

Intelligent Interfaces: From Fantasy to Fact (Panel Position Paper)

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The fantasy of intelligent interfaces is considered to be a poor starting point for successful system design. The concept is vague and misleads designers to think that users want to be impressed with the cleverness of the computer. The evidence is mounting that users much prefer interfaces that give them a sense of mastery and control. Design goals and research methods are proposed to speed development of more successful and powerful user interfaces.

Rapid progress in the development of advanced user interfaces is attracting attention from many directions. Commercial system builders are quickly recognizing the benefits of good user interface design and are actively applying three vital methodologies:

1) Guidelines documents to promote consistency and high quality during the design phase. General design guidelines (Smith & Mosier's report for The MITRE Corporation or Marlin Brown's book *Human-Computer Interface Design Guidelines*) and manufacturer guidelines (Apple Desktop Interface or IBM System Application Architecture Common User Access) are being supplemented by corporate or project guidelines documents. These speed development, improve quality, promote discussion, and provide a permanent record of design choices.

2) User Interface Management Systems decouple design from implementation and provide the user interface architect with the tools necessary to create a design that is independent of the implementation. UIMSs can provide an order of magnitude increase in productivity while improving quality and facilitating exploration and changes.

3) Usability labs and iterative testing provide an environment and process by which user interface concepts are made central to the development process. Early testing not only reveals flaws but often yields novel and beneficial design improvements.

These practical methodologies are paralleled by an enormous growth in research efforts at academic and industrial institutions. The application of controlled psychologically-oriented experiments and newer ecologically-oriented (or action) studies has produced an enormous literature that is leading to more useful taxonomies, more accurate predictive models, and sounder theories. This rigorous approach follows traditional scientific methods, balancing the benefits of the reductionist model with the attraction of the holistic approach.

Amidst this disciplined commercial and scientific endeavor, the promoters of "intelligent interfaces" have suggested that users need something else. While definitions of intelligent interfaces are usually vague, some

common threads can be found. Often the definition includes some reference to the application of artificial intelligence techniques with rule-based or knowledge-based expert systems as dominant themes. Another frequent theme is that the interface is "adaptive", suggesting that the interface changes automatically to reflect the user's skill level, error rate, knowledge, cognitive style, mood, pace, or task. Devotees of intelligent interfaces often promote the concept that the computer has a "user model" that is used as a guide to changing the interface.

While there are undoubtedly some situations where this approach will pay off, this panelist believes that the concept of intelligent interfaces is misleading for designers. Many empirical studies and commercial practice has quite clearly demonstrated that users are not entranced or even attracted to an "intelligent" system but rather seek control over a powerful system, a sense of intellectual mastery, the comforting feeling of predictability, and the satisfaction of their own accomplishment. These feelings are most consistently generated by direct manipulation systems which provide a visual presentation of the world of action, easy access to the relevant objects and actions, selection by pointing rather than typing, rapid incremental and reversible actions, and immediate feedback of the results, all in a context which prohibits or at least minimizes the chance of errors. Adaptability under user control is useful, but sudden system-directed changes can be disorienting while undermining the sense of predictability and user control.

In summary, I believe that the concept of intelligent interfaces may be attractive to some designers, but the evidence is increasing that users want something else. Drivers don't want a "smart" or "intelligent" car, they want "cruise control." Computer users don't want an adaptive system that attempts to guess their needs, they want expanded "control panels" to enable them to choose the user interface attributes.

In closing, while debates are enjoyable and sometimes productive, this panelist strongly encourages expanded scientific empirical studies to validate novel user interface design strategies.