A photograph of a university campus. In the foreground, a young man is lying on his back on a green lawn, looking at his phone. To his right, a group of students is sitting on the grass, some talking and some looking at their phones. In the background, a modern building with large windows and a sign that says "AAU" is visible. The sky is clear and blue.

# A Web-based platform for building Problem Based Learning competences (PBL) among students

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# Bio

- ▶ Professor in PBL and Digital Learning – Department of Planning, Aalborg University
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# Agenda

- ▶ Introducing the Aalborg PBL model
- ▶ Students' use of technology for collaboration
- ▶ Diversity among student groups
- ▶ Summing up – opportunities and challenges
- ▶ Presenting the UnFoLD project



# **Introducing the Aalborg PBL model**

# Aalborg University (AAU)

- ▶ Located in three campuses in Denmark: Aalborg, Copenhagen, Esbjerg
- ▶ Established in 1974 and from the beginning based on **Problem Oriented and Project Based Work** (The Aalborg PBL Model)
- ▶ More about Aalborg PBL:
  - ▶ <https://www.en.aau.dk/about-aau/aalborg-model-problem-based-learning>
  - ▶ <https://www.pbl.aau.dk/>



# The Aalborg PBL model

- Problem Based Learning
  - Based on real-life problems
- Project Organised Education
  - Project work supported by lecture courses
- Group Work
  - groups of four to six students
  - supervised by lecturers/professors
- Interdisciplinary Studies
  - Integration of theory and practice
  - Focus on Learning to Learn and methodological skills
- University Wide Model - Used in all faculties (with variations and some more case-based)

50 %

**Project work : a major project within a given subject-related framework determined for each semester (thematic framework).**

50 %

**Project related & mandatory courses supporting the project work  
Evaluated as oral examinations based on the project report or through individual written or oral examinations.**

