HOW THE USE OF PERSUASIVE CRITERIA CAN ENHANCE THE RESPONSE RATE OF A BUSINESS WEB SURVEY: ONE EMPIRICAL VALIDATION OF THE EIGHT PERSUASIVE INTERACTION CRITERIA.

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ABSTRACT

Web surveys are a common tool for the assessment of business aspects or employee expectations. It is a popular means of obtaining data on large populations. This paper analyses a persuasive process to improve response rate. We investigated a new approach using a criteria grid to increase the user commitment to answer to a web survey. This grid is based on works done on captology (Computer As Persuasive TechnOLOGY). In the first part, we present a tool for assessing and designing a powerful interface. This tool takes the form of a guideline structuring persuasive criteria that we define (credibility, privacy, personalization, attractiveness, solicitation, initiation, commitment, ascendency). In the second part, we present the context of our case study, which consists of a web survey administrated to each employees of a software company. More specifically, a systematic survey from the Work Council was conducted two consecutive years. In 2010, the web survey met our criteria of persuasion, whereas in 2009 the survey was made without particular persuasive attention. Comparing the rates of these two years, our results show that the user interface improvements' are leading indicators of employees attitude change. The response rate was 41% (2010, with persuasive criteria) versus 25% (2009, without attention of persuasive criteria). The paper concludes by identifying the perceived business benefits and limitation involved with the use of persuasive criteria.

Keyword: Persuasive interaction criteria, Web survey, Persuasion guidelines, Ergonomics criteria for persuasive technology.

INTRODUCTION

Doing business means influencing others! It is the same on the Internet, where website designers seek to influence users. Software developers often want users who will meet their expectations, buy their products, play their games or respond their online survey. On this last perspective, companies are faced with the problem of how to influence their employees.

Mail surveys are becoming a popular means of obtaining data and information on a large population of subjects with a low cost of administration (Roster, Rogers, Albaum & Klein, 2004). Previous researches have shown different strategies to maximize response rate (Dillman & Sangster, 1991). Some elements already appear about personalization, multiple send, and reminder. Offering incentive rewards or gifts shown to improve results (Goritz, 2006). Web is an emerging mode for launching surveys, because it is a more desirable mode of communication. It is more frequently used in such fields as commercial, government, academic research and business. Previous studies have found little difference with mail administration (Reddy, Fleming, Howells, Rabenhorst, Casselman, & Rosenbaum, 2006) (Rosenbaum, Rabenhorst, Reddy, Fleming, & Howells, 2006).

With email delivery, surveys are easier to launch and faster to analyze: it also guarantees a good level of privacy as it retains user anonymity (Tourangeau & Yan, 2007). Surveys, web or traditional, always encounter many challenges as nonresponsive errors (Couper, 2000). What is important is to determine a future behavior that requires information on user psychological factors as perceptions and attitudes concerning survey responses (Wijnen, Vermeir, & Kenhove, 2007). Catch the attention of potential participants so that they click on the survey link is difficult. The aim of this paper is to provide, discuss and test a model about persuasive technologies – based on a persuasive criteria guideline- that could bring a satisfactory effect in web survey participation intention.

This paper is organized in four sections. In section 2, we review a theoretical background about persuasive interfaces and a tool to evaluate and to design persuasive experiences. In section 3, we present a methodology that we applied and the results of data analysis. In section 4, we conclude with theoretical and practical findings, limitations and recommendations for further research.

PERSUASIVE CRITERIA

Persuasive technology

Web 2.0 and innovative technologies offer great opportunities for developing new influences on user experience. The past decade was met with a growing interest for users' attitude and behavior in information system (Oinas-Kukkonen, 2010). An important element to operate a change is about persuasive aspects. Fogg (2003) was the first to open the way for the field of persuasive technology for which he coined the term captology (Computer As Persuasive TechnOLOGY). From this acronym for "computers as persuasive technologies", he built the concept of persuasion in Human-Computer Interaction (HCI). He defines this field of research as "*an attempt to shape, reinforce, or change behaviors, feelings, or thoughts about an issue, object, or action*".

