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Finding Online Health-Related Information: Usability Issues Of Health Portals

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Abstract. As Internet and computers become widespread, health portals offering online health-related information become more popular. The most important point for health portals is presenting reliable and valid information. Besides, portal needs to be usable to be able to serve information to users effectively. This study aims to determine usability issues emerging when health-related information is searched on a health portal. User-based usability tests are conducted and eye movement analyses are used in addition to traditional performance measures. Results revealed that users prefer systematic, simple and consistent designs offering interactive tools. Moreover, content and partitions needs to be shaped according to the medical knowledge of target users.

Keywords. Human Computer Interaction, Online Health Information, Health Portal, User-Based Usability Evaluation, Eye Tracking

Introduction

Usability has become an important aspect of design process as well as a hot topic for researchers. The underlying principle of usability in design is to help any user to easily accomplish a task. Any design for any task, from design of an alarm clock to design of a spaceship might be the subject of usability. This study focuses on usability issues related to health portals which are user-centered or to be more specific patient-centered health applications. Health portals may have extensive health information, search engine, a network of communities for support and experience sharing. They may also include personalization systems such as electronic personal health records [1].

Usability literature for health portals includes few studies. Some researchers worked on patient portals which serve individuals suffering from a specific disease whereas, few studies focused on health portals which serve public. In fact, Chapman and colleagues stated that the importance of eHealth Portals is expected to grow as the digital divide lessens and availability of Internet widens [2]. Despite this expectation, which seems logical and parallel to reality, usability of health portals are underestimated.

One of the usability evaluation approaches is user-based evaluation which provides valid and reliable data according to user performance and experience. Typically task performance, speed, and error data are used for user performance analysis. For userbased evaluation, there are several ways to collect data, for instance capturing video

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throughout the experiment and instructing users to think aloud. In addition, tracking eye movements is proposed to be a promising data collection method [3]. For usability analysis, eye movements are recorded and retrospectively analyzed, which provides direct data about where a user looks on the screen as well as duration and the number of glance at a point. Therefore, eye tracking data complement user performance metrics.

The aim of this study was to specify usability issues of health portals emerging for delivery of health-related information which is the primary function of a health portal. This subject is found to be a gap in usability literature and to fill this gap this study is thought to be a starting point.

1. Methods

Thirteen voluntary adults (7 females, 6 males; aged 25-37) were administered usability tests of WebMD [4] and MayoClinic [5] health portals. The test conducted in Human Computer Interaction Research and Application Laboratory in METU Computer Center. For participants' use a computer with Internet con nection was provided. Eye movements were recorded using Tobii 1750 eye tracker. Experiment was designed and presented using Tobii Studio software.

For usability testing WebMD and MayoClinic were selected according to visitor trends [6]. Although two different health portals were selected, the aim of this study was not to compare them. Instead different characteristics of portals are expected to help identification of usability issues as well as to shed light for future designs. In line with health portal functions and the aim of this study, seven tasks on finding disease, drugs and test results information as well as using interactive tools were defined The tasks were presented in Turkish, but to avoid interfering effect of English medical terminology knowledge, English translations of medical terms were also provided. Seven participants were randomly assigned to WebMd while the remaining participants worked on MayoClinic. Participants also encouraged to "think aloud" throughout the experiment; comments and observations were noted. To complete tasks, using search utilities were not allowed. As participants completed tasks, they were administered a satisfaction survey.

Evaluation of performance and attitude is needed to understand operational capability of users and their perceived performance as well as difficulty [7]. For attitude criteria, a set of questions to measure satisfaction was prepared and administered by experimenter. In addition, comments revealing users' attitudes were examined. For performance evaluation, success rate for each task, time spent to complete the tasks and the number of errors were evaluated. In addition, the number and duration of fixation were analyzed for both designs. For analysis of satisfaction and performance evaluation data of 13 participants were analyzed while, eye movement analysis run for 4 MayoClinic and 5 WebMd participants.

2. Results

2.1. Performance Findings

Table 1 represents an overview of satisfaction and performance results. According to these findings, users of WebMd on average completed more tasks successfully but the

difference between portals was in seconds. For satisfaction criteria scores of MayoClinic users were higher than scores of WebMd users.

