Anthropology of Accessibility. The Perceptual Problems of Human-Computer Interactions

Anna Maj and Michal Derda-Nowakowski

Abstract

One of the most important problems which appeared in the computer mediated civilisation is the usability of content for people with limited abilities of perception and interaction. Digital communication has shown all inconveniences of hitherto prevailing 'interfaces to knowledge' and of communication devices in the range of their usability and accessibility. Traditional ergonomics ensured comfort of using the devices mainly to users without disabilities. The Net revealed the existence of the vast global community of disabled people who wants to come out of the ghetto of their own disfunctions and participate in other communities. The Internet is often the only chance to cross the barriers of this specific exclusion.

The Web design should take into account the aspect of various disabilities of the users. There exist both formal and informal instructions of accessible design. In some milieux of designers of interfaces and internet applications and content managers publishing of content and materials which are accessible is even a sign of 'good manners'. Therefore, there is a grassroots discourse of accessibility, which is conditioned socially. It is often contradictory to the discourse of global corporations, embodying their own non-standardised solutions. The struggle of the 'able-bodied' community for the accessibility of the content for people with disfunctions of perception is a new form of global thinking about creation and maintenance of communication standards. It is often connected with the generation of open access to the content referring to Creative Commons licenses and technologies of Open Source.

The paper analyses some procedures of improving the effectiveness of communication and interaction with computer in the process of web designing. It shows some examples of community initiatives connected with accessibility and everyday problems of disabled people. Ideologists and designers of usability and accessibility within the range of human-computer interaction are precursors of this new way of thinking about the needs of online communities which are aiming at the 'noble simplicity' enabling to encode complicated symbolic content - simplexity. Usability understood in this way exceeds the limitations of political correctness with its compulsory necessity of double coding and decoding of meanings. Such anthropological situation may become a natural bridge between the world of those who can see and those who are blind or other communities with limited access to the content.

Key Words: Accessibility, usability, assistive technologies, design, simplexity, Human-Computer Interactions, perception disabilities, user-friendly interface, cultural competencies.

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Ideologists and designers of usability and accessibility within the range of human-computer interaction are precursors of the new way of thinking about the needs of online communities which are aiming at the 'noble simplicity' enabling to encode complicated symbolic content - simplexity. Usability understood in this way exceeds the limitations of political correctness with its compulsory necessity of double coding and decoding of meanings. Such anthropological situation may become a natural bridge between the world of those who can see and those who are blind or other communities with limited access to the content. The reflection on the roles of mechanisms of social content-generation and visualisations of communication obstacles, both on-line and off-line, is necessary. There are various artistic and scientific projects, which resulted in real changes of architectural solutions or development of their accessibility.

The change in accessibility in symbolic and mediated communication is also a chance for revolution in thinking about the physical space. Thus, the Net impacts not only the architecture of information but also the architecture in traditional meaning. This way of thinking about the Network, communities and the new ergonomics of communication is therefore a kind of introduction to the reflection on new society lacking communication obstacles and on further evolution of humans connected to the computer, active in social terms due to technological interfaces and independent of limitations stemming from biology or traditionally understood disfunctions.

> In both perceiving and visually representing the natural organisation of objects, we are supported by the mind's powerful ability to detect and form patterns. With matters of the visual mind, the school of Gestalt psychology is particularly relevant. Gestalt psychologists believe that there are a variety of mechanisms inside the brain that lend to pattern-forming. […] Humans are organisation animals. We can't help but to group and categorise what we see. […] The principles of Gestalt to seek the most appropriate conceptual 'fit' are important not only for survival, but lie at the very heart of the discipline of design.[1]

John Maeda, a new media artist, researcher and designer develops his narration about simplicity and design telling the story of development of iPod menu - its three phases: the first model of the interface (a jog dial with four buttons located circularly around), its complication into four buttons and a jog dial (separated) and simplification (integrated into one scroll dial). The last step - simplification led to its limits - provoked both the commercial success and marked new trends of interface design. It should be noticed here that this kind of simplicity contribute to economise maximally the activities of the user. Most often such a design is favourable for a contemporary user. However, this kind of usability is not so simple to use. Maeda shows the example of good quality design failure on the level of the user inability to use the device. He recalls his brother-in-law's lack of competencies in using the newest iPod just after getting it as a Christmas present. This situation can be regarded as a result of design which demands from the user the knowledge of the previous interfaces and the ability to manipulate them.

