Enhancing User Experience of Enterprise Systems for Improved Employee Productivity: A First Stage of Case Study

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Abstract. User experience has been regarded as the focus of technology design following the diffusion of information technology into the society level. There are many researches discussing user experience as a concept from the software testing and design perspective and seldom the specific dimensions of user experience are investigated. This research attempted to conduct a case study to explore the psychological dimensions of user experience from the interpersonal relationship theoretical perspective. Specifically, a case study on the usage of SAP ERP system has been conducted and 8 enterprise systems users have been interviewed to reflect on their interactions with the ERP system. The interpersonal relationship features is reported missing from the current enterprise systems design. Implications to both researchers and practitioners are provided.

Keywords: User experience · Interpersonal relationship · Case study · Enterprise systems

1 Introduction

User experience refers to the subjective, dynamic and emotional side of technology usage from users' perspective [1]. Originating from the practical side of interface design, user experience has recently been penetrating into the academic field, especially HCI discipline, mainly because of the recent design stream alongside burgeoning social computing devices such as iPad, tablet PCs and smartphones. The technology advancement has allowed the design of the computer devices to not only focus on the functional part of the product, but also the aesthetic, affect, or hedonic side of the product. At the same time, the information technology has diffused into the society level and the growth of user base demands for more interactive interface [1]. Following this trend in the industry, studies on user experience appears in main stream journals and recently becomes a main stream study in user interface design field. It has replaced the previous word interface design for it provides richer meaning and broader context. Given this fact, many new software product developments focus on holistic user experience from user's perspective to improve product quality as well as the overall business performance. Several studies have reported better performance of the company by focusing on user experience. For example, Suh and Chang [2] has investigated

the role of telepresence in the online shopping environment and found that telepresence could directly or indirectly augment consumers' product knowledge, attitudes and purchase intentions, and reduces consumer perceptions of product risk and discrepancies between online product information and actual products.

With this wave of new user experience design, the software design has shifted from function-centred to user experience centred. However, the interfaces of most enterprise systems, such as ERP systems are still in its legacy state, i.e., the interfaces of these large systems are hard to change due to the scale of the software. The interface of many such systems could be traced back to at least ten years ago. The implementation of such systems involves huge investment and takes very long period of time. As reported in previous studies, there are many barriers in implementing such large systems in the organization [3]. At the same time, previous studies have also reported that hedonic or emotion factors such as affect [4] played an important role in determining information technology usage in workplace. The improvement of the social and emotional perspective of the enterprise systems should be able to improve employees' adoption rate of the information technology, leading to improved productivity. Study also report that user experience variables such as hedonic factor influence employee's continued adoption of enterprise systems [5]. We thus infer enterprise systems' adoption rate and performance could be improved greatly by focusing on improved user experience.

The aim of this research intends to investigate user experience of the current ERP system through a case study. During the study, ERP users from different stages will be interviewed for their experience of the existing ERP usage. Both the hedonic and functional experience will be investigated. To effectively represent the current ERP users, both early stage users and sophisticated users for SAP ERP systems have been selected for interview. The interview scripts and results will thus be analysed to give the guidance on the effectiveness of user experience on employee ERP system usage.

2   Literature Review

This section reviewed the state-of-the-art of user experience development and evolution followed by a review of user needs theory.

2.1   User Experience

User experience as a concept could be traced back to 1980s when PC when PCs were become more popular and software development processes started emphasizing the role of user involvement or user participation to successful implement and design information systems [6]. According to Hirschheim [6], users value high the participative design/implementation approach by which users are actively involved in the design/implement process despite user experiences are subjective by nature. Meanwhile the negative experience such as frustration and fear are also identified during computer usage [7]. Although many systems developed in those times focuses more on the functionality of the system rather than user experience concepts we are discussing now days, a shift toward user-centred design can be observed in the information system

development trend over years. Experience has been studied but does not play a central role before 2000s [8, 9]. User experience starts to gain popularity in 2000s when the mobile devices are enhanced to deal with picture, audio, and video information. The concept of technology as experience and design for experience are brought out [10–12], followed by a heated discussion [1, 13, 14] on user experiences from various perspectives under different virtual environments, especially virtual world [2, 15]. The concept of user experience evolved to include the subjective, emotional, and sensory perceptions from users' interactions with the information systems. The positive user experience will enhance the technology and the negative or the rejected experience results in decreased technology usage [7, 16]. User experience is regarded as an interaction process with technology and is influential in technology implementation.

