

December 1, 2004

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

# **The MIT Wireless Museum Project:** Context-Aware Technology & Community Identity

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## **Introduction**

In some museums in America, the passive act of looking at art and reading the wall labels are over. At the Portland Art Museum, for instance, visitors can now use a handheld electronic device to access audio clips, web links and additional information about the artist. Going one step further, they can also leave comments and questions about the exhibits for the museum curators, turning what was once a one-way flow of information into an on-going dialogue between visitors and the staff.

The MIT Museum in collaboration with the Media Lab is proposing to bring the museum out of its physical confines onto the streets of MIT's campus. Using context-aware systems, such as cellular phones, personal digital assistants (PDAs), GPS-enabled systems and radio frequency identification devices (RFIDs), that orient themselves in the real world and provide information about what is around them, visitors will no longer have to go to the museum to access its resources and collections. Instead, they will be enjoying a much richer experience by being in a specific place of significance, learning about an event or an invention in its original context. Museum staff can present multiple histories of one sight, offering present and past exhibitions simultaneously in cyberspace. Moreover, the history and memories of the MIT community will be searchable, indexed and pervasive throughout the campus. Theoretically, MIT's history will be everywhere.

In the future, our experience of a place will no longer be confined to that which we can sense with our physical beings. We will enter (if we have not done so already) an age where our technological devices will become necessary appendages, through which our preferences, personal information, entertainment and communications will be personalized, channeled and waiting for our perusal. These digital signifiers and electronic sensors will augment the visual signifiers of place and time. As we enter this brave new age of pervasive technology-augmented space, we will be challenged to reevaluate our uses, perceptions and our valuations of places. Just as technology has changed the use and demand for different spaces, developers, institutions, cities and states will have to evaluate the benefits and costs of these technologies. Moreover, these increasingly pervasive technologies will force us to debate the balance between privacy, access and equity.

## **The Cornell Experience**

From a research project that explored the possibilities of context-aware devices, students at Cornell University's Human-Computer Interaction Group developed a guidebook tour of the campus called Campus Aware. Visitors to the Ithaca, New York campus are able to access the history and the lore of the university through their GPS-enabled PDAs, which flashes messages whenever their physical geographical coordinates matches those of various landmarks and buildings. In addition to the scripted tour material, visitors are also privy to the notes that Cornell students and previous visitors had left in various places. As they go through the tour, they in turn are prompted to input their own impressions via the PDA.

Visitors liked the interactive nature of the Campus Aware tour, leaving an average of three messages each. Many expressed how much they enjoyed the personalized dimension to the tour. While administrators are also happy about the flexibility and efficiencies that Campus Aware brings to their operations, they are vary of some negative comments that could potentially leave an undesirable effect on what ostensibly is a marketing effort for a \$40,000-a-year product.<sup>1</sup>

Cornell has also experimented with this same technology at the Johnson Art Museum. The curators and the creators of the project, who now run their own company called Spotlight Mobile, had hoped to promote more dialogue along academic lines. Yet, they were surprised to find the technology's capabilities being subverted towards different uses. According to Geri Gay, a communications professor at Cornell, "Some of the younger college kids suggested something almost like a dating service. They mentioned over and over, if someone else likes a painting, they want to have a way to meet the person who wrote that note."<sup>2</sup>

## **The MIT Brand**

The Massachusetts Institute of Technology (MIT) has cultivated a world-renowned reputation for being on the forefront of cutting edge technologies and research in the fields of physical science, engineering, computer science and economics. The Institute's

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<sup>1</sup> Carrier, Jim. "Among the Ivy, a Campus Tour Guide That Beeps." The New York Times, 14 August 2003.

<sup>2</sup> Newhouse, Rebecca. "Finding art in the palm of your hand. Youthful approach uses interactive guides to exhibitions." San Francisco Chronicle, 12 August 2002.

emphasis on research and entrepreneurship can be most directly reflected in the quality of its student work, its faculty's research and the numerous business spin-offs that have fostered a cultural DNA of innovation.

In MIT historian Deborah Douglas' view, MIT produces something far less tangible and more valuable: intellectual property, ideas and solutions.<sup>3</sup> It recognizes that in order to solve increasingly complex problems, the leaders and inventors of tomorrow will need to bridge disciplines. MIT is actively promoting more collaboration within and across its disciplines via various projects. The Ray and Maria Stata Center has been designed by Frank Gehry with the explicit promise to encourage social interaction. The laboratory, workspaces and circulation passages were all designed to emphasize flexibility, connectivity and collaboration.<sup>4</sup>

The community building potentials of space has not always evolved as a result of such explicit goals. In May 1983, MIT started a five-year research program called Project Athena to integrate computational technology into the curriculum.<sup>5</sup>

During the course of the project, the focus ranged from developing the operating system and discipline-specific courseware, to making computing more user-friendly and to promoting its use in education.

