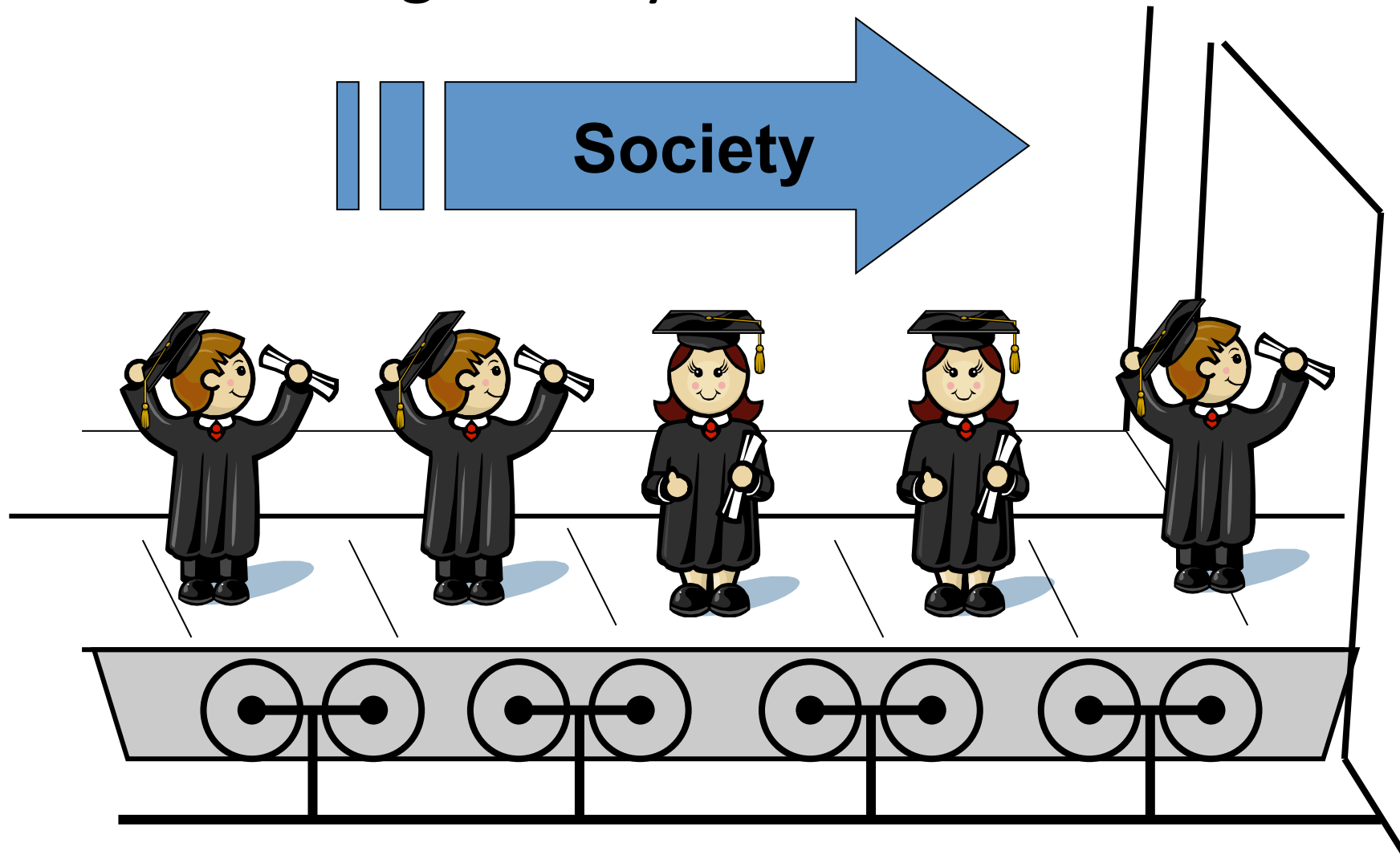




Erik de Graaff

Projects GOOD O triunfo dos porcos
Lectures BAD George Orwell

