Sustainable Refurbishment to Sustainable FM
Del 1

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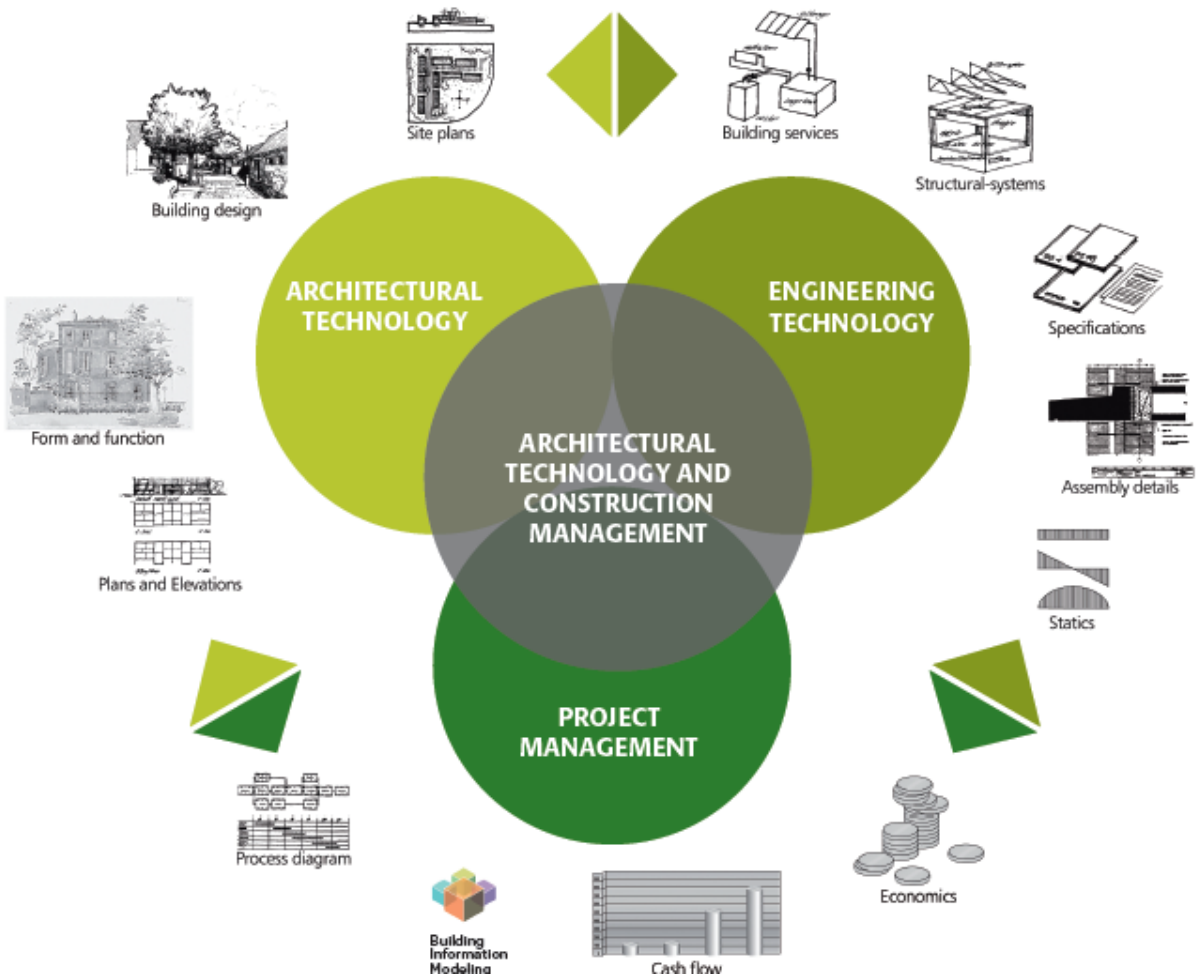
Bygningskonstruktør uddannelsen DK

