

User Needs of Mobile Phone Wireless Search: Focusing on Search Result Pages

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Abstract. Based on understanding differences between wired and wireless search, we analyzed user needs for mobile phone wireless search. According to this research, heavy wireless search users produce more traffic searching for information than searching for downloadable contents. Through several usability tests, we can get some design guidelines for wireless search result page. Users require different results and presentation for the results of general information keyword searches to media contents keyword searches. Users preferred representative labelling of categories. In addition, it is essential to minimize navigation of the search results.

Keywords: Wireless search, wireless internet, mobile phone, usability, user satisfaction, design guidelines.

1 Introduction

The usage of wireless internet has rapidly spread in Korea where the receptive capacity of new technology is comparatively high. As of September 2007, 47.7% of mobile phone users between the ages 12 to 59 have used at least one or more wireless internet services in Korea. By service type, 46.2% have used the mobile phone wireless internet within the last 1 year while 5.2% and 2.9% have used wireless LAN and broadband respectively. Notably, almost all(92%) mobile users between ages 12 to 19 have used the mobile phone wireless internet.¹ Taking these circumstances into consideration, the potential impact of wireless applications is enormous and is rapidly growing. Just as online search engines have been a gateway to increased consumption of wired data, the wireless search using mobile devices will help meet user needs for data access at any-time and at any place. However, the usability of wireless internet is still not satisfied due to small screens, lack of flexibility and comparatively high data traffic cost, etc.

Our goal in this paper is to present

1. Understanding differences between wired and wireless search
2. Analyzing user needs for mobile phone wireless search
3. Providing design guidelines for search result pages and search routs

¹ NIDA(National Internet Development Agency of Korea), 2007 survey on the wireless internet use, pp 3.

2 Usage Differences between Wireless and Wired Search

A survey was conducted in order to understand the usage differences between wired and wireless search service with 300 mobile device users who used wireless internet at least once a month.

The frequency of wireless and wired search is as follows. 40.3% of respondents accessed wireless search '1~3 times per month', followed by 'once for two days'(22.3%) and '1~3 times per week'(18.4%), while 46% accessed wired search '1~10 times per day'(46%), 'More than 10 times'(43%).

Table 1. Usage Rate of Wired-Wireless Search

Frequency	Wired Search	Wireless Search
More than 10 Times per day	123(41.0%)	12(4.0%)
From 1 to 10 Times per day	138(46.0%)	45(15.0%)
Once for 2 days	16(5.3%)	67(22.3%)
1~3 times per week	20(6.7%)	55(18.4%)
1~3 times per month	3(1.0%)	121(40.3%)

According to the results, the usage rate of wireless search is significantly lower than wired search. This result shows that the mobile phone wireless search does not give users a satisfactory experience due to complex reasons such as relatively expensive data usage charges, the small screen of mobile phones and insufficiency of search result contents, etc.

2.1 Reason for Using the Wireless Search

According to the survey, the main reasons for using mobile search was 'Information Search(21.8%)', followed by searching for 'Ringtones(15.2%)', 'terrific/GPS service(9.5%)' and 'Listening/Downloading music(8.4%)'. On the other hand, users who claimed they are using wireless search for downloading specific contents such as music, game or background image, practically accessed wireless search less than once a month. We can conclude that users produce more traffic searching for information than searching for downloadable contents.

2.2 Comparing Search Keywords between Wireless and Wired Internet

To compare the search keywords of wired search and those of wireless search, we analyzed top 100 search keywords of the KTF website and SHOW internet (KTF brand of wireless internet) from Jan. to Feb. 2008. 65% of wired search keywords were related to additional mobile services and the rest were for contents such as decorating phones. On the other hand, 75% of wireless search keywords were related to downloading contents, especially music, game and adult contents. For in-depth verification, we analyzed the KTF engine Logs for 4 days (mar.28~31.2008). The results show that wireless search is executed for an average 2.5 times per user. 88% of those users were searching for downloadable contents. Meanwhile, heavy search users who access wireless search more than 8 times tend to search for information data such as

news, shopping, transaction, etc. The data shows contradicting results from the survey about the reasons for using wireless search. However, heavy user's behavior agreed with the survey results since their search habits were more information-related.

Table 2. The Search Keywords of SHOW internet (KTF brand of wireless internet)

Ranking	Search keywords	Numbers of Queries
1	Game	2273661
2	Ring Tones	860965
3	Coloring ²	802439
4	Cyworld ³	654659
5	Girls' Generation ⁴	588540
6	Big Bang ⁵	522571
7	Mini Game	479385
8	Mat-Go ⁶	473945
9	Sex	469137
10	Hero SEOGGI ⁷	442171

2.3 Preferred Contents on Search Result Pages

We conducted a focus group interview composing of 4 age categories (Teen Group: 6, Twenties Group: 12, Thirties and Forties group: 6, Fifties Group: 4) to compare preference of wired and wireless search. In the case of wired search results, users wanted a wide range of information from various categories, but in the case of wireless search results, they preferred location/traffic/restaurant information, specific information especially needed outdoors and everyday life. For objective analysis of preferred items in the search results, we conducted a supplementary card sorting. The results are as follows, "News" ranked first, "Regional" second, and "Traffic/Location" third. In addition, users preferred more recognizable and familiar labeling such as 'Music', 'Game', or 'Location' instead of brand names like 'Dosirak', 'G-Pang' or '**114' which are provided by KTF. We can conclude that for mobile search, information about everyday life should be provided more readily than downloadable contents.