Necessity of guidelines

The importance of this field, which could be measured by the growing number of research during the last years, a lack of tool to assess or to design persuasive interface could be observed (Tørning & Oinas-Kukkonen, 2009). Our study investigating persuasive systems recommends for future research to create methods for a clearer measurement of a successful persuasive systems. Software developers and the general audience should be aware of this new approach to influence people.

Design principles and evaluation criteria for persuasion

Software ergonomics has already produced grids used in the measurement of the ergonomic quality of goods and services (Nielsen, 1994; Jordan, 1998, Brangier & Barcenilla, 2003). On the point of view of persuasive technology, researchers try to develop concepts and model to understand users' commitment. For instance, the "foot-in-th-door" compliance technique has already shown good results. The method consist of proposing a little first request to a subject then submitting him to a second one more expensive could be easily transposed to a situation where interactions are supported by emails (Gueguen, 2002). Another study (Torning & Oinas-Kukkonen, 2009) reviewed the most used design principles: Tailoring, Social comparison and Social Tunneling. So, in captology, there is a lack of validated criteria which take into account temporal aspects. In order to deeply change attitude and behavior, it was observed that accepting an effortless initial request predisposes in a positive way a user to accept a subsequent request asking for a greater effort.

To build criteria for interactive persuasion, we seek to respects three principles. First, we based our work on solid theoretical background and on explicit justification. Second, empirical and experimental validation was sought. Finally, the criteria and concept around must be understandable. For each criterion, explicit examples from everyday life application were proposed to illustrate concepts. 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.

Organizational principles of the criteria

Interacting with a computer presents some similarities with exchanging with a collaborative partner. If there is legitimacy, the system mediated could act as a coach who will lead user to some specific attitude or action (Nass, Fogg & Moon, 1996). By taking into account this information, we believe that an influent interface requires some qualities as a teammate. In literature, no validated criteria have been created which clearly identifies these required properties. Thus, we developed (Nemery, Brangier, & Kopp, 2009, 2010) a grid consisting of 8 criteria interactive persuasion and validate it on 30 experts (Nemery, Brangier, & Kopp, 2011)

To create this set of criteria, experts used an inductive method. Based on a literature review of more than two hundred articles and books, research have been made to find experimental data and concepts around persuasive technologies. The data were identified, classified and categorized according to an empirical approach. This grid is the result of several iterations: first inter judges and a pretest with six experts in ergonomics and HCI, second a classification test of each criteria by 30 experts. This experience has been elaborated to validate the set of criteria for evaluation of persuasive interfaces. 30 experts in HCI were asked to use the grid to identify persuasive elements in 15 interfaces. These interfaces have been chosen from different fields (e-commerce, sustainability, education, e-learning, health, leisure) and from different kinds of media (software, websites, video games, Smartphone) The mean percentage of correct identifications was 78,8% (Nemery, Brangier & Kopp, 2011), which represents a good score

THE PERSUASIVE INTERACTION CRITERIA

The validation has reached a consensus distinguishing 2 dimensions of persuasive criteria (static and dynamic) and 23 sub criteria (figure 1).

Static criteria

By static aspect, we mean all the prerequisite surface elements which are necessary to the establishment of an appropriate context to launch a dynamic process. That is to say: in interfaces, some prerequisites are necessary to promote the acceptance of an engaging process. These criteria are based on the content of technological influence.

Experts distinguished four components to promote the acceptance and the confidence of user.

Credibility is the first general criteria. It is the ability of the interface to inspire confidence and to make the user trust in the veracity of its information. Credibility is based on evidence of reputation and notoriety. According to the types of technical systems, data, service, document, person or even institution responsible for such information must be recognized honest, competent, fair and objective. It has four components: Trustworthiness, Expertise, Trustfulness and Legitimacy. Literature is full of references concerning credibility and trust on web media. (Bergeron, Jasmin & Rajaobelina, 2009; Bart, Venkatesh, Fareena & Urban, 2005; Huang, 2009)

Privacy means the protection of personal data, the preservation of personal integrity and security of the interaction. It covers all aspects of privacy that are used in interactions. This criterion also aims to ensure protection against loss, destruction or inadvertent disclosure or otherwise of these data (Liu, Marchewka & Yu, 2005). The privacy concerns: The expression of perceived safety, the Perception of rights and Ensuring the confidentiality of information.

