

Diversity of PBL: principles and learning models



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The Founding Fathers

W.B.
Spaulding



J.E.
Evans



J.A.
Anderson



J.F.
Mustard



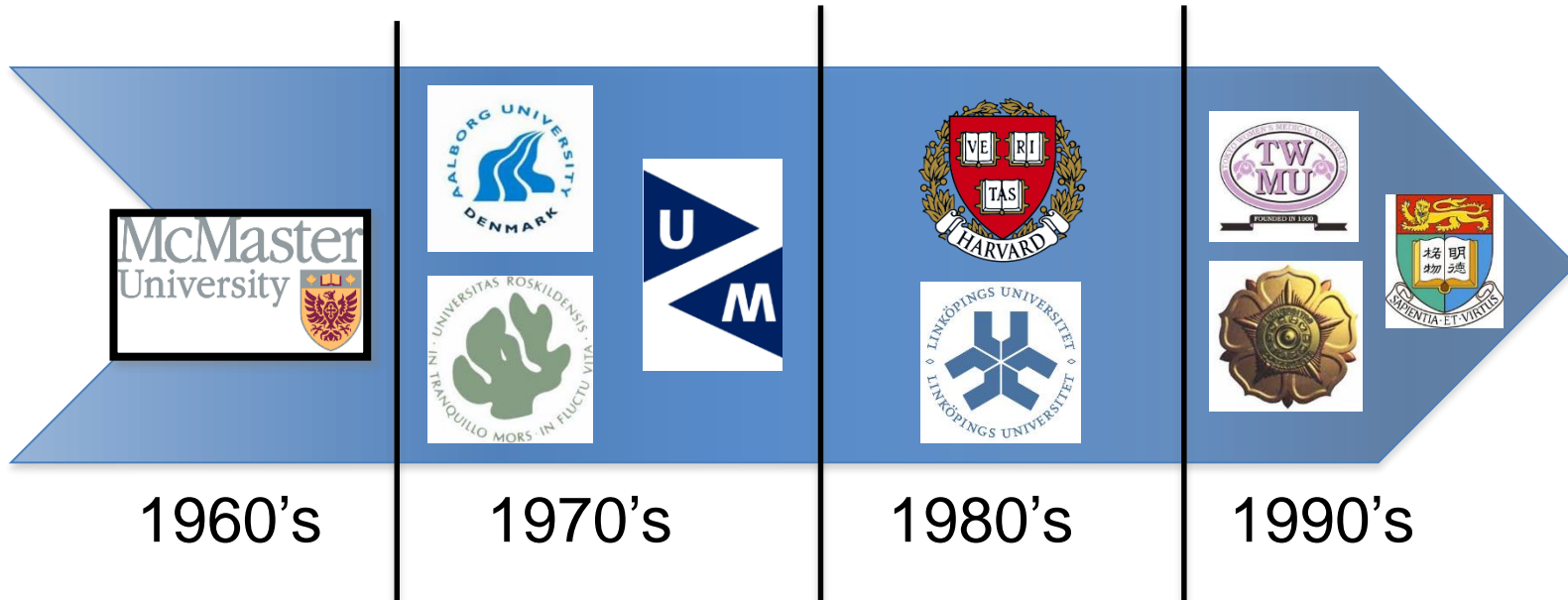
W.J. Walsh

Slide from Dr. V. Servant

Image source: http://fhs.mcmaster.ca/main/community_of_distinction.html

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Historical overview



1969: McMaster University School of Medicine opens its first small-group, problem-based curriculum.

1972: Roskilde University
1974: Aalborg University
1974: University of Limburg Faculty of Medicine
1975: Newcastle University Faculty of Medicine
1979: Universiti Sains Malaysia Faculty of Medicine
1979: University New Mexico Faculty of Medicine
1979: "The Network"

1985: Harvard School of Medicine adopts New Pathway Curriculum
1986: Linköping University Faculty of Health Sciences

1990: Tokyo Women's University
1992: Gadjah Mada University
1997: The University of Hong Kong

Today PBL is a highly successful educational method all over the world

In:

- Medicine
- Health sciences
- Law
- Economics
- Engineering
- All kind of professions



