**Development and Evaluation of a Dynamic Web-based Application**

Yichuan Hsieh, RN, MS\(^a\), Patricia Flatley Brennan, RN, PhD, FAAN, FACMI\(^b\)

\(^a\)Doctoral Candidate, School of Nursing, University of Wisconsin-Madison
\(^b\)Moehlman Bascom Professor, School of Nursing and College of Engineering, University of Wisconsin-Madison

**Abstract.** Traditional consumer health informatics (CHI) applications that were developed for lay public on the Web were commonly written in a Hypertext Markup Language (HTML). As genetics knowledge rapidly advances and requires updating information in a timely fashion, a different content structure is therefore needed to facilitate information delivery. This poster will present the process of developing a dynamic database-driven Web CHI application.

**Background.** Traditional webpages, commonly written in HTML with static webpage design, are not equipped to generate individualized information content in a way that is efficient and straightforward for clinicians to construct and modify. As genetics knowledge advances and information related to prenatal genetic screening and diagnostic tests has become widely available to lay people through the Web, creating a consumer health informatics application that is functional and capable of providing individualized information, as well as be updated in a timely and efficient fashion, has become a challenge to health care providers. Therefore, we will use the Prenatal Genetic Education Program (PreGEP), specifically designed for pregnant women of advanced maternal age (AMA), as an example to demonstrate how a dynamic database-driven web-based CHI application was developed and evaluated through design/redesign process.

**Methodology.** Content generation was based on Mishel’s theory of uncertainty in illness\(^1\), previous work\(^2\), and prenatal genetic counseling practice guidelines. The Preprocessor (PHP) script language (for structuring webpage presentation) coupled with MySQL, a database engine (for content storage), were used to develop the prototype and for quicker response time and handling various users’ input with individualized information display. Users’ input included age, gestational age, and topic preferences. An iterative framework\(^3\) that was proposed by Johnson and colleagues was applied in the evaluation process for redesign purpose.

Three stages of prototype evaluation were applied to ensure not only the functionality and usability of the application, but also to address the content display, credibility, readability and understandability to our target population. First, a cognitive walkthrough\(^4\) with two human factor experts was used to assess interface design and layout during the visual-display testing. Secondly, two domain experts, certified prenatal genetic counselors, reviewed the accuracy and quality of content information during expert-based testing. Lastly, the user-based testing was performed by six participants from the target population to assess functionality of the prototype as well as readability and understandability of the content. Cognitive walkthrough and the Questionnaire for User Interface Satisfaction 5.0 - short form\(^5\) were used.

**Results.** Figure 1 illustrates the redesigned screenshot of the individualized page after visual-display test. Reactions from domain experts help to identify issues for content modifications. Comments from user-based testing were used to finalize the prototype.

![Fig. 1 Screenshot of individualized page](image-url)

**Discussion.** The value of user-based testing rests on readability and understandability of the system to the intended users. This three-phase usability evaluation process demonstrates useful strategies that can and should be incorporated into the system design/redesign process to improve any CHI application for optimal design. Future work plan includes the implementation of the PreGEP in a randomized controlled trial to evaluate the effects of individualized information delivery method.

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**References.**