Personalization refers to the concept of customization to adapt the interface to the needs of individual ownership from the user (Peppers & Rogers, 1998). The customization includes all actions aimed at characterizing a greeting, a promotion or a context to achieve a closer approach the user. The customization may include: individualization and group membership. Personalization requires an analysis of the activity beforehand. Its power is dependent on the quality of data from the user and the degree to which their analysis of ultra-personalization may be the result. In the latter case, the interface gradually learns the characteristics of the user and modifies or reprograms its contact in the direction of extreme customization.

Attractiveness is the use of aesthetics (graphic, art, design) to capture the attention of the user, to support the interaction and create a positive emotion. The animation, colors, menus, drawings, video films are designed to catch and maintain the interest of the user. Presentation of these persuasive interactive elements must consider the cognitive perceptual characteristics of the user. These surface elements are placed on an existing context of interaction. Persuasive design could lead user to specific action (Redström, 2006). Attractiveness has three components: Emotional appeal, Call to action and Tunneling design.

Dynamic criteria

To lead user from behavior A to behavior B, it is important to take temporal aspect into account. Design an engaging loop requires to segment and plan persuasive process in organized steps. That is to say: 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 the interface. The dynamic criteria are four.

Solicitation refers to the first stage which aims to attract, challenge the user, in a short way to initiate the relationship. We can distinguish three elements: allusion,

