December 1, 2004

11.947 New Century Cities: Real Estate, Digital Technology and Design

Smart Places

Digitally Mediated Architectural Spaces

Shilpa Mehta
MCP Candidate, City Design and Development
MIT

People and Places

People interact with their habitat at a functional level and at a perceptual level. Associating specific activities to space and spatial needs results in standards and typologies for structuring environment, both built and unbuilt. The second layer of interaction is more symbolic and representational. People signify this interaction with the environment through impressing their identity on their habitat. Through this process a house gets signified as a home, places for worship become temples, churches or mosques and so on. This complex interaction between people and places manifests itself through space organization (functional) and place making (convergence of space and expression).

Phenomenological studies describe, "*place* as a space where life occurs" and as representing the "*genius loci* or the *spirit of the place*". The concept of genius loci also includes a temporal element representing the "*spirit of the time"*. In this new century, digital technology is redirecting this people place interaction into an arena dominated by and mediated through digital media and devices (Mitchell, 2001). At a structural level, the core activities that have constituted functional aspects of interaction continue to be central to the human environment interface. But the digital mediation of these activities is restructuring traditional notions about place making. People continue to meet and interact as always but these interactions are organized and structured by digital devices and media. Place making is now a convergence of space, expression and technology.

Initial interests in digitally mediated space have been focused on display and expression, communication, positioning and documentation. These four categories represent groupings based on functional applications of digital media and technology in urban and built environments (Townsend, 2004). With the exception of positioning, the interest is focused mainly on digital media as expression and representation of people and places. Existing urban places like Shibuya Crossing in Tokyo or Times Square in New York City and proposed applications like the message board at Seoul DMC, maximize the potential of the visual sensory aspects of digital media. Over time, these places have become part of the identity of the cities they are located in and become tools for orientation and positioning in space. The dynamic quality of these spaces comes from the transformation of media and not from the physical space itself. In fact, places like

Times Square are regulated as static physical frameworks to serve as scaffolds for digital media.

Space organization as a place making tool, exploiting digital media and technology, has the potential to generate intelligent and highly responsive environments. Space as represented by architecture has been associated with relative permanence and stability. Buildings are designed to meet specific life span requirements, which are typically outpaced by changing technology, especially in this last decade. Ubiquitous information and communication has increased spontaneity and resulted in greater dynamism in patterns of activity. The norms of social behavior and clustering in digitally mediated places require an architecture that is reflexive and not repetitive. Architecture has been polarized between excessive specialization where space is designed to particular specifications and tends to be very static for that reason or space is designed for flexibility and dynamic uses and tends towards repetitiveness.

Increasingly, digital media is being applied to activate or to enhance static physical settings. At the Brasserie in the Seagram's building in New York, architects Diller and Scofidio replace visual information as collected through the human eye with processed visual media as collected through the lens of a camera. The resulting effect is a simulation of a window within the physical space of the restaurant, which is relatively disconnected from the outside world. Sense of time and place is generated by the documenting and representing the positioning of people in space.

