**Campus of the future**
smart tools and information to support strategic choices

**TU Delft’s Campus research team**

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1. Vision on the campus of the future
2. Campus management challenges
3. Using big data & smart tools for management information

**PHYSICAL definition of “campus”**

- the “campus” is defined as the (collection of) buildings and land, used for university or university-related functions

**FUNCTIONAL definition of “campus”**

- **ACADEMIC**
  - classrooms, library, offices, laboratories, lecture halls, ...
- **RESIDENTIAL**
  - student housing, hotels, ...
- **RELATED BUSINESS**
  - start-ups, incubators, industry, ...
- **RETAIL & LEISURE**
  - sports, restaurants, cafes, ...
- **INFRASTRUCTURE**
  - energy, efficiency, technical condition
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Around the year 2000...
... literature and lectures about the future campus claimed:

“Bricks will be replaced by clicks”

“Campus managers will become ICT managers”
Campus strategy
“Clicks & Mortar”
(book: 21st century universities)

Content presentation based on
- Campus NL - past, present & future
  all 14 Dutch universities assessed in 1999, 2006 and 2016
- PhD thesis/dissertation
  “Managing the university campus” (2011)
- Case study research:
- TU Delft’s CAMPUS RESEARCH TEAM

“Campus of the future” – 3 models – “solid, fluid, gas”

A = traditional

B = network

C = virtual

“Solid state”

Building Tu Delft’s Faculty of Architecture
totally destroyed: 2000 students + 1000 employees “homeless”

Positive associations
- Traditions, rituals
- Loyalty, belonging: “members only”
- Community feeling: academic family
- Ownership
- Home

Negative associations
- “You can not use... my office, meeting room, lab…”
- High footprint user
- Old-fashioned island culture
- Inflexible, empty...

May 13, 2008

“Campus of the future” – models A – traditional university
- Strong hierarchy; top-down fixed organisational structures
- Exclusiveness, facilities per faculty
- Individual territory/workplaces - can we still afford this?
Current + future campus = more dynamic

1. More temporary staff – short contracts, visiting professors, summer schools
2. More and more visitors
3. Staff and students travel more
4. International students
5. Research (funding) has become more unpredictable (>2 year contracts)
6. Functional demands change rapidly (labs, ICT, legislation)

"The typical completion rate for a MOOC is about 5% to 10%. For MOOC students who attend learning hubs, the completion rates are above 30%"  
Source: Coursera (7 mln students)

from: http://www.bbc.com/uk/NEWS/business-26925463  
"Online students can’t help being sociable" (April 9, 2014)

It was a revolution moving higher education from bricks to clicks... and now it’s starting to go back to bricks again.

Online university providers, which offered people the chance to study from home, are turning full circle by creating a network of learning centres where students can meet and study together.

Instead of demolishing the dusty old classrooms of academia, the online university revolution is responsible for opening some new ones.

Coursera, a major California-based provider of online courses, is creating an international network of "learning hubs", where students can follow these virtual courses in real-life, bricks and mortar settings. They’re scheduled and arranged online, with the only vital ingredients being a laptop, wi-fi and somewhere to talk.

Positive associations
- Accessibility for long-distance students
- Very flexible
- Campus costs < 5%
- Very flexible
- Paperless
- Work-life balance own responsibility

Negative associations
- Loneliness
- Social isolation
- Less loyalty to university
- Lower course completion rates
- Work-life balance hard to manage

Campus models A-B-C as basis

A = traditional
- exclusive & territorial
- trend in 2006: "from bricks to clicks"

B = network
- interactive & shared
- trend in 2016: 10 years later

C = virtual
- place independent & individual
- trend in 2016: 10 years later

Campus of the future
model B – network university
- "campus is market place of knowledge" - sharing the campus, "less territorial", flexible, "university"

Negative associations
- Anonymous in large organisation
- Everyone’s workplace is nobody’s workplace
- Distractions
- Less privacy
- More mobility on campus

Positive associations
- Interdisciplinary
- Working in multiple teams, > 1 boss
- Serendipity
- Meeting place
- Open, more visible
- Flexible
- Campus costs lower
mental health & safety  
... high on the university’s agenda

Why “campus favorite study place”?