Human-Computer Interaction (HCI) is in fact a kind of cultural competence. Being one of the most important abilities in contemporary information society, paradoxically it is not taught anywhere; a user needs to acquire the knowledge by himself. There are no ideal interfaces - as we still need to 'learn machines' - but the good ones are stemming from the specific patterns of culture. Machines are learning these paradigms but also teach them to us, becoming the interpreters of humanity. This is the part of cyborgisation of culture, described as early as in 1964 by Marshall McLuhan in his classical idea of the extensions of man[2].

The fundamental problem arising in cyberculture in the context of human and machine interactions was symbolically captured by an anthropologist, Michael Wesch, in the title of his popular YouTube film: The *Machine is Us/ing Us*[3]. Therefore, the question of designing interfaces and devices regarding the users' needs and abilities is not marginal. The report of Pew Internet and American Life Project indicates that the presence of older generations in Internet is lower than the young (over half of Internet users is between 18 and 44 years old) - but within 10 years (with ageing boomers generation) the situation may change.

> The biggest increase in Internet use since 2005 can be seen in the 70-75 year-old age group. While just over one-fourth (26%) of 70-75 year olds were online in 2005, 45% of that age group is currently online. […] Instant messaging, social networking and blogging have gained ground as communications tools, but email remains the most popular online activity, particularly among older Internet users. Fully 74% of Internet users age 64 and older send and

receive email, making email the most popular online activity for this age group.[4]

The problem of cultural competencies in human-computer interactions is central to contemporary design, which needs to be the anthropology as well. Sometimes users' activity crosses the imagination of the designer. That was the case of Nasza-klasa.pl [Our-Class.pl] - Polish social networking website similar to Classmates - where a person who wanted to become a new user had to ask directly the website designers to broaden the age categories for potential users. The given categories were prepared for the users aged up to 90, whereas the asking person was 95 years old[5]. The two young designers did not predict in their economy of thinking about human-computer interaction that also this age group can perform such an activity as social networking. This situation lets us suggest that web design is mainly directed to young people, which seems to be logical regarding the Pew Internet research quoted above but possibly is not a good rule for the next decade. Thus, web design should develop in the direction of diversification of the potential users.

There are of course such interfaces as smart homes, which support the users, especially aged and with disabilities, but these are not only pure interfaces but also habitats. HCI design is de facto the problem of technological imagination concerning target groups. It depends on multiple functionalities built in the interface. The idea of usability of interfaces is at the moment one of the most significant matters within the ideology of 'proper design'.

Functionalities of interfaces and the necessity of usability are the ideas connected with anthropological problems of Web 2.0 design. In fact, the rules of HCI are a kind of web design savoir-vivre and cultural competencies. Designers in a form of ritualised competition watch each other in order to maintain the standards of usability and develop more user-friendly interfaces. From the anthropological perspective, we can see in this process both the patterns of culture drifting into the direction of political correctness and 'the battle for standards'. One of the main assumptions of design 2.0 is separation of content, appearance and user's behaviour. This separation makes websites more accessible to users and more visible for bots of search engines. These are issues located between creative thinking and social practices connected with technology standards. It is a vast territory for quality research on humans in cyberspace.

Usability was born in Bauhaus as a mental concept for modernist humankind. It shifted from habitat architecture to architecture of information. New media art searches for new opportunities to diagnose abilities of human body and mind in the context of machines. This basic assumption leads to the conclusion that a technology user is also a participant and this is a new

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perceptual paradigm. Creative process becomes an interaction design area where the needs of various social groups are transformed into artistic objects.

