Interacting with Computers 23 (2011) 117–128

Contents lists available at ScienceDirect

Interacting with Computers

journal homepage: www.elsevier.com/locate/intcom

Exploring the wiki user experience: The effects of training spaces on novice user usability and anxiety towards wiki editing

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ARTICLE INFO

Article history:
Received 17 May 2010
Received in revised form 28 September 2010
Accepted 2 November 2010
Available online 6 November 2010

Keywords:
Wiki
User experience
Anxiety
Usability engineering
Controlled experiments

ABSTRACT

With the advent of Web 2.0, the number of IT systems used in university courses is growing. Yet research consistently shows that a significant proportion of students are anxious about computer use. The quality of first experience with computers has been consistently mentioned as a significant contributor to anxiety onset. However the effect of users' first experience on system related anxiety has not to the authors' knowledge been researched using controlled experiments. Indeed little experiment based research has been conducted on the wiki user experience, specifically users' evaluations and emotional reactions towards editing. This research uses usability engineering principles to engineer four different wiki experiences for novice wiki users and measures the effect each has on usability, anxiety during editing and on anxiety about future wiki editing. Each experience varied in the type of training spaces available before completing six live wiki editing tasks. We found that anxiety experienced by users was not related to computer anxiety but was wiki specific. Users in the in-built tutorial conditions also rated the usability of the editing interface higher than users in the non-tutorial conditions. The tutorial conditions also led to a significant reduction in wiki anxiety during interaction but did not significantly affect future editing anxiety. The findings suggest that the use of an in-built tutorial reduces emotional and technological barriers to wiki editing and that controlled experiments can help in discovering how aspects of the system experience can be designed to affect usability and anxiety towards editing wikis.

1. Introduction

Information Technology (IT) is now common in higher education. From the use of word processing software to the use of virtual learning environments, students are expected to be familiar with a wide range of systems and interfaces. With the advent of Web 2.0 the number of systems a student is expected to use successfully is growing. Web 2.0 systems such as wikis offer pedagogical opportunities in terms of collaborative learning and allow the student to become integrated into the creation and maintenance of course content. Although these systems bring pedagogical benefits little is known about user reactions towards wiki interaction. Recent research has indeed suggested that usability of the editing interface is a potential barrier to wiki success (Ebner et al., 2008) but users' evaluation has not been empirically measured. Such aspects could reduce the effectiveness of the wiki system due to its collaborative core. Yet in-built training spaces such as sandboxes or in-built tutorials may influence users' usability evaluation and their quality of experience when editing wiki content.

The effect of having a poor experience with an interface may also be detrimental to the emotional relationship users develop with IT systems. Over 20 years of research has shown that a significant minority of students suffer negative emotions when it comes to computer technology (Farina et al., 1991; Heinssen et al., 1987; Joiner et al., 2007; McIlroy et al., 2007). Such anxiety may not only lead to negative affect when interacting with the systems but could also influence cognitive attention towards tasks through cognitive avoidance and off task thinking (Smith and Caputi, 2007). In more extreme cases and in cases where use is voluntary, students may minimise their use of the system (Brosnan, 1998). Anxiety about editing wikis may manifest in users due to their markup based interface, social core and lack of confidence in interacting with such a system. Research into the quality of students' first experience with computers has identified that poor first experiences have a significant effect on the development of anxiety about computers (Todman and Drysdale, 2004; Todman and Monaghan, 1994; Weil et al., 1990). Taking the research mentioned, first time users introduced to interfaces which deliver a negative user experience may be more at risk of developing negative emotions towards that interface. Even though such a finding has been proposed, little research has attempted to engineer different system interactions for users' first experience and observe its effect on anxiety towards systems experimentally.

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doi:10.1016/j.intcom.2010.11.002

The research presented concentrates on Web 2.0 systems, specifically wiki systems as they become more common in education. It aims to explore the effects of different types of in-site training spaces on usability rating in first interaction. We also aim to monitor the effects these spaces have on users' anxiety towards wiki editing. More specifically we aim to identify whether interactions where users rated usability as higher in their first editing experience also leads to less anxiety both during interaction and towards further wiki editing.

1.1. Background to the research

A wiki is a fully editable website. Users can view, add and alter the structure of content throughout the site. The flexibility of the system allows for knowledge to be built collectively through group collaboration and mistakes or conceptual falsehoods to be amended easily (Wang and Turner, 2004). They also allow the opportunity for students to become co-creators of course resources and content (Wang and Turner, 2004; Ravid et al., 2008) in partnership with other students and staff and gain transferable skills in using collaborative software (Parker and Chao, 2007). Wikis are predominantly edited by using a simplified markup language (Wiki Markup Language) (Augar et al., 2004; Wang and Turner, 2004) although some wikis include the option of using a basic rich text editor. Much can be done using the rich text editor however users are limited to only basic edits and the sole use of such a tool creates barriers to understanding and exploiting the full functionality of the wiki (Mader, 2008). It is therefore important that users become familiar with wiki markup early in their editing experiences. Wikis have been used in a variety of subjects and for a variety of functions such as collaborative creation of lecture notes (O'Neill, 2005), collaboration aids in group projects (Cowan et al., 2008, 2009) formation of knowledge repositories (Ebner et al., 2006) and the development of course texts (Ravid et al., 2008).

