The Intrinsic Value of Emotional Probes

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Abstract: Exploring the balance of visual aesthetics and usability in Web design that is meant to enhance user pleasure has enjoyed increasing popularity in the field of web design. The Emotional Probes (EPs) combine rapid ethnography and Cultural Probes (CPs) in order to investigate the users' emotional reactions and needs. The basic concept of EPs is to inspire design researchers and practitioners to apply a practicable design research strategy with the aim of probing real user experiences and create an enjoyable and effective user environment. Emotion engaged with design is a vital concern in dsign research. Unfortunately, laboratory usability tests overlooked visual aesthetics ever since human-centered design began. The EPs have elaborated on a series of design methods: diary, drawing, collage, think-aloud technique, observations, and conversation in order to approach users' emotional experience and its connection with visual aesthetic requests toward building an intensive understanding of the user experience. Designers and researchers can intuitively sense the users' emotional reflection of experiences, instead of highly-controlled laboratory testing of Web usability. This outcome is beneficial in keeping abreast of developments in design creativity and qualitative contribution of design inspiration. Owing to the increasingly emotional conciliation of human-computer interaction design, more emphasis tended to be placed on seeking visual-aesthetics touch and user-friendly methods for carrying out usability assessments. Therefore, EPs offer one significant advantage: empathic design guidelines to observe the end users. This advantage will work toward approaching real user experience and understanding user needs in usability. Further outcomes will reflect four primary characteristics of EPs: openness, empathy, uncertainty and enlightenment, leading creativity to meet human emotional demands, not harden it. In brief, EPs are not only design methods but also tools for designers. It can utilize creativity for practical needs, without ignoring the emotional requests of user experience. The results can lead to a user-friendly and enjoyable Human-Computer Interaction Design Concept.

Keywords: Values, Design Methodology, Emotion, Design Tools, Design Inspiration

1. Research background

Various forms of Web interface help users navigate more easily by making complex techniques eye-catching and easy to communicate. With the increasing number of Web users, the World Wide Web (hereafter referred to as WWW) has captured the attention of artists, designers, politicians, writers, marketers, and educators all over the world. Enjoying the support of speedy broadband services, it has changed the way wired individuals look for

information, developing an enormous number of opportunities for marketing and entertainment industries. Rapid advances in computer graphics have also created plenty of aesthetic experiences available in cyberspace. The visual interface of any Website is perhaps the most direct medium for communication and information exchange. Information conveyed through graphic design is easy to access because visual interfaces found in Websites can be designed in various ways to fit user requirements in Web-based communications.

The present work discusses user research through the perspective of visual design, as opposed to functionally advanced Web technologies. By means of direct visual contact with graphic design, user experience becomes aesthetically and emotionally engaged. Recently, web developers and designers have begun to consider the emotional and aesthetic influence of graphic design on users. Hence, in seeking to improve the quality of user experience, we find that the fundamental gap between interface usability and Web aesthetics will be eliminated.

User experience research is fundamental in developing knowledge that enables us to satisfy user needs. Kuniavsky (2003:3) explains that user research is the process of understanding the impact of design on a user in order to fulfill their needs and facilitate actual use. The impact of design includes sensuous, emotional, physical, and cognitive aspects of the interaction process between the product and user. The emotional aspect of Web users' experiences are directly influenced by the visual impact and aesthetic communication of interface design. These visual aesthetics seemed to be easily overlooked when usability design dominates the central research on user experience. Now that it is gaining more attention on visual aesthetics, more attention should be given to intensifying visual pleasures for users.