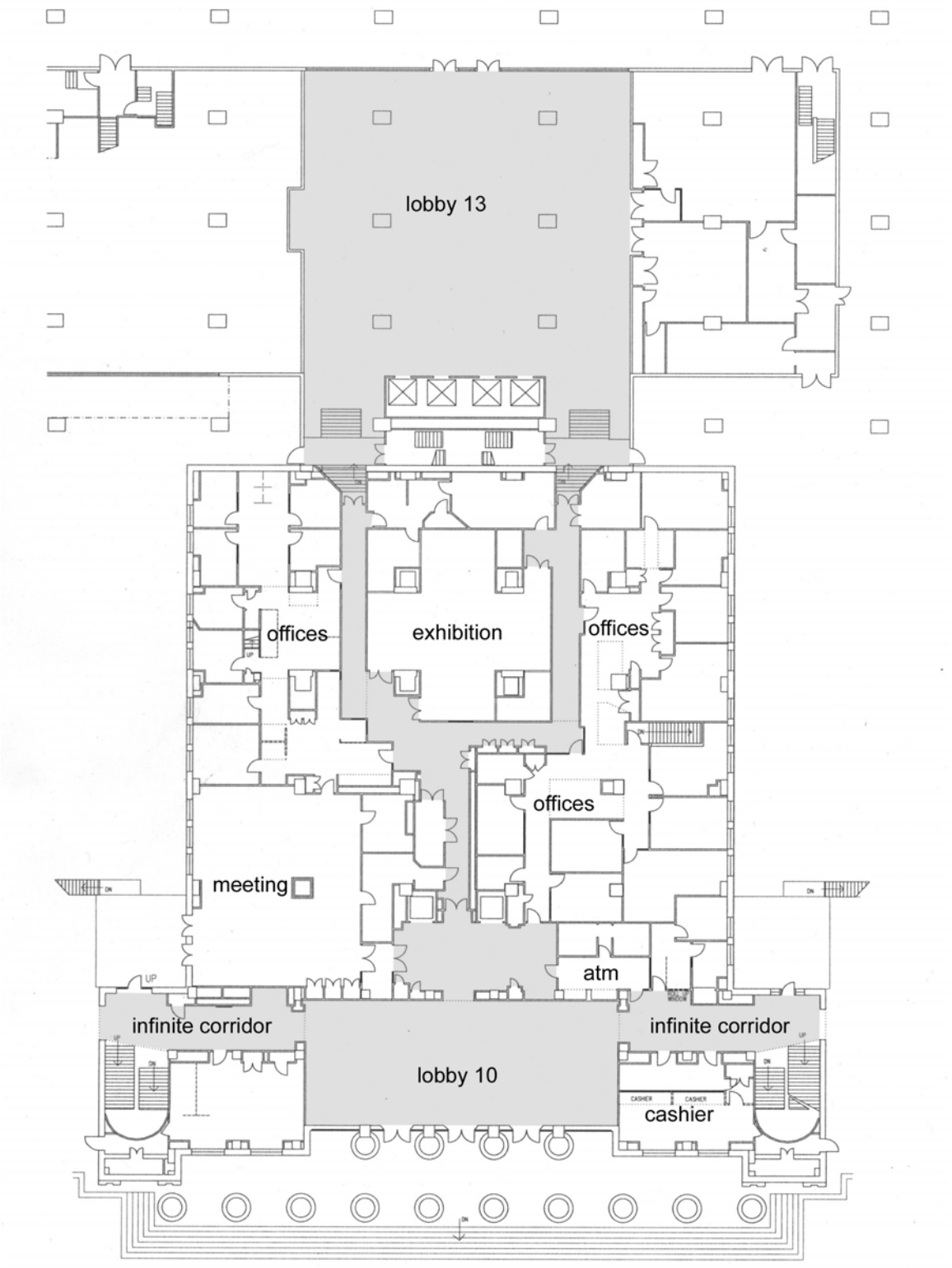
The mobility of media and devices, as a consequence of wireless technology, results in patterns of activity and clustering that are free of locational requirements. The circus at Florianopolis is an example of a new kind of technology-rich environment - a highly flexible, moveable building housing a media-rich venue for teaching children about the complexities of the rain forest. The children were outfitted with sensors, as is the entire environment, and the 'lesson' was cast as a story in which the participants tried to solve a puzzle; in the course of that task, virtual worlds were opened up to them—on walls, on tabletops, on screens—with which they interacted (A Place to Live and Learn - Helping Develop a New Kind of Technology Park in Brazil).

Intelligent location of digital devices in space has come a full circle in the last couple of decades. As a result of technology, digital devices are now compact and consolidated. This implies that these devices can now be discreetly tucked into the architecture of a place. On the other hand, architecture has developed mobility and nomadic potential and the generation of spaces can be more reflexive. Application of digital technology in space organization has potential to generate responsive spaces that are functionally appropriate as well as expressive in character, that is SMART PLACES.

Application

One application of digitally mediated architectural spaces could be in reinventing the "space" in and around the lobby in Building 10 as a "place" expressive of the culture of MIT. The cashier's office, located along the infinite corridor adjacent to the lobby, is being relocated and this space is available for other school related activities. Also, the meeting room (Vannevar Bush Room) and the exhibition space located adjacent to the lobby can be restructured and the space exploited to reconnect this lobby to the lobby in Building 13, reinforcing the connection between the courtyard along Memorial Drive and Vassar Street. This restructuring of space, at it's core, represents shifting norms about functions that represent an institution. The changing nature of discourse and participatory activities like meetings and conferences implies that these activities need not be trapped in static architectural spaces and can become part of a dynamic space reconfiguration. Activities involving interactions between people and visual media require lesser control due to the changing nature of media and could be located with greater flexibility in space.

The lobby in Building 10 is a voluminous double height space with multiple paths of movement at various levels, through it and around it. This space serves many functions, mostly transient in nature, and has a lot of visibility and significance on the MIT campus. This space hosts student activities like information stalls, which require high degree of visibility and institutional activities like graduation, which are symbolic, and high profile. Every activity has very specific space needs but at present, all activities occur in the same static envelope. This space is not conducive to other possible activities like formal and informal meetings as well as casual interactions due to its "one size fits all" character.