Different versions of PBL

P

B

L

Problem

Based

Learning

Phenomenon

Based

Learning

Project

Organized

Learning

Practice

Oriented

Learning

Not: Problem Based Lecturing

Different Formats of PBL

- the type of problem: Problem, Project, Case
- the available time per problem
- the number of students working on the assignment
- the role of the teachers
- the expected end results
- the methods of assessment

Components of PBL

- Self directed learning
 - Students define their own learning goals
- Collaboration in small groups
 - Students work together on problems from practice, teachers support the learning process, but they do NOT teach
- Thematic curriculum structure
 - Authentic problems reflect professional practice
- Assessment aligned with the teaching model
 - Not just selecting but also supporting the learning

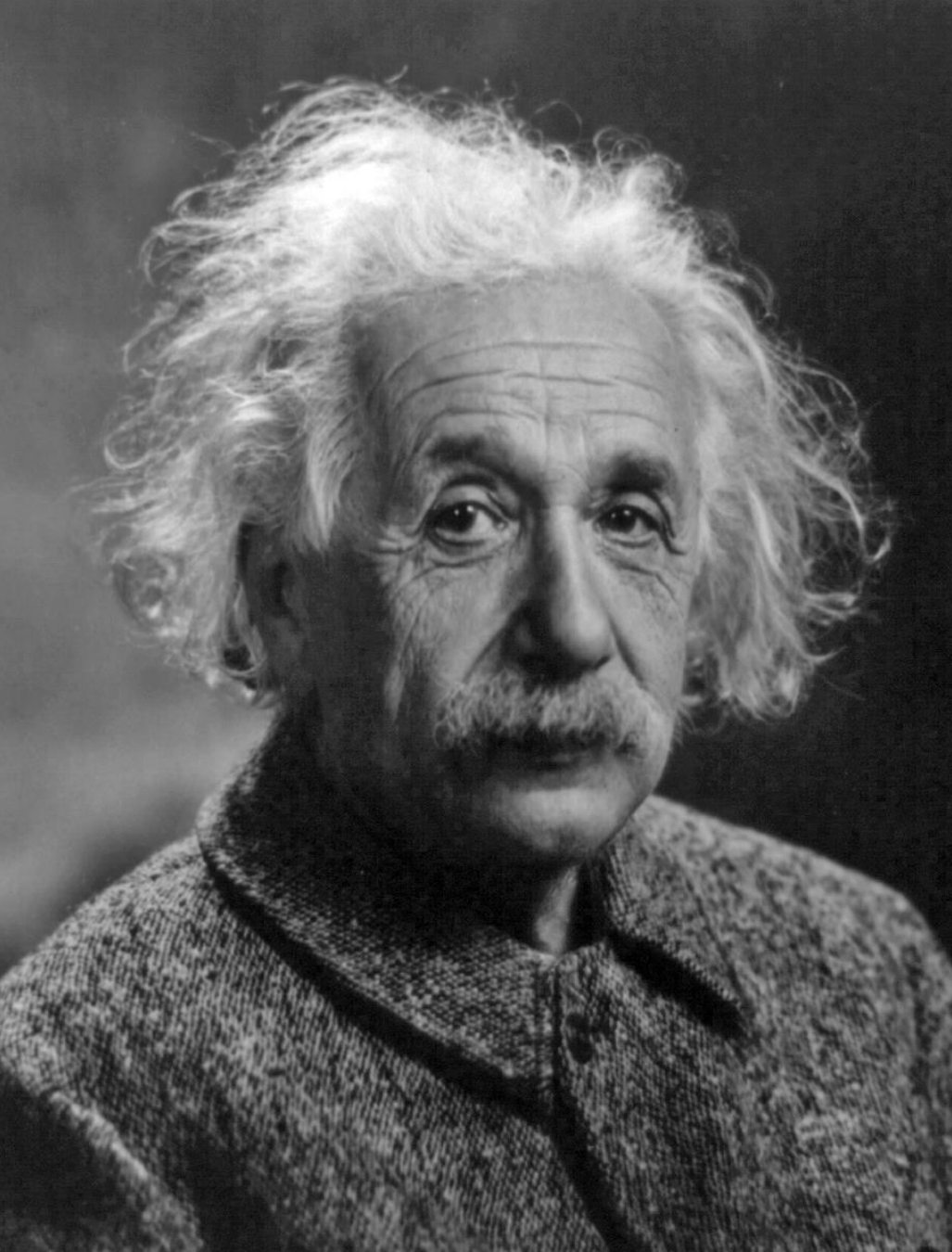
Effective teaching results in learning

- Every concerned teacher faces the question: 'What can I do to make sure my students learn what they have to learn'.
- PBL is just a tool. Teachers need to learn to use it effectively.
- In order to work with PBL you need to understand the underlying principles.