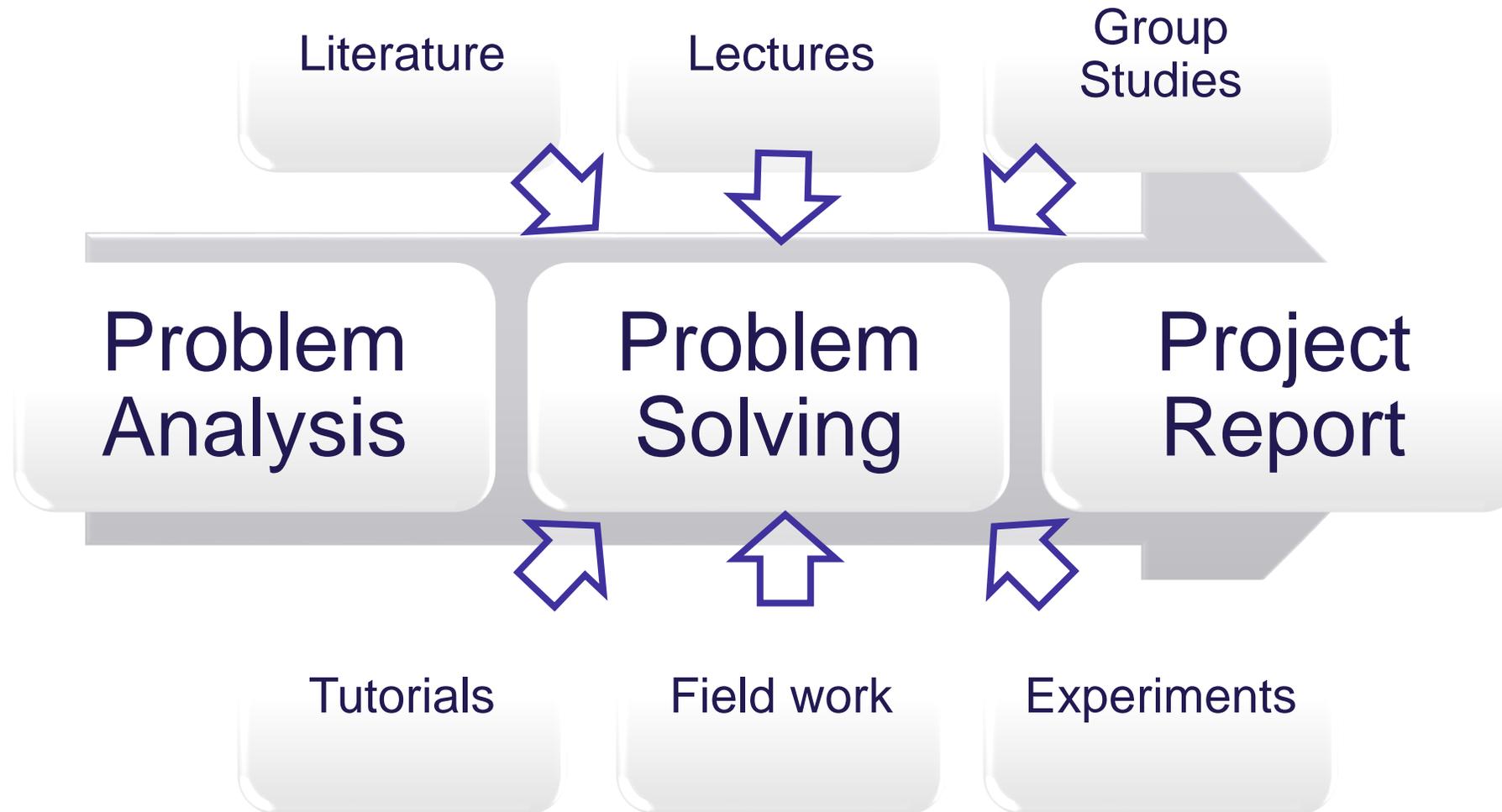


# The Aalborg PBL-model – in short

- ▶ Long-term collaboration 3-4 months (semester)
- ▶ Students often own and define the problem
- ▶ Students mostly decide on methods, theory, empirical investigations (together with supervisor)
- ▶ Solution – "open ended"
