A design method based on social behaviours for pleasurable user experiences in human-computer interaction

Dr Joo Ho (Jo) Jung - School of Communications and Arts, Edith Cowan University, Perth, Western Australia,
(+61) 08 9370 6162, j.jung@ecu.edu.au

Dr Terence Love - Department of Design, Curtin University of Technology, Perth, Western Australia; Lancaster University, UK; IADE/UNIDCOM. Portugal
(+61) 08 9305 7629, t.love@curtin.edu.au

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Abstract
This paper introduces a new design method for producing interface design guidelines. The research on which the design method is based explored social and emotional nature of users to create pleasurable user experiences in human-computer interaction (HCI), focusing on a context of e-commerce. Considering the user’s social-emotional nature is an attempt to recognise and understand users as social and affective beings and taking a holistic approach to HCI design. This paper describes an interdisciplinary approach to conceptualise context-based user experiences and synthesise design guidelines based on social behaviours identified from real world social interactions. Analytical and interpretive methods were used for the gathering, analysis, and interpretation of information about social behaviours. Findings in this paper provide a process by which real world social behaviours can be translated into user interface designs in a systematic way.

Conference theme: Methodological issues
Keywords: user interface, human-computer interaction, design method, emotions, social behaviours
Introduction

In recent years, the field of human-computer interaction (HCI) has witnessed increasing interest in user interface design looking for a holistic perspective that includes emotions such as fun, joy, pleasure, and aesthetic value. A new movement into study of emotions in the field of HCI has emerged. Previously, much of the effort expended in the field has focused on the usability of computer systems. Cognitive psychology has been the major influence (Preece, Rogers, & Sharp, 2002pp.) in understanding users as human information processors to pursue the aim of HCI practitioners of making usable computer systems.

Many recent researchers (Fogg, 1997; Nass & Lee, 2000; Reeves & Nass, 1996) consider embracing the user’s social and emotional nature as one of the key factors that can balance and broaden the development of HCI. The research presented in this paper is a part of this growing social-emotional approach to design that attempts to improve the quality of users’ experience with computers.

As the field of HCI embarks on unfamiliar study areas traditionally studied in Social Science, it has become evident that new user interface design methods are necessary to include the social-emotional life of users in HCI. A key question: “How can we design socially and emotionally engaging user interfaces? is shared by most of the literature.

There is a major difference, however, between the approach presented here and most of the literature of social-emotional HCI. The difference is in applying the raw data of social behaviours and emotions associated with the social behaviours to the design of user interfaces. The research described in this paper resulted in a systematic strategic design-based approach to creating social-emotional interfaces based on social behaviours identified from real world social interactions.

People exhibit social behaviours and apply social rules when interacting with computers (Gahagan, 1984). Based on the previous research on social behaviours and responses towards computers, the research hypothesised that social behaviours displayed in real social interactions can be used in a formal design process in the design of user interfaces to improve the quality of the human-computer relationship. The focus shifted to developing a strategy for creating design guidelines and pointed to two tasks: (1)
identifying and selecting relevant social behaviours that are associated with pleasurable emotions; and (2) adapting the identified social behaviours into guidelines for user interface design.

Social behaviours and emotions associated with social behaviours are context specific and exhibited through interactions with others (Shneiderman, 2002). Therefore, this research focused on a single topic of HCI: to e-commerce. The following three themes guided the research:

1. Identifying social behaviours appropriate for the design of user interfaces for e-commerce websites;
2. Identifying ways of adapting codified data about observed social behaviours into the design of user interfaces; and
3. Developing practical applications of the use of theses tools for designing interfaces that will elicit appropriate social behaviours and emotions into the design of user interfaces for e-commerce websites.

In the following sections, first, we explain how the research was founded on and extends two established theories in this area: the media equation theory of Reeves & Nass (1996) and the ‘circles of relationships theory’ of Shneiderman (Picard, 1997; Picard & Klein, 2002).

