



Yann Hengstenberg, Franziska Eckardt and Paul Benneworth

Reflections from a living smart campus

Student housing with climbing wall (foto: Beeldbank of the University of Twente.)

Universities and their campuses can play important roles in the economic performances of their regions, for example through stimulating high technology entrepreneurship and helping to create new economic growth paths. Furthermore, universities can stimulate societal knowledge exchange to contribute in addressing the grand challenges of the twenty-first century. There has been a recent trend for universities to create new infrastructures for these societal knowledge communities within the campuses, such as co-creatories, living laboratories and experimentoria, attempting to solve emerging urban challenges to support the drive for smart cities.

The campuses of universities can be seen as places where universities' global knowledge networks are brought together with the local knowledge needs of firms, with their spatial arrangements promoting interactions and stimulating knowledge exchange (Rutten et al, 2014). These campuses may offer infrastructures which bring together a range of partners who in turn form social networks allowing the rapid exchange of different kinds of knowledge (Hansson et al., 2004).

Recently, awareness has grown of the importance of universities to stimulating other kinds of societal development opportunities beyond the immediately economic. Universities may also work with policy-makers, practitioners, voluntary groups, civil society organisations and citizens to help these groups contribute in different ways to building better societies. So the question has been asked of whether university campuses can also stimulate these societal knowledge exchange activities to help address the grand challenges of the twenty-first century. And indeed, there has been a recent trend for

universities to create new infrastructures for these societal knowledge communities within their campuses, with vogueish names such as co-creatories, living laboratories and experimentoria. It is assumed that by bringing together key quadruple helix actors (Leydesdorff, 2012), these new campus elements can help stimulate knowledge exchange to create solutions to what Ackoff (1999) describes as "multidisciplinary messes".

One area where these experiments are increasingly popular is in attempting to solve emerging urban challenges to support the drive for smart cities. Central to these diverse experiments is the use of the campus in bringing together and stimulating interaction between different communities to create new useful knowledge. In this article we explore the question of whether this sometimes hyperbolic enthusiasm is justified by asking "*Do university spatial campus experiments help create more useful knowledge that can contribute to building effective smart-city solutions?*".

Campuses as spatial experiments

To answer this question, we extend Hansson's model to understand university campuses as loosely coupled communities of staff, students, business and publics, each engaged in their own knowledge creation (whether teaching, research or third mission). These different groups mutually interact in creating that knowledge (Reponen, 1999), and universities' physical infrastructures and campuses affect how these communities interact and couple (Benneworth, 2014). Universities can find ways to bring together communities that partly replicate those present in contemporary urban spaces where very different and heterogeneous communities interact and compete for space. They can study not only the technical dimensions of smart cities, but also the social processes which are necessary to avoid replicating previous problems of planned utopias becoming exclusionary dystopias.

In this article, we argue that the promise of these spatial experiments is to provide loose coupling between different knowledge communities as a condition for producing useful knowledge. We note that technologies can be developed within one type of community, the research groups. However, by coupling research groups via the spatial experiments with other social communities, with students, societal users and policy-makers, they may explore the ways in which new technologies and concepts are adopted, shaped and negotiated within diverse communities, often following contrary motives. For us this is the heart of the campus experiment challenge, in whether these living laboratory experiments can deliver this promise, in first instance by stimulating these soft-coupling processes.

University of Twente case study

To explore whether campus spatial experiments can drive soft coupling between knowledge communities, we focus upon

the University of Twente (UT). The UT was created in 1961 to fulfil a government decision to build a third Dutch technical university (after Delft and Eindhoven) to educate the highly skilled workforce demanded by post-war reconstruction. Enschede was chosen partly in a hope that the new technical university would help modernise the region's textile industry. Furthermore, the Drienerlo country estate was available for the campus between the cities Enschede and Hengelo (Boer & Drukker, 2011). A campus location was seen as a pre-requisite to avoid potential conflicts between existing residents and newly-arrived staff and students (what is sometimes called a 'town-gown conflict').

UT was created as a highly experimental university where staff and students lived together. There was a common first year curriculum for all courses, and students could acquire a short-cycle qualification, earning the university the moniker of "the experiment in the Forest" (Sorgdrager, 1981). Being experimental carried its risks, and in the early 1970s dwindling student numbers and the collapse of textiles forced the university to reconsider its approach. It reoriented its mission to creating and supporting new high technology industries, including its model for stimulating student spin-off companies that has persisted to this day (Karnebeek et al., 2001). Policy-makers supported these student graduates by co-financing a Business and Technology Centre (BTC), then developing a Business and Science Park (BSP) immediately to the south of the Drienerlo campus. When the dot.com bubble crashed and the ministry of defence announced a closure of the local military airbase, the university created a formal partnership with policy-makers and business support organisations. This partnership, called Kennispark Twente, had the mission to create 10.000 new jobs by making university-business engagement more systematic, including



Tower of Drienerlo on campus (foto: Beeldbank of the University of Twente.)

better managing connections between the university and its adjacent science park.

