

Usability Engineering

By Jakob Nielsen

Book review by Rodney Fuller

In *The History of the Mind in America*, Perry Miller (1965) summarizes the progression of the idea of “science” in early American history as that process that took a backward, immature collection of individuals who were divided intellectually and physically by their inability to communicate and coordinate, and how, through the combination of theoretical science and pragmatic applications of dedicated practitioners, the United States was transformed into a dynamic, entrepreneurial nation-state at a critical point in the industrial revolution. This change – described by writers at the time as either “majestic” or “magnificent” – can, according to Miller (1965), best be understood as “sublime” because much of the rapid change was caused by a few well-written books that were widely read and pragmatically revered. In *Usability Engineering* (1993), Jakob Nielsen has written such a book for the information age.

The problems of communicating and coordinating a diverse and divided nation at the dawn of the industrial age forced scientists and practitioners to consider the problems of public and private needs and to develop practical solutions for satisfying them. This process resulted in the creation of the modern “engineer,” and in Nielsen (1993) we have the first draft of a guide on how to engineer for the information revolution. The nineteenth century “engineers” oversaw the development of transportation and communication systems that could grow to an enormous scale while still remaining profitable, and deliver unimagined services to the average man or woman. According to Nielsen the purpose of usability engineering is to build bridges, provide links and make connections between the twin demands of user abilities and computer possibilities.

Nielsen proposes we do this in three basic steps: 1) the exploration of computer possibilities through a better understanding of the design of user interfaces, 2) the definition of utility and the corresponding measurement of the usability of prototypes and existing systems, and finally 3) a systematic process for discovering discrepancies and exploring other possibilities.

Nielsen advocates that an understanding of the computer system design process from a hardware, software and user perspective is one of the key principles of usability engineering. By reviewing this history (chapter 3) and then focusing on the current development lifecycle (chapter 4) Nielsen identifies the key principles of good usability engineering. These principles include most of the lessons learned in the short history of HCI: some of these steps include a focus on a design strategy that is parallel, participatory and iterative through rapid prototyping and knowing the user. By describing the design cycle first Nielsen implies that the obstacles to good usability engineering are misapplications of the design process rather than inappropriate metrics and measures tested by the usability engineer. A critical review of the remaining chapters indicates that this assumption is not always supported as there are many ways that the methods and practices of usability engineering could be suspect.

The second and fifth chapters focus on the definition of usability and the listing of heuristics related to good design. Both of these chapters define usability and the factors related to evaluating usability which include memory load, consistency, feedback, as well as the design of good instructions and error messages, etc. One frustration that the reader might have is the circularity between the definition of usability and the identification of design

heuristics – both tend to mirror each other reflected around the point of rapid design and evaluative measurement. This critical reflection point should imply that the variable measurement of user performance based on design heuristics will reflect against the conceptual possibilities of the usability definition, but if one can cast doubt upon the methods used to gather data or the reliability of the measures used designers can dismiss data as invalid or unreliable summaries of their “good” design. Such a conclusion may be unfounded in that both the design and the metrics may not be appropriate.

The final principle that Nielsen discusses is how one determines if a design is usable. It is at this point that the book proves to be an excellent summary of the issues related to defining the dilemmas described above – because to the extent that the usability engineer is careful and follows the guidelines described by Nielsen they can be fairly sure that they are evaluating the design of user interfaces. Chapter six describes the fundamentals of testing user interfaces with an outstanding discussion of the principle of statistical power (with Figure 17 alone summarizing thousands of pages of statistical research) as well as experimental methodology, design and ethics. This reader was confused as to why Nielsen discussed statistical power before he discussed methodology since these are almost always presented in the reverse order to insure that the reader will learn to qualify their methods with a degree of statistical certainty. Chapter seven discusses the process of assessment and issues related to collecting and evaluating user performance data. These methods include focus groups, observations, logging user activity and surveying users to obtain feedback.

The other chapters include an executive summary that gives an overview of the

benefits of usability engineering and the relevance of the field, and a chapter each on standards and international design. A final section of exercises, as well as a bibliography that is both comprehensive and can serve as an introduction to further reading for novices and experts in the field, is also included. One feature that I did find confusing is that the hints for the exercises should be moved to their own section rather than being upside down (but not reversed in terms of pagination) at the end of the exercises. Perhaps if these hints appeared after the Index it might allow the reader to check their progress without requiring a third hand and excessive turning (forcing one to adopt a "hint mode" when using the book). I also found that the hints related to the "international" exercise represented trivial design issues.

One last misgiving that was not covered in the above review is probably only a result

of the field being so new: Nielsen did not speak specifically to the issues of developing and evaluating for legacy systems. Quite often the usability issues for upgrades and UI overlays are presented as a dilemma of either "more power" (as the uncritical aggregation of features) or "more choices" (where hard choices are made regarding the abandoning of specific functionality to gain more generic usability). A section of how heuristics relate in this context would be greatly appreciated in the second edition of the book.

From one perspective the problem of usability engineering is simply the logical and necessary discovery of the underlying basis of information democracy – if you want to know then you have to ask. In *Usability Engineering* Nielsen proposes a paradigm for asking, and as such it is a good beginning to the discovery of what

qualities and characteristics make information effective.

Readers should note that the paperback version has dozens of new references to recent research, as well as one new usability method, both of which are not included in the hardback version of the book. It is also cheaper.

References

Miller, P. (1965). *The Life of the Mind in America*. San Diego, CA: Harcourt Brace Jovanovich.

Nielsen, J. (1993). *Usability Engineering*. Boston, MA: AP Professional. Hardcover: ISBN 0-12-518405-0 Softcover: ISBN 0-12-518406-9

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