MIT/Xerox PARC Design Studio of the Future

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The Design Studio of the Future (DSoF) is an interdisciplinary, remote collaborative design studio involving academic and industry partners. The motivation for this new studio model is to bring architectural design into the real world of networked concurrent design process, geographically distributed project teams, and CAD/CAM rapid prototyping technologies. In particular, the MIT/ Xerox PARC studio experimented with the interactive design of new educational technologies and networked environments.

DESIGN STUDIO OF THE FUTURE CONCEPT

New Models of Design Practice and Learning

The practice of architectural design, urban design, and product design increasingly involveclosecollaborationand teamworkamong a diverse group of designers and specialists. Aggregating expertise is a primary goal in the increasing competition to successfully introduce new designs and products at a global scale. The DSoF represents a prototype of networked teaching and research for the next generation of design environments. This new design studio model is based on interdisciplinary collaboration among MIT programs in architecture, urban studies, and media studies as well as schools of engineering (mechanical engineering, civil engineering, computer science).

Geographically Distributed Learning

The physical elements of this new architecture studio comprise networked computer and videoconferencing connections among electronic design studios. This prototype collaborative design network provides Wide Area Network connections and working relationships with industry and community partners to introducereal design, construction, manufacturing, problems and community issues into the studio design education. In the DSoF, students, faculty, and corporate partners interactively engage design issues in a truly geographically distributed and collaborative setting.

Studio Objectives

The program objectives of the DSoF bring together design practice, education and research in an interdisciplinary environment to accomplish the following key objectives a) Build a working prototype of a switched network of design studios, labs, and specialized facilities, to simulate the networked design and planning, and engineering organizations of the future b) Create a setting for collaborative design through coursework and industry-sponsored projects for experimentation with this studio network c) Pursue focused research to push the frontiers of architectural design and collaborative engineering.

Studio Resources

In the design studio, students access a wide range of hardware and software as well as telecommunications and rapid prototyping equipment to a) Model, visualize and analyze design proposals using geometric modeling and computer graphics technology b) Discuss projects with design critics and remote collaborators. both professionals and academics, via computer-integrated teleconferencing c) Access, via our institutions' internal network and the Internet, extensive databases of reference material and images d) Automatically convert digital geometric models into physical models and prototypes through the use of computer-integrated fabrication techniques.

MIT/ XEROX PARC STUDIO

The Fall 1997 DSoF implemented this structure and objectives working with an industry partner, Xerox/Palo Alto Research Center (PARC). In addition to a team of design faculty members, students had extensive access via videoconferencing to researchers at PARC, Steve Harrison and Scott Minneman. This structure extended the reach of the studio to include world class experts in information technology and provided a technical basis for design projects. It also provided students with the opportunity to gain skills in communicating complex design ideas to geographically distributed design collaborators and consultants via video-conferencing and other electronic media including the World Wide Web.

PROJECT DESCRIPTIONS

The studio was motivated by MIT's Educational Technology Council Report calling for a radical rethinking of the Institute's information and physical infrastructures based upon the design and application of advanced educational technology. In response to the spatial dispersion afforded by new information technologies, the studio instructors hypothesized the role of the campus as a physical location will become increasingly important. A new proxemics (micro-urbanism) of complex, adaptive, and non-hierarchical relationships between the physical and the electronic was a primary objective of the studio. Students worked in teams on the following three interrelated projects.

Passport and Multimedia Salon provided a platform to think conceptually about different ideas of space, including the types of space created by electronic media. Taking advantage of new non-hierarchical network topologies and the technology of parallel processing, the Passport introduces "ubiquitous computing" to the campus. This individual identity card and computational device supports the reconfiguration of social space and promotes interdisciplinary learning communities according to new relationships. The

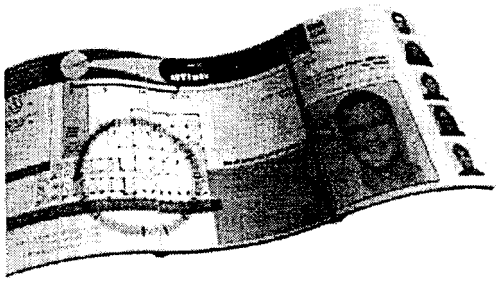

Fig. 1. MIT Passport.

Multimedia Salon, proposes a network of hybrid social/physical/ data spaces with interactive nodes connected to the campus movement system.

