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Paging vs. Scrolling: Looking for the Best Way to Present Search Results

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Web designers are constantly confronted with the problem of displaying large amounts of information in confined spaces. To deal with this designers usually have two options, either present the information on one long scrolling page or divide it into smaller amounts on multiple web pages. Studies have found that shorter documents that require more paging tend to be superior in both performance and preference to longer pages that require more scrolling. For example, Piolat, Roussey, & Thunin (1998) found that participants who paged through documents had a better mental model of the text and were better able to locate relevant information and remember its main ideas than those who scrolled. Schwarz, Beldie, & Pastoor (1983) found that paging was preferred by inexperienced users but did not find significant differences in task completion time or search performance. Other studies have also found no differences between the two methods in terms of user performance (see Mills & Weldon, 1986). However, almost all of the studies that have been conducted were done prior to the advent of the Web.

In today's Web environment users quickly scan most information, particularly search engine results. Because of this, it is possible that presenting long, scrollable pages may facilitate more efficient scanning, since users will not have to focus as much on paging while searching for the information. On the other hand, longer pages may be more disorienting, particularly for search tasks. Thus, the question posed in this study is how much information should be presented at one time on a search result web page?

METHOD

A Pentium II based PC computer, with a 60 Hz, 96dpi 17" monitor with a resolution setting of 1024 x 768 pixels was used. The participants' performance was tracked by using ErgobrowserTM software.

Participants

Eighteen participants (10 males 8 females) volunteered for this study. They ranged in age from 19 to 55, with a mean age of 28 (S.D. = 12 years). The median Web use for the participants was 7-14 hours per week (72% used the Web a few times per week or more).

Procedure

Users were asked to locate specific links on three search engine result pages, each with a different layout (see Figure 1). Each layout had a different search domain (music, sports cars, and clothes) and presented a different number of links on each page. All layouts presented a total of one hundred links. One layout presented ten links per page (on ten pages), another presented fifty links per page (on two pages) and another presented 100 links on one page. For each layout arrangement, participants were instructed to search for specific links within the search domain results. For each search domain,

participants were presented with ten search terms that were identical to links located within a particular result layout. After participants viewed each search term, they were instructed to search for a corresponding link within the search results. For every ten links, one corresponding search term was randomly selected. Each link had to be properly identified within five minutes to be considered correct. Participants could search until they found the correct information by scanning the pages and using the “forward” and “back” paging buttons, or until the time expired. The result layouts, their associated search domain, and the search terms were counterbalanced by means of a Latin square design. The web layouts were saved on a local server, which produced almost instant access to the search pages in all conditions.



Figure 1. Users searched for information on a page with 10, 50, or 100 links.

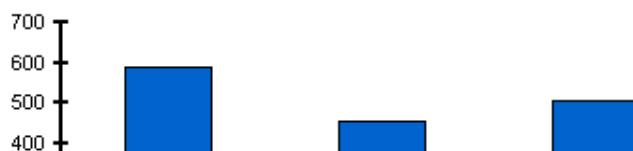
After finishing all the questions for each condition, participants answered a satisfaction questionnaire. The questionnaire consisted of a 6-point Likert scale, with 1 = “Disagree” and 6 = “Agree” as anchors. The questionnaire items were: *“The layout made it easy to find information, there were too many choices, the layout looks professional.”* After participants answered the questionnaire for each condition they ranked the three results layouts for general preference.

Results and Discussion

A within-subject ANOVA design was used to investigate actual performance (mean task completion time) and perceived search efficiency performance for three types of link conditions. Preference across conditions was analyzed using a Friedman χ^2 .

Task Completion Time

Assessing the time taken to complete the search tasks revealed a significant difference between the page length conditions (see Figure 2) in that the fifty-link condition had a significantly shorter completion time than the ten-link condition [$F(2, 28) = 4.88, p < .05$]. It is possible that having to page every ten links increased the search time because participants had to both attend to the search task and find and click the “forward” or “back” button in order to progress to the next search result page.



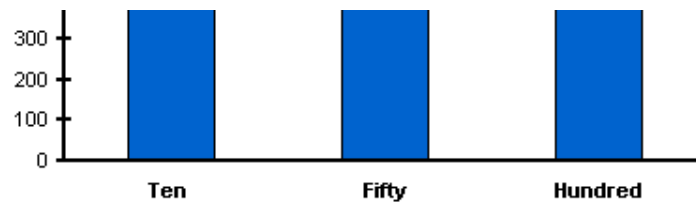


Figure 2. Mean task completion time in seconds.

Perceptions of Search Efficiency

Easy to Find Information

In terms of how easy the information was to find, results indicated that the ten-link condition had a significantly greater perception of being easier to search than the hundred-link condition [$F(2, 32) = 4.01, p < .05$]. It is interesting that having to page through successive search results was perceived as being easier than scrolling through one long search result page, especially in light of the fact that it took longer to find the information in the ten-link condition (see Figure 3).

