An Extension to Simulated Web-Based Threats and Their Impact on Knowledge Communication Effectiveness

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ABSTRACT

This paper presents an extension to the study by Kock, Chatelain-Jardon, and Carmona (2008), An Experimental Study of Simulated Web-Based Threats and Their Impact on Knowledge Communication Effectiveness, and empirically validates their results. Kock and colleagues reported that enhanced memorization capacity can be used in computer interfaces to exploit knowledge communication. They evaluated the impact of an evolutionary adaptive web-simulated threat (simulated web-based snake attack) on the effectiveness of knowledge communication and reported positive and significant outcomes. This research extends their study by using a technology-related web-simulated threat and measuring its impact on knowledge communication effectiveness. This research showed that the subjects in the treatment condition performed approximately 34% better than those in the control condition, which provides empirical support to the original study and shows how to exploit automatic brain mechanisms to enhance knowledge communication effectiveness throughout the design of computer interfaces.

KEYWORDS

INTRODUCTION

Ubiquitous technology has dramatically changed the way in which people communicate and interact, and knowledge communication is one of the activities that has been drastically affected by the existence of the technology. A fundamental factor that promotes or deters the effectiveness of web-based knowledge communication is the human–computer interface. An abundant body of research has accumulated in studies that try to improve interfaces by considering user needs through usability studies, which are carried out throughout the implementation process (Schnitman, 2007). However, few studies have considered the incorporation of automatic brain mechanisms in the design of human–computer interfaces (see Kock et al., 2008, 2008a, 2009). The goal of this research is to incorporate automatic brain mechanisms (instincts) into effective knowledge communication performance in the context of computer-based learning by extending the original study by Kock et al. (2008).

The central contribution of this research mainly comes from the unlimited application of its findings; this research suggests that selective incorporation of simulated web-based threats (regardless
of the nature of the negative stimulus) on the computer interface would lead to enhanced memorization throughout the activation of the automated mechanism of surprise. The human race requires specific forms of environmental input for its development, but "all [its] mechanisms require particular forms of input to be activated and to function properly" (Buss, 1995, p.5). An involuntary and instinctive response to surprise, such as that of increased cognitive capacity in the presence of what is perceived as a threat, should be relatively easy to exploit with the use of a simulated negative stimulus. In the present study we demonstrate how to exploit automatic brain mechanisms (i.e., enhanced memorization capacity as a consequence of the activation of the mechanism of surprise) to enhance knowledge communication effectiveness throughout the design of computer interfaces. Consider, as an example, the inclusion of a web-simulated emergency in the middle of an online training for medical doctors or registered nurses, this could have a bi-fold effect on the training, potential life-saving decision making due to enhanced memorization (because of the surprise/unexpected element) of the topic at hand, and potential better performance during such an emergency since it may not be unexpected anymore.

THEORETICAL FRAMEWORK

Literature Review

The increased availability of cheaper and more efficient computers has strongly influenced the rampant use of information and communication technology (ICT). This, aided by the development and popularization of the Internet and the World Wide Web (Web), has enabled new forms of communication (Clubb, 2007). The enormous impact that the Internet and the Web have had in our life during the past years is well known; they have become a prevailing global driver of innovation, growth, and productivity. Real, Leal, and Roldan (2006) suggest that information technology (IT) is considered an enabler of organizational learning; therefore, the importance of IT can be considered as central for the learning process of most organizations. Masino (1999) suggests that the learning process is intensely influenced by technological advances, and Gasco, Llopis, and Gonzalez (2004) imply that organizations must make progress in the use of e-learning in order to adapt to the new e-business culture. Similarly, Hortovanyi and Ferincz (2015) demonstrated that on-the-job learning is facilitated by ICT and that “the optimal level of ICT is essential for successful knowledge transfer and on-the-job learning” (p. 2).

Web-based knowledge communication provides a flexible cost-effective alternative to traditional learning environments, and although its effectiveness is sometimes questioned (Picciano, 2002), millions of students participate in courses with an online component (online, hybrid, mixed-mode, and Web-enhanced).

A fundamental factor that promotes or deters the effectiveness of Web-based knowledge communication is the human–computer interface. The role of the interface is essential because it is the point of contact between the human and the computer and it is the one in charge of communication between them. If the interface is not well designed, it is not capable of communicating with the human, breaking the learning/communication process. Because of the importance of this communication, numerous researchers have tried to improve interfaces by considering user needs through usability studies, which are carried out through the implementation process (Schnitman, 2007). For example, Horvath (2006) states that the presence of social and special cues in the interface would increase user satisfaction, comprehension, perceived ability, and enjoyment. Lynch and Horton (2002) suggest that since a robust screen design can increase user satisfaction, the screen design should be carefully considered. Gerlach and Kuo (1991) argue that, in order to satisfy users’ motor and perceptual needs, signals must be perceivable and responses should be within the range of a user’s motor skills. Thus,
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