How cognitive ergonomics can deal with the problem of persuasive interfaces: Is a criteria-based approach possible?

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ABSTRACT

Today the user experience covers areas such as usability, satisfaction and accessibility which are known as critical factors for success of user interfaces. However, studies about persuasion, relying on credibility of the product for instance, are less recognized. Our goal is to promote the introduction of persuasive methods in software elaboration through psychosocial theory, especially in the Business Intelligence area. Currently, we are proposing a criteria grid measuring persuasive dimensions in interfaces; this grid is being validated.

Keywords

User experience, persuasion, credibility, criteria grid

1. INTRODUCTION

Have you ever received spam in your email box that tried to sell a product or a service that you do not want? Maybe you have subscribed to an RSS feed and then regretted your decision after? Wouldn't you want to have data that would help you convince your colleagues to take the decision you find the best? As you can see, persuasion is beginning to invade our technical systems, particularly in the area of social networks. Evidently, new problems are appearing in the field of computer ergonomics. It takes into account social dimensions and put user at the center of the man-machine relationship. Some authors have developed the concept of persuasive technology to emphasize HCI influence on social conduct.

The aim of our communication is to discuss the concept of technological persuasion, to note how useful it could be during the software evaluation or conception phases and to insist on the importance of ethics in this field.

As a first step, we will define the contours of the theoretical persuasion technology. We will then propose a framework for the analysis of persuasive evidence as a tool for the design of interfaces, while discussing the ethical problems. Finally, we will conclude by referring to the prospects for validation of our proposed grid.

2. THEORETICAL POINT OF VIEW

The first work using the persuasive power of technology took place in the 1970s and 1980s. It was about promoting behaviors related to health or to the improvement of the employees' productivity. But the evolution of persuasive methods really started in the 1990s with the emergence of the Internet. At the moment, web sites are the favorite media for trying to change the attitude and behavior by its rich interactive possibilities. The main contributor in this discipline is Fogg [1] who proposes to create a science named Captology. This word is based on the acronym "Computer As Persuasive Technology". The notion of captology has existed for several years (the 4th International Conference on Persuasive Technology will take place in 2009) and states a focus on behavioral change resulting from human computer interaction.

2.1 Definitions

We will define the persuasive technology and then present the framework for the analysis of persuasive elements. According to us, persuasive technology can therefore be seen as a vehicle to influence and persuade people through HCI.

Fogg believes that persuasion technology works as both (a) a tool since the technology can help individuals achieve their objective, (b) as a media interaction which creates an experience between the user and technology and (c) as a social actor. The social characteristic deals with properties to use strategies of social influence.

Our definition presents persuasion technology as an action to influence and persuade people through HCI. The impact of persuasion technology affects the fields of social work, psychology and ethics and obviously the social organization. Indeed, the technology becomes persuasive when people give it qualities and properties that may increase its legitimacy, reliability and perceived credibility. Persuasion technology is characterized by the fact that the intention of changing the attitude and behavior is subtle, hidden and sometimes pernicious. Persuasion technology is at the crossroads between ergonomics, social psychology, organizational management and of course the design of GUI.

2.2 Forms of Persuasion

Fogg [1] distinguishes between the macro and micro-persuasion. Macro-persuasion represents products whose main intent is to persuade. E-commerce websites clearly belong to this category since their main objective is to change the purchasing behavior of visitors [2]. The preventive health programs that seek to modify dietary behavior or sexual behavior also reside under this level of persuasion. Their goal is to improve the lifestyle of the people using them. The micro-level concerns all products whose primary purpose is not to persuade but which are using methods of persuasion in order to satisfy a different objective. For instance, edutainment software is designed to teach educational information to children. To do so, elements of micro-persuasion are used such as the reward

system or messages of encouragement to increase the child's motivation to continue to play and learn.

2.3 Fields and Areas

Persuasion technology affects many areas. Technology development also initiates a diversification of applications. The rise of e-commerce websites in recent years is propitious to the use of persuasive methods, both in the field of design and ergonomics, trying to change purchasing behavior. It explains why marketing is a beacon of persuasion technology. eBay is a good example of persuasive technology. Indeed, stars to assess the seller reliability are a confidence index and tend to alter the intentions and therefore the purchasing behavior of visitors. A major new field of research concerns the field of health, both in the prevention of risk, monitoring of disease and the promotion of sport. For example in New Zealand, a video game group has been created [3] as an aid to stop smoking. The game is aimed at the Maori population and is based on elements of the collectivist culture to change or prevent smoking behavior of young Maori.