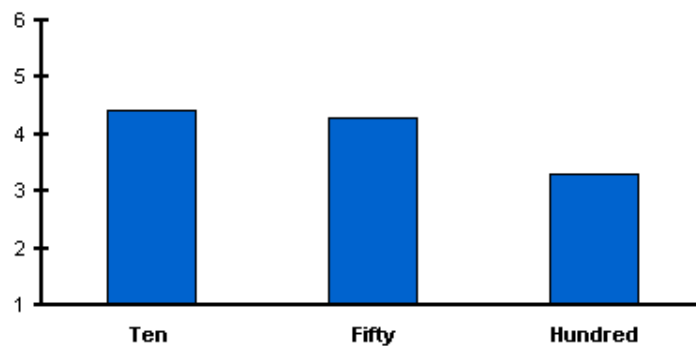


Figure 3. Easy to find information (1 = "Disagree" and 6 = "Agree")

Too Many Choices

Assessing the perception that a particular layout presented too many search choices revealed that the hundred-link condition had significantly greater perception of presenting too many choices than the ten-link condition [$F(2, 32) = 6.72, p < .05$]. It is possible that the ten-link condition was perceived as easier to find information because it presented a more manageable amount of information (fewer choices) at one time (see Figure 4).

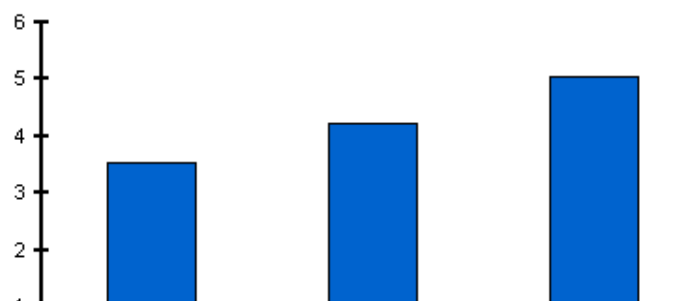




Figure 4. Presents too many choices (1 = "Disagree" and 6 = "Agree")

Looks Professional

We also asked users if a particular layout looks more 'professional.' It was found that the ten-link condition had significantly greater perception of looking professional than the hundred-link condition [$F(2, 32) = 3.28, p < .05$]. This outcome may be due to the fact that most search engines default the number of search results to ten per page and, thus, ten results would appear more professional looking. It also could be that participants perceived the ten-link condition as more professional in appearance because it was perceived as being easier to find information (see Figure 5).

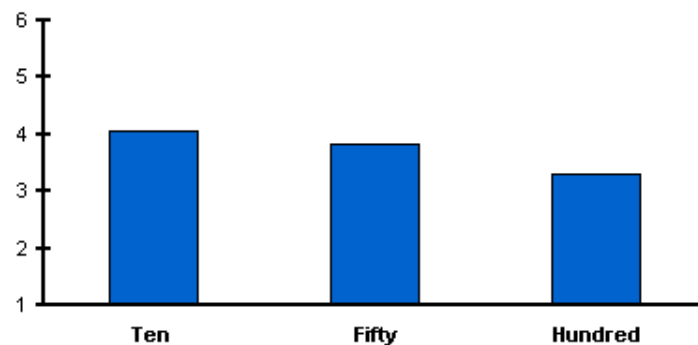


Figure 5. Looks professional (1 = "Disagree" and 6 = "Agree")

Link Arrangement Preference

Analysis of the participants' preference for each link arrangement revealed a significant difference in ranking [$\chi^2(2, N = 17) = 12.82, p < .01$]. Post hoc analysis revealed that the fifty-link arrangement was significantly preferred to the hundred-link condition (see Figure 6). It is not too surprising that the hundred-link condition was the least preferred, since it was perceived as presenting too many choices and being more difficult to find information, even though participants using this condition were actually faster in finding information than the ten-link condition.

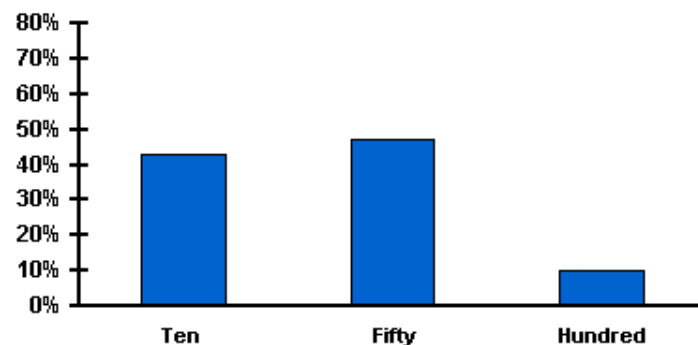


Figure 6. Mean preference (the higher the bar, the greater the preference)

CONCLUSION

Overall, the fifty-link condition had the fastest search time and was most preferred. It is possible this is because this layout required only a limited amount of paging (only two pages). Conversely, the hundred-link condition was by far least preferred. That is, it was perceived as being the most difficult condition to find the correct information, as well as being perceived as the most cluttered. What this suggests to us is that participants favored and performed best on layouts with both reduced paging and scrolling. However, when forced to pick between the two, they clearly preferred paging, even though participants using the ten-link condition took the most time to find the correct information. Accordingly, this study seems to suggest that having moderate amounts of links per page (around 50 links) is superior to having longer pages.

Note: A presentation based on this work was presented at the Human Factors and Ergonomics Society's 46th (2002) Annual Meeting.

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