- ▶ Students write up an app. 60-100 page project report reflecting their work
- ▶ An university-wide pedagogy – not short-term or single course



# Problem Based Learning – the Process



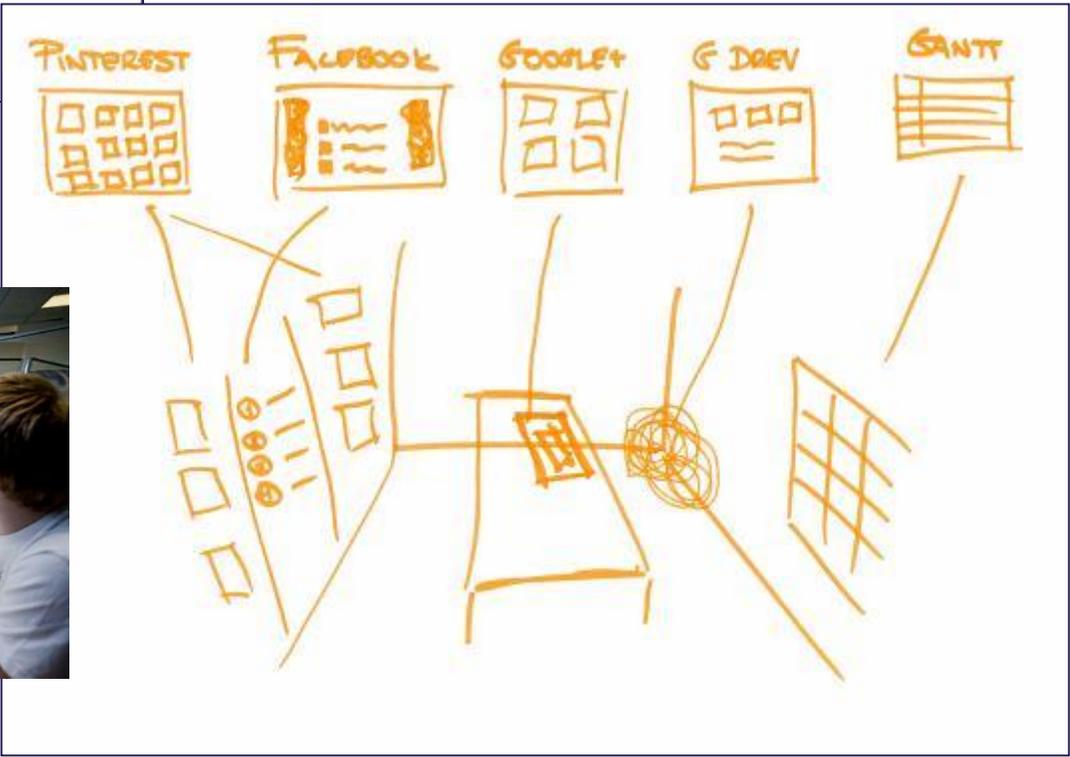
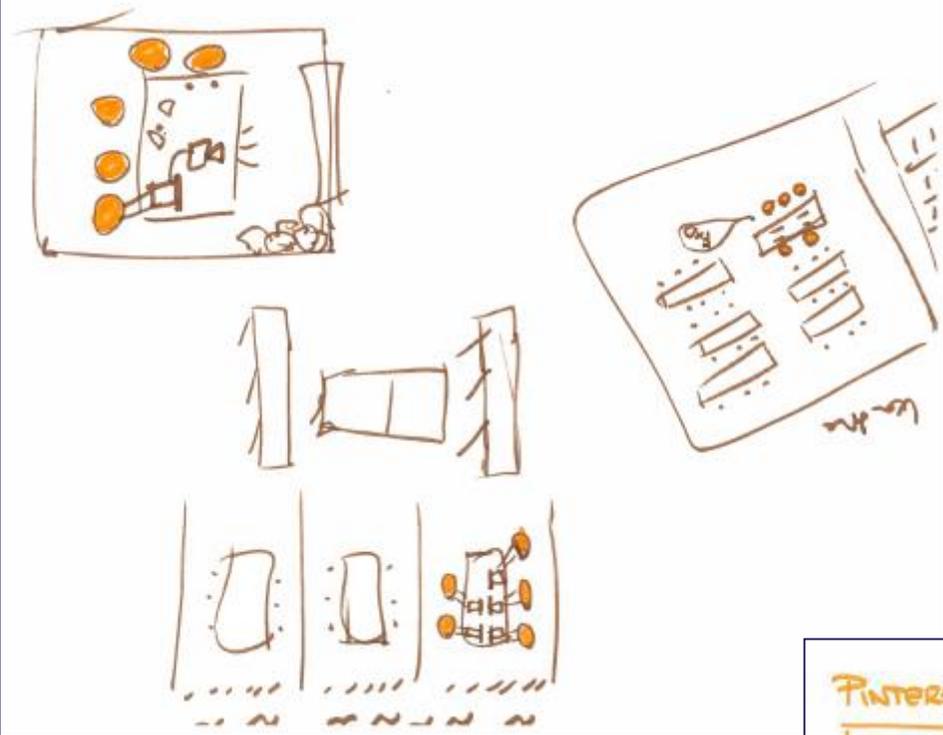
# Students' use of technology