suggestion and teasing. The invitation sets up the beginning of the relationship and the dialogue between the user and electronic media. Widely disseminate, the first personalized message increases the probability of initiating the first action from the user. The interface attempts by words, graphics or any form of dialogue, to suggest a behavior. Solicitation represents the ability to induce an action from the user with a minimal influence. Here, the interface suggests, without expressing explicitly ideas or actions that the user could achieve (Dhamija, Tygar, & Hearst, 2006).
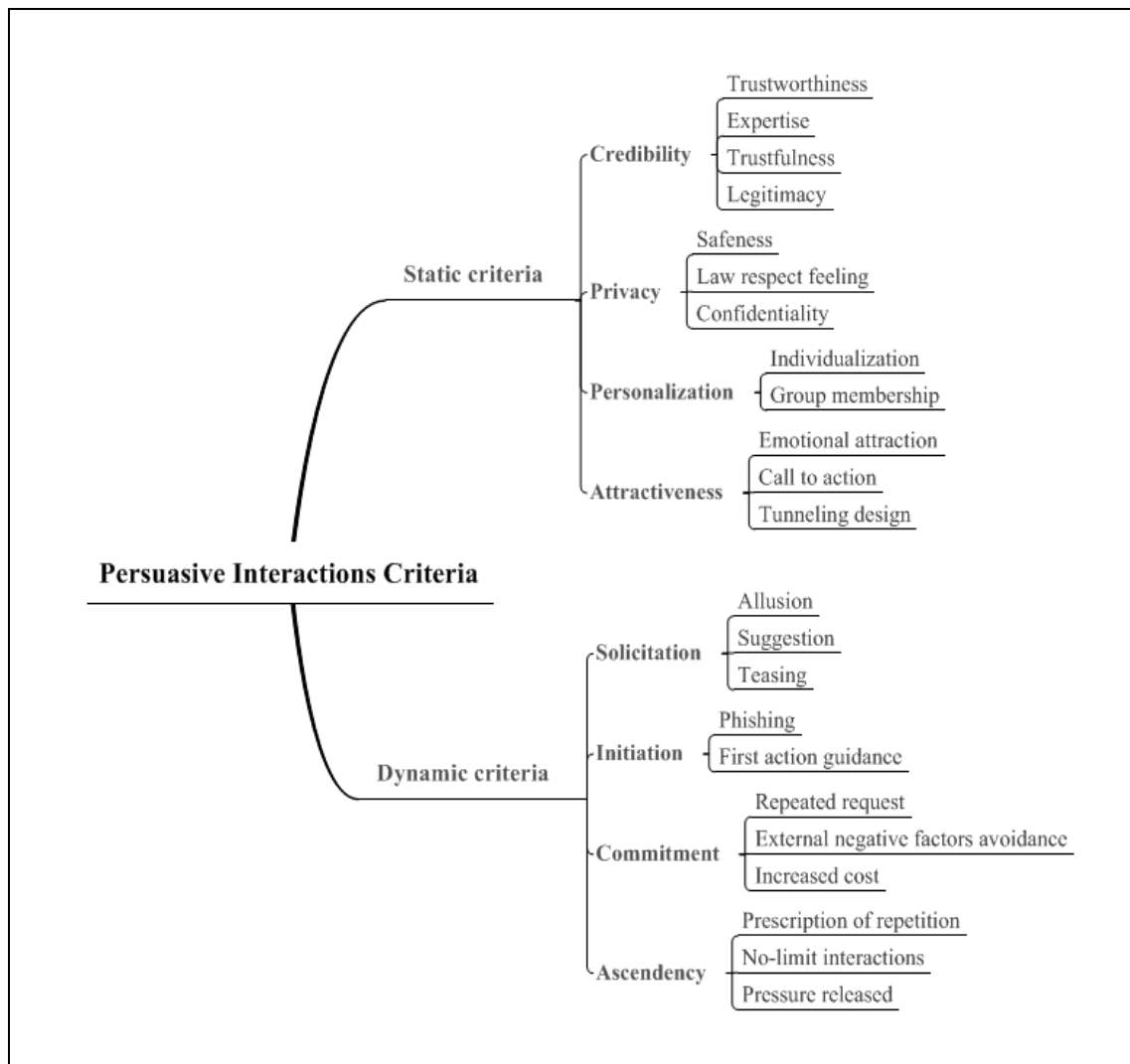

Fig. 1. General architecture of the eight persuasive interactions criteria

Initiation refers to elements of the media that allow the first user-initiated. These elements may take the form of phishing and piloting the first steps. Following requests from the interface, the user's attention is captured. On its own initiative, users are encouraged to realize the first engaging action. With initiation, the first action is done without coercion or perception. The user is caught in a process that grabs him gradually (Yang, 2005).

Commitment means that system continues to involve user through a process. It is the set up of action sequences or predetermined situations. Several queries regularly and gradually involve the user. The test of commitment is demonstrated by: control of infancy, encouragement, continued interaction. The electronic media will induce more intensive and regular behavior (Weiksner, Fogg, & Liu, 2008).

Ascendency is an expression of the completion of the engaging scenario. The grip is the deepest form of technological persuasion. The user has definitely accepted the logic and goals of the electronic media. At this step, the user involvement is total and he runs the risk of addiction or at least an over-consumption of electronic media. In these interactions, the user performs a behavior that serves to generate pleasure and maybe to relieve internal discomfort. At the interface level, the influence is manifested by various elements: irrepressible interaction, tension release, consequences beyond the interaction with the media.

CASE STUDY: USING "THE PERSUASIVE INTERACTION CRITERIA" TO IMPROVE THE USER PARTICIPATION OF A BUSINESS WEB SURVEY

Context: Annual workers' council survey

The current study took place in a French software company. The workers' council launched an annual survey to measure the employee satisfaction level of service benefits such as sponsored travel, sports associations, events, discounts and vouchers. A request has been made by the workers' council to improve response rate to this survey which were low causing a lack of representativeness.

