# Does a "Smart Campus" Create "Smart People"?

## *From Smart Cities to Smart Campuses—Supporting the "Campus Citizens"*

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I have three simple rules to build a "Smart Campus":

- Listen to your people.
- Make the invisible visible.
- Create experiences not services.

There is no doubt that there are major challenges that future cities will face, not least a huge increase in the populations living in urban areas. According to a United Nation report [1] every second the global urban population grows by 2 people. Therefore the urban population is expected to increase from 3.6 billion people in 2011 to 6.3 billion in 2050. In 2020 more than 700 cities will exist with populations of +1 million; today we have just 500 cities with populations of+1 million. The exploding urban population growth creates unprecedented challenges, among which provision for water and sanitation are the most pressing and painfully felt when lacking [6]. Cities cannot be sustainable without ensuring reliable access to safe drinking water and adequate sanitation. Therefore, many tech companies are investing in R&D to create 'smart' cities, with the goal of making our lives more efficient, better informed and hassle-free. Research estimates that$16 billion USD will be spent annually by 2020 on core technologies in pursuit of this goal. A recent trend has been to develop the "Internet of things" that can sense, connect and mine a wealth of data about our cities, the environment and ourselves.

Our Intel Collaborative Research Institute on Sustainable Connected Cities[1] [4] is concerned with enhancing and changing how people live, interact and engage with cities. Our main goal is to enhance city sustainability and improve citizen well-being.

### The Smart Campus an Incubator for a Smart City

While the interest in future cities and the future challenges are quite clear, the "millennium challenges" of future campuses still remain unclear. Will it be the fact that campuses will have "just" more students and less staff? Or more diverse groups of campus citizens, including many more guests or visitors connected through the Internet to the groups and people working and living on the campus? It is safe to say that each campus will have a unique set of challenges that need to be addressed. Campuses are far more diverse than cities and harder to cluster into categories than cities.

[1] www.cities.io

During the specialist meeting we would like to share our views (coming from a city perspective) and best practices that we learned and researched within our center from a computer science background, particularly focusing on human-computer interaction aspects (HCI) to improve the **campus experience** of future campuses. We will focus on the following three aspects:

### 1) The "Campus Citizens" are key to the success of any smart campus project.

Do not listen to McKinsey & Company[2]—listen to your people. Consultancy companies have great plans in their drawers— plans for future cities and also campuses based on data. As outlined earlier, our perspective in the Sustainable Connected Cities Institute is human-centered. We have wide-ranging expertise and background in user experience, interaction design, ethnography and ethnography, together with research in the built environment, commerce, engineering, anthropology, the arts, and social psychology. We also work as inter-disciplinary teams (with people from computer science, designers, ethnographers, and psychologists among others) to make a real change to enrich and extend city dwellers lives. This fits with the vision of Bell [1] of computers not just acting on our behalf and anticipating what we want but also enabling people to be more creative, using state of the art computer technologies and toolkits. Therefore we think it is crucial to focus on the "campus citizens" and their needs. A campus comes alive because of the students, faculty, administration, service and visitors. It should be more than "buildings controlled by a fancy dashboard."

### 2) Misbalance between input and output

Many claims have been made about the potential benefits of embedding smart technologies in cities that connect the infrastructures with our public spaces, streets, homes, mobile phones and even our clothes could be tested before on university campuses to see possible impacts and effect. We noticed that there is still a huge misbalance between this "input" and the "output" back to the citizens. We will share our best practices and examples how ICT can change and impact the behavior of citizens (city and campus citizens) by connecting them to the "invisible data streams" of the city/campus as we for example did with the Tidy street project [2]. Others have also successfully presented various project e.g. MIT's Senseable Cities group[3]. We will reflect on the list of services, output interfaces and ways how people can interact with the data streams that have the potential to transform and shape a campus, especially having the role of space in mind.

### 3) Striving for efficiency?

Besides being a mini-city, each campus has some unique characteristics that need to be taken into account. By placing increasing numbers of sensors in all kinds of places that can be monitored, we could collect real-time data about how our utilities are faring, our transport is moving, our energy is being consumed, where things and people are and what they are doing,

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[2] http://www.mckinsey.com/insights/urbanization/how_to_make_a_city_great
[3] http://senseable.mit.edu/

with the hope to achieve a greater understanding of how our "places" work, what is needed to make them work even better, and how to maintain them more efficiently when something breaks down. Smart grids are being deployed in the background aiming to support the rapid and effective contingency and capacity planning. This is "just" the homework that we need to do. These enabling technologies are only the foundation for a successful future campus. We believe that research on smart campuses should not strive for this super-efficiency of the underlying technology. We argue that it is equally important for the "campus space" to consider the impact of new campus technological developments on quality of life and create an atmosphere that will help researchers and students conduct high quality teaching and research.

The accumulation of vast amounts of campus sensor data should not become overwhelming, making people feel disempowered or even disengaged. It should be designed to support the main role the space plays in their lives: **education, research**, and creating a **pleasant campus experience**.

## References

[1] Bell, G., Dourish, P.: Yesterdays tomorrows: notes on ubiquitous computings dominant vision. *Personal and Ubiquitous Computing 11*(2) (2007) 133–143.

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[3] Department of Economic: The Millennium Development Goals Report 2010. United Nations Publications (2010)

[4] Schöning, J., Rogers, Y., Bird, J., Capra, L., McCann, J. A., Prendergast, D., & Sheridan, C. (2012). Intel Collaborative Research Institute-Sustainable Connected Cities. In *Ambient Intelligence* (pp. 364–372). Springer Berlin Heidelberg.

[5] Yvonne Rogers, Licia Capra & Johannes Schöning: Beyond Smart Cities: Rethinking Urban Technology From a City Experience Perspective. *Urban Pamphleteer: Future & Smart Cities*, (1), (2013)

[6] United Nations Development Program. Human Development Report Office: Hu-man development report: Background papers. Human Development Report Office, United Nations Development Programme (2001)