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RELATIONSHIPS BETWEEN DESIGNER, USER AND PRODUCT

Everyday we are surrounded by large amount of manufactured items, intended to make our lives easier and more pleasant. Everyday we failure by using them being very frustrated and stressful. Does it blame users or is it caused by bad, poor design of products?

Introduction

Business and industry have learned that their products ought to be aesthetically pleasing and many designers help to improve only the appearance. But nice-looking appearance is only one value of a well designed item. Usability and understandability are important as well. ⁽¹⁾ Usable and aesthetic design should go hand in hand, because using not easily understandable products results in frequent errors and frustration. The same technology that simplifies our life by providing more functions in devices also complicates life by making those same devices harder to learn and harder to use. The problem is, that whether it be simple phone or personal computer, technology is easy part to change. The difficult aspects are social, organizational and cultural.

At the end of 20th century, marked as 'information revolution', the level of technology advanced and forced the development of many new devices, based on electronic structure, not only electro-mechanical. The amount of various electronic devices, used by people everyday, rapidly increased. These products invented many new functions and features, but on the other side, forced the level of complexity up. Things were poorly structured, too complex and very difficult to understand and to use. But the customers kept buying – in part because they were trapped by the technology mania, and because they were forced to. Today's level of technology is much more sophisticated, the development is very fast. Most of the currently used items are computerized, based on digital technology. But the same problems survived.

The special part of products, necessary for efficient improvement of used technology, is

interactive interface, usually referred to as 'user interface'. Even interfaces cause many problems concerning bad structure and difficult usability and understandability. It seems, that finding effectively designed solutions to these problems might be the major task. But the most important question is, who is responsible for solutions to these future tasks? Industrial designers, communication designers or software ergonomists? ⁽²⁾

User interface

The term 'user interface' is interpreted in different ways. Simply, interface enables tool use. Interface allows the user to manipulate a system to get desired results, to accomplish a goal, usually through a set of tasks. The basic assumption is communication. ⁽³⁾ Interface communication is important in two primary aspects: what you can do with system (equipment) and feedback from system (equipment) and these two also constitute another important assumption, which is interaction. Generally we talk about "interactive communication". In the world of computer-based items, we use the term human-computer interaction (HCI). There is a basic assortment of user interfaces, depending on their form and usage. We recognize the simple terms user interface (UI), graphic user interface (GUI), solid user interface (SUI), voice user interface (VUI) etc. Today's interfaces are being transformed into graphic, software interfaces, using a display screen. Many physical features have become obsolete, while the system of controls considered as solid user interface keeps material. At present, practically all objects are becoming multimedia oriented and the trend is towards attempting to unify all media. The branches of communications, interpersonal (cell phones, handhelds etc.) as well as on mass scale (broadcasting, signage, information systems etc.), and that of control devices (medical devices, transportation etc.), are the area where multimedia is spreading most intensely. Using contemporary digital technology it is possible to translate all types

of messages. Designers are interested in the creation of the physical objects (industrial) and in the design of interface (visual), understood as the assembly of texts, drawings, graphics and commands through which the user interacts with the computer present in the object. But this purpose has only been achieved with the development of the computer. Simply, a good design of user interface is going to take more and more importance, it's necessary to define 'user interface' as a system of both, industrial and visual parts, and to resolve the conceived problems.

Humanizing of non-human

The technology of the last decades has dominated our lives, requiring many hours of our attention. Now it is time for technology to be quieter, calmer and less visible. Especially computer technology is starting to become an enabling infrastructure, invisible, out of sight and out of mind, but even more powerful and useful. ⁽⁴⁾ Information technology dematerialises a large part of what it touches and it consumes little material and little energy. Franco Maria Rao, designer for Gruppo space Planners notes, that in rapidly communicating information of an operational nature and of a commercial/cultural and advertising nature, the task is to "clothe" the hardware. ⁽⁵⁾ Another point is to advocate so-called "user-centered design" instead of "object-centered design", which has been much more preferred up to this time. The philosophy of user-centered design is based on the needs and interests of the user, with an emphasis on making the product usable and understandable. This philosophy is known more by popular term "user-friendly". It means that the object must be designed in accordance with the needs of users of different ages and their different experiences. Generally, at present, this approach leads to humanizing the world around us, humanizing the technology. It is applicable for all kinds of products, and it also plays a major role in designing of user interfaces. Raymond Pirouz wrote, that "user interface design is a term used to describe the act of creating a way for people to easily and seamlessly interact with complex objects or technology and it is basically the humanization of non-human. Its roots reach deep in computer science,