Finally, whether in education, health, consumption, entertainment and especially work, all areas are affected by persuasion technology. It is therefore important to develop ergonomic practices.

3. PROPOSED CRITERIA

The ergonomic computer has often produced grids used in the measurement of the ergonomic quality of goods and services [4, 5]. In this perspective, we seek to establish a grid to focus on the persuasive dimensions of interfaces and their effects; a grid that is robust, reliable, useful, relevant and easy to use for ergonomists.

3.1 Organizational Principles of the Criteria

Our proposal is based on a bibliographic analysis and draws up a grid that distinguishes forms and processes of social influence, respectively the static and dynamic aspects of the interface.

Table 1. General Articulation of the Criteria

Static Aspects of the Interface	1. Credibility of the interaction 2. Legitimacy of the system act 3. Guarantee of privacy 4. Suggestibility 5. Responsiveness 6. Social conformity 7. Displaying format that may reinforce behaviors
Dynamic Aspects of the Interface	8. Invitation 9. Priming, Initiation of the users 10. Commitment 11. Freely accepted compliance 12. Ascendency and possibility of addiction

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3.2 Static Aspects of the Interface

In interfaces, some prerequisites are necessary to promote the acceptance of an engaging process. These criteria are based on the content of technological influence.

3.2.1 Credibility of the Interaction

Definition: Giving enough information to the user allows him to identify the source of information to be reliable, expert and trustworthy.

Justification: Credibility affects use and is seen as a form of loyalty. Credibility is the combination of the perceived reliability and perceived expertise of the product [1]

Example: Presenting updated information and the date of the update.

3.2.2 Legitimacy of the System Act

Definition: Reassure the user by justifying the influence of interface elements and increasing the stability and understanding of the interaction goals.

Justification: If the user sees the interface as legitimate, it will be easier for him to accept its influence [6].

Example: Famous brand could be perceived as a moral strength.

3.2.3 Guarantee of Privacy

Definition: Do not persuade the user to do something that publicly exposes his private life and which he would not consent to do.

Justification: Privacy is an important point about ethics. Respect for human rights must be respected by persuasive technologies [7].

Example: Private question about religion or politics orientation must be avoided.

3.2.4 Suggestibility

Definition: Present indirect and non-intrusive elements with incentives.

Justification: The suggestibility is to introduce into the mind of the user some elements that could affect them later [8].

Example: Interface elements that induce incentives to perform an action.

3.2.5 Responsiveness

Definition: Adapt the form of persuasion to the user to make it more likely that the user will respond in a desired way.

Justification: Acting on a willingness to accept is a predictor of the internalization of the persuasive message [9]

Example: Recognize the user and welcome him by his name.

3.2.6 Social Conformity

Definition: Social conformity provides information about other users in order to converge the views and behavior of the user.

Justification: It reflects a need for accuracy and confirmation of individuals. People tend to act in the same way as a person to whom they look similar [10].

Example: Emphasize the social bonds of trust to strengthen the adherence of the user

3.2.7 Displaying a Format that may Reinforce Behavior

Definition: Strengthening surface design and the presentation of persuasive interactive elements, while taking into account the perceptual and cognitive characteristics of the user. Prompt the user to do what is expected of him.

Justification: Enhancing surface is related to the persuasive design. Controlling the physical elements of the interface and maximizing the visual impact can cause membership and create or reinforce a behavior [11].

Example: The choice of colors as a reinforcement of the message.

3.3 Dynamic aspects of the interface

Regarding dynamics, there is also a means to bring the user in a process of interaction to strengthen the progressive engagement of the user to the elements of its interface.

3.3.1 Invitation

Definition: To identify the profile of the user information in order first to suggest a personalized approach and more likely to correspond to its needs.

Justification: Using the information given by the user allows for elements of hook and plan a sequence of engagement [12].

Example: Display a welcoming message.