*pull factors*
- Quality of campus: better facilities, network, ICT applications
- Other students: more group work, group pressure to study, friendship and love (!)

*push factors*
- Distractions at home: room mates, social life, hobbies, Netflix
- More pressure on students: higher tuition fees, stricter deadlines, rules
- Risk of burn-out
- "Students queue up < 9am"
- "The search for a quiet place to study"
- "Love-hate relationship with the smart phone"
- "Push factors"
- "Pull factors"
- "We need regular working hours and deadlines"
- "We need to work on campus to be disciplined and focused"
- "Protect us from working day & night"
- "We must silence the next source of stress!"
- "Work pressure too high!"
- "Too many distractions at home: room mates, Netflix etc."
- "Love-hate relationship with the smart phone"
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2400 HEIs / universities in Europe need management information to make ‘the right’ decisions

- political conditions
- ambitious university agendas
- user demands
- health & safety
- functionality
- costs per m²
- total costs of ownership
- market value

The European Campus (2019)
Management & Information

14 universities of technology / 6 countries / 28 indicators

The European Campus Heritage & Challenges (2014)

The university campus is an asset for Europe’s knowledge economy:
- quality of place
- cultural heritage buildings
- attractive university cities

The university campus is a (potential) problem for Europe’s knowledge economy:
- bad technical state
- inefficient use of space
- costly maintenance

Managing the campus as a strategic resource requires:
- more information on all perspectives
- more references to support decisions
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We asked campus managers in 2015, “urgencies?”
“claiming space and not using it”

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“claiming space and not using it”

Reality campus: underutilized, often empty
Perception users: booked, full

“The schedule often provides FAKE news”

Start of a PhD study > 2016
- Bart Valks
- Supervised by Campus Research Team
- Supported by graduate students

Collecting big data about campus use, based on positioning of user devices
Image: Rob Braggan, 2017/2018
To connect and support campus users

Campus of the Future – collecting big data

Source: TU Delft research on TU Delft campus - searching for use patterns, based on REAL-TIME DATA

GPS-Tracking
Using Eduroam/WiFi
GPS-Navigation
Find a quiet study place
Smart campus tools based on REAL use (not on scheduled use)

Smart campus tools 2.0 format

Cases

1 Smart tools to find available study places

- Cause is a perceived lack of study places on campus by students or desire of library to improve its service
- There is a shortage of available campus management information for study places. How well are study places used?
- Solution contains:
  - Real-time availability
  - Booking of project spaces
  - Location of study places
  - Properties of study places

2 Smart tools to optimise teaching space use

- Cause is a wish to further optimise frequency and occupancy rates
- Possibility to monitor and adjust based on no-show behaviour and expected student attendance
- Solution is measurement of space use via WiFi; in some cases intended via infrared
3 Smart tools to share classrooms for studying

- Cause is a perceived lack of study places by students or wish of library to improve its services
- Solution is the use of ~25% initial vacancy in classrooms
- Solutions have multiple components – also booking project rooms, finding study places with PCs

4 Finding free (office) workplaces

- Cause is a transition to shared workplace concepts, lower amount of workplaces per FTE
- Employees can find a workplace in a building or search between multiple locations
- Alternative measurement methods: WiFi, docking stations, desktop PCs

5 Optimising the use of meeting rooms

- Cause is a shortage of meeting rooms, and many unused meetings due to high employee turnover rate
- Solutions use infrared sensors and videoconferencing facilities

6 Aligning building use and energy use

- Cause is the wish to avoid waste of energy on vacant buildings and spaces (combined with other demands)
- Cases contain multiple sensors and functionalities.
- Possibility to adjust temperature and light to preferences
- Reserving workplaces (check-in)
- Find your colleague, wayfinding etc.

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“Bipolar campus strategy”

reinventing the past + supporting the future with smart tools

“Do not disturb”  “Place to meet”
“Off the radar”  “Interconnected”
Solitude  Community
Silence  Buzz
Offline  Online

www.managingtheuniversitycampus.nl
Yes, we can afford the campus - if we are prepared to share more space and use smart tools to be more resource-efficient.

Our blog - for more information...
- this PPT under DOWNLOADS
- books under SMART TOOLS and PUBLICATIONS

Thank you for your attention!

Google:
- Alexandra
- TU Delft
- Campus