According to Naomi B. Schmidt, Manager, Educational Planning and Support at MIT Information Service (I/S), "Athena was the breeding ground for things that are now taken for granted in the computer world," such as the X Window system for Unix and Kerberos authentication software. About 96% of undergraduates now use the 1,300 computers on a campus-wide network.

Yet, the social network among the students that resulted from the Athena project also became a part of its legacy. Students created instant electronic communities using the Zephyr, the precursor to the Instant Messenger software program so popular with teenagers today, which grew out of the Athena networking system. According to Deborah Douglas, when the MIT administration broached the idea of taking away the

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<sup>3</sup> Conversation with Deborah Douglas, MIT Museum curator for science and technology.

<sup>4</sup> Reiss, Spencer. "Frank Gehry's Geek Palace." *Wired Magazine*, May 2004.

<sup>5</sup> Mihalik, Aaron D. "Project Athena." *The Tech*. 13 April 1999.

Athena Clusters, which requires a multi-million operating budget per year, the idea met with a tremendous amount of resistance from the student body, which had incorporated the clusters into its culture. The Athena Project produces spaces that were more than just a place to do homework but to socialize and hang out.

### **The MIT Wireless Museum Project**

The MIT Wireless Museum Project, as it is currently conceived, is intended to extend the Museum's mission to use its collections to create a cohesive and coherent narrative to explore invention, ideas and innovation. As in any museum based in an academic institution, its main mission is to make available the history and memory of the institution to the current students, staff, alumnus and the greater community. Yet, to tell the story of a place like MIT is an enormous challenge, given the constraints of exhibition space, the number of hours the museum is open, staffing and operating budgets, and staffing resources.

"What if the museum can fulfill its mission at any place, any time, where the constraints of space is no longer a factor, where a freight elevator's capacity will not limit my ability to show an object?" wonders Deborah Douglas, MIT Museum's Curator of Science and Technology. What if anyone can have that precise interaction with objects and delivery of information anywhere?

The potential impacts of a wireless museum are clear. The MIT Museum can produce geographically based content that anyone can access instantaneously via a cell phone or PDA. Walking through MIT's campus, people can learn about the creation of the Stata Center, and about the legendary Building 20 that stood there before. Built as a temporary building in 1943 for the Radiation Laboratory, Building 20 once housed 4,000 researchers engaged in wartime research and development. It was also here that Harold Edgerton devised his underwater cameras, Noam Chomsky "more or less" invented modern linguistics and Amar Bose is said to have spent several years surreptitiously testing loudspeakers in the anechoic chamber.<sup>6</sup>

Increasing interest, use and access to the resources and contents available at the MIT Museum, the Institute Archives and the various departments will not only enhance the

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<sup>6</sup> Reiss and The MIT Institute Archives.

presence of the Institute in the city but will hopefully also increase the access students have to each other. It is a given that this technology, with its location specific capabilities, will be used in unexpected ways by the student body and staff to increase academic collaboration and community building. Every student and staff person at MIT already carry around with them an RFID chip embedded into their identification cards. Is it such a leap of the imagination to conceive of one day using these RFID chips to connect with others? Imagine a random meeting between an electrical engineering and a civil engineering student somewhere along the Infinite Corridor because their context-aware devices alerted them of their shared interest in wind power research. Imagine two alumni meeting for the first time at their 20<sup>th</sup> reunion and their realizing they were in the same calculus section freshmen year.

### **The Opportunities**

The vision for the Wireless Museum project extends far beyond simply increasing the access to information and enhancing connectivity within the MIT community and its vicinity. The hope is that by investing in the project, MIT would realize some return in increasing the chances of academic collaboration and social interaction, improve the quality of life of its student body, and as a result, the heighten MIT's profile as a place for innovative research and scholarship. The technology will increase the flexibility of MIT's built spaces, providing people the chance to appropriate and personalize their surroundings with their own comments. MIT will like to see the intensification in the use of its existing spaces towards the same goals that the Stata Center is expected to bring to fruition, but at a much lower cost. Very likely, if the use of this technology becomes as integral to the daily fabric of the MIT experience as Project Athena has become, the MIT brand will be burnished even brighter, further driving agglomerative activities of biotechnology companies into Technology Square and more talent to the area.

The Wireless Project will hopefully generate enough interest and momentum to encourage the redevelopment of the desolate and underutilized stretch of Massachusetts Avenue between Vassar Street and Lafayette Square. The imbuing of these places with memory and meaning will make the activity of inhabiting a physical space a much richer experience.