industrial design, psychology, ergonomics, audio-visual design, animation and graphic design." ⁽⁶⁾ He writes, "the challenge in interface design is to enhance usability while maintaining a balance between communication, visual design and technology".

User-centered design

User-centered design should make use of the natural properties of people and the world, it should exploit natural relationships and natural constraints. Thus, the appropriate design process must follow several basic principles. These principles constitute a form of psychology – the psychology of how people interact with things. ⁽⁷⁾

Generally, this interaction is affected and determined by some basic factors.

Design can appear an appropriate action with the object through a set of signals. One set comes through the natural **constraints** of the object that limit what can be done. The basic classifications of these natural constraints are physical, semantic, cultural and logical. These four are apparently universal, appearing in a variety of situations and sufficient. Cultural constraints are learned conventions shared by a cultural group. Semantic constraints rely upon the meaning of the situation to control the set of possible actions, upon our knowledge of the situation and of the world. Logical constraints use reasoning to determine the alternatives. Physical limitations constrain possible operation. The next major dimension affecting that interaction are **affordances**. There are two: real and perceived. The designers care more about what actions the user perceives to be possible than what is truly available to them. Moreover, they play very different roles in physical products than they do in screen-based products, such as graphic user interface. Real affordances are closely related to physical constraints. Although affordances are important, they play only a minor role, cultural conventions are much more important.

Another aspect is natural **mappings**.

Mapping is a technical term meaning the relationship between two things, in this case between the control and its function. It takes advantage of physical analogies and cultural standards and leads to immediate understanding. Some natural mappings are

cultural or biological, others follow from the principles of perception.

For knowing what to do there are other relevant principles, too, especially **visibility** and **feedback**.

The principle of visibility is violated in everyday things. In many designs crucial parts are hidden away and it causes many problems. In this case it is necessary to make things visible on the execution side of an action so that people know what is possible and how actions should be done. Also it is important to make things visible on the evaluation side so that people can tell the effects of their actions. The term feedback means sending back to the user information about what action has actually been done, what result has been accomplished. It is known concept in the science of control and information theory. In design it means to give each action an immediate and obvious effect. These concepts are really important even in design of interfaces, nothing succeeds like visual feedback, which in turn requires a good visual display.

In encountering basic principles of designing for people is essential to make an accurate **conceptual model**. It constitutes three different aspects of mental models: the design model, the user's model and the system image. The designer must develop an explicit, perceivable conceptual model that is appropriate for the user, that captures the important parts of the operation of the device, and that is understandable by the user. This is very important, because affordances and constraints specify the range of possible activities, but affordances are of little use if they are not visible to the users.

User profiling

In accordance to user-centered design, the general fundamental principle is "Know who your user is". It means that the primary goal is to discover human everyday behaviour and thought processes. It must be considered from several points of view: sociology, psychology and ergonomics. A design that is good for technically skilled user might not be good for ordinary people without skills such as businessmen, artists etc. In this case the designer should know what the user's goals, skills or experiences and needs are.

It's necessary to consider age, sex, knowledge, skills, interests, customs, purposes and many more. Very important is a list of user dichotomies, such a skilled vs. unskilled, young vs. old etc.

A psychological point of view seems to be most important in case of designing user interface according to interaction between human and things. There are some basic ways, to investigate it. When a user encounters a new object, information how to operate it can come in two ways. One is to use something similar to what was done in the past and transfer old knowledge to the new object or to obtain instructions. Another approach is to use information in the world, particularly if the design of the object has presented us with information that can be interpreted. These two concepts of perception are called 'knowledge in the head' and 'knowledge in the world'.