To help create an experience that resonates emotionally and functionally with users' visual pleasure, this study provides alternative perspectives from usability engineers and program designers. These alternatives could allow us to explore user experience and interface usability. The results show potential for improving the quality of user satisfaction and interface usage through a better understanding of the visual impact of Web design on the emotional aspects of a user's experience. The practical aim of this research is to provide a set of applicable design or research tools for exploring user experience including emotional dimensions called Emotional Probes (EPs). These were developed as a set of hybrid methods to strengthen validity and reliability through multiple perspectives. Data were generated through specific methods of EPs: diary, drawing, collages, conversation, and observation. The outcome of the evaluation of users' emotional experiences relied on a combination of intuition, creativity, experience, and theoretical awareness, under the operative principle of interpreting the visualisation process of users' emotional experiences. Potentially, EPs can be adopted in a wide range of design areas related to user-centered design.

This research uses mixed methods to collect different dimensions and depths of user experiences and evaluate the practicability of EPs. These EPs can be valued by raising the designers' understanding of users' emotional experiences and keeping appropriate distance between the designer's professional judgment and creativity.

2. Emotional experience and design

"*Emotional experience can be considered a distinct kind of subjective awareness; different emotions correspond to*

different varieties of this kind of awareness" [5]. Eac h p erson's em otional ex perience, ge nerated by vari ous interactions with the external world, is unique. Russell (1991:1) says, "*Motion, love, anger, happiness, and anxiety express concepts that influence people's life.*" By tran slating t hose sensu ous stim uli in to human p erceptions, emotional experience has a strong influence on personal value-judgments about one's life. Emotional aspects of experience guide people in appropriate decision-making to move away from the bad toward the good. In addition, positive an d negative em otions have stro ng influ ences on user behavior, in cluding value-judgments an d decision-making. Insofar as Web interface can act as a mediator between humans and computers, understanding users' emotional experience might be the first step in im proving design quality. In the fields of art and design, emotional experiences such as joy, love, pleasure, fright, fear and surprise, have been portrayed in order to enrich aesthetic experiences. Engagement is an essential ch aracteristic in volved in defining the concept of emotional design. In product design, emotional considerations are brought into the process to satisfy the qualitative needs of users. Emotional connection can be seen in "branding," "advertising," "product personality," and "color schemes" with reg ards to "soft fun ction/design." It includes "*intangible qualities, such as emotional bonds, familiarity, aspirations, desire, sentimentality, aesthetics, personal taste, touch, smell, feel and personality.*" Relatively *hard* functions co ncern usability i ncluding physical an d cogn itive fu nctions such as "*how it works, what it does, construction and materials*" [12]. Therefore, when designing a Web interface, it is a b asic requ irement for designers to c reate a use r interface with *hard functions*; however, it is essen tial for designers to engag e in an emotional relatio nship with u sers and Web functions in order to enh ance u sers' q uality of experience. This research is based on the objective of developing a design or research tool to help designers discover the ways by which t hey ca n promote use r e xperience. The first st ep is de veloping a p rofound understanding of h ow t hey think and feel wh en interacting with Web interfaces. The EPs were thus established in response to th e growing need to include aesthetic and emotional contact to human-computer interaction.

3. Designing creative probes in the form of Emotional Probes (EPs)

The domain of Web interface research exploration is related to Web usability testing. Web activities start working from the moment a user decides to visit a Website. The role of Web visual design is to catch the users' attention and influence their decision. Lindgaard, Fernandes, Dudek, and Brown (2006:1) conducted three studies to ascertain how quick people form opinions about the visual appeal of a Web page. The results indicate that visual appeal can be assessed within 50 milliseconds, suggesting that Web designers have about 1/20th of a second to create a good first impression. This is relatively little time to catch the interest of a potential audience. The visual impact of the first page can influence the viewers' perception as they explore the site further. Before the viewers perceive Web usability an d information, el ements of visual aesth etics st eer th eir em otional jud gments as further i nteractions occur. T hus, presenting a n a ppealing visual exp ression is th e first step in attracting users' atten tion and th eir interest in the content of the site.