Context and constraints

During the last years, information overload becomes a more realistic truth due to the growth of internet. In France, a typical software company has announced in 2011 that their 49 000 employees receive an average of 200 emails per day. Processing time (reading, writing, and response) was rated at 10 to 20 hours per week. Due to the quick increasing rate of new information production and its over diffusion in business organization, employees aim to develop strategies to avoid lack of time (Edmunds & Morris, 2000).

According to a study (Harzing, 1997) computer companies have on average the lowest response rate, 16,2%, in comparison to other fields: electronics 17.1%, food and beverages 18.4%, motor vehicles and parts 20.4%, paper products 20.6%, chemical products 21.3%, petroleum products 21.4% and pharmaceuticals 23,8%. The response rate in France is 13,6% which represents a low rate among other worldwide countries.

Problem and method

Our general problem is to see if it is possible to increase the participation of employees using the eight criteria of persuasion. Our hypothesis is to see if the implementations of interfaces that include these criteria are more used than the interfaces without persuasive criteria. From this point of view, we are looking to show the empirical relevance of our criteria. Methodologically, therefore we will compare two similar situations, one with and one without criteria.

In 2009, a business survey was launched in a company, with all its employees totaling 960 participants. The same survey was launched in 2010 with 897 participants at the same company and this time it took into account the persuasive guidelines. These two surveys were launched with SurveyMonkey, a survey software that supports most browsers. This factor was important as it provided each participant with the same display for (Couper, 2000) regardless of the settings.

The content of web questionnaires has been controlled and it was the same between 2009 and 2010 (fig. 2). Presentation and design of invitation have been modified

according to our persuasive guidelines. The decision not to offer incentive rewards or gifts has been made in order to only measure interface impact. Offering check or cash have already shown to improve the results (Goritz, 2006).
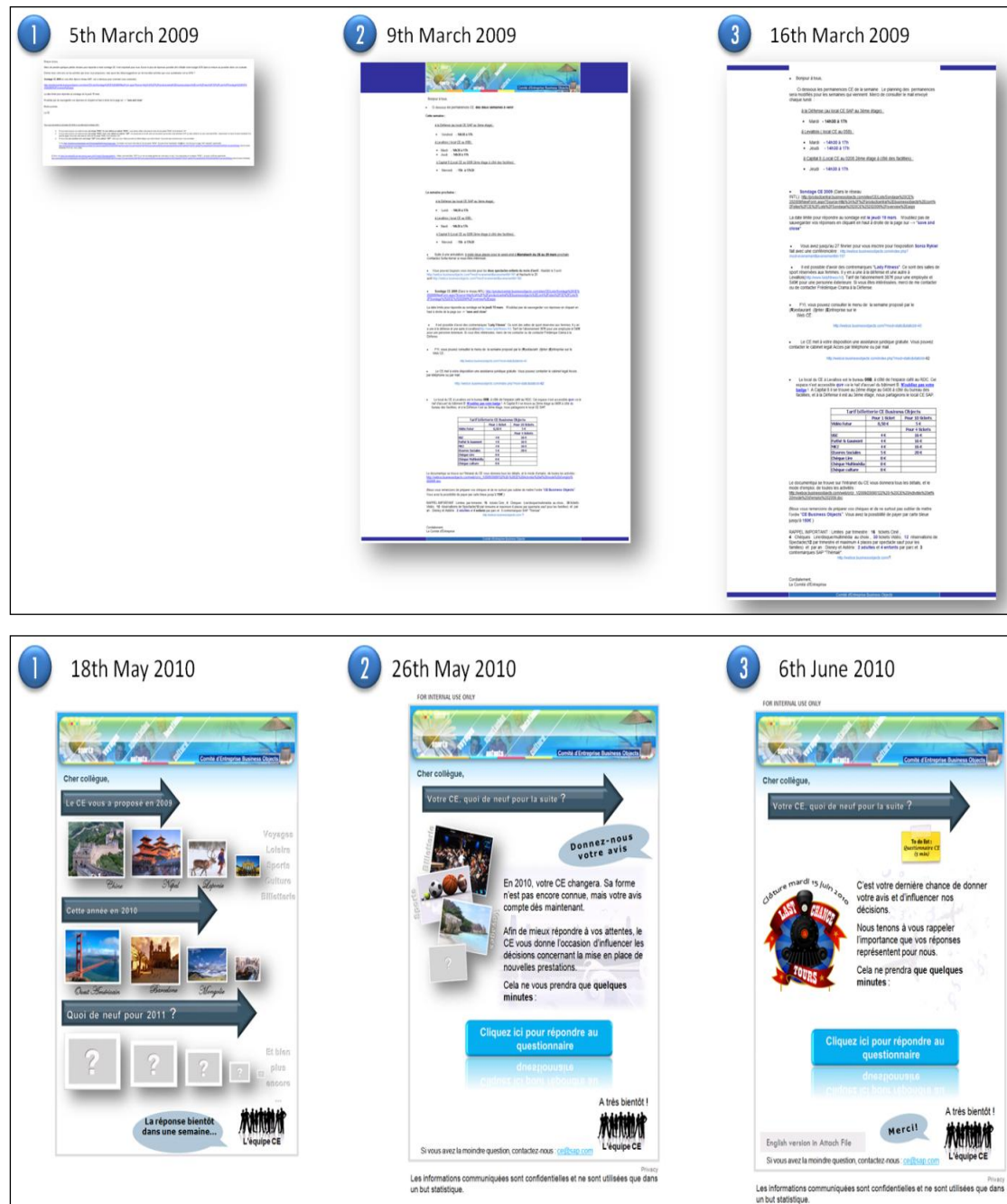