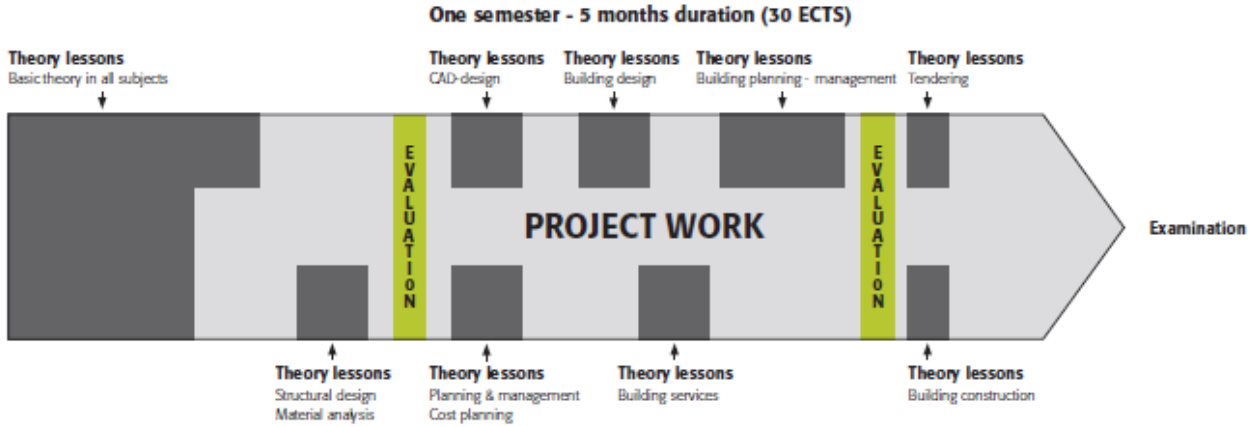
VIA University College

kea
KØBENHAVNS ERHVERVSAKADEMI

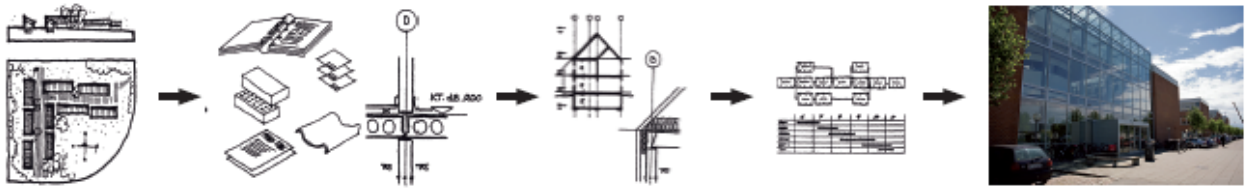
Field of competencies



Project based learning



The working process



Form & function
Clients demands
Building regulations
and laws
Personal planning

Material analysis
Details
Building components
Cost planning
Quantity surveying

Life cycle
Costing
Heating