Yet, what will become of the value and use of the physical objects and the Museum itself? At the very least, the project will hopefully generate more awareness among visitors, students and the Cambridge community about the resources available at the Museum. Deborah Douglas has speculated whether there will still be a need for the gallery spaces in the future. Will visitors alerted to MIT's contribution to radar research have additional interest in visiting the Museum to see the actual objects themselves? Dennis Frenchman, Professor of the Practice of Urban Design in the Department of Urban Studies and Planning, suggests that the project will increase the use and the value of the museum and its staff multi-fold. Its responsibility will morph from telling the MIT story through an object isolated from its context to one of where the complexities and nuances of place will challenge the conventional structure of a linear, simple narrative. The training, expertise and the experience of the staff will become even more essential to producing the content and managing its transmittal.

### **The Constraints and Uncertainties**

The vision of the project also includes engaging the public to participate in adding its own stories and views to the sites. Like the Campus Aware program at Cornell, they can leave notes, or pieces of "e-graffiti," attached to the spots that others can later access. Adam Holt, one of the thinkers connected with the project, compares the project to geographic blogs, allowing people to engage in a continuous dialogue about the content and space, with linking capabilities to other places and topics, like a geographical world wide web. The freedom to not just be a passive receiver of information but a creator of content should enrich the cultural identity and heritage of the MIT community and provide different experiences of places for different people.

Yet, Cornell has found that negative "e-graffiti" jeopardizes the goals of the Campus Aware tour and has exercised tight control over its content, editing the comments to promote the University in its best light. The issue of controlling the Wireless Project's content will surely be one of the issues with which the creators and administrators must grapple. MIT's faculty, students and staff celebrate individuality and innovation; this culture inevitably attracts individuals who harbor a certain anti-establishment ethos. Where would MIT draw the line between respecting the freedom of expression and the broadcasting of potentially hateful and inflammatory thoughts? How much responsibility does the Institute have regarding the content it presents?

MIT launched the much-celebrated OpenCourseWare (OCW) initiative in 2004, which allows anyone with an Internet connection to access much of its curriculum at zero cost. The impetus for the project stems from an ideal that “the open dissemination of knowledge and information can open new doors to the powerful benefits of education for humanity around the world.”<sup>7</sup> Yet, while the OCW initiative provides positive externalities to the greater community and generates favorable publicity, the Institute is careful to protect its core business. The OCW does not come close to matching the quality and breadth of the educational experience that enrolled (and paying) students receive. Will the Wireless Project serve the MIT community and the greater public in different ways, offering differing levels of access to the content?

Moreover, with the proliferating use of RFIDs, GPS-enabled cell phones and PDAs, the issue of privacy will be contested. How much of our information be collected when we access the network and how will it be used? Will this use of cyberspace be used to serve us more personalized, useful information or be used to spam us, or some combination of both?

Most importantly, the MIT Wireless Project must resolve the issue of its funding and sustainability. In the current economic environment and with MIT’s operating budget belt-tightening, the issues of who will bear the cost of building its infrastructure, its content and its continuous management will be the biggest hurdle to its eventual realization. MIT will likely steer away from commercializing the content and charging access fees because of its educational status and its ideals; the OCW is currently funded by MIT and several foundation grants. Will the Wireless Project be able to prove its value, to measure the impact of its reach? The measure of whether it will work here will affect the possibility of it scaling out to other institutions, places and uses.

For the business world, the proposition of enhancing community, to increase connectivity and to improving the quality of life is without stringent valuations. Community development organizations, like the Lower Manhattan Development Corporation (LMDC), Boston Main Streets and the Penn Business Improvement District all bear the costs of promoting these spaces through its own operating budgets. These organizations

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<sup>7</sup> OpenCourseWare, MIT: <http://ocw.mit.edu/OcwWeb/Global/AboutOCW/our-story.htm>



all have metrics by which they measure their return on investment. In this case, if MIT is trying to publicize itself, how will it measure its return? How would this project impact the companies and other commercial interests who place a premium to be in close proximity to MIT's technology hub? How about for the developers who are trying to enhance the value of their projects, will they value the positive externalities that the project can bring?

## **Conclusion**

The vision of the Wireless project has both a very local and broad perspective. At the local level, the promotion of MIT, its research, reputation and collaborations is an immediate intended goal. Yet, for people like Deborah Douglas and those at the Media Lab, the technology has the possibilities of disseminating information and building community at a much broader scale. They envision the evolution of the project into a geographical world wide web, with information about locales produced not only by professional historians, but by the people who live, work and travel through that space. Access to the information and knowledge provides the potential of enriching not only the MIT and Cambridge community but also that of neighborhoods and communities around the world. What would our neighborhoods look like and how will we behave differently? The promise of and the experiment with freedom of knowledge at MIT continue to evolve.

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