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ABSTRACT

The major complaint users have about using the Web is that they must wait for information to load onto their screen. This is more acute in countries where bandwidth is limited and fees are high. Given bandwidth limitations, Web pages are often hard to accelerate. Predictive feedback information is assumed to distort Internet users’ perception of time, making them more tolerant of low speed. This paper explores the relationship between actual Web page loading delay and perceived Web page loading delay and two aspects of user satisfaction: the Internet user’s satisfaction with the Web page loading delay and satisfaction with the Web page displayed. It also investigates whether predictive feedback information can alter Internet user’s perception of time. The results show that, though related, perceived time and actual time differ slightly in their effect on satisfaction. In this case, it is the perception of time that counts. The results also show that the predictive feedback information displayed on the Web page has an effect on the Internet user’s perception of time, especially in the case of slow Web pages.

Keywords: Download Time, Internet User Frustration, Internet User Satisfaction, Subjective Time, Wait Time Feedback, Waiting Time Perception, Web Page Loading Delay

INTRODUCTION

The wait time that Internet users face when requesting a Web page from the Internet is one of the most serious deterrents to rapid development of online business (Rose, 2000). Research has persistently shown that if a Web page does not load quickly enough, Internet users will abandon the site and look for information elsewhere (Grigoroudis et al., 2008; Jupiter Research, 2006; Otto et al., 2000). An early study conducted by Zona Research (1999) estimates that electronic commerce lost sales due to Web page loading failures is worth $58 million a month. In the travel and tourism sector, each month, $2.8 million are at risk due to unacceptable Web page loading delays. After testing the user interface for Google Search, Google realized that moving from a 10-result page loading in 0.4 seconds to a 30-result page...
loading in 0.9 seconds not only slowed traffic but also decreased ad revenues by 20% (Farber, 2006). Similar work at Amazon.com revealed that every 100 ms increase in page load time decreased sales by 1% (Kohavi & Longbotham, 2007). While the Graphics, Visualization & Usability Center at Georgia Tech (GVU, 1999) revealed that the majority of Internet users attempting to find product information had problems, anecdotes in the literature indicate that customers are frustrated when pages take a long time to load (Jupiter Research, 2006). The problem of wait time has attracted increased public attention since the first Nielsen study in 1994 (Nielsen, 1994).

The dimension of time has been central in several research disciplines that are closely related to consumer behavior. It also started to draw attention in Internet-related research when the Internet user started to be considered a “customer” (Ritchie & Roast, 2001).

In Marketing, several research streams concerning time have evolved within the consumer behavior literature over the past twenty years. These include the effects of time pressure on consumer decision making (Johnson & Payne, 1985), people’s allocation of their time (Feldman & Hornik, 1981), and perception of time (Hornik, 1984).

Awareness caught up in the Information Systems (IS) discipline as well and revived researchers’ interest in studying response time in a new kind of systems: Web-based systems (Galletta et al., 2004; Hoxmeier & DiCesare, 2000; Otto et al., 2000; Rose, 2000; Rose & Straub, 2001; Rose et al., 2003).

Researchers concerned about time in Marketing, IS, and Human Computer Interaction (HCI) generally focus on actual “clock time”. No less important, however, is how users experience time duration.

A famous study conducted by Perfetti and Landesman (2001) provided interesting insights about time and how Internet users perceive it. The researchers conducted an experiment involving 10 different Web sites loaded over a 56 kbps modem. For each site, they had users rate how fast they felt the site was. When the researchers measured the actual loading times, they found no correlation between them and Internet users’ rating of speed. Even more interesting was the finding that users rated the fastest site (About.com, loaded in an average of 8 seconds) as the slowest and rated one of the slowest sites (Amazon.com, 36 seconds) as one of the fastest. Clearly, perceived speed and actual speed were different concepts and increasing actual speed does not necessarily make users perceive the site as faster. This means that, although two Web sites may perform identically on a technical level, their perceived Web page loading delays may be very different from a user’s perspective. Often, Web sites manage this perception by providing the Internet user with information on the amount of time to wait using such tools as linear progress bars or countdown timers.

WEB PAGE LOADING DELAY

What is Delay?

Delay has often been called differently in the literature: “responsiveness” (Otto et al., 2000; Park & Gretzel, 2007), “download time” (Weinreich et al., 2006), “response time” (Dennis & Taylor, 2006), “waiting time” (Nah, 2004), “download delay” (Rose et al., 2003), “latency” (Bouch et al., 2000), etc.

Past research has attempted to define and quantify what constitutes a delay, a “long” delay, an “excessive” delay, a “tolerable” delay as well as to examining its effects noting that the subjective interpretation of the delay may vary from person to person and context to context (Katz et al., 1991). In the Hoxmeier and DiCesare (2000) experiment, computer response delay of 12 seconds was deemed “intolerable”. For others, delays of 13 seconds for single pages were rated as “long” and resulted in significantly lower satisfaction (Nah & Kim, 2000). Others have suggested 8 seconds (Sliwa, 1999). Still others (Dennis & Taylor, 2006) determined that 7-second delays were both “noticeable” and “acceptable” for laboratory studies.
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