and
ventilation
Building design

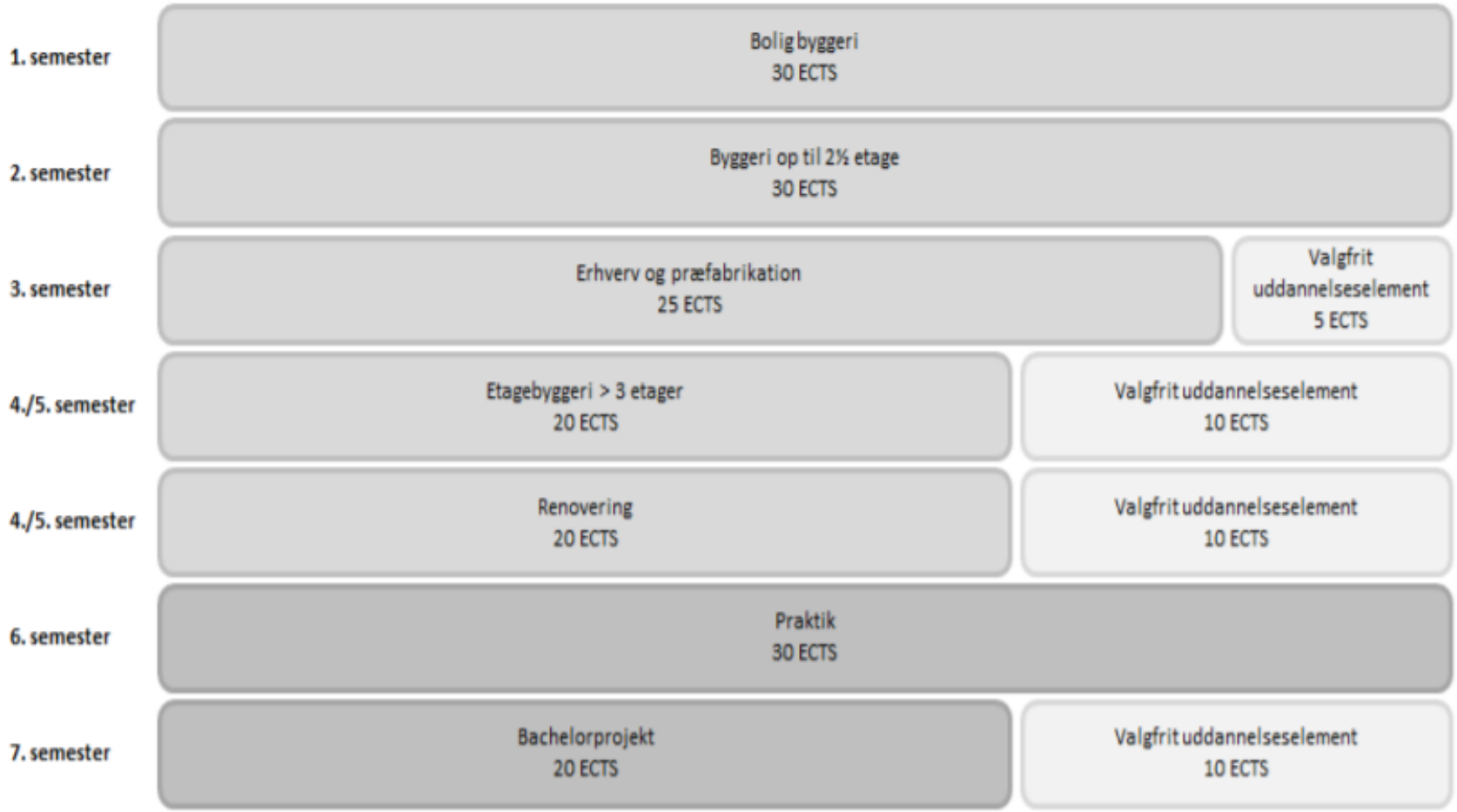
Local authorities
and detail drawings
Sewage and drainage
Room drawings
Building components

Time schedule
Management
Tendering
Working drawings
Specifications

Running and
maintenance

Bygningskonstruktørens uddannelseselementer

Figur 2: Bygningskonstruktøruddannelsens obligatoriske og valgfrie uddannelseselementer