It seems to me that anything that can be taught to another is relatively inconsequential, and has little or no significant influence on behavior.



Carl Rogers on
teaching at Harvard
in 1951



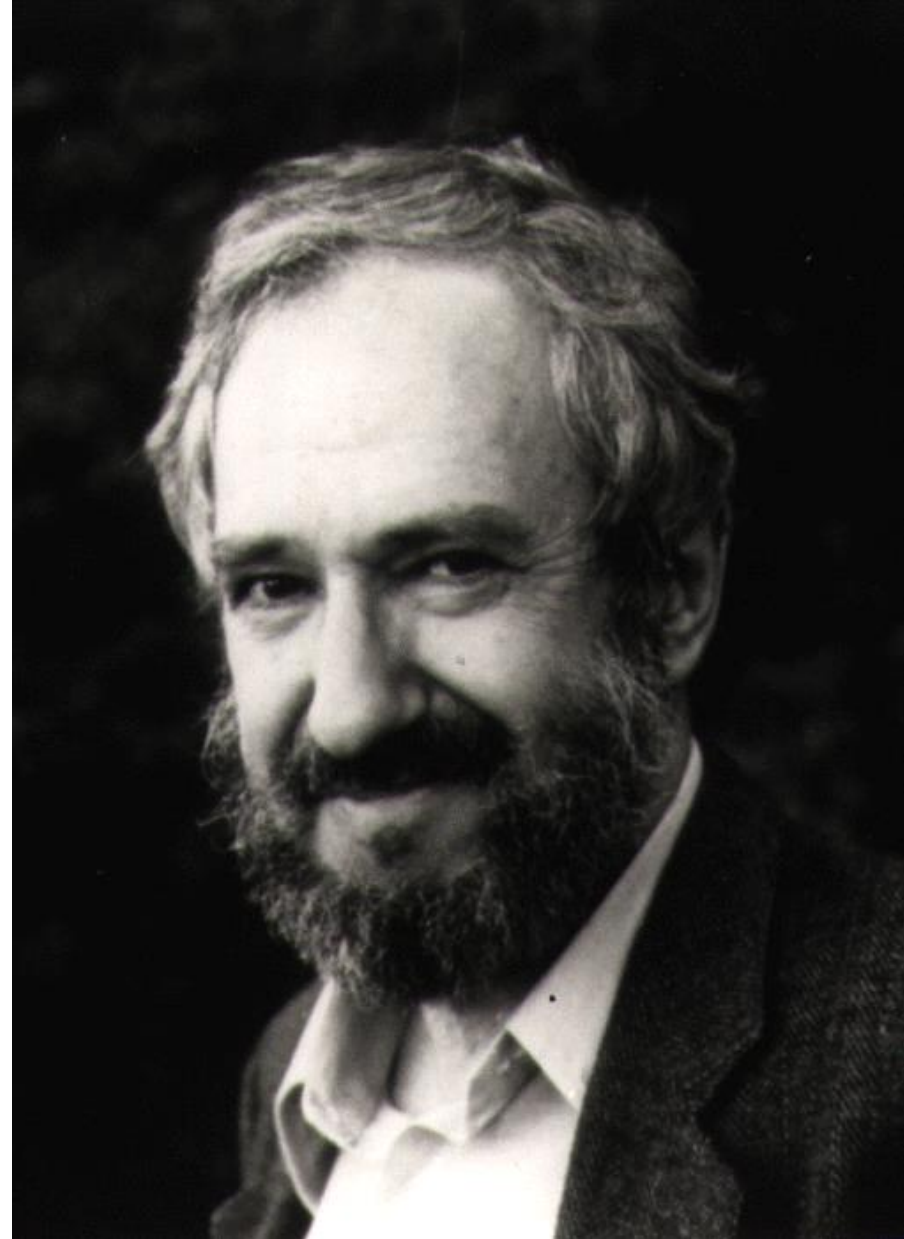
Great minds on teaching and learning:

"I never teach
my pupils, I only
attempt to
provide the
conditions in
which they can
learn."

