

Swisshouse: The Consulate of the Future

A Physical/Virtual Environment for Science and Education

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ABSTRACT

The Swisshouse fosters the networking and knowledge exchange among a distributed community of Swiss researchers and academics. It consists of a physical/virtual environment that encompasses a decentralized website and a 3,200 sqft large loft space as an interface to the virtual community. Embedded information devices define the boundaries of the wired loft space and enable distant users to participate in organized and spontaneous events. In this paper, we outline the rationale for the design of the physical and the virtual site.

Keywords

ubiquitous computing, physical/virtual environments

INTRODUCTION

The Swisshouse is a new type of Consulate. Its objectives are (i) to facilitate networking and knowledge exchange among the Swiss-American scientific community, (ii) to build a bridge to the Swiss university network, and (iii) to provide a platform for interdisciplinary interaction among participants from research, education, business, law, politics, finance and the industry (Comtesse 1998).

In order to expand the scope beyond the limits of the physical boundaries and enable the geographically dispersed community to actively participate and cooperate, we proposed a concept that comprised not only a physical but also a virtual component. The exchange of scientific, cultural and business knowledge will happen both physically and digitally. Both worlds are intimately connected together. The physical space provides a sense of place and belonging to the community. The digital world integrates into the physical space and enables the Swisshouse to reach out far beyond the defined physical walls.

DESIGN PRINCIPLES

The physical building is conceived as a 3,200 sq.ft. large, wired loft. The programming and articulation of the interior spaces of the Swisshouse reflect its unique nature as a physical/virtual construct. The underlying design

principles were the following:

1. Embedded Information devices: The information appliances that make the connection to the virtual world are embedded in the architecture and furniture of the building, and become space-defining elements themselves. The devices are social and cooperative in nature.
2. Intimate link between physical and virtual space: The physical building is conceived as a spatial interface to the virtual community. Particular attention has been given to the different types of spaces and elements needed to connect with the virtual community.
3. Design of the boundary between public/private space: The boundaries between public, private as well as semi-public and semi-private spaces are clearly defined in the physical site, as well as on the web.
4. Deliberate use of the senses of perception: The senses of perception --acoustic, visual, touch and smell-- are choreographed for enhancing the design principles (e.g. virtual/physical, public/private).



Figure 1. Map of the information devices in the Swisshouse.

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APPLICATION

Based on these principles, we devised 12 usage scenarios, including Swiss science week, brainstorming sessions between scientists in Boston and Switzerland, business meetings among start-up entrepreneurs and distributed venture capitalists, avant-garde exhibitions, remote lectures, interactive executive seminars, etc. To support these scenarios we designed the architectural elements that will act as human-computer interfaces (Figure 1). They are described in the following.

The Kinetic Arena

The convergence point in the physical Swisshouse is the «Arena». The «Arena» is a rectangular shape that slowly steps down 3 feet into the floor slabs. The arena makes the landscape of the Swisshouse: it is a hydraulic device that can be leveled at the street level, sunk into the basement, or elevated to form a small podium, based on acoustical requirements. Activities happening in the arena are transmitted in real-time onto the virtual sites via a "net-eye" mounted onto the ceiling of the Swisshouse.

The Knowledge Café

The Knowledge Café opens directly to the arena. The tables of the Café are networked media objects, large and long, creating informal groupings and enabling geographically dispersed brainstorming (Figure 2). The café is a semi-private space that can be accessed from the web, but physical users remain in the control.

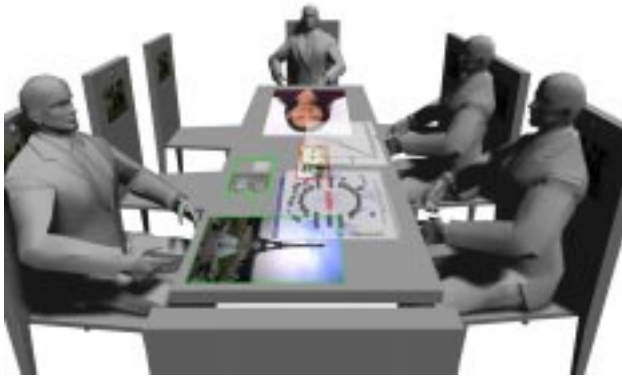


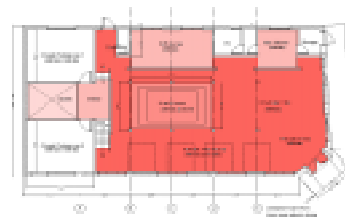
Figure 2. Knowledge Café

Personal Space

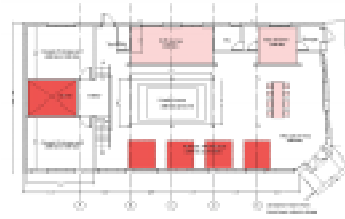
Open nomadic workspaces are distributed throughout the loft-space. Each individual shares the table, but has his/her own corpus. The corpus is personalized storage. It is used in the physical space, and has its counterpart in the digital space.