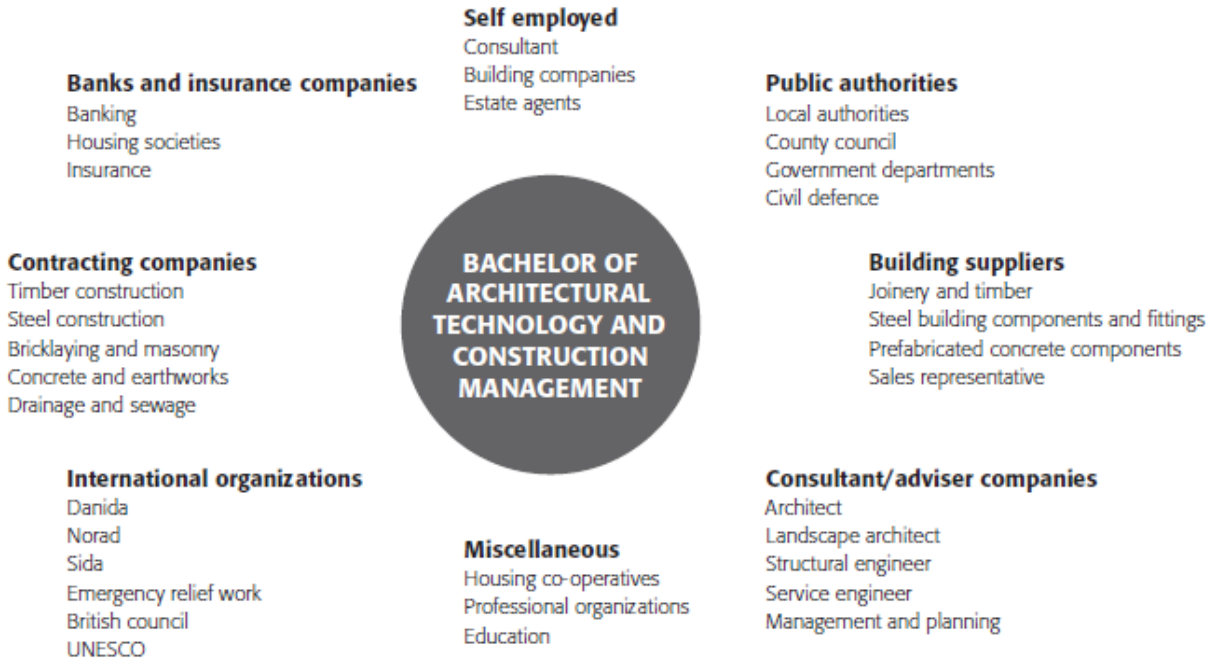
Kilde: Tilvirkning i Uddannelsesnetværket på baggrund af bekendtgørelsen

VIA University College

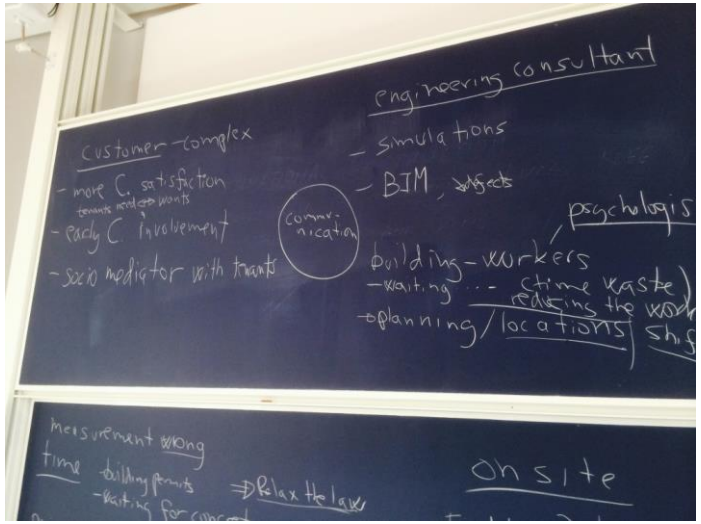
kea KØBENHAVNS ERHVERVSAKADEMI

Field of employment

You are able to undertake many different functions and fulfil widely varying roles in the building and construction sector.



Sustainability in the classroom: from practice to teaching



Martine Buser

CM Chalmers University of Technology, Sweden

Our project

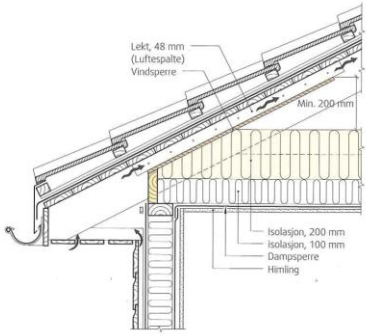
- Aim: creating teaching material to support sustainable FM
- Two folds
  - Sustainable FM as a research topic (this afternoon)
  - Sustainable FM as teaching topic (this morning)
- Participants
  - Københavns Erhvervsakademis KEA, professional bachelor
  - Via University College, professional bachelor
  - NTNU master education in FM
  - Chalmers master education in Construction Management
- Project owner Konstruktor Foreningen DK

