Laboratory for Automation Psychology and Decision Processes

Kent L. Norman
Department of Psychology
University of Maryland
College Park, MD 20742-4411
Kent_Norman@lap.umd.edu

ABSTRACT
The Laboratory for Automation Psychology and Decision Processes (LAPDP) focuses on the cognitive/psychological aspects of human/computer interaction and does both basic and applied research in this area. It is housed in the Department of Psychology and is affiliated with the Human/Computer Interaction Laboratory (HCIL) in the University of Maryland Institute for Advanced Computer Studies (UMIACS).

Author Keywords
Cognitive psychology, HCI, menu selection, usability testing, decision-making, survey design.

ACM Classification Keywords
H.5.2 User Interfaces, H.5.4 Hypertest/Hypermedia.

INTRODUCTION
The Laboratory of Automation Psychology was founded in 1984 in the Department of Psychology at the University of Maryland by Kent Norman and Nancy Anderson. The Laboratory is affiliated with the Human/Computer Interaction Laboratory (HCIL) and the University of Maryland Institute for Advanced Computer Science (UMIACS). Our graduate students are in cognitive psychology and have a dual interest in psychological topics such as judgment and decision-making, learning and memory, and attention and performance and topics in human/computer interaction. Our Web site shown in Figure 1 gives details on our work, access to publications, and information about current graduate students.

LINES OF RESEARCH
Our research has dealt with issues of user performance as a function of cognitive ability and interface design. Early research focused on judgment and decision making in menu selection and navigation of hierarchical databases. Since then, we have covered a wide range of research interests.

Menu Selection and Navigation
Our initial research in the 1980's was on navigation through hierarchical menu systems. We were involved in the depth versus breadth issue and helped to show empirically that breadth is superior to depth in menu design due to theories of choice latency. In addition, we investigated patterns of search relative to the structure of the menu. This research resulted in the publication of the *Psychology of Menu Selection* [2]. We continue to do research in menu selection and navigation, now in the context of the World Wide Web.

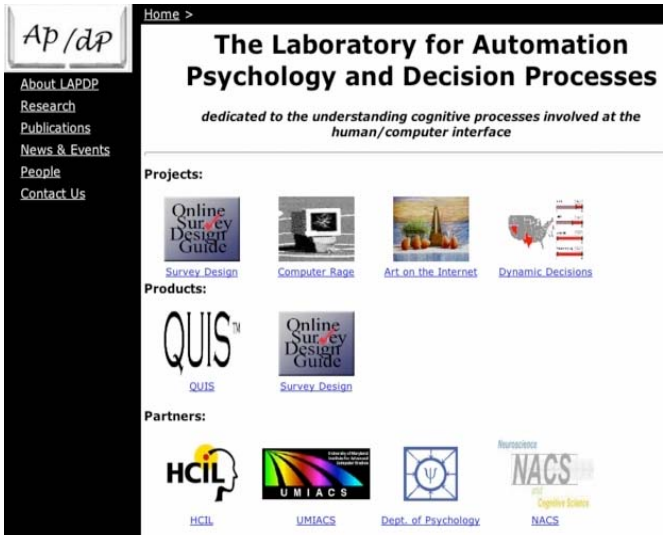

Figure 1. Laboratory Web Site at http://lap.umd.edu.

Metaphors and Apparency
The importance of metaphors has been stressed in our lab. We have investigated specific metaphors for menu selection, hierarchical databases, and distance education. In addition, we have been interested in how the operations of complex systems can be made apparent to users through graphic techniques that show hidden relationships.

Usability and User Satisfaction
The Questionnaire for User Interaction Satisfaction (QUIS) was developed in the LAPDP in conjunction with Ben Shneiderman in 1988 [1]. It was designed to be a standardized, general use instrument that allowed researchers to assess users' overall satisfaction with software and to rate the software on a number of subscales. Since its inception, the QUIS has been continually revised and extended to keep up with current technology. It is

licensed through the Office of Technology Commercialization at the University of Maryland (http:lap.umd.edu/quis).

Electronic Educational Environments

When the University of Maryland started to explore the use of electronic classrooms in 1990 with a grant from AT&T Information Systems, the LAPDP became involved in the assessment and development of new educational technologies and environments. This line of research is reported in the online book *Teaching in the Switched On Classroom* [4]. We continue to work in this area and host college courses on our own prototype web server (http://cognitron.umd.edu).

Design of Web-Based Surveys

For the past six years, we have worked with the U.S. Census under their support to do research on the design of web-based surveys. We have investigated the navigation of item-based versus form-based surveys, the dual navigation of data bases to find answers and surveys to find questions to be answered, the design of conditional branching in surveys, and methods of editing and correcting answers. This research continues in preparation for the 2010 U.S. Census.

Attitudes About Computers

Since the beginning of the LAPDP, we have been interested in attitudes about the effectiveness of computers, the fear of computers, and aggression toward computers. Our current project is on "computer rage." We are collecting survey data at http:lap.umd.edu/surveys/computer_rage on violent acts and attitudes against computers. We are also posting video clips of actual, simulated, and suggested rage episodes against computers.

Individual Differences

We have long been interested in tracking individual differences in our research on user performance. In particular, we have studied spatial visualization ability and its relationship to performance on tasks requiring information search in hierarchical databases and the manipulation of files, windows, and other graphical objects.

Dynamic Query and Decision Making

In conjunction with the HCIL, we are investigating the design of dynamic query systems for usability in database search and for decision aids. In one application, a map of the United States is shown. Sliders allow the analyst to select states within ranges on a set of variables. Mousing over a state displays the data for that state. Chloropleth maps provide color coding on one variable. We are investigating the patterns of use of such maps and ways that they alter decision-making processes.

FACILITIES

The LAPDP is housed in the Department of Psychology and occupies 600 square feet divided into four rooms: a library/entrance, a main work/control room, a user testing theater, and an observation room. Three workstations are used for running participants in experiments. Each workstation has two flat panel monitors. Instructions and tasks are presented on one monitor and the user is allowed to work on the other monitor. In some cases, both monitors are used for dual navigation tasks. Three computers for lab personnel also have two flat panel monitors to provide similar environments for programming experiments. Two Web servers are used for testing, information dissemination, and data collection. Digital video cameras and software are used for video capture of user interaction.

CONCLUSION

The academic environment makes the Laboratory for Automation Psychology and Decision Processes an ideal location for research that spans the gulf between basic and applied topics. Our graduate students have pursued research careers in academics, government, and industry. We look forward to continued support and interest in the emerging technologies that require interaction between the human cognitive processes of judgment and decision making and technological systems for information dissemination, communication, and command and control.

ACKNOWLEDGMENTS

We thank our sponsors, administrators, and students. In particular, we acknowledge the U.S. Census for its support of our work over the last six years and our collaboration with the Human/Computer Interaction Laboratory and our colleagues Ben Shneiderman and Ben Bederson..

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