Browser search hijackers / Shai Shlomo Eistein

Abstract

I. Objective

The objective of this research was to diagnose the relationship and perception of the search engine user community towards browser search hijacking, based on the definition of browser search engine hijackers as "potentially unwanted programs." Meaning, the research tried to define if there was a basis for the definition of these search engines as potentially unwanted programs. Whether they are unwanted programs, and there is no reason for users to want them. Alternatively, they could be programs that the users would prefer to use.

Following that, the research tried to conclude what were the ethical implications of the browser search engine hijacking phenomena. The research questions asked were related to the ethics of browser search hijacking, based on the usability experience analysis and user preferences. The main question asked was, "What are the ethical implications of browser search hijacking," and to answer that question, a secondary question was asked, "What are the users' attitudes concerning browser search hijacking?" These questions were asked because our premise was that the ethical implications would be drawn from the feelings and experiences of the search engine user community.

II. Method

The research population was constructed from users studying for academic degrees related to the fields of information and technology. The reason this population was selected was to exclude bias based on lack of technical ability and to focus on the influence of the search tool of the browser search hijackers on the searching experience. The users were divided into four

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groups, and each group was exposed to results from a different browser hijacker's search engine. The experiment was done within the users' computer classrooms with consent from the lecturer teaching the class. The questionnaire was composed of four different parts: demographics, search results analysis task, search task, and a preferences and attitudes questionnaire. The outputs were analyzed using quantitative and qualitative research methods.

III. Results

Using the quantitative research methods, we found that the users' rating order of reasons for preferring their search engine included: most comfortable interface, best user experience, most efficient engine that retrieves most relevant and accurate results, the search engine that everybody uses, and a search engine that secures information and privacy. Further, the users' reasons for agreeing to use a browser hijacker's search engine were best user experience, most comfortable interface, a search engine that secures information and privacy, most efficient engine that retrieves relevant and accurate results, and the search engine that everybody uses. Furthermore, it was discovered that there was a difference between the users' preferences based on demographics and other attributes.

On top of that, an ANCOVA analysis was done to verify if there were differences in the level of satisfaction from browser hijacker search engines and the popular Google search engine. The level of satisfaction was examined using the level of satisfaction from the order of search results and the number of relevant search results. There were no significant differences in the level of satisfaction in either parameter examined in any query result.

Finally, a model was built to forecast the tendency to agree to use a browser hijacker's search ($r^2=0.41$, $p<0.01$) engine based on preference for search engines that secure information and privacy, user experience, comfort, efficiency, most popular search engine, negative

feelings towards hijacker search engines, level of importance when choosing a search engine, gender, the level of pre-thinking about preferences toward search engines, and previous encounters with browser hijacking. The most important predictor was gender.

Using qualitative methods, two themes in user preferences toward search engines were found: use efficiency and user experience. The first theme is "use efficiency," meaning categories related to accomplishing the search goals, and this is comprised of the following categories: a search engine that includes additional applications, such as email and cloud storage; flexible and advanced search with dedicated search engines for images and academic articles; well-ordered results that contain summarized information and meaningful titles; a search engine that retrieves information from sources that has high credibility and reliability; and an efficient search engine that retrieves relevant and accurate results.

The second theme is "use experience," meaning the categories that are related to the search interface and search process, and it is comprised of the following categories: fast retrieval speed; comfortable, static, and easy-to-use interface; minimal marketing content and advertisements in the search results; user language-aware with translation capabilities; and a search engine without error-proofing faults and broken links. On the other side, some users did not have high expectations from search engines and reported they were using their search engines for reasons of popularity and habit.

Another subject that was analyzed using qualitative methods was the users' feelings to browser hijackers' search engines. On that subject, it was found that users have different feelings towards browser hijacker search engines and the hijacking experience. The range of feelings included negative feelings like anger, stress, loss of control and discomfort. On the other hand, some users expressed apathy or lack of interest towards search engines and were

not especially concerned about the search engine replacement. At the far edge of the spectrum, some users expressed curiosity towards the new engine and even overcame the initial feelings of anger and experimented with the search engine, although it was changed without their knowledge.

IV. Conclusions

The definition of browser search hijackers as a "potentially unwanted program" is accurate. That is because under certain circumstances, users might prefer the use of these search engines. However, users dislike search hijacking. So it would be preferred by users if corporations that are interested in adopting search engines to their business model promote advantages that match their users' preferences (e.g. fewer marketing-oriented results or securing privacy and information) to promote their search engines. This is rather than promoting their search engines based on the search hijacking which the users dislike.

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