On the other hand, recent studies on Web users have placed relatively less emphasis on the aesthetic design and visual im pact of an in terface in term s of co nventional user-centered design. Mo st of these stud ies are h eavily involved with expensive marketing surveys and l aboratory evaluations. It may be im practical to employ such a process for m ost Websites because of the ir s hort development cycle and limited lifespa n. In gaining m ore awareness about end-users' emotional experiences, there is a g rowing need to develop new methods that could

enable researchers to observe and comprehend user experience. Therefore, this research considered developing alternative methods for investigating user experience and understanding users' first impression of a Website.

To obtain an in-depth understanding of user experience, this study adopted the cultural probes approach in conjunction with the rapid ethnographical method, rather than producing an *average* picture by taking a huge amount of quantitative survey and applying statistical analyses. Conventional ethnographic investigation is normally conducted over a long period of time, since it involves communicating with respondents or living in the specific community under investigation. Basically, rapid ethnography uses less equivocal questions than conventional ethnography in order to gather data from natural settings more efficiently and provide decision makers and designers with useful information in a timely manner. Techniques employed in rapid ethnography may include 1) "*narrowing the focus*" of questions, that is zooming in on key informants, such as experienced designers or users; 2) applying "*multiple interactive observation*" approaches to collect exceptional or useful information about user behavior; and 3) using "*collaborative and computerized iterative data analysis methods*" [13].

The CPs method is designed to reveal users' authentic experiences including individual preferences, emotional responses, behaviors, and so on. The adaptable techniques of CPs in data collection are analogous in character to ethnographic methods such as in-depth interviews, diary surveys, and observations. The difference is that these probes are packaged with particular designed materials such as diaries, disposable cameras, jigsaws, postcards, collages, maps, and other personalized documents. The materials are designed to gather an understanding of people's everyday lives in a playful context and to make it easy for volunteer participants to report their thoughts, ideas, and feelings. Intimate characteristics of mediated CPs encourage users to describe their thoughts, feelings, and preferences. Therefore, this form of research can more adequately observe users' experiences including their emotional reactions. The findings can be applied to real life issues and can serve to nourish the design process at every stage [6].

Through the convergence of rapid ethnography and CPs, this research developed an experimental method using EPs for studying user emotional interaction via a graphic user interface and Website Design. We assembled a collection of EPs into a "*Probe Booklet*." The format of the booklet was a diary, which allowed the participants to individually describe their emotions and opinions throughout the period of study (Figure1).

Figure1: The picture on the left shows the overall techniques applied in the EPs diary booklet; the right picture shows the view of the diary booklet and some of the entries from one participant's diary.

The EPs offer techniques that allow for the collection of information about users' emotional experiences. These also open up a new perspective for user interface designers working within the graphic design field. The EPs use multiple methods and allow participants to describe their emotions and opinions individually. The basic concept of EPs is to combine different methods to produce more valid and reliable results than using a single method under the concept of triangulation. This study's objective in developing these research methods was to find ways of seeking an in-depth understanding of users' feelings and needs, thus creating new design inspirations and bridging the gap between user and designer expectations. In the following sections we shall illustrate the seven important methods of EPs.

The process of using EPs: The use of EPs implies a sequential hybrid of methods (from step1 to step7) in order to use the particular strengths of each method to reinforce the whole.

Step1.Pre-interview conversation

Prior to the diary survey, the researcher had a conversation with each participant and explained how the activity would proceed. The conversation served to give instructions to participants and ensure that they understood how to proceed with the survey independently. Since each participant had different experience levels when it came to Web services, the researcher talked with each participant and made notes.

Step2. Self-completion diary

In human-computer interaction studies, diaries offer a track of personal, sensitive, emotional, and experiential records of "*what [the] users did, when they did it, and what they thought about their interactions with the technology*" [14].This present research project was designed as a semi-structured diary survey including three types of inquiry: 1) creative drawing; 2) mood board practice; and 3) open questions. The participants were interviewed one-by-one over a one-week period [2]. The diary format can be adjusted to last anywhere from a few hours (as a self-record booklet) to a month (diary).