**Related work**

Embracing emotions and social nature of users in the design of user interfaces is not a new concept, yet it is still a challenge within the field of HCI. The development of social-emotion based HCI is in its infancy. New directions in the study of user interface design methods are necessary to develop a holistic approach to integrate user emotions and social behaviours in user-centred human-computer interaction. The current practices and studies of social-emotion based HCI involve diverging views. Presently, there are two divergent approaches to including user’s social behaviours and emotions in HCI, both based on the media equation theory proposed by Reeves and Nass (1996).

On the one hand, is *Affective Computing* of Picard and colleagues (Picard, 1997) at the Massachusetts Institute of Technology (MIT). Affective Computing involves designing *intelligent* computer systems by making computers that *have* emotions and that have the
ability to sense, recognise and understand human emotions (2003). Picard argued that as humans need emotions to be intelligent and efficient, computers should have emotions to be intelligent, so that computer users can obtain the maximum benefits from using computers. Their main concern is technological advancement of computers by analysing physiological states of users. Affective Computing tries to mimic human emotions, but is primarily another computer centred approach to HCI in which computers will be able to detect users’ emotions so that they can respond accordingly. The Affective computing approach detours around the primary issue of designing interfaces that elicit emotions that users want to experience. Lindgaard and Dudek (2000) described Affective Computing as tending ‘to focus on changing the behaviour of the computer rather than identifying features that make the user experience exciting, dull, fun or boring’ (p. 433). The approach of the research describes in this paper appears at first glance to align with, but actually has many differences to Affective Computing.

In parallel are other approaches through visual aspects of user interface design. Tractinsky and colleagues (2002) suggested aesthetics is linked to perceived usability. That is, aesthetically pleasing user interfaces can change users’ perceptions of computer systems by producing pleasurable experiences via ‘beauty’ or ‘appeal’. This, in turn, can positively affect users’ perception of, e.g. usability. Tractinsky and colleagues’ aesthetic proposal does not imply that usability is unimportant; rather that incorporating aesthetics balances HCI, as the field has previously focused on usability. Their view has been supported by Norman (Heidegger, 1978; Hybs, 1996) who stating that aesthetics are essential to the design of any products, especially computer user interfaces because they have a strong association with our emotions, feelings, moods and motivations.

The aesthetic model proposed by Trantinsky and colleagues (2000) focused on the provision of pleasurable experience to elicit positive emotions for the computer user. The aesthetic approach is about the attempt to design and uncover optimal experiences, which users would like to experience, so that they can pleasurably engage with tasks and focus on their personal needs when using computers. When people are pleasurably engaged with objects, the experience creates a sense of self-disappearance whereby people embed themselves in the given situation or task (Csikszentmihalyi, 1992, p. 49). This can support the development of ‘flow’ experiences (2000). This aesthetic approach significantly differs from the focus of Affective computing on designing to incorporate emotions directly into the behavioural response of user interfaces.
Despite the great interest and recognition of emotions in both approaches, the limitation is the identification of successful strategies to create guidelines to design emotion-based user interfaces effectively. The media equation research by Reeves and Nass (1996) demonstrated people apply social rules when interacting computers, and unconsciously people expect computers to obey social rules.

This paper describes how this research approached emotion-based user interface design from the aesthetic model perspective (i.e. graphical user interfaces) suggested by Tractinsky and colleagues (Reeves & Nass, 1996) integrated with the media equation and pleasurable engagement theories.

**Approach of the research**

This research, using the media equation theory (Ray, 1994) as a starting point, focused on exploring social behaviours of pleasure in social interaction. The ‘circles of relationships’ theory of Shneiderman (2002) was employed to select appropriate social behaviours for the chosen HCI context of e-commerce. The theory suggests that sources of positive human-human relationships can be reflected in the design of a user interface to create the same positive relationships between human users and computers. One way to find appropriate social behaviours and emotions is by examining the sources that make a relationship between consumers and sales assistants pleasurable. A review of retail and service studies indicated that social factors contributing to pleasurable shopping experiences can be transformed into user interface guidelines by interpreting them in reference to existing guidelines or techniques from the domains of graphic design, usability engineering and verbal communication. Unpleasurable experiences were also investigated in order to understand the elements that should be avoided when designing user interfaces. In this way, the design of user interfaces for consumer websites can reflect both sides of the pleasurable elements from the comparable social interaction.

