

**WEBSITE USABILITY EVALUATION USING  
SEQUENTIAL ANALYSIS**

By

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This effort would not have been possible without a lot of work and in some cases sacrifices from others. My committee deserves special acknowledgement for their support – Ted Frick as my chair who provided the idea, his time and the advice along the way. The other committee members: Marc Dollinger, Elizabeth Boling and Jack Cummings provided a diversity of opinions and experiences that were invaluable. Finally, to my family and friends that provided some of the critical support that made this dissertation possible.

Some might consider a dissertation the birth of new knowledge. During the creation of this dissertation there was much more occurring than the reader might realize, the birth of our first child Rebecca Marie Hebb. I can truly say that my approach and appreciation of life has grown in ways that I could have never imagined since this topic was started. Seeing your two month old daughter crumple up a set of research questions and then smile afterwards can make a committee's questions seem much easier. One also gains an additional appreciation of uninterrupted time when caring for a daughter at home while trying to analyze data. I can still only wonder what she thought of when laying among piles of papers staring at a marker board full of numbers and diagrams. Perhaps there is a future educator in the making.

# Abstract

Christopher L. Hebb

## WEBSITE USABILITY EVALUATION USING SEQUENTIAL ANALYSIS

The Sequential Probability Ratio Test (SPRT) was used as a method to determine the number of subjects needed during summative evaluation of a website. Extant methodology for choosing the number of subjects during formative evaluation has often been based on a Poisson model. The goal of formative evaluation is to identify and correct website usability problems. However, during summative evaluation, the primary goal is to evaluate website effectiveness. Does the SPRT, when used to determine website effectiveness: 1) reduce the number of participants and tasks needed, 2) retain sufficient problem identification, and 3) improve cost effectiveness of usability evaluation?

Twenty-five undergraduate pre-education students participated in usability tests that employed a thinking aloud protocol. Each user attempted 20 randomly sampled tasks from a pool of 120 typical tasks for a large website. Three SPRT methods, the Poisson-based model, and a classical sampling approach were used in retrospective data analyses. Resultant identification of usability problems was also observed with these statistical techniques.

Results indicated that a website effectiveness decision could be made with the SPRT after testing 5 users chosen at random, with an average of 12 tasks per user. However, this number of users and tasks identified 25% of known usability problems. Likewise, the Poisson-based approach identified 35% of the problems with these same 5

users but with 20 tasks per user. For over 10 years, the prevailing rule of thumb has been that 4 to 5 subjects will identify the usability problems when evaluating websites. Results from this study indicated that more subjects may be needed for identifying 80-85% of website usability problems. Results also indicated that the SPRT is more cost-effective than the Poisson model if summative evaluation and not problem identification is the goal of usability testing.

Abstract approved and accepted by:

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