Most user experience studies agreed that user experience is subjective [6] and related with emotional perspective of human needs [1, 2, 13, 17], sometimes highly related with the pleasure or hedonic factors [11, 18]. In Deng et al.'s [5] study on the role of user experience on continual intention to use mobile devices, the experience is discussed from the cognitive absorption perspective and measured as hedonic and utilitarian experience. According to the current explanation for user experience, it fluctuates with the situation and emotion [10]. It is also dynamic and interactive and focuses on the co-creation feelings with friends and colleagues [11]. Yet, it is linked with human needs [19]. In a metaphor, user experience sounds like a woman hard to be pleased and vague to figure out. It is capricious and changes with emotions and situation. It seems there is no logical and theoretical method to identify why user experience changes. We would like to point out that this is because most previous studies are from computer sciences perspective but a social psychological theoretical mechanism is neglected in the previous study by focusing too much on the functional dimension of user requirements. Like Freud's dream analysis method, experience and feelings links with social dimensions and spiritual dimensions covered in the subliminal. The surged user experience might be the manifestation of fulfilled or under fulfilled social or interpersonal needs [19]. From this perspective, the technology acts as the artefact for the social presence.

2.2 Social Needs and Interpersonal Needs

It has long been a tradition for social scientists to discover the human nature from various perspectives, among which Maslow's hierarchy needs theory [20] probably explained all fundamental needs as an individual, physiological needs, security needs, respect and esteem needs, and self-actualization needs. Taken the human needs into consideration, it's no hard to find that trust plays an important role in online shopping design because it satisfies security needs from Maslow's perspective [21]. There are also many other social psychological theories and this study will take the interpersonal needs perspective to discuss the user experience of software design because the social dynamic nature of the interpersonal relationship theory.

We will adopt the Fundamental Interpersonal Relationship Orientation (FIRO) developed by Schutz [22] to explain how the current enterprise systems meet the user experience requirements from the fundamental interpersonal needs. Schutz [22, 23]

proposed that interpersonal relationships could be measured by a person's intention to interact with others. He argued that people's intention to interact with others can be measured by three dimensions—inclusion, control, and affection. Each of these three dimensions has two behavior directions—expressed and wanted behavior. In total, there are six dimensions in FIRO—expressed inclusion, wanted inclusion, expressed control, wanted control, expressed affection, and wanted affection. Based on this framework, the expressed behavior describes the extent of people's willingness to include, control, and loves others, whereas wanted behavior describes the extent of people's willingness to be included, controlled, and loved by others.

To be applied empirically, FIRO was operationalized as FIRO-B (FIRO behavior). Since the introduction of FIRO, its measures have been widely adopted in social psychology research. On average, FIRO has an average of twenty-five citations annually in the Social Science Citation Index [24]. Furnham [25, 26] indicated that the FIRO-B was one of the three most widely used questionnaires in occupational psychology.

The FIRO model can be applied to all situations in which interpersonal relationships are investigated [22]. There are three levels of the theoretical application of the model, based on the number of persons involved in the interpersonal relationship—the individual level (one person), family level (more than two persons), and group level (more than two people). While individual-level applications described mainly an individual's orientation in the three dimensions, which provide the foundation to analyze the individual's social behaviors, family-level applications mainly deal with how the orientations of family members in the three areas influences their relationships inside and outside the family, and group level applications deal mainly with how the match of the orientations of group members in the three dimensions, namely, the group's compatibility, affect the group's performance [27–29], effectiveness [30, 31], and efficiency [32]. We will adopt the individual level application of FIRO to guide the analysis of ERP user needs.

3   Research Methodology

A case study approach has been adopted for this study because of the explorative nature of user experience study for the enterprise systems. As for the user experience study is still in early stage theory building through qualitative analysis such as case study is essential for a subject [33]. As an exploratory case study, the research follows a set of classical qualitative research principles in information systems and some other social scientific fields [34].

Enterprise systems might refer to CRM system, supplier relationship management system but the core is the ERP system. We select SAP system as our case study software because SAP takes the largest market share for the ERP software. To objectively capture user experience, two groups of SAP ERP users from both sophisticated and early stage users are selected for focus group study. A strict research ethical procedure is followed before conducting the study. All the participants for the focus group study are voluntary and an informed consent form is provided to them before the study. 8 early stage users in the ERP class who have used SAP ERP software

for assessment for one month have been invited to participate in a one hour focus group to discuss their experience with ERP systems. 2 skilled SAP ERP users agreed to give their opinions on SAP ERP user experience. Two focus group studies for these two groups are held independently.

