowe aspekty, które mogą służyć jako profile oczekiwań użytkowników i wspomagać projektowanie interfejsu użytkownika. Badania są częścią projektu CAB – Socrates Minerva.