

Toward an HCI Theory of Cultural Cognition

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INTRODUCTION

With the increasing demand for global communication between countries, it is imperative that we understand the importance of national culture in human communication on the World Wide Web (WWW). As we consider the vast array of differences in the way we think, behave, assign value, and interact with others, culture becomes a focal point in research of online communication. More than ever, culture has become an important human-computer interaction (HCI) issue, because it impacts both the substance and the vehicle of communication via communication technologies. Global economics and information delivery is leading to even greater diversification among individuals and groups of users who employ the WWW as a key resource for accessing information and purchasing products. Companies will depend more on the Internet as an integral component of their communication infrastructure. With a shift toward online services for information, business professionals have identified international Web usability as an increasingly relevant area of HCI research. What must be addressed are the cultural factors surrounding Web site design. Specifically argued is that culture is a discernible variable in international Web site design, and as such, should better accommodate global users who seek to access online information or products. There are still many unresolved questions regarding cross-cultural HCI and communication and the delivery of information via the Web. To date, there has been no significant connection made between culture context and cognition, cross-cultural Web design, and related issues of HCI. This correlation is relevant for identifying new knowledge in cross-cultural Web design theory and practice.

BACKGROUND

In order to maximize the easy access of online information and products, the building of Web sites

should accommodate for more than multilingual communication (Sheridan, 2001). Much rather, Web site developers responsible for design and testing, should have an equal concern for the complexity inherent in cultural diversity, that is, with factors such as social and psychology development. Past and recent cross-cultural studies and theoretical models have made direct links between culture, context, and related preferences (Chau, Cole, Massey, Montoya-Weiss, & O'Keefe, 2002; Hall, 1959, 1966; Hofstede, 1997; Trompenaars, 1997), but with a high emphasis placed especially on behavior.

Nisbett and Norenzayan (2002) argued that most psychologists in the 20th century continue to hold erroneous assumptions about the relationship between culture and cognition. This, they say, is fostered from theoretical positions in learning theory as seen by the work of Miller and Johnson-Laird (1976), as well as other cognitive scientists who embrace Piaget's position of extreme formalism and content independence of inferential rules found in culture. The problem with this view is that formalist theory assumes that cognitive processes are universal and all normal humans are equipped with the same set of attentional, memorial, learning, and inferential procedures, regardless of the content they operate on. However, the landmark work of cultural psychologist Nisbett (Nisbett, 2003; Nisbett & Norenzayan, 2002; Nisbett, Peng, Choi, & Norenzayan, 2001) provides a significant rebuttal to these assumptions about the independent relationship between culture and cognition. He includes a theoretical model of significant depth on which to build support for a new theory for international Web design that addresses the complexity of cognition in cultural context. Nisbett and Norenzayan (2002) state that the idea that culture profoundly influences the contents of thought through shared knowledge structures has been a central theme in modern cognitive psychology.

Nisbett's perspective on culture and cognition is derived from a range of studies and knowledge claims based on the earliest work of Vygotsky

(1979, 1989) and carried on by Luria (1971, 1976) in the 1960s-1970s. The central theory of the Russian School argues that cognitive processes emerge from practical activity that is culturally constrained and historically developing. Nisbett makes note of the significance of this early Vygotskian research (Luria, 1971; Vygotsky, 1979) to promote the idea that culture fundamentally shapes thought. This latter claim has provided a theoretical model for cultural cognition theory (CCT), which goes to the root of human information processing and other complex cognitive systems that are affected by cultural context. Nisbett and Norenzayan (2002) present evidence concerning assumptions about universality and content independence, concluding that multiple studies support their view of the relationship between culture and cognition, casting substantial doubt on the standard assumptions held by many psychologists. At the same time, the vast majority of empirical studies in cross-cultural psychology and cultural anthropology support the position that cognition is dependent upon cultural context, especially where formal education is present.

MAIN FOCUS

Over the last ten years, usability theory and testing have dominated the discussion among HCI and information technologists in academia and industry, setting the stage for culture to become the next frontier of Web design research (Dalal, Quible, & Wyatt, 2000; Eveland & Dunwoody, 2000; Fernandes, 1995; Kim & Allen, 2002; Marcus & Gould, 2000; Sears, Jacko, & Dubach, 2000; Wheeler, 1998; Zahedi, Van Pelt, & Song, 2001; Zassoursky, 1991). At present, many technologists neglect the impact of culture on communication, content delivery, and information structure. For them, technology is often used in place of creative and research-based solutions for overcoming limitations to human communication. However, as the strategic planning of Web design has fallen into the hands of HCI designers, social scientists, and communication experts, technology has not been seen as the panacea to online communication issues between cultures. Rather, in the process of investigating the most appropriate ways to maximize online information

delivery to international users, these specialists are exploring ways to confront an array of cultural contexts that are both vast and complex.

In regard to HCI, there are multiple usability studies that address cross-cultural Web site design from a socio-behavioral perspective (Barber & Badre, 1998; Dalal et al., 2000; Eveland & Dunwoody, 2000; Fernandes, 1995; Honold, 2000; Kim & Allen, 2002; Marcus, 2000, 2003; Marcus & Gould, 2000; Sears et al., 2000; Wheeler, 1998; Zahedi et al., 2001). However, limited focus on the relationship between culture and cognition as a theoretical model has been adequately explored, especially when we consider user preferences that are culturally determined by social-cognitive development. Hence, this article presents the view of cultural cognition theory (CCT) from the earliest work of Vygotsky (1979, 1989) and Luria (1971, 1976). Their work was further developed through the contemporary research of Richard E. Nisbett (Nisbett et al., 2001, 2002; Nisbett, Fong, Lehman, & Cheng, 1987; Nisbett & Ross, 1980) and colleagues. A relationship is drawn between CCT and cross-cultural Web development as a means to identify cognitive differences among designers that ultimately influence site design and user-Web interaction. The collective works outlined earlier identify propositions that argue how culture shapes cognitive phenomena, influencing the content of thought through shared knowledge, and subsequently learning, cognitive development, and processes that may impact Web design.

One proposition purported by Nisbett and Norenzayan (2002) is that “cultures differ markedly in the sort of inferential procedures (cognitive processes) they typically use for a given problem” (p. 2). To support this claim, they spend considerable time outlining a range of studies dealing with linguistics and mathematics that show cultural differences in basic knowledge structures and inferential procedures (Lucy, 1992; Luria, 1971; Miller, Smith, Zhu, & Zhang, 1995; Miller & Stigler, 1987; Wynn, 1990). Specifically, these studies show infinitely variable differences in knowledge domains, analytical processes, learning skills, and inferential procedures (such as deductive rules and schemes for induction and causal analysis), among diverse cultures. This is because these processes operate on different inputs for different people in different situations and cul-

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