Practice oriented

Management more theoretical

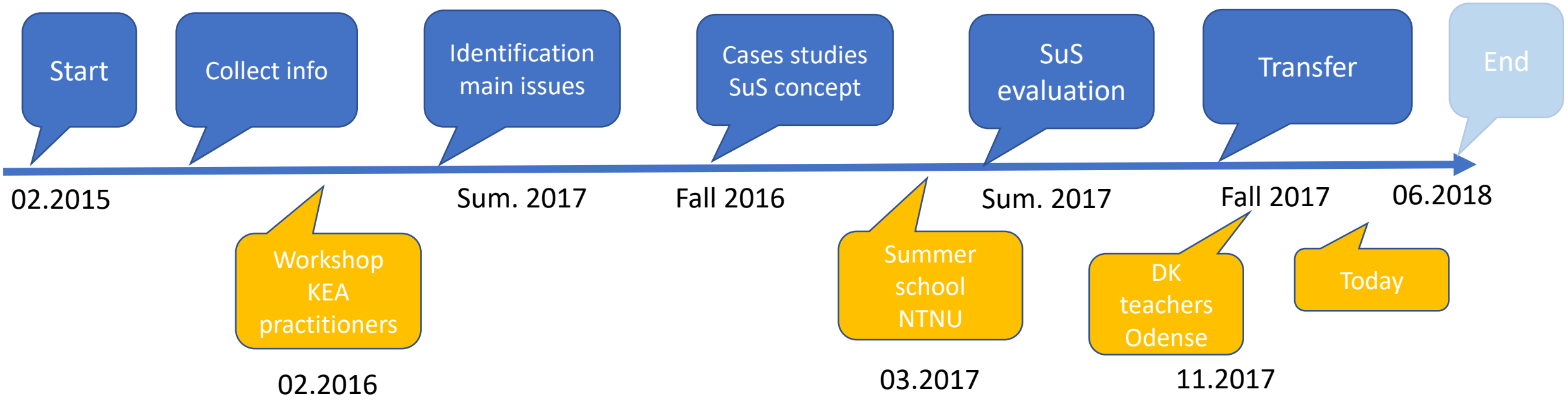
Project context

Himling
Innertak
Loft



- Scandinavian countries common understanding of FM and sustainability (flat hierarchy, well organized labour, social values)!
- Work across boundaries :
  - Countries: DK, NO, SE
  - Schools: Chalmers, KEA, NTNU, VIA
  - Language: Danish, Norsk, Svensk, and English
  - Educations: bygningskonstruktør and master students in FM and CM
  - Disciplines: engineer, architect, sociologist, “architect technologist” ….
- Conditions of the project in part defined by the funding body (Nordic Built)!

Project time line



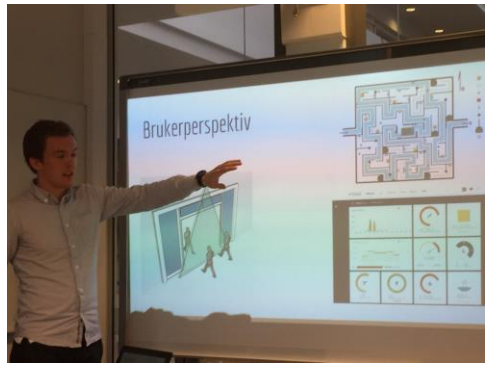
Topic : users integration in FM

- Sustainable FM not optimised yet !
- Focus on measurable achievement
- To achieve sustainability goals users need to be involved (Gram Hansen et al 2017)!
- If clear that FM can contribute to sustainable agenda, not clear how to handle the users (educating end-users Atkins 2014)
- Our educations address sustainability but do not equip students with awareness and concrete tools to solve issues related to the social aspects of environmental and economical sustainability solutions.
- The complexity of these issues require multidisciplinary competences. So we need to cross barriers between traditional disciplines (Atkins, 2016).

Participants

- FM companies
  - 1 contractor, 1 FM company, 2 public housing companies
- Students
  - Kea, Via and Chalmers: 10 participants each
  - NTNU 5-4 … (not the prospect of going abroad….)
  - In total 34
- School
  - Researchers, teachers, PhD students
  - Role to facilitate and observe

Summer school



- A short intro to sustainability FM (Christian Koch and Siri H. Blakstad)
- Short method support
- Project Base Learning PBL
- 4 ongoing cases studies
- Setting: 2 groups of 4-5 students (all countries represented) working on the same case 2, 5 day.
- Results presented by the students and evaluated by both teachers and practitioners
- The team role: create the frame, find cases and engaged practitioners, set the goals!