Fig. 2. Time line invitation survey in 2009 and 2010.

Guidelines operationalization

Improvements were treated as a package. We globally improved the interface content in order to make the engaging process conducive to the establishment. We applied four static criteria (credibility, privacy, personalization and attractiveness) and two dynamic criteria (solicitation and initiation).

Credibility of the workers' council was highlighted by giving a symbolic representation of council members. An important place for the logo has been dedicated to ensure legitimacy of entity. Some reminders on the first email were about past services that the works council offered to remind employees about their reliability and expertise.

With respect to personal data and confidentiality, an important message has been repeated in two parts of the interface to reassure employees about anonymity and data security.

Not too much effort has been made concerning the personalization of the interface. Other efforts such as telephoning employees or giving some visual elements to distinguish services, age or even gender of potential participant have been rejected due to technical constraints. A consistent business theme has been applied and the invitation message starts with "Dear colleague".

Attractive pictures have been displayed to reinforce the workers' council message and to have a positive emotional impact. A big button has been placed as a call-to-action to encourage employees to click on the survey link.

An important observation has been carried out on the temporal aspect of the questionnaire to launch the engaging loop. Steps have been defined to shift the type of user from 'non respondent' to 'respondent'. Concerning chronological aspect, they were constrained to only using the three message format of the workers' council, the same format used during the past few years. In 2009, one invitation message was sent and two reminder messages were launched in case of non response. Commitment traditionally requires many steps to gradually change a user's attitude. To avoid this constraint, we decided to add a crucial step of teasing. In 2010, a first mail was sent without any action requirement from the user. Some attractive pictures were displayed to show previous sponsored travel with just a simple message "What's new for 2011? The answer in one week..." The idea that the council would provide new services that better fit the employee's needs was suggested. After one week a new mail was sent with the relevant answer. To impact the works council decisions, the employees had to answer the survey. A last reminder to participate in the survey was sent one week later.

Results

Reviewing the participation decision shows that with the traditional email approach in 2009, 243 employees among 960 (25,31%) answered the works council survey. In 2010, it reached 371 employees on 897 (41,36%) with persuasive criteria applied. The 2010 results show a positive effect and indicate that employees are more invested and felt involved in the web survey. The results suggest that intervention on the persuasive aspects of interfaces, especially on static and dynamic dimensions, may involve an increase in responses rate.