3 Usability of Mobile Phone Wireless Search

3.1 Preferred Contents on Search Result Pages

We asked 30 users with experiences of wireless search to conduct KTF wireless search for a specifically chosen ring tone and the name of a specific service menu. While 70 percent of the users succeeded in the ring tone search, 53 percent succeeded in the

² The service title of Ring back tone.

³ A Korean social networking website which is similar to 'Facebook'.

⁴ A Korean dance group composed of nine girls.

⁵ A Korean hip hop & R&B group composed of five members.

⁶ The title of a famous mobile game.

⁷ The title of a famous mobile game.

service menu search. Among the users who succeeded in their ring tone search, 79 percent achieved it by entering a keyword in the main domain, while only 21 percent of those users first entered search menu category to search the ring tone. In case of the service menu search, 81 percent of the users searched on the integrated search of the main domain, whereas 18 percent of the users opted for the search menu category. One reason why relatively fewer users search on the search menu category is that users are familiar with the search process using search tabs through their wired search experiences. Another reason is that users do not have a clear standard within their mental model in choosing a category containing the specific search results. It is because a user has to go through several stages before obtaining necessary information.

On the other hand, the fact that the success rate for service menu search was lower than that for the ring tone search can be explained in that it was provided as part of the contents of the category along with general information without further clues for the service menu.

3.2 Category Labeling: Individual Category Labeling vs. Representative Category Labeling

In an effort to improve the categories provided by search pages, we asked 50 people about their preference as to categories. Considering the fact that more space would be used up to distinguish each category as the number of the categories grow, we sought to merge categories for the sake of the efficient use of limited space of the search page. When merging related categories, we asked our sample group about their preference between individual labeling of categories (e.g. News/Traffic/Regional,

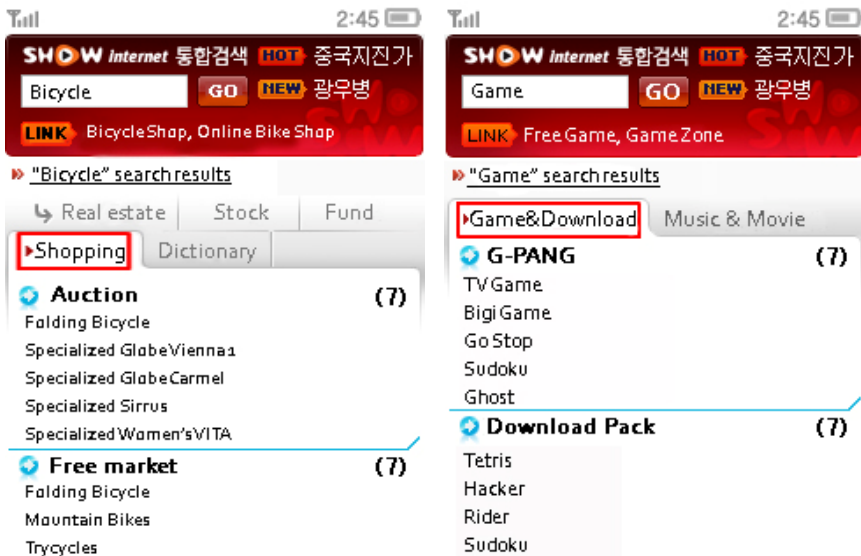


Fig. 1. 2 depth search result page (left), 3 depth result page (right). This shows the tab-style navigation. 2 depth tabs include representative categories with closely related categories 3 depth tabs include more detailed categories.

Shopping/Finance/Education, Ring tones/RingToYou/ Wallpaper) and representative labels of categories (e.g. News, Life, Music). It was found that 64 percent of the sample group preferred representative labeling and they did not depend so much on category labels at the time of wireless search. The general response was that representative labeling showing overall characteristics of the contents provided sufficient information for the purpose and more information as to the more detailed labels of the categories was needed only after 2 depth.

3.3 Navigation Method: Tab Style Navigation vs. Vertical Scrolling

Whereas in the first result page of the search the sample group users preferred the scrolling method to overview the search result as a whole, after selecting a particular category they preferred the tab-style navigation in detailed categories provided in the 2 depth. This is because, when a wrong choice of a particular category is made, this method provides economical ways to move between categories without returning to the upper-level web pages.

4 Design Guidelines for Wireless Search Result Pages

Through our research on users shown in this paper, it is concluded that the characteristics of the wireless search, such as limited screen space, pressure of the service rate and limitation in time, requires optimized and customized and keyword-specific web design so that users can find necessary information within a short period of time.

Firstly, users require different results and presentation for the results of general information keyword searches to media contents keyword searches. In case of general information searches, users want to access current affairs information/ news even without using pertinent keywords. In contrast, in media contents searches where users know the clear objective of their search, users want matching results for their keywords. Although it would be applied in a similar way in wired searches, it would be far more critical in wireless searches. If the required information is not found in the first page of the search result, most of the users tend to give up the search altogether. Therefore, it is necessary to consider the ways to show customized information according to the keyword within the first page of the search results. In addition, users want media contents search results to allow quick searching by way of thumbnails. As the screen space is limited, the users should be given options as to the order of thumbnails according to popularity, date, etc.

Secondly, it is desirable to provide comprehensive categories through which users can grasp the characteristics of the contents rather than providing detailed categories contents in the search result page. Users consider it more important to get a general idea of the particular contents, such as sitemap or paid contents, rather than the categorization of the contents.

Thirdly, as wireless search involves costs for use, it is essential to provide jumping routes between categories to minimize navigation of the search results. Generally in the case of wireless searches, integrated search using a search tab is used rather than sequential search through menu search categories. Therefore, it is suggested to minimize the categorization of contents and to provide navigation through tabs to enable movements between categories. In addition, more relative tabs should be arranged beside the chosen tab.

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