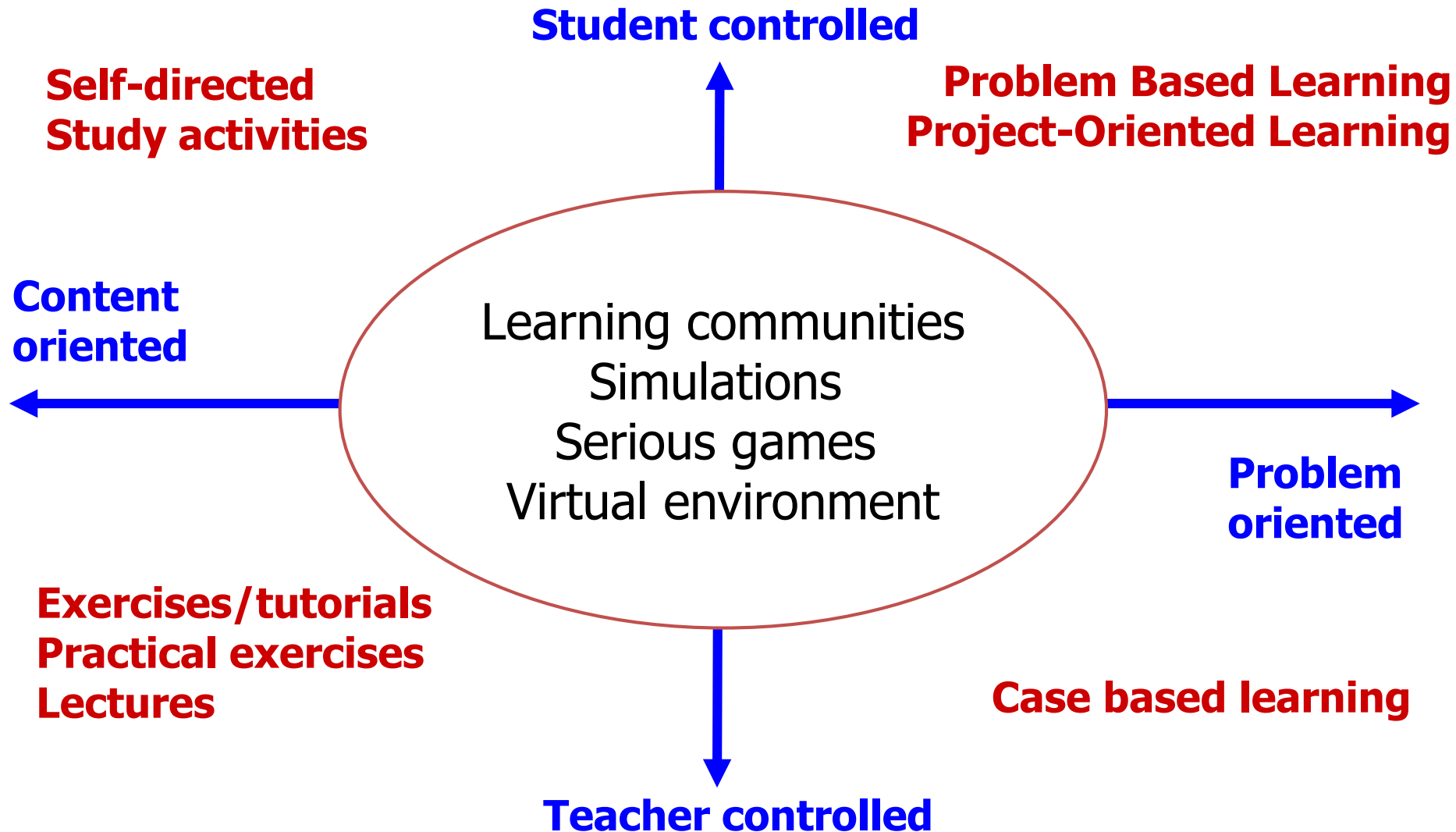
- Albert Einstein

"I am convinced
that the best
learning takes place
when the learner
takes charge"

-Seymore Papert



The learning environment



Assignment

Think: Of a learning experience that changed your life.