Existing First Level Plan – Building 10 and Building 13.
Floor Plan Source: MIT Facilities Website.

The challenge is to overlay a dynamic and responsive architectonic layer on this existing space in such a way that it doesn't take away from the original character of the space but adds another dimension to it. This dimension is "physical" in its conception and "ephemeral" in operation. Visualize a minimal system of movable panels that operate on a modular grid embedded in the floor and ceiling that are intelligent and programmable. These panels adjust enclosure for specific activities through sensing and pattern recognition as well as on request for scheduled events and activities. The panels are constructed mostly in glass within a minimal metal framework and contain interactive visual display, documentation and information systems to support the various activities and events generated by the space. In the double height space, these panels span the height of the volume and provide visual interest and information for people moving on the upper levels. Also, these panels could be equipped with sensors to control light reflectivity in the space based on time of day, weather and activities taking place in the space.

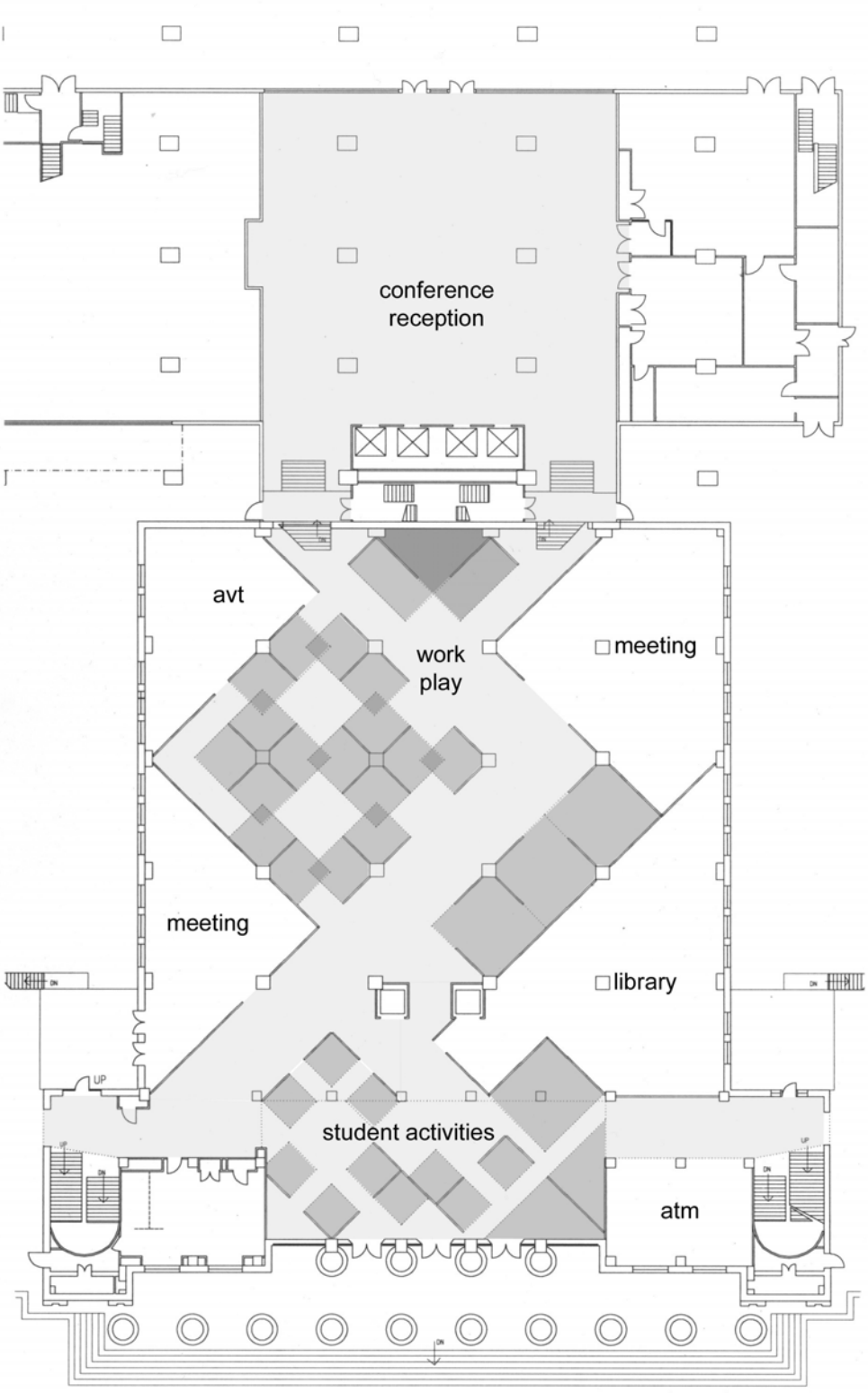
The movable panel system is intelligent and responsive. This implies appropriate use of technology to achieve reflexive space organization as well as provide optimal enclosure, privacy and required media support for the activity. Using sensors and pattern recognition technology, these panels could adjust enclosure based on time of day, number of people in the space, patterns of clustering and so on. Also, the system could be programmed to adjust the layout of the space for specific events and functions. This could imply that the panels are lined up against the wall to exploit the entire volume or laid out to create specific sizes and enclosure types to suit a particular activity. One extreme application of this system could be purely for expression. The movable panel system could be programmed to move and transform as an event in itself like a choreographed dance sequence. Also, the department of architecture could utilize this system for research and training related to space organization.