The prehistory of HCI can be traced back not only in engineering but also in artistic works of Nam June Paik, Bill Viola, Christa Sommerer, Laurent Mignonneau and others. The good example here is David Rokeby's work, *Very Nervous System*, which was described as adding new meaning to the term 'interactivity'.

> The active ingredient of the work is its interface. The interface is unusual because it is invisible and very diffuse, occupying a large volume of space, whereas most interfaces are focused and definite. Though diffuse, the interface is vital and strongly textured through time and space. The interface becomes a zone of experience, of multi-dimensional encounter. The language of encounter is initially unclear, but evolves as one explores and experiences. The installation is a complex but quick feedback loop. The feedback is not simply 'negative' or 'positive', inhibitory or reinforcing; the loop is subject to constant transformation as the elements, human and computer, change in response to each other. The two interpenetrate, until the notion of control is lost and the relationship becomes encounter and involvement. […] The installation could be described as a sort of instrument that you play with your body but that implies a level of control, which I am not particularly interested in. I am interested in creating a complex and resonant relationship between the interactor and the system.[6]

Very Nervous System is the interactive circuit, which may be seen as a beyond-language conversation of human and computer. It is very similar to contemporary systems, which enable controlling computer with the eye movement or body gestures without VR equipment. Various inventions concerning the use of brain waves to control interfaces, even 3D virtual environment of Second Life, have been developed for several years in multiple research centres (e.g. Keio University)[7]. Such technologies can serve Internet users with movement disabilities helping them to control computer and interact with other Internet users. But what is also important is the social networking of people with disabilities.

Antoni Abad, a Spanish artist, founded Zexe.net website. It is an artistic project connecting various groups of marginalised people from different cities, e.g. Gypsies, prostitutes, taxi drivers, etc. One part of the website, called *Canal Accessible, serves people with movement disabilities

who create their own wikimap of Barcelona where they mark all places in the city space which are not accessible for people on wheel chairs[8]. The users are documenting their work with photographs taken with mobile phone cameras.

In fact, this is not only the common map of physical obstacles in their daily life, but also a communication canal for discussions on various themes and a kind of exhibition area showing their problems to other Internet users. This work can be defined as a space for creating the discourse of marginalised groups. Such wikimap, being the user-generated content service, is not only the interface of HCI, but also of social symbolic relations helping to redefine the meaning of the real space.

HCI is connected strongly with researches on the perceptual apparatus and cognitive process. It results in the emergence of completely new ideas concerning possible ways of perceiving. New inventions and interfaces of totally new types have been created for people with sight or hearing impairment. Some of such interfaces are based on the idea of the replacement of senses. The vOICe is Peter Meijer's project stemming from the concept of seeing with ears. Device is a kind of a scanner mounted in spectacles, connected with headphones and completed by the software processing the optical signals and changing them into the soundscape. The volume represents the brightness of objects with continuos monitoring of the close environment[9].

Roberto Manduchi develops similar but still completely different project. His electronic cane is a kind of assistive technology device, which uses laser beam and spatial sensors. It finds obstacles in space, measures the distance, depth and size of objects and informs the user about it via the sound interface. The prototype tester, Lucia Florez, confirms the invention being intuitive and compares it to 'skin perception'[10]. Both inventions are based on sensory substitution but perform it differently. It should be noticed here that the ideas are simple but to reach this simplicity the technology needs to be complex. Therefore, the design for people with visual impairments needs to blend both, complexity and simplicity - the previously mentioned simplexity.