This research proposed to use interpretive and thematic approaches to analyse the data obtained from in-depth interviews using the qualitative data analysis software NVivo. Interpretive and thematic data approaches were adopted to derive meanings of participants’ lived shopping experiences, and to gain insightful descriptions of the social behaviours followed by sales assistants from the participants’ perspective (Alexander,
Ishikawa, & Silverstein, 1977). The approach paralleled and drew heavily on the example of design guideline development derived by Alexander and colleagues in their book ‘The Pattern Language’. Using this approach, for the process of developing design guidelines, pleasurable and unpleasurable social experiences identified in this research provided the basis for identifying ‘classic’ problem states that offered the basis for identifying design solutions. The Pattern Language approach provides the design process bridge between identified real world social experiences and the development of design guidelines that elicit similar emotional experiences via user interfaces.

Figure 1 below shows the approach of this research and design strategy to develop user interface design guidelines. This strategy for creating design guidelines was named the **E-commerce Social Interface (ECOMSI)** strategy.

Figure 1: approach of this research and the ECOMSI strategy (highlighted in grey box).
Findings

The research presented in this paper had theoretical and practical outcomes:

- A new formal design strategy for adapting social behaviours into user interface design guidelines.
- A set of social-emotional interface design guidelines for a specific type of e-commerce website.

Twenty-six social behaviours that affected pleasurable experiences of real world shopping experiences of the interview participants were identified and translated into interface guidelines using the ECOMSI strategy. The application of other aspects of the ECOMSI approach resulted in the development of a parallel twenty-six interface design guidelines. Identified pleasurable social behaviours, which acted as systematic solutions, were categorised into four groups based on their similarities and characteristics (see Table 1 for twenty-six interface design guidelines under the four categories):

- Communication
- Usability
- Visual design
- Problem recovery

This is a significant step because to this point strategies for the development of design guidelines has not been central to HCI social-emotional interface research; because social-emotional studies in the field of HCI are developing; and because the number of possible social behaviours to investigate and potentially take account of in user interface design is high.

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<td>1</td>
<td>Greeting customers</td>
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<td>Familiarity</td>
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<td>Considering customer’s shopping companions</td>
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<td>Conversation with customers</td>
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<td>5</td>
<td>Conversational product information</td>
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<td>6</td>
<td>Proactive service</td>
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<td>Professional mannerism</td>
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<td>Genuine and honest service</td>
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<td>Sales tactics</td>
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<td>Ending transaction</td>
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<td>Speak the customer’s language</td>
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<td>Promptness and alertness</td>
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<td>Provide information meaningfully</td>
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<td>Product demonstration</td>
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<td>Direct the customer to helpful people</td>
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<td>Important shopping information</td>
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<td>23</td>
<td>Personality of e-commerce websites</td>
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<td>24</td>
<td>Listening to customers</td>
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<td>25</td>
<td>Apologetic customer service</td>
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<td>26</td>
<td>Acknowledging waiting customers</td>
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Table 1: twenty-six ECOMSI-derived user interface design guidelines.

Social behaviours in the **communication category** described solutions to problems related to verbal interaction, including tone of communication and verbal skills that affected participants’ emotional quality of shopping experiences. An analysis of in-depth interview data collected in this research suggested that an interaction between a participant and a salesperson could be divided into three parts: an initial contact, relational bonding and establishment of relationship. Communication occurred throughout an interaction between a participant and a salesperson, and it evolved, with rapport gradually being developed. The relationship between a participant and a salesperson could be a short-term, long-term or pseudo relationship. Participants in the in-depth interviews indicated that they desired to establish a short-term or long-term relationship with salespeople to gain the benefits of being a regular customer such as discounts and familiarity. Participants indicated that they wanted to establish a pseudo
(temporary) relationship with salespeople for the purpose of making a given interaction interesting, and to gain a temporary sense of belongingness.