# Why look at students use of technology

- ▶ Similarities across different pedagogies such as CDIO, Problem/Project/inquiry Based Learning
- ▶ Student often work in groups, on projects and where there are varying levels of self-organisation and self-direction
- ▶ But students often coordinate and collaborate and adopt technologies as they see fit (or do so even if instructed to use institutional technology)





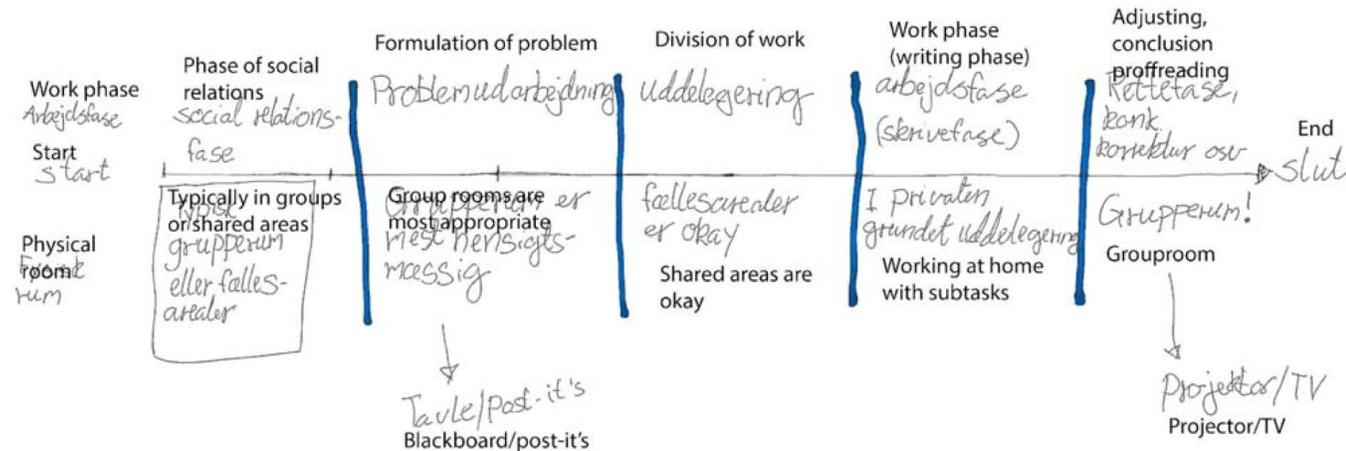


# Long term group collaboration

- ▶ Long-term group collaboration rare in HE - team work and nomadic work studied within CSCW
- ▶ *Workers/learners who accomplish tasks across locations, but equally entails collaboration with others and can be distributed in time*
- ▶ AAU struggling with access to group rooms and nomadic work amongst students becoming more important to understand
- ▶ Three categories central to collaborative learning practices :
  - ▶ 'orchestration of work phases, spaces and activities'
  - ▶ 'orchestration of multiple technologies'
  - ▶ 'the orchestration of togetherness'.



# Orchestration of work phases, spaces and activities



- ▶ Macro-temporal view of connections between work phases, spaces and activities (and technology)
- ▶ Suggesting alternations between collaborative and cooperative modes of work depending on phase in the project
- ▶ Different spaces (and technologies) for different activities





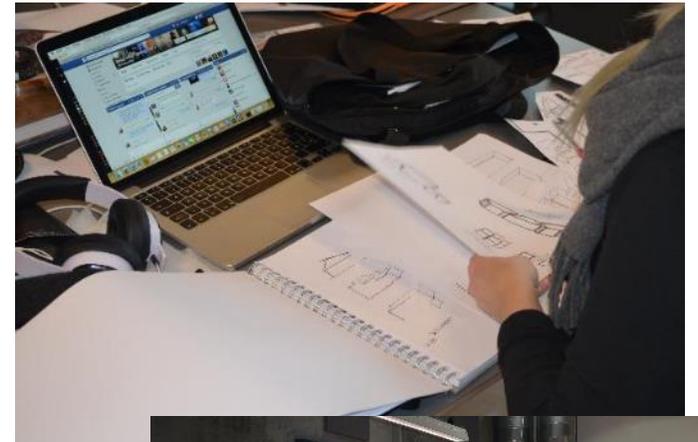
# Orchestration of multiple technologies

- ▶ Digital and networked technologies omnipresent (Facebook, Google Docs, Dropbox, Hangouts, and Skype)
  - ▶ Much use of technology for group work found outside institution - heavily commercialized spaces
- ▶ Students' decide how to adopt and what technologies to use (for project work)
- ▶ Mixture of technologies and practices vary across the groups depending on the preferences and competences of the group members.
  - ▶ Develop practices in the groups over time.
- ▶ They settle on an *aligned constellation* (Rossito et al., 2014), but continuously negotiate and refine their use of technologies
  - ▶ dynamic, flexible and mouldable assemblage of technologies as their needs changes over time in relation to phases of the group work



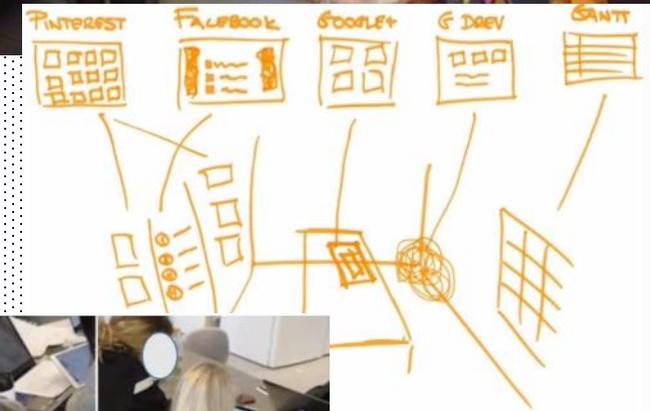
# Orchestration of multiple technologies

- ▶ Digital technologies pervasive but also 'physical' and non-digital artefacts - pens, post-its, paper, and blackboards
- ▶ Composite or hybrid uses of technology - transpositions:
  - ▶ Digital mindmaps are remade, re-enacted and restructured on post-it notes and paper
  - ▶ overview of tasks in a Google Docs reorganised on blackboard to be re-inscribed in Google Docs.
- ▶ Students orchestrate work and technology in different social constellations:
  - ▶ Individually, in smaller groups or whole group - alternate between cooperative and collaborative modes of work