Another way of discovering human-things interaction comes from knowledge of human erroneous behaviour. "To err is human". People do errors routinely, but the incidence of them and their effects can be minimized with proper design. Errors come in several forms. Two basic categories, in general, are slips and mistakes. Slips result from automatic behaviour with roots in subconscious actions. Mistakes result from conscious deliberation. Contemporary psychology recognizes some basic assortment of slips and mistakes with specific properties. Basically, human thought is based on conscious and subconscious. Both conscious and subconscious thoughts are powerful and essential aspects of human life, but both are subject to errors, misconception and failures. Often people tend to rely upon remembered experiences rather than on systematic analysis.

Ergonomic aspects are very important in the design of a system of controls, classified as solid user interface. They are physical objects and they take place also in the development of screen-based interfaces, especially in the case of visual activity. It plays a special role in the design of so-called wearable interfaces, that are designed to wear and use the human-body /for example: backpack PC, HMD-head mounted display, wireless communications hardware and input devices: touchpad, chording keyboard, necklace communicator, identifier, eyegear monitor etc./

My approach

The basic purpose of my project is to discover all traced principles of user-centered design of user interface. It will consist of several parts:

1., Theoretical part

The core of this part of my work will be presenting all general principles of user-centered design theory, a short history of a user interface evolution, basic assortment according to general properties and usage, current trends, possibilities, frequent problems and some analysis of several different interfaces. I will discuss it from several points of view and respect all necessary aspects such as functional, semantical, ergonomical, aesthetic as well as psychological, sociological and, of course, cultural. It is important to consider the fact, that a user interface can constitute very original identity of a product too. I want to pay a special attention to describe general terms of interface theory: communication and interaction.

2., Practical part

In this part of project I want to outline possible solutions of designing user interfaces. I will design specified user interface for specified device following all theoretical principles. It will include solution of an interactive environment as graphic, screen interface in association with solution of a solid interface as system of controls. All results of the project will be published in a digital format on my own Internet domain UID /user interface design – www.uid.sk/ as well as in printed paper version with CD-ROM. The printed version should include all relevant information, resources from research and development and appendices, the CD-ROM will present the final functional interactive interface too.

In fact, design of user interface in its complexity comprises huge amount of problems from psychology, ergonomics, sociology, information technology to industrial design, graphic design and design of visual communication. Thus, motivation of this work is to provide mainly information, allow a better survey and contribute to a better development in our conditions.

Conclusion.

It seems, that digital, computerised everyday things will affect our daily life more and more. It's up to us, designers, to evolve a principle of humanization for all things around us, especially those based on digital information technology. I hope, that my solutions of this problem, intended in my dissertation work, will help to make those things pleasant, but also much more usable and understandable.

NOTES AND REFERENCES:

(1) Peter Blake replaced the popular slogan of functionalistic theory "Form Follows Function" by term "Form Follows Fiasco" in his book *Form follows fiasco: Why modern architecture hasn't worked*. Boston: Little, Brown; 1977" and suggested similarity of those kind of problems in architecture

(2) Lango, Clemens: *Interaction Structures as a Challenge to Designers*. FormDiskurs 61/1999

(3) Merholz, Peter: *What Makes an Interface Communicate?* www.peterme.com, 2000

(4) Norman, Donald A.: *The Invisible Computer*. Cambridge, MA: MIT Press, 1998

A good example of this approach is the new version of the popular personal computer Apple iMac, where the concept of humanization of technology is apparently followed both in design of physical product (computer – industrial design), and in design of visual environment of operational system (software – interface design).

www.apple.com/imac

(5) Martegani, Paolo; Montenegro Riccardo: *Digital Design: New Frontiers For the Objects*. Basel, Birkhäuser, 2000

(6) Pirouz, Raymond: *Click Here*. Web Communication Design. Indianapolis. New riders publishing, 1997 p. 67

(7) Norman, Donald A: *Design of Everyday Things*. New York: Doubleday, 1990

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