Media Space and Video Conferencing Spaces

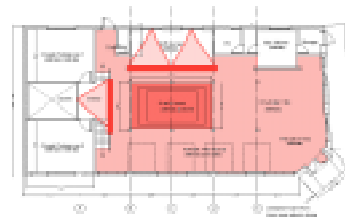
The media room is located under the gallery. The spaces provide efficient screen displays, and remain open to the hall and the arena. The wall panels integrate large screens for computer projections to be used for cooperative work and interactive presentations. The spaces are for small group conferences. We introduce in this media space the



SCENARIO 3:
INAUGURATION



SCENARIO 7:
VISITING SCIENTIST



SCENARIO 11:
DISTANCE LEARNING

Figure 3. Sample Usage Scenarios

concept of the "Mood Ceiling." The mood ceiling is a horizontal, back-projected plane that reflects the atmosphere at the distant partner's location

Active Information Wall

An active information wall serves as a large interactive display for exhibitions, real-time information and asynchronous connection with the distributed virtual community. This is a public element that belongs to and represents the distant audience.

THE VIRTUAL SWISSHOUSE

The Virtual Swisshouse is the virtual counterpart and extends the idea of the Swisshouse into the Internet by offering a platform for exchange of information, networking among individuals, distant education and creation of a virtual community. What is happening physically will be apparent on the virtual site, and vice versa. For example, whenever a visitor logs into the virtual site, a sound will be heard and a small physical icon will start to move in the physical building. Alternatively, a visitor entering the physical space in Cambridge will be captured by the neteyes mounted on the ceiling of the building and transmitted to the sites around the world in real-time.

Digital Community

A high-speed computer server, located in the basement of the physical Swisshouse, will host the web-based environment, and facilitate networking and interaction among the Swiss-American scientific community.

Digital Switzerland

The virtual site (creativeswitzerland.com) is a "digital Switzerland," a neutral space in which ideas can flow freely, and discussions among distant parties can be held openly.

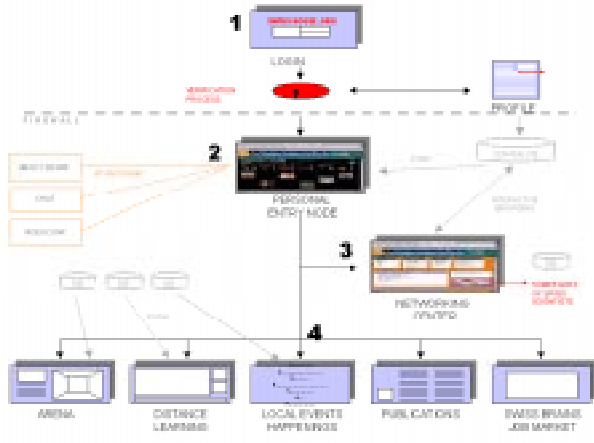


Figure 4. Architecture of the virtual site.

Idea Marketplace

The site is also a growing knowledge base. Community members post and retrieve information based on their interests. The general structure of the virtual site is that of a marketplace in which ideas and expertise are exchanged. Authorship of content is decentralized: everyone contributes. Market mechanisms automatically determine which information will persist. The role of the swisshouse webmaster is to act as the knowledge broker.

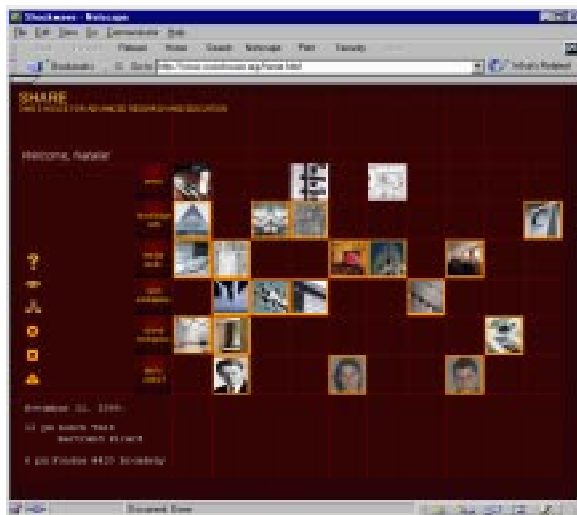


Figure 5. Sample prototype interface with links to the physical elements: Arena, Knowledge café, Nomadic Workspaces, etc.

Push and Personalize

The graphical interface is personalized to meet the habits of the individual user. Whenever a piece of information is added that might be of interest to a user, it will be pushed to the user directly. A physical signal will signal the new message.

Physical/Virtual Connection

The underlying structural elements correspond to the physical elements and are interconnected: Arena, Knowledge Café, Information Wall, Donuts, etc. Information is pushed to the appropriate sections based on predefined user profiles.

CONCLUSION

We have presented our current design of the Swisshouse, a physical interface to a distributed community, augmented by a parallel virtual world. We are currently in the design development stage. The major challenges we face are the coordination of the various interfaces among the building trades, craftsmen, hardware manufacturers and software programmers. The project will be completed in Summer 2000.

ACKNOWLEDGMENTS

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Figure 6. Preliminary design of the Community browser for finding fellow Swiss with similar interests.