

Harnessing Web Information Technologies for Secure, Adaptive and Individualized Health Communications

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Introduction

Web information technologies (WebIT) can be harnessed to deliver reliable, secure, interactive, adaptive and individualized communications¹. While managing research projects involving information systems can be complicated, the unique, high level desired functionalities in consumer-focused tailored WebIT merit special attention. Specific requirements for these applications require attention to: security, dynamic user interface design, questionnaires, Web navigation, and the dynamic display of user display preferences, such as font size.

Solutions

Web usability guidelines were reviewed and design choices were made. A detailed user interface style guide was developed to provide consistency and reduce the risk of usability problems.

1. Secure Server: We installed SSL on our Web server to provide privacy and reliability between our server and the user.

2. Cookies: Cookies are implemented to maintain the active session and to trace the user, cookies also times out after ten minutes of user inactivity for the security reasons.

3. Font: System font sizes are dynamically calculated according to the user's choice and set to specific fonts for consistency. The font size is determined by the relative size, rather than the absolute HTML size.

4. Pages Design and Buttons: The user interface consists of six left buttons that trigger sub-buttons on the top of the screen. Each button has three different states with three different appearances, one for the original state (button in the "up" position), one for when mouse is over (illuminated text), and the last one for when it is clicked (a pressed-down appearance). If a new button is clicked, it will change to the clicked state, and the former clicked one will change back to the original state. The clicked state is associated with the educational material displayed in the center frame. The user can therefore easily know which main button and sub-button have been depressed in order to browse the center education piece. The button size and number are adapted to work on all the platforms. Figure 1 shows the layout of the buttons.

5. Questionnaire Management: Five questions are dynamically prompted on each page and the status of the number of questions answered and the number of remaining ones are displayed on each page. If the user omits answers to one or more questions, the missed questions will automatically be prompted on the following page, providing a smooth transition and feeling

Fig. 1 The "Help" button and the sub-button "Change Page Appearance" have been clicked



of progress.

6. Designing a Dynamic User Interface: After the user completes the baseline questionnaire, we calculate the variables that tailor the education for each user. The educational material is displayed dynamically according to the tailoring variables including history of diabetes, angina, and whether taking nitroglycerine, etc.

7. Administrative management: We also built a dynamic on-line administrative management tool. With this tool, it is very easy to add or delete a user and to check the usage of the system or the status of each user. Because each action of each user is logged a database, we create several queries to show the logon statistics, the process summary, the baseline question states, follow-up question statistics and education pages statistics. The ColdFusion Server is a very powerful tool for Web application implementation, with many built-in functions for rapid prototyping, allowing us to monitor the performance of the server, to know if it failed, and why.

Conclusions

Our approach provides an individualized educational message, delivered in a secure personalized wrapping: adaptable and adaptive web information technology.

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References

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