Pair: in groups of 3-5 persons

Share: and compare experiences

What stands out?

Are there similarities or differences?

PBL in Engineering: the Aalborg Model

Students learn from working on real life problems as a team of engineers:

- Problem Based
- Project Organized
- Cooperation in small groups



Theory-practice

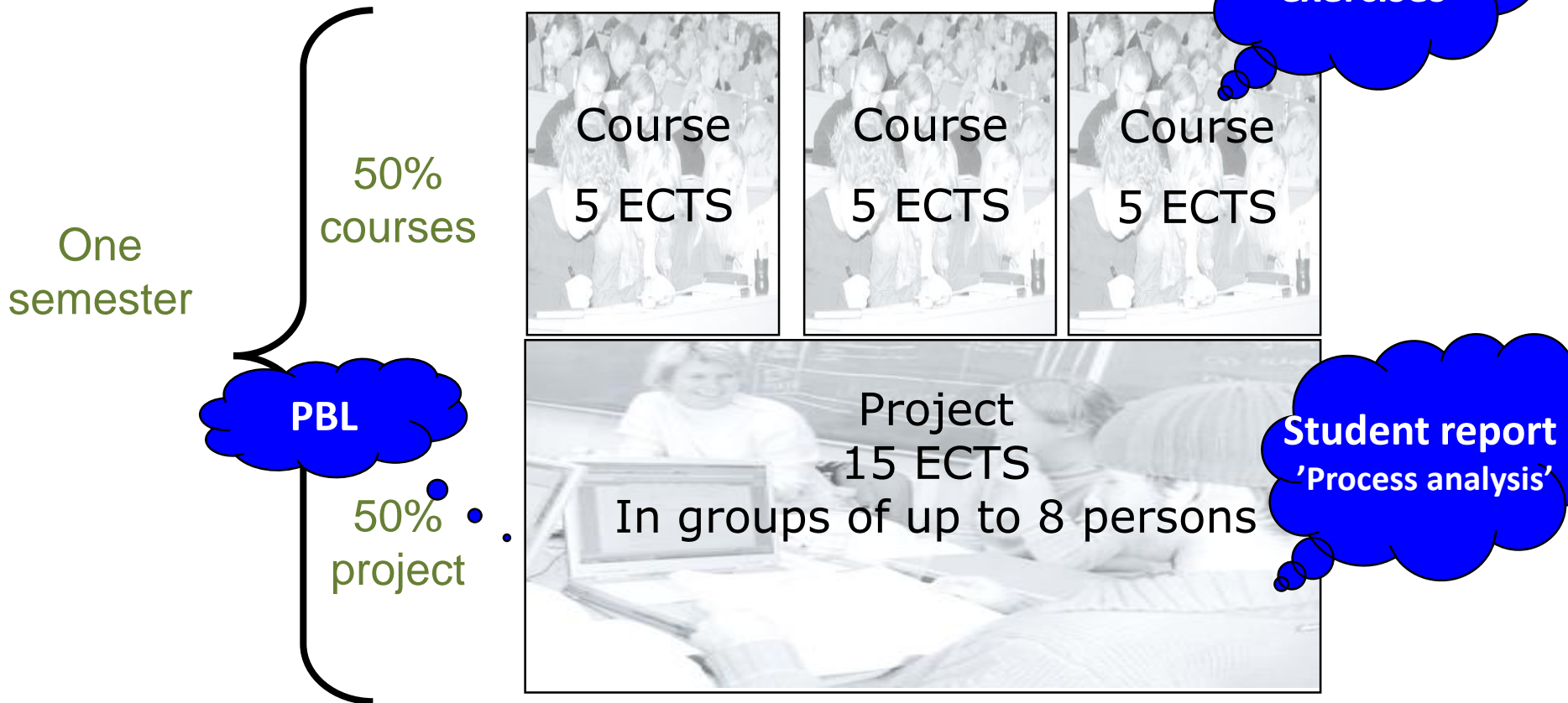
- Interdisciplinary learning
- Exemplary learning



Aalborg PBL Model

- First year basic studies.
- 50% project work + 50% courses.
- Projects are challenging assignments from practice.
- Strong influence from local business community.
- Heavily oriented towards engineering sciences