Spatial experiments

We began by noting the fashion for universities expanding their public benefits from the purely economic to the more social. Indeed the UT has followed this trend, recently announced its intention to transform itself into a Living Smart Campus to create workable solutions for delivering smart cities. This recent declaration builds on UT's much longer tradition of campus spatial experiments. That tradition has built experience in managing space that allows loose coupling, facilitating knowledge sharing and overspill, and ultimately more effective knowledge production. Our claim for the innovative nature of the Twente campus

as a useful lens to understand smart city experimentation processes derives from its statutory basis as an experimental campus (Boer & Drukker, 2011). We highlight three spatial experimentation processes in which understanding was developed in driving loose coupling between different knowledge communities.

Firstly, the early experiments in campus architectural and spatial form were a key factor in later creating entrepreneurial spirit and a campus knowledge community, its *genius loci*. It is easy to forget how radical the idea was of providing accommodation for staff and students in a single campus, or to plan each faculty as a distinct building in a village, when the fashion of the time was in modernist masses such as Lancaster or Bielefeld. The removal

of a flyover between campus and BSP in 2011 at a cost of €170m was predicated on an understanding of both the symbolic and material value in removing what was both a real and a network barrier between business and university communities.

Secondly, the experiments in entrepreneurship had clearly acquired a spatial dimension. The original BTC was created as much as a place where new entrepreneurs could learn from their peers, as to receive formal advice, training and mentoring. This approach was amplified in the 1996 MESA+ research laboratory, a shared physical space at the campus edge where nanotechnology researchers and companies could share machinery, with business technicians working alongside research students in solving common problems. The value of this knowledge created by co-location and loose coupling for economic development can be seen in the formation of 25 high technology companies over a decade.

In the 2000s, regional partners further extended this principle in their rebuilding plans bringing the MESA+ to the heart of the education zone immediately adjacent to both the (academic) Nanolab and the Gallery business and technology centre.

Thirdly, the final spatial experiments at the UT were practices to open up the university campus to the wider society, allowing publics to participate in university knowledge communities just as businesses have done with university research activities via MESA+ and the Gallery business centre. The university actively brought societal partners onto the university campus, including businesses for career fairs, networking events and promotional marketing. Other participants were the regional police and fire services for safety and disaster training, other students via the annual Summer School, and even local secondary schoolchildren via the Twente Academy. Furthermore, there were sporting events such as the Batavia Race and a range

of residential sports tournaments, the Green Vibrations Ascension Day festival, the Open Days, and the use of the university's dedicated trail bike track to house regional and Dutch Trail championships. The university has integrated its own signage into regional way-marking networks, bringing walkers, recreational and mountain bikers onto the campus on a daily basis. The university has been used as a site for the city's annual Four Days of Walking festival. On FC Twente match days, the campus becomes an overflow parking for the football stadium, with free buses taking supporters from the campus to the stadium and back. The municipality recently renamed the district, formerly Drienerlo, as Kennispark (Knowledge Park), allowing the local train station to be renamed Kennispark, making it visible to train travellers across the Netherlands and perhaps achieving parity of esteem with Amsterdam Science Park, and Strijp-S in Eindhoven.

Solving urban challenges?

These longer term experiments reveal some of the boundary conditions by which universities may create loosely coupled knowledge communities suitable for bringing together different kinds of knowledge oriented towards different purposes. These models are all too often focused on the technological rather than the human dimension. But it is precisely the human dimension, people talking to one another and sharing ideas to solve problems, that has emerged as successful on the UT. The campus can be understood as providing a semi-permeable boundary: it both holds at bay some of the shortages of infrastructure, finance, knowledge capital and business opportunities, and has in turn allowed to build knowledge communities that have spread outward from the campus into the region. MESA+ created a shared grassroots knowledge pool, between technicians, students and post-docs, not just between CEOs and the university chairman. The spin-off programme leveraged that social

knowledge pool to drive economic development, but it was the co-created knowledge that was the asset to be leveraged. UT is currently attempting to integrate the campus into other non-economic local networks, what might be thought of as the networks of everyday life, hoping that will create knowledge not just academically useful, but also making the Twente region a better place to live.

This in turn allows us to address the question of how university spatial experiments can promote campus soft coupling to create knowledge addressing the social as well as technological dimensions of the grand challenges of the twenty-first century. The campus has worked to promote soft coupling where these various human dimensions have been present. Viewed from this perspective, the problem with living laboratories is that they risk to become artificial and sterile. They may function as stages where senior managers play out enactments of interaction rather than forums where different communities meet and interact in the course of creating knowledge that is useful for them.

The risk we see in the hype of spatial experiments is that they prioritise the concept and the organisational form over the social interactions in the community. We do not know how to systematically create soft coupling between these communities, although we have a sense of how this might happen in practice. The essence here appears to be the ownership of knowledge by external participants who can take it into society, but at the same time we know universities find it difficult to engage with groups of problem-owners who could really benefit from that knowledge. Campus spatial experiments are promising, but this promise remains to be delivered on a case-wise basis, demanding better, more systematic understandings of the social lives of these spatial experimenting communities.

Yann Hengstenberg, Franziska Eckardt and Paul Benneworth (p.benneworth@utwente.nl) are with Center for Higher Education Policy Studies (CHEPS), University of Twente.

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