Maintaining and developing problem-based project work

38 years institutional experience

Lars Bodum
Head of Department
Department of Development and Planning
Aalborg University
Aalborg University –
in Aalborg, Esbjerg and Copenhagen
Aalborg University – Main Campus
Aalborg University – facts

Aalborg University has app. 19,000 students, ranging from students at preparatory courses through master-level candidates

10% are international students coming from 100 different countries all over the world

The university employs approximately 1,800 faculty and 700 administrative and technical staff

The educational programmes are organized into the university’s 4 faculties and departments

Aalborg University has app. 60 programmes taught in English

Annual budget (2012) in excess of € 300 Mill.
Management

Organization

Management

University Board

President
Vice President
University Director

Dean
Faculty of Humanities

Dean
Faculty of Social Sciences

Dean
Faculty of Engineering and Science

Dean
Faculty of Medicine

Director
National Building Research LAB

Chief Librarian
Aalborg University Library (AUB)

Heads of Departments

Schools Study Boards

Heads of Studies

Steering Committee

Academic Councils
The values of Aalborg University

The values that distinguish Aalborg University:

**Creativity**
Aalborg University goes off the beaten track in research, teaching, administration and in the exchange of knowledge with its surroundings

**Openness**
Aalborg University is open to dialogue, new ideas and thoughts and to positive criticism and difference of opinions

**Co-operation**
Aalborg University is characterized by many different types of co-operations - conducted is an atmosphere of mutual trust and respect
The Aalborg Model

Semester themes => problems => questioning and wondering

A project each semester

Group size of 5-8 students first year, 2-4 students the last year

Each group has at least one facilitator/supervisor

Self selected group and projects within themes

Group examination/ individual examination
Aalborg model

I: Project based/organised

Formulation of objectives and problems

Unique and complex tasks

Active searching and writing process which may lead to deeper understanding

Teamwork

Deadlines
## Aalborg model

2: **Problem based**

<table>
<thead>
<tr>
<th>Problem based – open</th>
<th>Discipline based – narrow</th>
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<td>methodical objectives</td>
<td>subject objectives</td>
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<td>methodological/discipline themes</td>
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<td>ill defined problems</td>
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<td>learner directed</td>
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<td>exemplarity</td>
<td>disciplines</td>
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<td>exemplarity</td>
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What is a problem?

Unsatisfactory or unsettled
A difficulty
A state of affairs needed to be changed
Something that is not working well
Contradiction
Wonder
Interest …. 
Something to develop!
Characteristics of good problem

• Feasibility – it can be studied

• Clarity – most people can understand

• Significance – contribute to the pool of existing knowledge
The new Aalborg Model

50% courses

Courses 5 ECTS  Individual assessment
Courses 5 ECTS  Individual assessment
Courses 5 ECTS  Individual assessment

50% project

Project 15 ECTS  Individual assessment

One semester – half year

1 ECTS (European Credit Transfer System) = 30 working hours
One project per semester

15 ECTS = 450 hours of student work
Diversity of physical facilitation
More than 1200 rooms for teams
Self organised groups - Project management
Courses, lectures, seminars
Many different types of projects

‘It is boring to only focus on technical things… I don’t want to become nerds by studying engineering. I want to work with technology in a creative way and to do something for people…’
Facilitation and group dynamics
Anti Sway System for a Ship to Shore Crane
Synopsis

The purpose of this project is to design a system to dampen the sway which occurs when a cargo container is moved with a ship to shore crane. It is determined that the system must be able to control both velocity and position of the container. This means that the crane operator must be able to apply a velocity reference to the crane via a joystick, as well as he must be able to operate the crane by entering a specific position to where the container must move. This is the background for the actual controller design. The controllers are implemented as both classic and state space controllers. The classic controllers are implemented as four separate controllers: Position and velocity controllers in vertical and horizontal direction. The two directions are controlled separately.
Overall assessment of Danish Engineering Institutions by companies (Ingeniøren, 2008)

- Aalborg University (N=130)
- Technical University of Denmark (N=129)
- Vitus Bering (N=56)
- University of Southern Denmark (N=99)
- Aarhus University (N=75)
- Engineering University College in Århus (IHA) (N=83)
- Engineering University College in Copenhagen (N=74)

The chart shows the percentage of companies giving different ratings (1 - Worst to 5 - Best) to each institution.
Are there one or more institutions which you find particular good at developing engineering education according to the needs of society and companies?

*(Ingeniøren, 2008)*
Duration rates for Danish universities 2007, Official statistics
Research on Problem and project – PBL programmes

More motivated
Deeper learning
Increased skills and competences
Higher grades

Employability increased – relevant skills process skills: collaboration, project management… etc.

Higher retention
Faster duration
Higher salary after ten years from enrollment
Applying for a UNESCO Aalborg Centre for Problem Based Learning in Engineering Science and Sustainability
Research

15 PhD students

- Creativity and mega projects (satellit)
- Organisational change to PBL
- PBL and the subject identity
- Design of PBL curricula in Thailand, India og Malaysia
- Intercultural learning in teams
- PBL and sustainability – strategies for implementation

Research projects

- External: research council projects on engineering practice, sustainability, curriculum construction
- Internal projects evaluation of the new PBL model – ongoing
- Group assessment and PBL
Collaboration agreements: staff training and PhD

UNESCO Chair in PBL in EE
Global Network

Master in Problem Based Learning
Thank you for your attention!