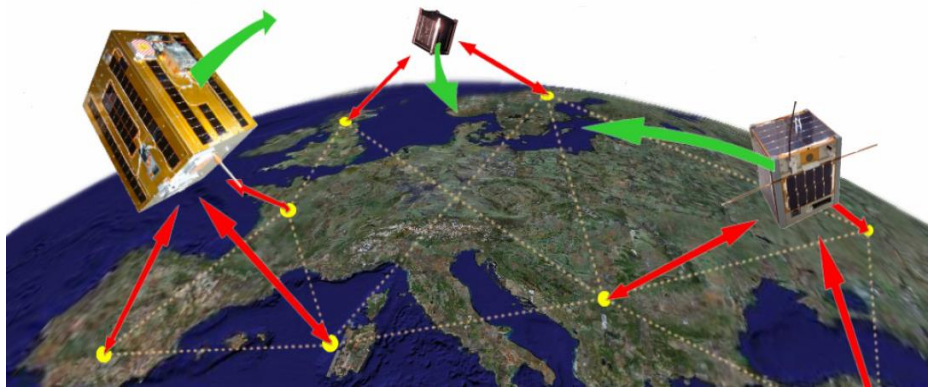
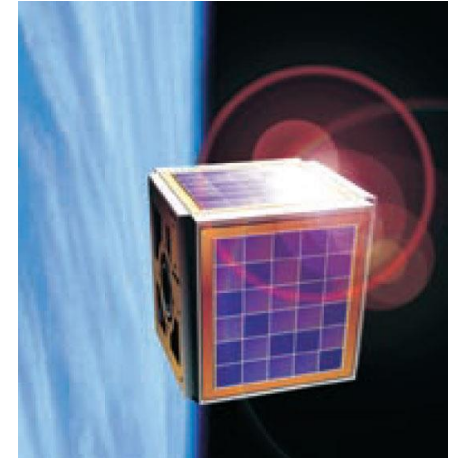
AAU PBL-model



1 ECTS (European Credit Transfer System)

Project-example:

- Aalborg University has been building students satellites since 2001.
- **Cubesat - launched june 2003**
- was the first student satellite. The project was launched in 2001.
- **SSETI EXPRESS - launched october 2005**
AAU students were responsible for many things at the satellite - including computer, camera payload, communication system and groundstation.
From start in january 2004 it took only 17 months before the satellite was ready to be launched. A world record.
- **AAUSAT II - a satellite launched oct-nov 2007.**
- **AAUSAT3 - was launched spring 2013.**
- **AAUSAT5 – launched from The International Spacestation oct. 2015**



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Different types of projects

Assignment projects (AP)

- planning and control by the teachers/supervisors
- problem and the subject chosen beforehand

Subject projects (SP)

- definition of the subject by the teachers beforehand.
- students choose a problem and method.

Problem projects (PP)

- problem determines the choice of disciplines and methods.

Learning in the workplace



Advantages

- Authentic problems
- High motivation
- Cognitive alignment
- Real production

Disadvantages

- No control over problem selection
- Work takes precedence
- Focus on production

Students working in small groups



Studio Classroom at TU Delft

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The Maastricht model: A Curriculum based on thematic modules

PBL Modules:

- lasting six weeks
- containing just some cases
- integrating knowledge from different disciplines

Tutorial Groups

- self-directed learning
- eight students in a group
- cooperation and teamwork

Facilitated by a tutor:

- guiding the process without taking the lead
- guarding quality without interfering in the process

Different varieties of Activating the Learner

- Self directed learning – *The student in control*
- Experiential learning – *focusing on experiences*
- Situated learning – *in an environment designed*
- Collaborative learning – *as a social context*
- Active learning – *to involve students in*
- Transferable skills – *learning for a lifetime*
- Cognitive apprenticeship – *of learning from each other.*

PBL; POL; POPBL; AL; EL and many more – because everyone wants to invent the wheel!

Advantages of PBL-PO

- Students learn knowledge and skills in the context of practice.
- Students become aware of their recourses in practice oriented problem solving.
- Students learn to communicate and cooperate across discipline boundaries.

Diversity of PBL around the world



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Ask yourself: which method would you like to apply ?



Questions ?



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