3.3.2 Priming, Initiation of the Users

Definition: Triggering the first boot-engaging action of the user by creating a point of entry, stirring interest.

Justification: In social psychology, the notion of commitment [13] is initiated by a first act which is inexpensive and is consented to be done.

Example: A free way to subscribe to an offer.

3.3.3 Commitment

Definition: Continue commitment to involve the individual through a process of accession to the objectives of the GUI.

Justification: Having accepted an inexpensive first step, it will be easier to accept the following steps each time increasing the persuasive force [14].

Example: Improve the frequency of the final behavior or attitude expected.

3.3.4 Freely Accepted Compliance

Definition: Expanding spiral binding sequences increases their frequency and impact force. Maintain interaction and capture the user.

Justification: By segmenting the persuasive message, we follow the thinking of the user. Tunneling is how to assist the user during the process of persuasion [1].

Example: Continue to catch his attention by frequent solicitation.

3.3.5 Ascendency and Possibility of Addiction

Definition: Show engaging scenario completion, follow up its influence and control its evolution over time.

Justification: The last step is the culmination of the process leading to behavior and attitude initially expected. We can then speak of voluntary submission [14].

Example: The individual accepts information that he would not have accepted voluntarily.

4. DISCUSSION

4.1 Ethical Preoccupation

Our grid is under development. Validation results are in progress. Also, even without discussing its quality, its limitations and its interest in ergonomic practice, we want to discuss some points related to these issues in contemporary ergonomics.

Persuasion technology plans to change attitude and behavior, which naturally raises questions of individual freedom. It is a fascinating topic, but persuasion is not without mentioning acts of proselytism or propaganda in history, affecting among others the field of religion and politics. The technology itself, as a tool that can influence the masses, makes reference to some fears of manipulation embedded in the collective unconscious. Persuasion technology, like any persuasive method, is not unethical but depends in fact on its manner and use. Important work is being conducted among the young population, in terms of education or preventive health through persuasive games. But young people can also be vulnerable to a sample that would make it easy to steal personal information. The question of the ethics of interaction must be asked.

4.2 Rules

To address these problems, 7 ethical principles of persuasive design have been proposed [16]:

- The results of persuasive technology should never be considered unethical, if persuasion was undertaken without the technology or if the result would have occurred regardless of persuasion.

- The motivations behind the creation of a persuasive technology must remain ethical even if it is to lead to a more traditional persuasion (i.e. not mediated by technology)

- The creator of a persuasive technology should consider all sides and take responsibility for all results reasonably in its foreseeable use.

- The creator of a persuasive technology should ensure that it considers the privacy of users, with at least as much respect as if it were their own privacy.

- A technological persuasion that relays personal information about a user to a third party must be subject to scrutiny with regard to personal information.

- The creators of a persuasive technology should disclose their motivations, methods and expected results, unless such disclosure would seriously undermine another objective ethics.

- Persuasion technology does not deceive in order to achieve a final persuasion not avowed or undeclared.

In addition to these 7 rules, there is the golden rule of persuasion: "The creators of a persuasive technology should never seek to persuade one or more persons to do something they would not consent themselves to be persuaded to do."

5. CONCLUSION

This communication allows us to explain 12 criteria divided into 2 dimensions - static and dynamic aspects of the interface - seeking to improve the performance evaluation of persuasive elements in interfaces. These criteria can also serve as guidelines or rules guiding the choice of design. This research also focuses on the social behavior of interaction with technology, the hidden dimension in nature. Moreover, classically inspect ergonomics software is judging one's ability to be effective, efficient, error tolerant, easy to learn and satisfying for its users [17]; persuasion is generally outside the scope of the inspection. However, the intrusive aspects, ethical handling of certain domestic or professional interactions cannot remain outside the ergonomic analysis, particularly as these factors affect the attitudes of users to technology. By applying knowledge about how humans work on the psychosocial level, our inspection schedule is therefore based on a normative approach of what is and what is not a persuasive technology related to a product. It presupposes the existence of a relatively generic model of the human. However, the diversity of users and situations of use belies this narrow conception of human. For this reason, the performance of inspection techniques may be minimal. In any event, they should be supplemented by other evaluation methods. Therefore, the validation phase of this grid is to be achieved.

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