CREATING AWE

Formulating a Research Process for An Interdisciplinary Effort to Build an *Animated Work Environment* (AWE)

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ANIMATED WORK ENVIRONMENT: AN OVERVIEW OF THE WORK-IN-PROGRESS

Poster Abstract

With this poster we describe a planned, three-year interdisciplinary research process. We present our initial efforts to open the interdisciplinary dialogue that is essential to the success of this three year National Science Foundation funded Animated Work Environment (AWE) project. AWE is intended to create new technologies to flexibly integrate work activity in the home. To begin the process, graduate students participating in seminars led by each of the investigators conducted semester long projects exploring discipline-specific issues related to the project. We highlight the contribution to be made by each discipline and can now begin the project with a working knowledge of the tools and approaches of each discipline.

What is AWE?

Working life is increasingly defined by fluid, decentralized relations across a wide spectrum of people, machines and environments, prompting new organizational strategies and new tools. Moreover work technologies are changing rapidly, and increasing in number, capability and complexity, placing new demands on workers and their organizations to both learn and adapt to these technologies.
This dramatic shift in the nature, place and organization of working life motivates the AWE project, which involves the designing, prototyping, demonstrating and evaluating of a prototypical "robot-room" with embedded Information Technologies. The figures below illustrate an initial view of the AWE concept as described in the grant proposal. On the left we see AWE in "sleep mode" and on the right the AWE user has transformed AWE into "composition mode."

Now that the National Science Foundation funded project is in place the task for the interdisciplinary team is to move from concept to prototype: to create AWE.

The AWE research plan

In the first three years of the AWE research project we intend to: (A) develop digital, animated models of the total AWE concept operating in different social and environmental context; (B) develop a full-scale working prototype demonstrating AWE's novel, continuous, morphing surface and user interface; and (C) critically evaluate these models and prototypes based on usability testing. Four interrelated activities define our research plan for realizing this ambition: (1) The survey, analysis and theory of relevant working conditions (led by the Sociologist); (2) An ethnographic study of the work activities of information workers, as well as the usability evaluation of several alternative AWE concepts and full-scale prototypes (led by the Human Factors Psychologist).
(3) The design of alternative AWE concepts, and the demonstration of AWE as a total concept, first as a digital animation and second as a full-scale prototype (led by the Architect). (4) The development of the core continuous surface and its computer interface with formative usability testing of prototype surfaces, as well as its integration into a full-scale prototype of the total concept (led by the Robotics Engineer).

Acknowledgements

This research project "Animated Work Environment" is funded by the National Science Foundation Grant #IIS-0534423.

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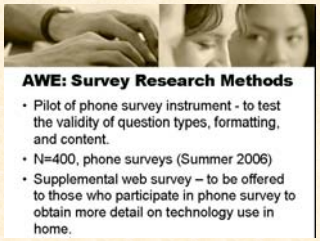
SURVEY RESEARCH METHODS TO MEASURE TECHNOLOGY USE IN THE HOME

In developing the AWE concept, thinking about design and functionality of AWE was aided by creating specific scenarios and specific tasks. However, it is important to consider a broad range of household-based work issues—issues faced by the population at large and related to a wide range of tasks—so that AWE is not too closely tailored to a limited purpose.

The telephone survey content will attempt to define the full range of household work activities and the manner in which they currently fit or fail to fit with the household as a physical and social environment. Themes to be covered include: What sort of work activities do you currently perform in the home? Where in the home do you perform these activities? To what extent do these activities affect social relationships with other household members? To what extent does the physical environment at home constrain or facilitate work activity?

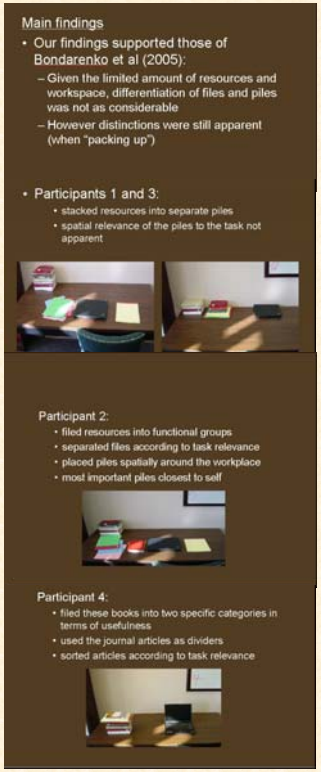
The slides below point to some initial findings from a small pilot phone survey conducted by the team of sociology. While the primary aim of the pilot survey was to evaluate the survey instrument, several interesting substantive results were obtained as well.



ETHNOGRAPHIC AND TASK ANALYSIS USABILITY STUDIES

AWE design requirements will be specified by assessing and describing how people perform information-processing tasks for work or leisure using *current* interfaces and resources. In particular, we will observe and describe users' current work or leisure tasks using task analysis techniques. Task analysis is based on empirical, ethnographic methods in which observational or interview data is collected from a number of representative users or task experts by having them perform (or talk about) a series of specific work tasks.

In the example below from our pilot study, a group of human factors psychology students designed a situation to observe participants reactions to an unanticipated interruption to a cognitive task. Participants were told that they had 45 minutes to set up a simple MS Powerpoint slide presentation. At the 30 minute mark the participants were then told they had to temporarily halt the task. The students then sought to categorize variations in how participants "put aside" the task.



ARCHITECTURE and COMPUTER/ELECTRICAL ENGINEERING

While survey research and usability studies will help to identify problems and potential solutions, architecture and computer/electrical engineering will design and build the AWE prototypes that address these problems and solutions. In our initial pilot phase the aim was to do in theory what the overall project seeks to do in practice. The architectural challenge was to come up with designs that afforded flexibility and enhanced productivity, while the engineering task was to identify promising technologies to realize these design.

Below are two examples from the pilot phase. In the example on the left a team of architecture students proposed a room with flexible walls and furniture and the engineering students explored the use of robotic arms to build the design. On the right, the architectural emphasis was on flat surfaces that could easily morph and adapt to changing uses, the engineering response was to research a system of surface joints that would allow the transformation of a flat surface into an appropriate smoothed surface.