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UI Design Update Newsletter – May, 1999

Insights from Human Factors International

In This Issue Bob Bailey reviews:

Heuristic Evaluations — Is there a useful set of usability heuristics currently available to practitioners? There is, but unfortunately the best set is not the one most widely used.

Heuristic Evaluations

Usability evaluation and prototype fidelity: users and usability professionals, Catani, M.B. and Biers, D.W., Proceedings of the Human Factors and Ergonomics Society 42nd Annual Meeting, (1998).

Heuristic evaluations are conducted by a small set of evaluators. The evaluators examine a user interface, and judge its compliance with a set of internalized usability principles. Usually, evaluators try to estimate the degree to which each usability problem would potentially impede user performance or acceptance. This is done to help set priorities for making revisions to the system.

Theoretically, the heuristics that are used are related to recognized usability criteria that, if improved, can make a positive difference in the product's usability. Unfortunately, "usability problems" are frequently identified that differ substantially from those obtained in performance testing (Catani and Biers, 1998). Part of the problem could be that evaluators continue to rely on faulty sets of heuristics.

The evaluator effect in usability studies: problem detection and severity judgments, Jacobsen, N. E., Hertzum, M., and John, B. E., Proceedings of the Human Factors and Ergonomics Society 42nd Annual Meeting, 1336-1340, (1998).

An empirical study of perspective-based usability inspection, Zhang, Z., Basili, V., and Shneiderman, B., Proceedings of the Human Factors and Ergonomics society 42nd Annual Meeting, (1998).

Several recent papers referenced a set of usability heuristics as though these heuristics had some validity in the evaluation of user interfaces.

The most-used set of heuristics, shown below, can be traced back to a ten-year old paper by Molich and Nielsen (1990):

- Use simple and natural dialogue
- Speak the user's language
- Minimize the user's memory load
- Be consistent
- Provide feedback
- Provide clearly marked exits
- Provide shortcuts
- Provides good error messages
- Prevent errors
- Provide help and documentation

Improving a human-computer dialogue, Molich, R. and Nielsen, J., Communications of the ACM, 33(3), 338-348,

These heuristics, which are widely used, have never been validated. There is no evidence that by applying these heuristics in the design and development of user interfaces that it will improve the interface.

(1990).

Enhancing the explanatory power of usability heuristics, Nielsen, J., CHI'94 Conference Proceedings, (1994).

In fact, Nielsen (1994), after evaluating several sets of heuristics, concluded that a better set of heuristics may be:

- Visibility of system status
- Match between system and the real world
- User control and freedom
- Consistency and standards
- Error prevention
- Recognition rather than recall memory
- Flexibility and efficiency of use
- Aesthetic and minimalist design
- Helping users recognize, diagnose and recover from errors

Cognitive engineering principles for enhancing human-computer performance, Gerhardt-Powals, J., International Journal of Human-Computer Interaction, 8(2), 189-211, (1996).

An even better, research-based, set of heuristics was proposed by Gerhardt-Powals (1996):

1. Automate unwanted workload
   - Free cognitive resources for high-level tasks
   - Eliminate mental calculations, estimations, comparisons, and unnecessary thinking
2. Reduce uncertainty
   - Display data in a manner that is clear and obvious
3. Fuse data
   - Reduce cognitive load by bringing together lower level data into a higher level summation
4. Present new information with meaningful aids to interpretation
   - Use a familiar framework, making it easier to absorb
   - Use everyday terms, metaphors, etc.
5. Use names that are conceptually related to function
   - Context-dependent
   - Attempt to improve recall and recognition
6. Group data in consistently meaningful ways to decrease search time
7. Limit data-driven tasks
   - Reduce the time spent assimilating raw data
   - Make appropriate use of color and graphics
8. Include in the displays only that information needed by the user at a given time
   - Allow users to remain focused on critical data
   - Exclude extraneous information that is not relevant to current tasks
9. Provide multiple coding of data when appropriate
10. Practice judicious redundancy (to resolve the possible conflict between heuristics 6 and 8)

Unfortunately, the best potential set of heuristics is little known and little used. And even worse, a much weaker set is widely known and apparently much used. Is it any wonder that we do not have more of an impact on the quality of new user interfaces.