InfoCor addressed the main distribution system of the campus, the Infinite Corridor. Projects proposed designs for a regenerative information infrastructure combining an intelligent flooring and cladding system. The InfoCor fuses physical space and electronic space by integrating fiber optics within surfaces allowing for ubiquitous energy, information distribution and access. A prototype of the system was produced employing composite materials. Conceived as an interactive interface the InfoCor serves as an experimental prototype for the development and demonstration of new materials and information technologies at MIT.

VizPod probed the potentials of new visualization technologies within a hybrid physical/virtual environment. The VizPod, sited in an existing courtyard, is intended to serve as an interdisciplinary visualization platform for two adjacent departments, Physics and Chemistry. Designed as a quasi-autonomous structure, the VizPod seamlessly integrated large scale immersive virtual reality environments within the inner surface of an enclosure made of conductive polymers. The aluminum tiled exterior of the structure incorporates glazed surfaces allowing for a mixture of daylight and artificial light within the visualization laboratories. These spaces, movement sequences, and the overall structural and material assembly were extensively tested in computer simulations and animations.

FINAL REVIEW

The final studio review was held simultaneously on the East and West coast. Usingreal-time videoconferencing and the World Wide Web, student projects were presented and discussed by guest critics in both locations. Critics included architects, industrial designers, visual artists, information technology designers and engineers. The final review was videotaped and made available along with the entire studio production on an internet site. An exhibition of studio projects was also held in the school and subsequently at PARC. The multimedia presentation format served to make the design research and the work produced open to discussion by the widest possible range of critics, design professionals, as well as the public at large.

EVALUATION PROCESS

The design process of the whole semester was extensively recorded, including desk crits, video conferences, and reviews. This documentation was made available to students, and faculty during the semester and will serve as the basis for Ph.D. students and specialists at PARC to study the pedagogical implications of geographically distributed learning and design. Evaluation of the studio is an ongoing process based on the quality student work produced as well as the teaching methods and learning technologies employed. This long term evaluative process has several advantages over the traditional studio in that it provides incremental learning for faculty as well as students and can directly contribute to the development of new models of architectural education and practice.

Fig. 2. MIT Multimedia Salon

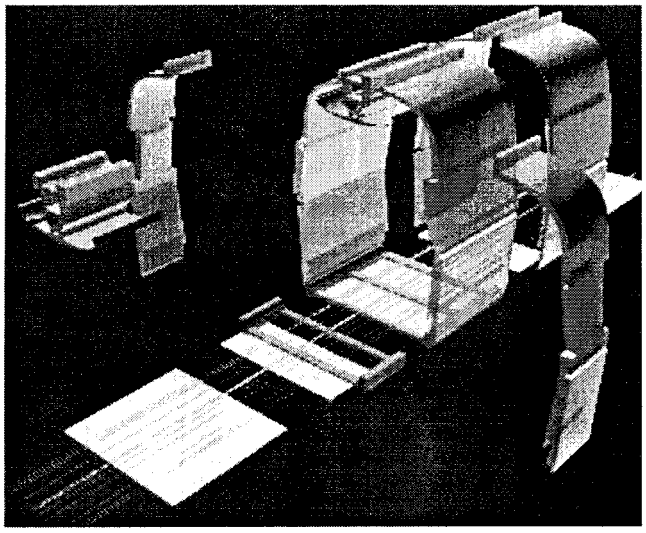

Fig. 3. InfotCor

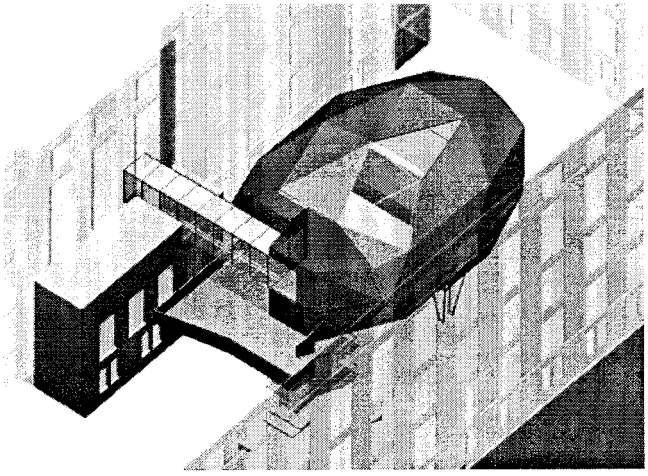

Fig. 4. MIT VizPod exterior

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