The use of glass as base material for this panel system supports the ephemeral nature of the space. Glass could be manipulated to provide transparency and visibility as well as opacity and privacy. Potentially, glass could be structured to transmit data as with fiber optics and for use as interactive display media. Glass could be used to manage light levels in a space through controlling opacity and reflectivity. Most importantly, glass performs as a neutral overlay allowing the symbolic qualities and permanent character of

the existing space to permeate through. It is permeable and supports the concept of a zone where *the traditional line between public and private realms has been broken, although it is never entirely lost. Carefully considered, the line seems to fold in upon itself in these places, with islands of private activity nested within public environment and vice versa at many different scales and times. In this "permeable realm", entirely different types of activities and spaces can permeate each other and successfully co-exist* (Frenchman, 2001).

By embedding interactive visual display systems within the panels, space usage could be managed more effectively. It would no longer require matching group size and physical space requirements to available media required for the function. The challenge is to design a versatile display system, which could switch media and expand in scale when compounded with other units. So, if the display required was for a large-scale video presentation, multiple panels could be combined to create a synchronized large screen. Also, the display could be variable between the top and bottom half of the panels. The users of an enclosure at the lower level could be using the display to project a computer presentation while the top half could be providing information on the events on and off the MIT campus. A choreographed visual spectacle is one application of the display system for expression.

Reinvigorating the connection between building 10 and building 13 requires some careful spatial reconfiguration. The meeting rooms could be made more flexible by utilizing the same paneling system. The critical criterion here would be managing privacy, visual and acoustic. The adjustable opacity of glass and careful detailing of the paneling system could easily resolve this issue. The meeting function could also freely locate within the space depending on specific requirements of the event. The exhibition adjacent to the lobby need not be confined to its current location. By exploiting the display system embedded in the panels, the exhibits could be located with greater flexibility. With the artwork becoming a part of the wall, the space allocated for exhibitions does not require an enclosed lockable space. Exhibitions could be consolidated in one larger space or sprinkled around in a narrative along the connection between the lobby in building 10 and the lobby in building 13.



Proposed First Level Plan – Building 10 and Building 13.
Represents one possible scenario.
Floor Plan Source: MIT Facilities Website.

What results from this extraordinary overlay is a truly reflexive use of space, both in terms of space organization and expression. The culture of MIT is about innovation and this design challenge requires innovative application of digital media and technology. This application focuses on making space organization more responsive and transitional and locating digital devices in these spaces to support the potential uses of these spaces while fully exploiting the latent potential in both, spaces and devices, for mobility. The programmable and intelligent nature of this ensemble generates value through supporting the functional requirements of the place in an efficient and flexible manner. All this under the larger umbrella of motivating and supporting discourse, that is generating value through realizing the potential of person to person interaction. Responsive and intelligent places unambiguously support person-to-person interaction, which forms the basis of discourse and knowledge sharing.

References

Frenchman, Dennis; "Media Street Elements, Guidelines, and Illustrations," Working Paper (MIT) 27 January 2003.

Mitchell, William; E-Topia: Urban Life, Jim – But Not As We Know It; Cambridge, MA: MIT Press, 1999.

Mitchell, William; Me ++, MIT Press: Cambridge, MA, 2003.

Townsend, Anthony; "Digitally Mediated Urban Space: New Lessons for Design." Praxis 6 (2004).

A Place to Live and Learn - Helping Develop a New Kind of Technology Park in Brazil<http://web.mit.edu/sap/www/plan/plan_issues/59/live/article_bottom.html>