Step 3.Think-aloud technique with observation

The think-aloud technique is useful for providing a convenient and inexpensive way of obtaining immediate feedback from users while performing certain actions and doing a usability test. In this study, the technique was applied to ensure that the participants understood how they should perform their tasks and to observe how they proceeded with such tasks. Using the think-aloud technique, the researcher can then monitor users' browsing habits and ascertain whether or not they understood how to complete their diaries by recording their feelings about and suggestions for interesting Websites.

Step 4. Observation

With direct observation, the think-aloud technique could be extended to gather more opinions about an individual user's experience and online behavior. Data on the relevant actions and reactions on the part of participants could be collected to contrast with their diary recordings. This application of the think-aloud technique with participant observation strengthens the validity of the study.

Step 5.Creative drawing

Drawing, simply put, is "*the manual skill of generating signs to represent what one sees*" [10]. It is also a visual metaphor that can "*show a person's emotional state of mind much better than verbal definition or description*" [4]. In this study, we used drawing as a way for users to describe their feelings. It is not always easy to use written or oral language to describe one's emotion. Drawing provides people with a communicative method that works on both conscious and unconscious levels. Lines, positions, and structures give communicative meaning to drawing.

By connecting user interfaces and drawing practice, this study aims to develop an alternative tool that can be used to approach user needs in interface design. In his research, Goatman (2004) intended to generalize individual difference in to statistical categories, which indicate emergent connections between personal preferences and interface design. Goatman's classification with sketched landscape layouts seems to reveal a potential relationship between the graphic exercise, individual personality, and the forms of interface methods. His study seems to indicate that a generic relationship may be transferable to situations where interface methods are involved in revealing human personality. Given the limitations of Goatman's experiment (2004), this study modified the elementary results of his research (see [2]) and added to the garden drawings two other drawings of library layouts and personal homepages for use in user examinations (see Figure 2). Throughout three rounds of testing, this research method intended to enhance the inner validity of the test when it is adopted with small-scale sampling. Different personal impressions of gardens (more emotive content), libraries (more logical content), and personal home pages (more personal content) allowed participants to use their imaginations in drawing their own design. The point of this activity was for each participant to draw a picture in response to their impression of and feeling about their favorite Web interfaces, instead of describing them in written words.

Figure 2: Series of creative drawings of the garden, library, and personal home page by three user-participants.

Step 6. The mood board

The "*mood board*"—a collage exercise—is often used by designers to translate their target market data into a visualized representation of product design, interior design, architecture, and other design-related activities. In product design, collage exercises are habitually employed to visualize the "*value*" of design, such as being cold, gentle, joyful, peaceful, or in other emotionally descriptive ways. As Mattelmäki and Battarbee (2002: 4) state, the collage is an "*emotionally expressive and dynamic*" exercise for explaining one's personal character or way of life or illustrating one's feelings toward certain subjects and events. Such a form of playful interaction with people's experience is as valuable as other research techniques in data collection. Mattelmäki and Battarbee (2002: 3) further comment that, "*collages are sometimes used in the beginning of the design process to find the spirit for the design and in user research and participatory design exercises to reveal dreams and emotions.*" Therefore, we used the Mood board practice approach and integrated it into the EPs approach to reflect users' emotional associations (see Figure 3).

Figure 3: Mood Boards completed by three different participants during the week-long experiment.

Step 7. Post-interview conversation

This final conversation made it possible to evaluate the practicability of these methods, wherein the researcher continued to collect data that had not been captured in the completed self-record or diary. The final conversations were conducted to encourage participants to clarify, elaborate, and reflect on the materials they recorded and composed during the research period [8]. Thus, these conversations made the study more complete by providing an in-depth understanding of the participants' various responses in the self-records and diaries they produced.