Although wikis bring pedagogical benefits, case studies where wikis have been used in an educational context report that users tend to edit content very little (Carr et al., 2007; Ravid et al., 2008) if at all (Ebner et al., 2006, 2008; Kickmeier-Rust et al., 2006; Cole, 2009). Interestingly, usability and ease of use are seen as significant barriers to contribution in wikis and a potential reason for lack of editing (Cole, 2009; Ebner et al., 2008). Usability is crucial to participation in online communities and the reduction of technological barriers is important in encouraging users to contribute to collaborative systems (Preece, 2001; Preece et al., 2004). Such systems rely on high volumes of user contributions to become useful, varied and accurate knowledge resources. For instance a dynamic wiki (one with high edit activity) leads to falsehoods and errors being amended quickly and to current updates of information. If the system by which users contribute is seen as difficult to use and leads to an unsatisfactory user experience it is unlikely that users will contribute frequently leading to the creation of a "*digital ghost town*" (Preece et al., 2004), especially if such contributions are voluntary rather than compulsory under course requirements. The benefits the wiki brings in terms of co-creation and transferable skills in a higher education scenario would therefore be minimised. Identifying aspects of the system experience which can influence usability is therefore of paramount importance in reducing this barrier.

Indeed poor initial interaction with the wiki may have emotionally detrimental effects. It is possible that due to interface and system experiences users will develop anxious feelings towards wiki interaction. Indeed having poor wiki editing experiences, as suggested in computer anxiety research (McIlroy et al., 2001; Todman and Drysdale, 2004; Todman and Monaghan, 1994) may lead users to become anxious about editing wikis further and potentially even minimise their contributions. Research using undergraduate students identified that students who had positive early experiences were less anxious about computer use (Todman and Drysdale, 2004). Users whose first experience was rated as fun, relaxed and where they felt in control also had low computer anxiety (Todman and Monaghan, 1994). The research mentioned however does not measure this under experimental conditions. There may be two reasons for this. Firstly there may be a difficulty in recruiting participants who have no experience at all with computer interfaces. IT is now widely used in society so the likelihood of finding a large cohort of complete novice users easily is small. Secondly problems lie in the vagueness of the term computer anxiety when trying to experimentally observe it. The concept is defined as "*an irrational anticipation of fear evoked by the thought of using (or actually using) computers*" (Brosnan, 1998) yet the uses of computers have developed exponentially since the start of computer anxiety research. Computer anxiety as a term lacks specificity about the experiences and systems which users are anxious about using, making it difficult to identify and engineer relevant experiences. It has become a term encompassing all negative emotions felt during any computer interaction. This umbrella term inadequately describes the variability in negative emotions when interacting with computers in the 21st Century. It is more likely that users' anxiety will vary depending on the interaction with specific systems rather than a "general" interaction with a computer. With the advent of Web 2.0, social influences may also cause anxiety, which are not taken into account in the computer anxiety concept.

This specificity is important if HCI researchers are to engage with the subject area in terms of designing and observing effects of user experiences on anxiety and its onset as is the case in this research. The study of specific emotional reactions to interaction is now more pertinent in the HCI field with the shift towards the exploration of subjective reactions towards technology (Dix, 2010). The affective reactions of users in terms of technology interaction are at the core of the developing concept of User Experience (UX) (Hassenzahl and Tractinsky, 2006). Yet the UX literature tends towards the study of positive emotions and reactions (Hassenzahl et al., 2010; Law et al., 2009; Law and van Schaik, 2010) rather than opening to the spectrum of human affect. The study of negative emotions towards technology is just as pertinent. Such negative emotions are important as they may be rooted in first experience and could affect uptake, contribution and ultimately success of collaborative systems such as wikis.

In exploring wiki editing UX there has been little empirical evaluation with much of the knowledge gathered in this area being based on qualitative research. It has been noted that the simplicity of wiki markup language used to edit wiki content is one of their main strengths (Goodwin-Jones, 2003; Mader, 2008). However wiki markup is seen as confusing and difficult by first time users (Augar et al., 2004; Holtzblatt et al., 2010) and may lead to anxiety. Because of its syntax and command based nature, users are put under intense cognitive burden when interacting with such interfaces (Davis and Bostrom, 1993). Users must understand the syntactic form of the language used and remember the specific commands rather than being able to infer functions and develop mental models of the system easily through use of graphical or menu orientated interfaces. Interacting with such an interface may be anxiety inducing for first time users due to the wealth of commands and syntactic rules which make the success of the users' interaction uncertain. Users may be overwhelmed by the knowledge needed for a successful first interaction. Error recovery in this type of interface also requires knowledge of commands and syntax to identify where the error is and what is needed to recover from it. Ability to recover from errors and apprehension towards learning programming languages are factors common to the measures of other IT related anxieties (Chou, 2003; Heinssen et al., 1987; Rosen et al., 1987). It is likely that such an issue would also be anxiety inducing in a wiki context, especially to novice users.