IT Progress Indicators: 
Sense of Progress, Subjective Sense 
of Time, User Preference and the 
Perception of Process Duration

T. S. Amer, The W. A. Franke College of Business, Northern Arizona University, Flagstaff, AZ, USA 
Todd L. Johnson, The W. A. Franke College of Business, Northern Arizona University, Flagstaff, AZ, USA

ABSTRACT

Users of information technology (IT) often encounter “progress indicators” during their interactions. These graphics (e.g., progress bars) appear on computing screens as users wait for a task to complete. The purpose of progress indicators is to inform users of the progress being made to complete a task. This study employs two theoretical models from psychological research on human waiting to develop specific hypotheses related to the design of progress indicators: the sense-of-progress and the subjective-sense-of-time frameworks. The results of three experiments indicate that progress indicators exhibiting key characteristics from these frameworks influence user experiences. Experiment 1 revealed that participants preferred a linear progress bar to a cycling progress bar. Experiment 2 revealed that participants preferred a video progress indicator to a cycling progress bar, and judged the process duration to be shorter with the video progress indicator. Experiment 3 revealed that the video progress indicator yielded the best user experience.

Keywords: Progress Indicators, Progress Bars, Psychology, Human Computer Interaction, Waiting

INTRODUCTION

Users of information technology (IT) often encounter “progress indicators” during their interactions. Progress indicators are graphics that appear on the computer screen as a user waits to complete a task, such as downloading a file, saving a file, or updating software. The purpose of progress indicators is to inform the user of the progress that is being made as the task moves toward completion. Progress indicators can take different forms, such as a spinning disk, a bar that moves across the screen, or a textual message (for example, “26% completed”) (Conrad, Couper, Tourangeau, & Peytchev, 2010; Cooper & Reiman, 2003; Galitz, 2007; Shniederman, Plaisant, Cohen, & Jacobs, 2009). Because they are common features in IT environments, it is important to understand the appropriate form, content, and movement patterns of progress indicators to maximize the quality of the user experience and effectiveness of their interactions (Shniederman et al., 2009; Villar, Callegaro, & Yang, 2013).

DOI: 10.4018/ijthi.2014070105

Copyright © 2014, IGI Global. Copying or distributing in print or electronic forms without written permission of IGI Global is prohibited.
This study applies theoretical models from psychology and reports experimental data to better understand the impact of progress-indicator design on the user experience.

Related Literature

Prior research has investigated the design features of progress indicators in different contexts to determine appropriate parameters and user perceptions. One area of concentrated work investigated the use of progress indicators in online surveys (Villar et al., 2013. Also see Conrad et al., 2010; Matzat, Snijders, & van der Horst, 2009). The emphasis was on the effect of alternative progress-indicator design to reduce “drop-off rates”—that is, to minimize the probability that a respondent will not complete a survey after starting it. Villar et al. used meta-analyses of 32 published manuscripts that examined three types of progress indicators: constant (moving linearly), fast-to-slow, and slow-to-fast. Their results indicated that using a constant-moving progress indicator does not significantly reduce drop-offs and that effectiveness of the progress indicator varies depending on the speed of the indicator: Fast-to-slow indicators reduced drop-offs, whereas slow-to-fast indicators increased drop-offs. These results may be explained by a sense-of-progress psychological framework of waiting (to be discussed below): A progress indicator that moves quickly at the beginning of the task may give users the impression that there is a greater movement toward task completion (a sense of progress), which improves satisfaction.

Some additional research has examined other progress-indicator design features in contexts other than participants completing online surveys. Crease and Brewster (1998) found that adding sounds to progress bars improved usability because users preferred progress bars with sound cues over progress bars without sound cues. Harrison, Amento, Kuznetsov, and Bell (2007) and Harrison, Yeo, and Hudson (2010) examined how several different features of progress bars affected a user’s perception of progress duration during a waiting period. The authors examined progress bars with nonlinear movement and “ribbed” and “pulsating” visual features. While no specific theoretical framework was used in the design of the progress bars, the authors found that participants perceived that progress bars that paused took longer than those that did not. Order effects may have confounded some of their results as the authors noted that participants tended to prefer (i.e., perceive as faster) whichever progress bar they experienced first.

Hamada, Yoshida, Ohnishi, and Köppen (2011) attempted to find a relationship between progress bar colors and perceptions of process duration during a waiting period. They prepared six combinations of colors, blue/red for the progress bar’s foreground color, and cyan/orange/gray for its background color. While no specific theoretical model was referenced in the design or the choice of the color combinations, the data reported no difference in subjective perceptions across participants. The authors hypothesized that the results were possibly due to the small sample size of only 10 participants and the order effects in the presentation of the experimental trials.

Hurter, Girouard, Riche, and Plaisant (2011) explored the possibility of using “active progress bars,” which allow users to switch to temporary (secondary) activities when a primary activity requires them to wait. Using the results of survey data, they proposed samples of secondary-activity applications, combining existing applications with a normal progress bar. The secondary activities included entertainment activities (for example, games) and work activities, such as allowing the user to manage a to-do list. The researchers’ idea was to make use of the time users spend waiting for the primary activity to complete.

Kortum, Peres, and Stallmann (2011) and Garcia and Peres (2012) examined auditory progress indicators as an alternative to the visual progress indicators. In both studies participants were asked to listen to three alternative auditory stimuli during waiting periods: pure tones (sine wave), musical patterns (cello), and a continuous electronically generated musical scale.
Related Content

Motivational Patterns and the Performance of Entrepreneurs: An Empirical Study of Women Entrepreneurs in South-West Nigeria
[www.igi-global.com/article/motivational-patterns-performance-entrepreneurs/62267?camid=4v1a](www.igi-global.com/article/motivational-patterns-performance-entrepreneurs/62267?camid=4v1a)

Collaboration and Communication in the Online Classroom through a Brain-Based Approach
[www.igi-global.com/article/collaboration-and-communication-in-the-online-classroom-through-a-brain-based-approach/117609?camid=4v1a](www.igi-global.com/article/collaboration-and-communication-in-the-online-classroom-through-a-brain-based-approach/117609?camid=4v1a)

The Influence of Information Control upon On-Line Shopping Behavior
[www.igi-global.com/chapter/influence-information-control-upon-line/68270?camid=4v1a](www.igi-global.com/chapter/influence-information-control-upon-line/68270?camid=4v1a)
Supporting Learner Reflection in the Language Translation Class
*International Journal of Information Communication Technologies and Human Development* (pp. 26-48).

[www.igi-global.com/article/supporting-learner-reflection-language-translation/34052?camid=4v1a](www.igi-global.com/article/supporting-learner-reflection-language-translation/34052?camid=4v1a)