4. The intrinsic value of EPs: openness, empathy, uncertainty, and enlightenment

Based on the completion of the process detailed above, the EPs produced rich data that helped the researcher understand Web users' emotional experiences. The outcomes of applying EPs can lead further studies to discuss beneficial and intrinsic values, especially the EPs' primary characteristics: openness, empathy, uncertainty, and enlightenment. These probes can lead designers to think about the importance and effects of applying creative research tools to human-centered research in terms of design research. The following section discusses the four characteristics of adopting EPs.

4.1 Openness

User experience not only concerns how users browse through Websites but also how they feel during the process. Web aesthetics has no physical substance (or texture) but conveys images through the screen to trigger users' physical and emotional pleasures. In this research, the EPs approach was applied to interpret users' emotional interactions with Web user interfaces through a set of hybrid contextual methods. The data collected by means of the drawing and mood board exercises were used to describe what was not easy to identify during the participants' interviews and observations. To a certain extent, graphic data might increase the difficulty of analyzing respondent's thoughts regarding the designer as an analyst might use subjective judgment to explain the data. For this reason, combining EPs with interviews and observations could increase non-verbal recording analysis and reduce the misunderstanding involved in interpreting those visual messages. Meanwhile, the designer can be inspired by those images. Although the outcomes were not quantifiable evidences, they did provide imaginable pictures. The visual openness of those image data influenced the designer's creativity rather than completely inflexible information such as responses to close-ended questions. This study tried to keep certain "openness" in interpreting those images, encouraging the researcher to undertake more conversations with users in order to develop better understanding. Significantly, the results indicate that emotional experience could be observed through creative practices such as drawings, mood board practices, and diary records. Thus, in the process of applying EPs, the researcher could come closer to users' real living experiences.

4.2 Empathy

The process of designing EPs for this study was based on the emphasis of design awareness of user needs. Listening to your users is an important process in product innovation. However, innovating good products is a big challenge in eliminating the gap between user responses and their real needs and discovering their unspoken needs. Therefore, EPs adopted the concept of empathic design to respect users' demands and find out what is beneficial to them. This study adopted small-scale case studies and allowed designers to build in-depth awareness of user needs in less-interrupted situations. Each EP method used in this study encouraged users to

express their respective desires and concerns. In addition, each method has inherent limitations, but has its own strength to discover further information regarding user experiences. Drawings and collages supplied diaries with records of unspoken needs and imaginable images for designers. At the same time, using EPs can obtain in-depth understanding of user experience, rather than produce an *average* picture by taking a huge amount of quantitative survey and performing statistical analyses.

4.3 Uncertainty

This study aimed to bridge the communication gap between designers and users in the goal of improving the process by which users can experience design. Through different methods of study, the researcher found that it was possible for users to address their thoughts and ideas intuitively and actively instead of using quantifiable surveys. The application of EPs indicated that users' interaction with Web interface design can be understood by the relationships between 1) personal needs and personality differences; 2) different visual impacts; 3) connection between first impression, perception, and attention; and 4) emotional responses to Web interfaces. Through the different methods employed in this study, various contexts of data potentially increased difficulties during the analysis process. Three potential difficulties were: 1) the complexity of analyzing visual materials; 2) the arbitrariness of the meanings of the visual materials; and 3) the analyst's subjective views and personal preferences. Even though there was uncertainty during the analysis process, the outcomes could still provide positive values and reflect the nature of design. The specific concern of CPs is addressed by Gaver at al. (2004:56):

> *"Probes embody an approach to design that go beyond the technique alone. The potential benefits and lessons from this approach are in danger of being lost if Probes are used in a purely 'scientific' fashion."*

Instead of giving "*accurate*," "*comprehensive*," and "*clear*" guidelines for the design process, EPs based on cultural probes aim to provide designers with open insights for developing a deep understanding of users' emotional experiences.