# Examples

- ▶ As explored: Use of digital technology widespread and woven into everyday practices - hard to separate the 'digital' from the 'analogue'
  - ▶ Group room digital overlays, but digital also occupies space
  - ▶ Pinterest-pictures
  - ▶ Models and transpositions
  - ▶ Is a digital picture printed digital or analogue?
  - ▶ Seamless movement between analogue and digital
- ▶ A rich and varied ecology emerge





# The orchestration of togetherness

- ▶ Students orchestrate work and technology in different social constellations: *individually*, in *smaller groups* or *whole group* - alternate between cooperative and collaborative modes of work
- ▶ Digital technologies important in coordinating this work – ‘always on’ via FB messenger and using ‘likes’ to indicate ‘read’ or meet in hybrid ways – some co-present others via skype
- ▶ Groups dependent on each other and maintaining good social relations and presence – particularly challenging when working together apart – **social glue**
- ▶ Need to negotiate and orchestrate their idea of and preferred ‘constellations of togetherness’
- ▶ Social processes and social glue are important part of learning within nomadic groups
- ▶ Topic for further research – how do they manage the work of maintaining social cohesion and co-presence? Particularly relevant following the COVID19-pandemic



# Diversity among student groups

Work by PhD Student – Mia Thyrre Sørensen

# Diversity in PBL collaboration

## 5 PBL groups

- ▶ Choice and use of technology
- ▶ Meeting frequency
- ▶ Meeting spaces

 Communication and Digital Media  
Members: 3 males + 3 female

Technology:     

+ disciplin-specific software

 Varied through the project period

 Meeting rooms, open study area

 Robotic  
Members: 4 males

Technology:     

+ disciplin-specific software

 Daily meetings

 Group room, laboratory, Virtual meetings, seminar rooms

 Sociology  
Members: 4 females

Technology:   

 Weekly meetings

 Home, booked meeting room

 Sport Science  
Members: 2 males + 2 female

Technology:   

+ disciplin-specific software

 Ad-hoc planning

 Meeting rooms, library

 Machine and Production  
Members: 3 males + 1 female

Technology:   

+ disciplin-specific software

 Daily meetings

 Group room, laboratory, seminar rooms



# Ongoing negotiation of work constellations, sociability and technology

## ▶ Working individually – Working together

- › The project groups work in **alternating work constellation** – all members together, in-pairs/subgroups, individually. The work modes are **dynamic** and seems **blurred**.
- › Various strategies across project groups – some write primarily individually, others write the entire project report in pairs

## ▶ Social – Academic

- › The group work is a hybrid of **academic activities** (e.g. professional discussions, report writing, conducting experiments) and **social activities** (e.g. eating cake, gaming, social events). Alternating conversation; at once a fluid, smooth and unproblematic translation and an abruptly marked character change without any devotion to introductory metacommunication.
- › Various strategies: dedicated time for social talk, work-from-home-days and virtual meetings to decrease the amount of social talk, activities to create social coherence and motivation

## ▶ ‘Digital’ and ‘non-digital’

- › Students use a combination of digital and physical tools. Digital platforms, black boards, post-its and pens are integrated in student collaboration practice They move fluidly between technologies and physical/digital contexts.
- › The student PBL collaboration involve ongoing group negotiations and constant ‘balancing’ of time, space, activities, technologies and social aspect.



# Four types of presence



## **Summing up – challenges and opportunities**



# Key messages

- ▶ Complex entanglements of space, time, activities, and technologies to manage in nomadic collaborative learning groups
- ▶ Fluid boundaries between the 'digital' and 'physical' and transpositions – distinction superfluous?
  - ▶ Focus on 'digital' might overlook important aspects of practices in nomadic collaborative groups
- ▶ Orchestration of togetherness an important area of future studies – how to manage working together apart
- ▶ Complex work where students – we find – are developing valuable collaborative competencies in managing nomadic collaborative group learning



# Tinkering vs. institutionalisation

- ▶ Students have a rich, varied and creative use of technology
- ▶ However, they also need support to master academic and professional tools
- ▶ How do we as institutions learn from and support students' use of technology for self-organised work?
- ▶ How do we balance and master the delicate dance between providing students with freedom as well as support?
- ▶ How do we bring back student innovative practices and choices of technology into our institutional infrastructures?