4 Case studies

1. Brittania Hotel, Norway

2. University building, Chalmers, Sweden

3. Social housing DK

4. Eco housing in DK

Case	1 Hotel, Norway	2 University, Sweden	3 Social housing, Denmark	4 Eco housing, Denmark
Context	Large ambitious renovation of a hotel built in 1870	Retrofit of a university building, the creation of small open offices and new meeting area	Designing retrofit for social housing targeting inner climate issues	New built of sustainable housing, users participation in operation and maintenance
Goal	How to integrate sustainable solutions including the hotel's guests	How to engage users (students and employees) to behave according to the sustainable goals integrated in the building	To solve inner climate issues and engage the residents to act accordingly to new standards	To motivate the residents' association to take responsibility, operate and maintain the buildings and surrounding
Client	Contractors	Facilities management company	Public housing company	Public housing company
Challenges	To create a luxury hotel which builds on sustainable principles and engage clients to behave accordingly	To create an attractive environment that inspires and supports the interaction between researchers, students and companies.	To engage and motivate residents to take an active role	To motivate the residents to do self-management and operation of housing and common areas
Students contribution	App technology Smart intelligent rooms Adapt prices to sustainability contributions sustainability: demonstrate how guests can contribute to save energy by choices of different prices in the booking	Apps and smart technology for the FM unit: Monitoring use of space Room booking BIM for all buildings Information Operational planning Training program Motivation/points User: Social zone with a green garden with fresh vegetables Gaming café	Formation and monitoring tool that affects the behaviour of the residents: Inspiring information What is expected when living here Social events Surveys Professionals to handle technical installations	Organize tasks and inform the residents in what task they are expected to engage in Information channel Clear Incitement's for doing the tasks and consequences for when the maintenance tasks Yearly maintenance day for fellowship and common good

Assessment

- By the FM practitioners
- By the students
  - Daily feedback individual and in common, and questionnaire at the end
  - Progress log
- By the teams
  - Diary
  - Observation participant or not
  - Daily common discussion within the group, with the students and the practitioners

Table 2. Results of the students' questionnaire

Scale Questions	Very good	Good	Fair	Bad	Total
What is your assessment of the SuS	19	15	0	0	34
Does the SuS contributing to your education	15	15	4	0	34
Do you have a better understanding of the social aspects of sustainability challenges after the SuS	10	19	4	1	34
How do you assess the participation of the professionals to the setting	14	12	6	1	33
Do you feel you participate constructively to the group work	19	15	0	0	34
As the SuS improve your understanding of the two other national cultures	22	11	0	1#	34
Would you recommend the SuS to other students	26	3	1	0	30

non Scandinavian student

Results

- A success ;-)
- Students very attentive to language and culture differences
- Values for students, teachers and some of the practitioners…
- However
  - This is a project with a substantial budget, how to translate this in everyday teaching context?
  - Divergence between the teachers regarding the contribution of SuS, either focus on process or content (cases)
  - Difficult to assess the outcomes in term of learning and sustainability

Source:
Buser, M. & Støre-Valen, M. (2017) "*Developing the social aspects of sustainable facilities management: A multi-country summer school project"*, paper presented at the CIB conference "Shaping Tomorrow's Built Environment", 11 – 12 September 2017, University of Salford, Manchester.

Questions

The project created more questions than answers :

- Are we up to date with the challenges these FM companies are facing?
- What tools can we offer to our students (participation, financial incentives, nudging,…) ?
- Are we ready to have inter-disciplinary programme (common method, theory, pedagogic progression?)
- Do we need new competences or profiles?
- If we don’t do it who will?

How do we bring the new practices and research to the classroom ?

- How do we know what we need to teach?

1. In a world in constant change, how can we integrate the practitioners' new developments in our teaching activities?
2. Can our Nordic Built project and other similar projects contribute to your work in the classroom?
3. And if they can, how should it be done it?

Thank you for your attention!