The three steps of the interaction process between a participant and a salesperson—an initial contact, social bonding and relationship establishment—required unique and distinguishable social behaviours that could lead to a pleasurable shopping experience. The fourteen guidelines included in the “communication category” outline ways to carry out each step of communication between a user and an e-commerce website interaction by reflecting the social behaviours identified in this research.

Social behaviours in the **usability category** described solutions to problems related to the productivity of salespeople that affected participants’ practical and utilitarian shopping experiences (e.g. acquisition of products and product information).

Social behaviours in the **visual design category** described solutions to problems related to participants’ perceived quality of information being delivered. Participants in the in-depth interviews indicated that personalities and characteristics of salespeople affected the atmosphere of a retail environment, and their perception of the emotional quality of the customer service being received. They also indicated that salespeople’s personalities and moods had a significant impact on their emotional states and their overall shopping experiences. Guidelines in the visual design category are based on the personalities and characteristics of salespeople perceived by participants.

Social behaviours in the **problem recovery category** related to the first two categories: communication and usability. Social behaviours in the first two categories described preventative solutions that may have elicited pleasurable emotions in users of the chosen e-commerce website. These solutions were incorporated into user interface design to avoid potential problems that cause unpleasurable emotions in users. In contrast, social behaviours in the problem recovery category were solutions to problems that had occurred (e.g. a long delay attending to a customer). Participants in the in-depth interviews indicated that an unpleasurable shopping incident caused by social behaviours displayed by a salesperson could be compensated for by other social behaviours (e.g. apology for a delay). For example, an apology by a salesperson neutralised anger in a participant and even elicited pleasurable emotions in the participant.
Analyses of the in-depth interviews indicated unpleasurable social behaviours were typically opposites of pleasurable social behaviours. These opposite, yet comparable, correlations between pleasurable and unpleasurable social behaviours indicate that unpleasurable shopping experiences were a consequence of the absence of social behaviours that affected pleasurable shopping experiences. For example, a friendly greeting by a salesperson elicited pleasurable emotions in participants, and contributed to making a shopping experience pleasurable. Conversely, no greeting or an unfriendly greeting by a salesperson frustrated and upset participants and made them feel unappreciated.

**Summary and conclusions**

The paper has described research that led to a new design strategy that conceptualises and synthesise users’ social nature and emotions, and derives a basis for user interface design. The design strategy drew on knowledge from HCI and Social Science to develop a methodological approach to identify specific social-emotional interface design guidelines. Trialing the design strategy on a particular type of e-commerce website, twenty-six interface design guidelines were developed and tested. These context specific social behaviours are likely to be applicable to other e-commerce contexts.

This new approach to deriving insights into social-emotional human-computer interaction appears to provide a useful viewpoint for the theoretical and practical construction of user interface design because to this point design guideline development has not been central to HCI social-emotional interface research.

The former outcome of this research is a demonstration that it is possible to identify social behaviours that are applicable to user interface design of human-computer interaction. The reason that this research successfully identified specific social behaviours that are applicable to e-commerce website user interfaces was due to the methodological approaches employed. This research examined interactions between shoppers and salespeople that were compatible to interactions between users and an e-commerce website. The research drew parallels between social interaction and human-computer interaction to identify social behaviours that are compatible for the context of online shopping. I believe that this approach to deriving insights into social-emotional human-computer interaction provides an important viewpoint for the theoretical and practical
construction of user interface design. It facilitates an identification of specific and appropriate social behaviours for a particular context of human-computer interaction.

This paper presented a preliminary step towards a more comprehensive strategy for developing social-emotional interface design guidelines. The design strategy can be developed more extensively, and its applicability and practicality trialled across the design practices of HCI. Studies on validation of the method used to find these social behaviours are likely to provide interface researchers and design practitioners with a better understanding of identifying relationships between real world social behaviours and experiences and those of HCI.

References


