Advancing the Spatially Enabled Smart Campus and Environmental Planning and Design

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Despite what seems like annual budget crises and ongoing fiscal stress on their systems we see universities, large and small, investing in their campuses, less as collections of classroom buildings but as extensive learning environments. The spaces and forms that combine to shape the daily spatial experiences of these students create a series of opportunities for spatial exploration and learning in an environment that is also generally information rich and well-enabled with information technology. As a designer, the linkage of these spatial experiences with technology and students excited about learning is an outstanding opportunity for exploring space as well as themselves.

Typologies of activities in a spatially enabled smart campus
While it will surely be an obsolete model by the end of the workshop, I offer this model as a starting point for considering some of the activities on smart campus. They are broken into living and learning. Within those further specific emerge:

1) Living
   a. Active—Students on larger campuses are increasingly relying on smart devices to navigate the daily challenges of life. While the classic example might be finding their way to classes on the first days of the semester, day-to-day living includes other uses. Students find themselves employing smart campus technologies for communication, monitoring their bus, finding a parking sense, tracking down friends or getting food.
   b. Passive—Active campus spaces might be enhanced by sensors that respond to student use of the space. In the evenings a central plaza might undergo multiple changes in lighting in response to fluxuations in the numbers or locations of students in the space. If students know that large crowds trigger a light show in a gathering place, it might incentivize socialization that is designed to be safer/friendlier/more academic. Maybe a group that completes laps around the library is rewarded with a video that is projected on the sidewalk.
   c. Crowdsourced—By contributing spatial data, students could help reshape their living environment. Every few years paths could be redirected based on voting on smart phones. Or campus designers could use data on shifting walking and biking patterns to alter locations for bike racks, paths, obstacles, or even course offerings.

2) Learning—Smart campus applications could support a variety of approaches to learning:
   a. Spatial—For our purposes spatial learning may seem the most obvious. Spatial learning games like ARIS could be integrated into the campus experience. New
students could be encouraged to explore a campus in a digital scavenger hunt. Basic spatial cognition and fairly advanced social studies could all be taught using tools like this. Since spatial literacy is enhanced by experiencing spaces, sequences, and

b. **Topical**—At larger diverse universities, there are a variety of topics that might benefit from topical uses of smart campus applications. Landscape architecture students might be guided around, plant to plant, in a digitally-led lesson in plant identification. Engineering students use iPads to find different support systems for pedestrian bridges or roof overhangs.

c. **Collaborative**—Technology is facilitating new ways of sharing creative and intellectual work. Students who use their tablet for drawing and sketching could post their drawing of the campus administration building in a digital map space where other sketchers could post their as well. This exchange is common in an analog art class, but crosses temporal dimensions with the technology. Further, if the sketches capture different parts of the central quad, they could be stitched together to create a collaborative 3-d sketched representation of the campus core.

d. **Casual Inquiry**—Curious students might find casual inquiry to be a great way to engage their surroundings. Who is Barker Hall named after? Just capture the QR code and get an answer on your smart phone. How do the wetlands on campus function? If you walk close to them, maybe your smart device will provide a link to more information?

e. **Direct Inquiry**—In some cases, student’s devices could be active tools for research. As crowds move between larger spaces on campus, perhaps a tablet could be used to monitor the movement based on the university’s own sensors spread through the spaces. Similarly, questions about weather or microclimate might be answered through live remote monitoring of sensors.

As the other position papers will inevitably show, this is not a complete list, but they may provide some useful boxes for an eventually taxonomy of smart campus activities, both real and imagined.