As for the selection of Websites or images the participants created, these all involved emotional preferences, which also made it difficult to obtain complete interpretation. In qualitative research, field data normally results in various conclusions by different researchers [1]. In addition, visual images could be translated by researchers' own biases, as results usually have a certain level of uncertainty. However, the researcher emphasized that the concept of CPs was employed to explore more inspirational aspects of the design experience from the field data, and that the idea was not to emphasize issues of proof or disproof. The researcher also discovered that the method of data collection and analysis had its own contributions for design inspiration and the creativity of designers. The value of "*uncertainty*" that arises in the process of data analysis can reflect another advantage of applying EPs: *inspiring design ideas*.

4.4 Enlightenment

As for the process of employing EPs in a flexible and intimate way to elicit user-participants' responses, one good idea is to develop a kind of *brainstorming relationship* instead of a conversational user experience survey. To understand the process by which the quality of user experience in the Web environment can be improved, we were careful not to limit the questions to any particular types of Websites or prototypes. Instead of the researcher making

the selection of Websites, this research process allowed users to search for their favorite Websites on the condition that they followed a key theme. The data collection process was not limited to setting up prototypes, as the website samples were open to the user-participants' respective selections. After the diary survey, we obtained a variety of website samples which indicated user preferences. The use of EPs should be viewed as a brainstorming process for gathering users' perspectives for designing user experience. When this approach is used to explore Web user experience, designers can start by recruiting about 10 participants to take part in their study. If each of them can offer five examples of their favorite Websites using existing ones that have similar themes to the one that is going to be developed, the designers can gain $10 \times 5 = 50$ Websites that reflect their users' preferences. Through these samples, the designers can gather at least 50 ideas, which might be in accordance with the users' preferences, habits, interests, feelings, criticisms, and experiences.

This process resembles a brainstorming session. The designers can use this tool as needed, whether in a focused group discussion or in individual interviews. Significantly, the users' selected website samples can provide the designers with concrete examples about their preferences. Looking at the samples, the designers might also discover other competing Websites. In addition, results of the creative practices (e.g., the mood board section and the drawing practice) are likely to indicate users' familiar visual languages, which are created by their associations and imagination. Thus, the data collection process is used as a brainstorming scheme to gather different ideas from users' suggestions. From this significant finding, it should be clear that the value of applying the EPs approach goes beyond just being a survey technique, it also serves as a tool through which the difference between applying ethnographic and quantitative strategies in user-centered research can be further understood.

5. Conclusion

This research focused on the complexity of the Web phenomenon involving users' emotional experiences and visual interactions. It is not easy to use a single method to deal with the complexity and ambiguity of social phenomena and gain an understanding of real life situations. As Yvonne rightly observes in Darlington and Scott (2002:132), "*life is always more messy than tick boxes.*" This is why we developed EPs for collecting qualitative data and conducting analysis, instead of using quantitative methods. The implementation of the probes had many specific objectives involving the interpreter's engagement, senses, and subjective experiences for incorporating emotional values into a design. In addition, the researcher was able to review the participants' responses in different dimensions using different approaches such as observation, interview, and a cooperative brainstorming process using drawings and collages. The EPs are a set of alternative methods to provide an in-depth understanding of users' emotional associations, thereby enabling designers to be inspired by users' experiences to solve existing problems in design. These EPs also possess four characteristics: openness, empathy, uncertainty and enlightenment, all of which inspire designers' creativity to meet human emotional demands. They also offer the possibility of evaluating the usability of other design projects, such as those for products, multimedia, and packaging in order to enhance the quality of their designs and the users' satisfaction with these. This probe strategy is created to build general principles of user-centered design toward obtaining more humane designs.

In summary, the effect of applying EPs allows for the continuous development of a mutual communicative relationship between designers and users in enhancing user experience. This research offers insights into the

theoretical and practical knowledge concerning the sources of inspiration from which future emotional designs can be conceived. In this way, this study recommends an increased awareness of emotional design development in the hope of enriching user experience and making the Web more pleasing and enjoyable for its users.

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