Health Portal	Average Total Test Time	Average Time Spent	Average Number of Errors	Average Success Rate	Average Satisfaction - Portal	Average Satisfaction - Task
WebMd	16:39.9	02:02.1	3.00	89.80	20.43	31.43
MayoClinic	16:36.7	02:05.3	3.83	83.33	26.67	35.33

Table 1 Overview of user performance results

All participants managed to accomplish finding general information and treatment alternatives of a specific condition, side effects of a drug and emergency treatment in short time with high precision. This indicates that disease and drug related information presentations on both portals are effective and efficient. On the other hand finding information about a specific test result as well as using symptom checker and Body Mass Index calculator were troublesome tasks.

2.2. Eye Movements Findings

2.2.1. Main Page



Figure 1 Heat map of WebMd



Figure 2 Heat map of MayoClinic

As participants were not allowed to search within portal, they started each task from main page. Figure 1 represents heat map generated using 5 WebMd participants' eye tracking data according to fixation counts. Red spots were the highest fixated points with 70 counts, whereas green areas were the lowest fixation regions. According to fixation metrics, health conditions was the most attended part of WebMd main page. Moreover, participants skimmed whole page during the experiment. On the other hand, heat map for MayoClinic main page (Figure 2) represents that the highest fixation number was 30 counts and placed over main menu items on top of the page. Another area with high fixation count was the region where content is presented. Analysis of MayoClinic main page revealed users' preference towards top menu. In line with that, experimenter observed that users cannot recognize the change on content area when a left menu stem was clicked, which suggests a reason for top menu preference.

2.2.2. Presentation of Disease-Related Information



Figure 3 Heat map of Health A-Z

Figure 4 Heat map of Diseases and Conditions

All participants effectively and efficiently completed the task which was finding information about a specific disease. In addition, performance results were close for two health portals. Eye movement data was analyzed to investigate the design which is advantageous over the other. On WebMd, "See All" button at the bottom of health conditions links to Health A-Z default page. Heat map (Figure 3) of this page shows that participants scanned whole "A" list. On the other hand, heat map (Figure 4) of "Diseases and Conditions" main page presents fixations on a limited area. Users of MayoClinic did not need to scan any list of diseases. As a result, MayoClinic users completed this part of the task faster. The next step was searching for the specific disease on a list. The list provided by MayoClinic includes all possible diseases and conditions while WebMd lists common conditions and provides a separate detailed list. As a result, WebMd prevents scrolling and enables focusing on a relatively small area.

2.2.3. Symptom Checker





Figure 6 Eye gaze and fixation

WebMd users needed to identify a link to symptom checker. There are two possibilities which are an image on top of health conditions list and a nominal link under search box. Three users preferred nominal link and 2 users preferred image button. In contrast, fixation count and duration on image were higher than values of nominal link. Next step was to start the tool. According to observations during tests, users were confused when they reach to Symptom Checker page (Figure 5). Supporting this observation, the huge number of fixations indicated confusion and requirement of high amount of effort (Figure 6). For MayoClinic users, symptom checker task was troublesome since it was not promoted and as extensive as WebMd's tool.

3. Discussion

The aim of this study was to specify usability issues of health portals in order to minimize the burden on health information seekers, who are probably experiencing stress and anxiety. For this purpose, a user-based usability test was conducted and eye-tracking results were shared.

For the main page, a simple and focused design enables users to reach the required part of the portal and reduces the load on users. On WebMd main page, participants scanned whole page, whereas on MayoClinic main page, users only fixated on menu items. Supporting these findings, WebMd users underlined that there were too much information and the web site was crowded, but they liked the interactive tools. For MayoClinic, the underlined characteristics were being systematic and consistent. Both WebMd and MayoClinic present disease and drug related information effectively and efficiently. Both portals preferred to represent diseases in alphabetical order and users could navigate using initials. The important point is to serve the alphabetic buttons alone without any default list which requires users to at least skim the list and lose time. In addition, providing a "common" list helps users to find the information easier compared to a complete but long list. Moreover, image links should be used carefully since participants tend to ignore images as in symptom checker button of WebMd. To reach the symptom checker, a nominal link is preferred although image link was attended more. Another important issue, symptom checker analysis point out is that proving many stimuli for the same purpose confuse users.

Further analysis using eye movement data and replicating the experiment with a larger sample may uncover other design and usability issues of health portals.

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