The profile of these two groups of users is strikingly different. For the early stage ERP users, 7 are male and one is female and all of them are between 20-28 age groups except one between 28-35 age group. The first focus group participants are from multi-cultural background, with two of them from China, two from Thailand, one from Germany, one from Indonesia and one from Nigeria. Most of them have some work experience in business related area. They have full access to all modules in the ERP system. Each of them is required to describe their personality and most of them are outgoing and sociable. The skilled ERP user groups consist of two ladies above 36 years old and both of them are British. The first lady A has been working with SAP ERP system for 7 years and the second Lady B has been working with SAP ERP system for about 15 years. Both of them have been using accounting and financial accounting modules of SAP system. A semi-structured questionnaire with guided questions is adopted during the two focus group sessions. A set of questions is designed based on the characteristics of ERP systems and the FIRO theory.

4 Case Analysis and Results

After gathering all the data from the two rounds of focus groups, we analyse our data firstly by coding all the transcripts. In general we have classified our transcripts into three categories: experience, difficulty, and improvement. We will present our analysis on these three categories based on the FIRO framework.

4.1 Experience

The experience here refers to the experience with the ERP systems and users are given opportunities to describe their feelings and emotions with using ERP systems. Users from both groups have expressed the feeling of frustration during the usage process. Specifically, one typical user from focus group 1 described his feelings:

I feel really frustrated when I couldn't find anyone to help with using the system. It's so complicated and I am tired very soon. I feel isolated during this process.
Another member from the focus group 2 also mentioned the similar feeling:

The overall experience is very difficult because it's self-taught. You know have anyone to help you with the learning process although you will be given training.

However, after certain level of usage, some users will experience the positive feeling. For example, one user from focus group 1 reported that he feel happy after using it for a while. Another member from focus group 2 although mentioned that she feels the system is good because of all the functions it provides.

From the basic human needs or the FIRO perspective, it's not difficulty to find out that the current ERP system lacks social functions and makes users frustrated and helpless. The overall experience with the systems is difficulty and hard to follow

because no human features are designed into the system. Features to fulfil human's basic interpersonal needs such as inclusion, control, and affect are missing in the current system. That's why users feel isolated and helpless with any control over the system. Although users feel happy after some level of usage, the positive emotions is more related with the fulfilment of need for security [20] or the flow theory [35].

4.2 Difficulty

The difficulty in the paper refers to the difficulty users experience during the usage process. Users are asked to recall all the difficulties they have experienced during using the ERP systems. Both focus group members reported similar difficulties. For example, one user from group 1 reported that "*it's very hard to correct the mistakes you have made while using the system. No functions to allow you to know what I have done wrong."* Similarly, both members from group 2 reported that "because *the system is self-taught, it's very different to correct the mistakes."*

There are more difficulties such as error messages are hard to be found and the colour of the system is too monotonous. There is no backward button etc.

From the human needs perspective, this is an extension of the experience users have been through. There are not enough human features in the system design which limits users' sense of inclusion and control during using the systems.

4.3 Improvement

Improvements refer to users' expectations to improve the system design so that they could use the system more efficiently. Both groups have expressed that they wish to have improved graphic interface with better colour scheme. At the same time, they expect to have improved audio functions for reminding etc. All these are related with human's perceptions about the world. Search functions all through the system is expected to improve so that users won't need to go through all the paths to get to the specific transactions. Search functions across different tables could also greatly improve the sense of control over the system, which is related with the need for control dimension of the FIRO framework.

5 Discussions, Implications and Conclusions

This paper is a first attempt to investigate the user experience of the ERP system from the interpersonal relationship perspective with FIRO framework. We have used the case study approach by analyzing data from two focus groups through three perspectives: experience, difficulty, and improvement. All focus group analysis showed that the human features are lack in the current ERP system. From the FIRO framework, most of human interpersonal needs are missing in the current system design. When human interact with the computer systems such as ERP system, the fulfilment of interpersonal needs dimensions in the system would greatly improve user experience. Need for inclusion could be embedded in the system by enabling users to send

messages to each other and discuss the issues they encounter. Need for control could be improved by interface of the system so that users could operate more functions such as customization of the system. Need for affect is currently missing in the system but the future design shall consider this.

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