TITLE

"SMART" SPACES, RESPONSIVE ENVIRONMENTS, AND ASSISTIVE TECHNOLOGY: THE ROLE OF THE DESIGNER

FULL ABSTRACT TEXT:

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DESCRIPTION

The 21st century residence is built around many pervasive technologies; one of the most important being electricity. We do not go out and purchase circuit boxes, wiring, conduits, and switches separately from Wal-Mart after the construction of the house. Instead the system is designed with the house and installed with the construction of the house. Why then should computing (as it becomes increasingly pervasive) be an additional input past the design process? Should not pervasive computing and assistive technology be designed *with* the house, just as electricity or plumbing? What is the role of the designer in the development of responsive environments and "smart" spaces?

BACKGROUND

As computing initiatives evolve intelligent devices that work in the background of our day to day living, several questions arise about how we *interact* with these devices. Streitz and Nixon talk about two forms of the disappearing computer: physical disappearance and mental disappearance. As architects, it is the second category that interests us: artifacts that are still large, but not perceived as computers because people discern them as, say interactive walls or interactive tables (Strietz, N and Nixon, P.; The Disappearing Computer; Communications of the ACM; March 2005). Although, eventually we will all live in such "smart" spaces, it is people with disabilities; old elderly people who wish to age in place; and other groups that wish for independent living, that require such initiatives immediately. As computers slowly recede into walls, tables and furniture, we transition from *human-computer interaction (HCI)* design to *human-information interaction (HII)* design. As a natural evolution, Petersen claims that interactions should move from the level of objects to the level of the space plan (Petersen, M.G.; Interactive Spaces: Towards a Better Everyday?; Interactions; Jul-Aug 2005). In order for "smart home" technologies to achieve mainstream acceptance, disparate device design is not adequate. The design of a "smart" home or the seamless introduction of "assistive technology" involves the integration of physical and virtual spaces. Thus it is paramount that architects and designers work in tandem with engineers, computer scientists, and health professionals to develop and test strategies and designs that work and will find acceptance.

METHODS

Over the past few years, our lab has been working with students, architects, engineers, politicians, social organizations and local residents in an attempt to develop strategies and implement "smart" home technologies in actual rural/quasi-rural scenarios. From our experiences based on actual concerns and problems, we have been able to create better guidelines for such scenarios. The following is a broad categorization of the presentation:

Teaching

Architects and designers of the 21st century design with new tools such as inexpensive computing, almost free electronics, wireless communication, high performance materials, and new design, fabrication, and supply-chain technologies (Larson et. Al; Open Source Building - Reinventing Places of Living; BT Technology Journal). In such a scenario it is as important to educate architectural students on *how* to use such technologies as *where* such technologies are required.

The presentation will examine our experiences from:

- undergraduate design studios that use the problem of assisted living and responsive environments in real life (quasi-rural) settings.
- graduate design studios that work with real life problems; developing both conceptual solutions as well as fully realized prototypes aiding in independent living.

Research

Research into the problems and models of rural healthcare is important to the development of prototypes and real life design solutions. One prominent issue with the use of technology is the perception and acceptance of it within the user base. It is thus important to study both users and user patterns, as well as develop guidelines based on such research. The presentation will examine:

- the problems and the models of rural healthcare that require the development of other systems to augment the current "brick and mortar" model of elderly care.
- the Delta Assessment survey (n~1200) in collaboration with social scientists and public health professionals. The survey will provide us with a better understanding of the perception and acceptance of technology among the rural population of south eastern United States region (Tennessee, Arkansas, Louisiana, Mississippi).
- multiple conceptual/prototype projects that will assist physically challenged and old elderly to live independently developed with engineers and designers working in tandem.

Service

No research is complete unless the solution is tested and implemented within real life scenarios. Our lab works with social service organizations, politicians, town planners and actual residents to develop prototypes and design solutions that fit their socio-cultural and economic set up. The presentation will list:

- our collaborations with non-profit organizations, social organizations and town leaders in an attempt to realize pervasive computing and technology projects within communities and for people with need.
- projects developed through discussions and meetings with old elderly people who helped develop the guidelines for the design and its development.

RESULTS

Through this session we will examine the role of the architect and the designer in the design and deployment of "smart" homes and assistive technologies. We will also present projects that are a result of collaboration between architects, students, designers, planners, and engineers. We will present the lessons learned from these interventions and guidelines that can be used for developing a prototype design projects with real communities and rural systems through collaboration.

CONCLUSION

Several "home labs" around the United States, EU and Japan are working on integrating devices into actual "home" environment. There are multiple initiatives around the world in engineering, social science, and public health/policies to design and develop such "smart" homes. However there is very little interest in the architectural/design community. We believe that designers need to be actively involved in the development of ubiquitous computing technologies for living environments. Designers must also learn to collaborate with other researchers in order to develop responsive and assistive spaces. Isolated design development will lead to inconsistent standards and technologies and may ultimately make the system more complicated. In the end, if we work together in the development of such technologies, not only will they reach the market faster, they will also be better designed and more usable.