## **UnFoLD – developing a digital platform for digital PBL**



# UnFold project

- *“A new type of digital learning platform designed to enable learning through various new forms of collaboration, emphasizing the automation of qualitative feedback and an increasing ability to measure learning outcomes and return on investment (ROI).”*
- Project-collaboration between university and technology company and industry/education partners (Aalborg University)
  - Partners: AAU, CanopyLab – University College of Northern Denmark, Port of Aalborg, Arla
- UnFoLD aims to develop a digital learning platform for scalable and efficient upskilling in the workplace through three main innovations:
  - Digitized Experiential and Collaborative Learning (ECL).
  - Automated qualitative feedback.
  - Measurability of educational impact and measuring ROI.





# Unfold project

- From a research perspective: Supporting collaborative networked pedagogies at scale
- Working on digitising 'pedagogical patterns' for PBL, Hackathons, Megaprojects to be implemented into existing CanopyLab.com platform ([www.canopylab.com](http://www.canopylab.com))
- How to provide meaningful automated feedback in collaborative pedagogies and work with competence profiles ("Develop an interactive tool for learners to navigate, track and control their professional development of skills.")
- A lot of interesting stuff, and a lot of messy, complicated and problematic issues to address 😊

## Objective 1: Digitize Experiential and Collaborative Learning (ECL)

Experiential and Collaborative Learning (ECL) methodologies have proven efficient for developing skills (1), however they often rely on face-to-face-interaction and are limited in terms of scalability. To support interactive, personalized and adaptive education at scale we will digitize ECL patterns such as:

- Problem and Project-based learning (PBL)
- Hackathons
- Megaprojects
- Case competitions

**Thank you!**

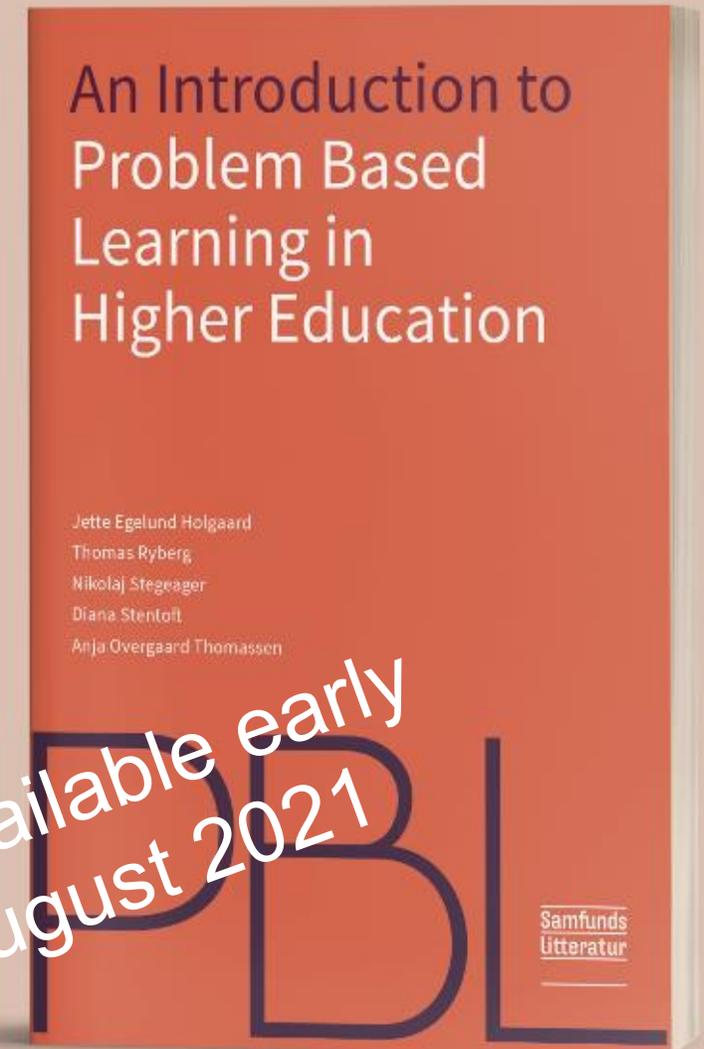
# PBL

<https://samfundslitteratur.dk/bog/introduction-problem-based-learning-higher-education>

*An Introduction to Problem Based Learning in Higher Education* offers readers a solid foundation for maximising the potential of project work. The authors present a number of models, ideas and suggestions for how students can use the challenges and possibilities inherent in PBL to take responsibility for their own learning. Themes include:

- Problems and Problem Formulations
- Project Planning and Management
- Collaboration among project groups and supervisors
- Communication and Conflict Management
- IT Use
- Evaluation

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