But some remarks must be done. Due to the recent reorganization and global context in this software company, it was not possible to split our sample and to send two different types of email to employees in order to measure contribution of each criterion. It could have raised anxious reaction from participants. So the responses from 2009 could have been compared with 2010 by controlling the demographic data on the two samples.
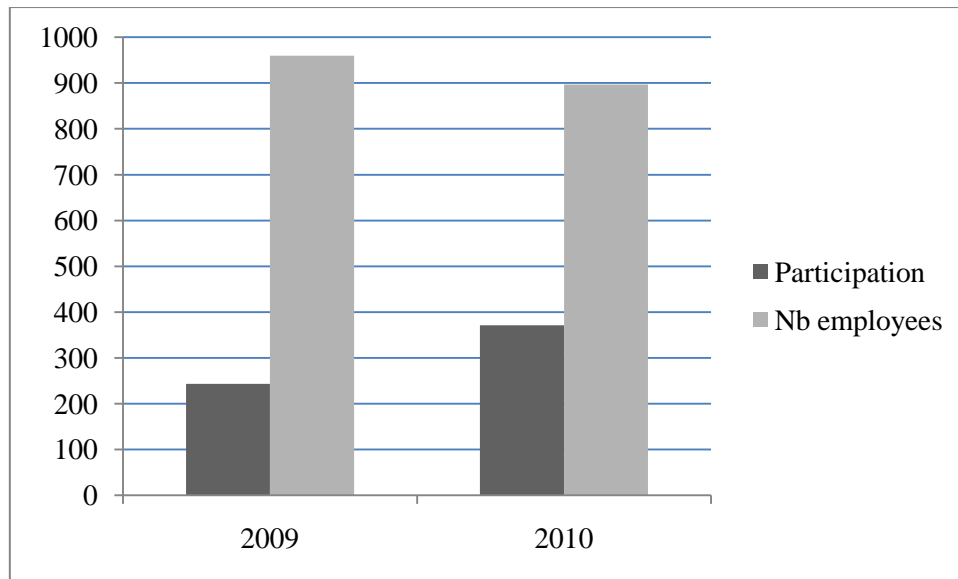
Fig. 3. Participation in web survey in 2009 (243/960) and 2010 (371/897).

To enrich our results, we also conducted interviews of twelve employees. Interviews have been conducted to control technical and social aspects. Production from four types of population (2009 and 2010 respondents; 2009 and 2010 non-respondents; 2009 respondents and 2010 non-respondents; 2009 no respondent and 2010 respondent) have been collected. Qualitative productions from these twelve employees indicate that the perceived factor affecting their intent to answer was mainly about interface elements. Most of them evoked a lack of time problem or information overload as reasons for not answering the survey. The social influence wasn't perceived... This shows that the influence has remained soft, invisible, unseen, and has not sought to assert a manipulative intent. As noted Girandola (2003), attempts of persuasion are not generally felt positively by their target, and involve a reaction of stopping interactions.

DISCUSSION AND CONCLUSION

The recent development of business surveys in companies raises issues under both cognitive ergonomics (usability, emotional design of interfaces, understanding of procedures) and social psychology (acceptation of new tools, social influence). Rather than opposing these approaches, this article attempts to pool by proposing persuasive criteria that combine cognitive ergonomics and social psychology. Then the effectiveness of these criteria is measured during a real survey.

The concept of persuasive technologies is rarely explored within the context of web survey. The results of introducing persuasive criteria as a guideline when designing powerful interfaces is encouraging, even though the field of designing surveys can be challenging, especially in a French computer software company. By these first results, potential benefits of using criteria to improve persuasive strength of interface have been revealed. The use of criteria as an evaluation or conception method has some limitations. In this case, specificities about organizational context, technical environment and support characteristics must be taken into account. Suddenly, "user experience design" will no doubt come across interventions within cognitive ergonomics (usability, user centered design, ergonomic criteria) and psychosocial (commitment, acceptance, social organization) to assess whether their combination

potentiates the effectiveness of technology use. So combining cognitive ergonomics and social psychology is a new challenge for understanding user experience!

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