Concluding, the result of the process of interfaces design for people without disabilities is augmented perception, even if we think only about the level of symbolic communication and the extensions of body and mind. But the final effect of designing interfaces for people with disabilities is first and foremost the process of reducing perceptual deficiency and sensory substitution. This can be regarded as a process parallel to media convergence - sensorial convergence. Derrick de Kerckhove, rethinking Marshall McLuhan, concludes:

> There is clearly more to design than containment and seduction. In a very large sense, design plays a

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> metaphorical role, translating functional benefits into sensory and cognitive modalities. Design finds its shape and its place as a kind of overtone, as an echo of technology. Design often echoes the specific character of technology and corresponds to its basic pulse. Being the visible, audible or textural outer shape of cultural artifacts, design emerges as what can be called the "skin of culture".[11]

The contemporary 'skin of culture' seems to be hybrid: design means at the same time screenology, projecting interactions and augmenting perception. The design, which Derrick de Kerckhove was writing about in middle 90's, was concentrated on the shape and appearance of things and objects. Today, design is mainly projecting a user's experience, behaviours and feelings. It is closer to body and mind, develops cognitive processes and, in fact, programs a new user. Thus, it can be called the 'skin of a user' - which is taking us back to Marshall McLuhan thought[12], but in the completely new cultural context.

Notes

[1] J. Maeda, *The Laws of Simplicity. Design, Technology, Business, Life*, MIT, Massachusetts, 2006, p. 17-18.

[2] M. McLuhan, *Understanding Media. The Extensions of Man*, Ark Paperbacks, London-New York, 1987.

[3] Michael Wesch's personal website, [viewed on 3rd November 2008]. URL: <http://www.ksu.edu/sasw/anthro/wesch.htm>. M. Wesch: 'The Machine is US/ing US' in YouTube, [viewed on 3rd November 2008]. URL: <http://www.youtube.com/watch?v=6gmP4nk0EOE>.

[4] S. Jones, S. Fox, 'Generations Online in 2009', Pew Internet Project Data Memo [report], Pew Internet and American Life Project, 28th January 2009 [viewed on 13th February 2009], p. 2-3, URL: <http://www.pewinternet.org/Reports/2009/Generations-Online-in-2009.aspx?r=1>.

[5] P. Lipiński, 'Milioner z Naszej Klasy'. [A Millioner from Our Class]. Interview with Maciej Popowicz, the creator of Nasza-Klasa website. *Duży Format. Dodatek do Gazety Wyborczej* [online]. 20th May 2008, URL: <http://wyborcza.pl/1,75480,5222854,Milioner_z_Naszej_Klasy.html>.

[6] D. Rokeby, 'Installations: Very Nervous System (1986-1990)' *in David Rokeby website*, 12 November 2000 [viewed on 14th February 2009], URL: <http://homepage.mac.com/davidrokeby/vns.html>.

[7] 'Using Brainwaves To Chat And Stroll Through Second Life: World's First', in *Science Daily*, 16th June 2008 [viewed 14th February 2009], URL: <http://www.sciencedaily.com/releases/2008/06/080613163213.htm>.

[8] Canal *Accessible, URL: <http://www.zexe.net/BARCELONA>.

[9] Vision Technology for the Totally Blind [project website], 7th February 2009 [viewed on 14th February 2009], URL: <http://www.seeingwithsound.com>.

[10] A. Coombs, 'Researchers engineering better technologies for the blind' in *San Francisco Chronicle* [online], 27th November 2005 [viewed on 14th February 2009], URL: <http://www.sfgate.com/cgi-bin/article.cgi?f=/c/a/2005/11/27/ING3TFS91M1.DTL>.

[11] D. de Kerckhove, *The Skin of Culture: Investigating the New Electronic Reality*, Ch. Dewdney (ed.), Somerville House Publishing, Toronto, 1995, p. 154.

[12] McLuhan, op. cit., p. 47.

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Anna Maj, Ph.D., is an assistant professor in the Institute of Cultural Studies, University of Silesia, Katowice, Poland. While interested in media anthropology and theory of perception, currently her research and writing is devoted to the issues of travel and mobility in the context of new technologies.

Michal Derda-Nowakowski, Ph.D., is currently an independent researcher, founder and editor-in-chief of ExMachina Academic Press. While interested in web anthropology, design and typography, currently his research and writing is devoted to the issues of HCI and perception.