The learning factory

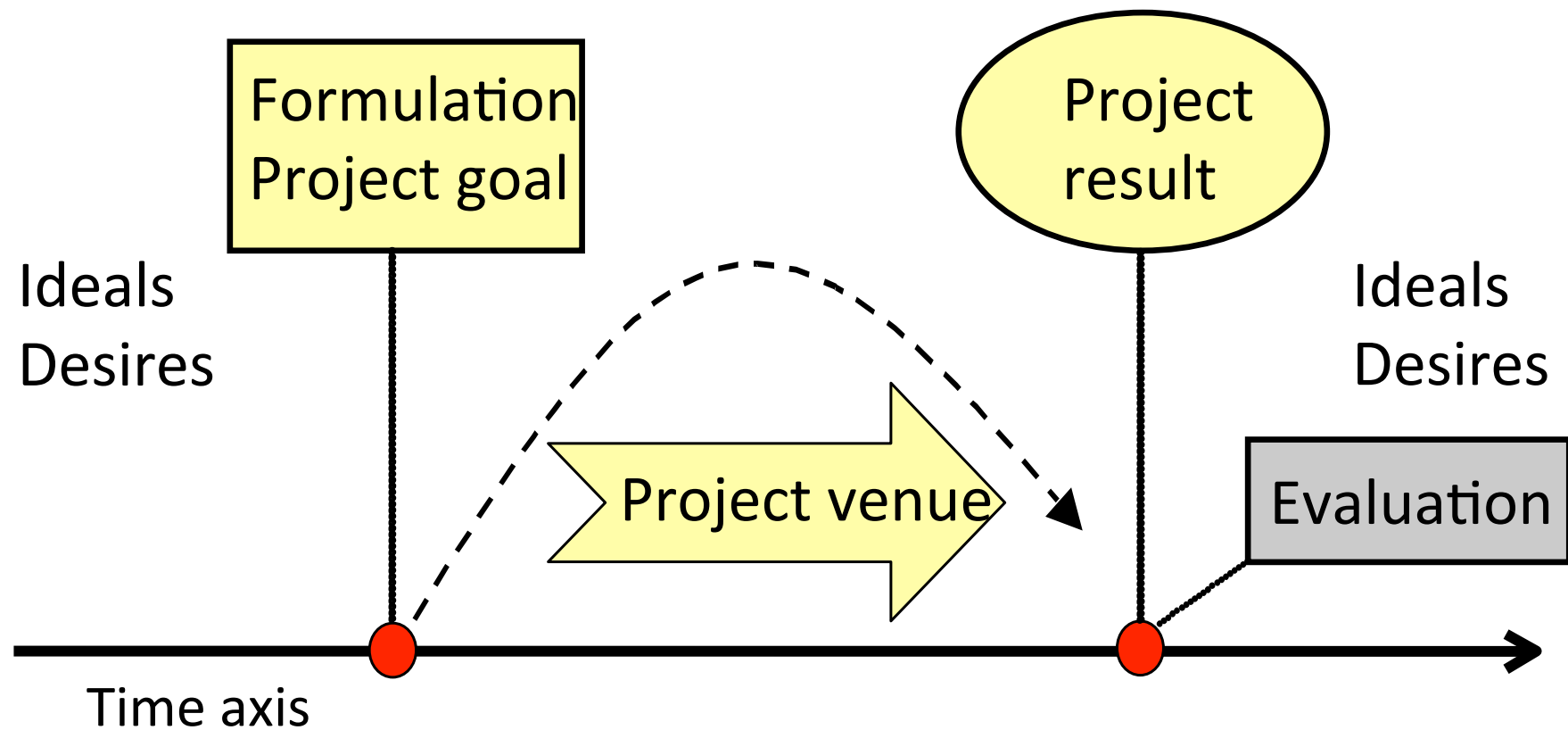


Projects in Engineering Education

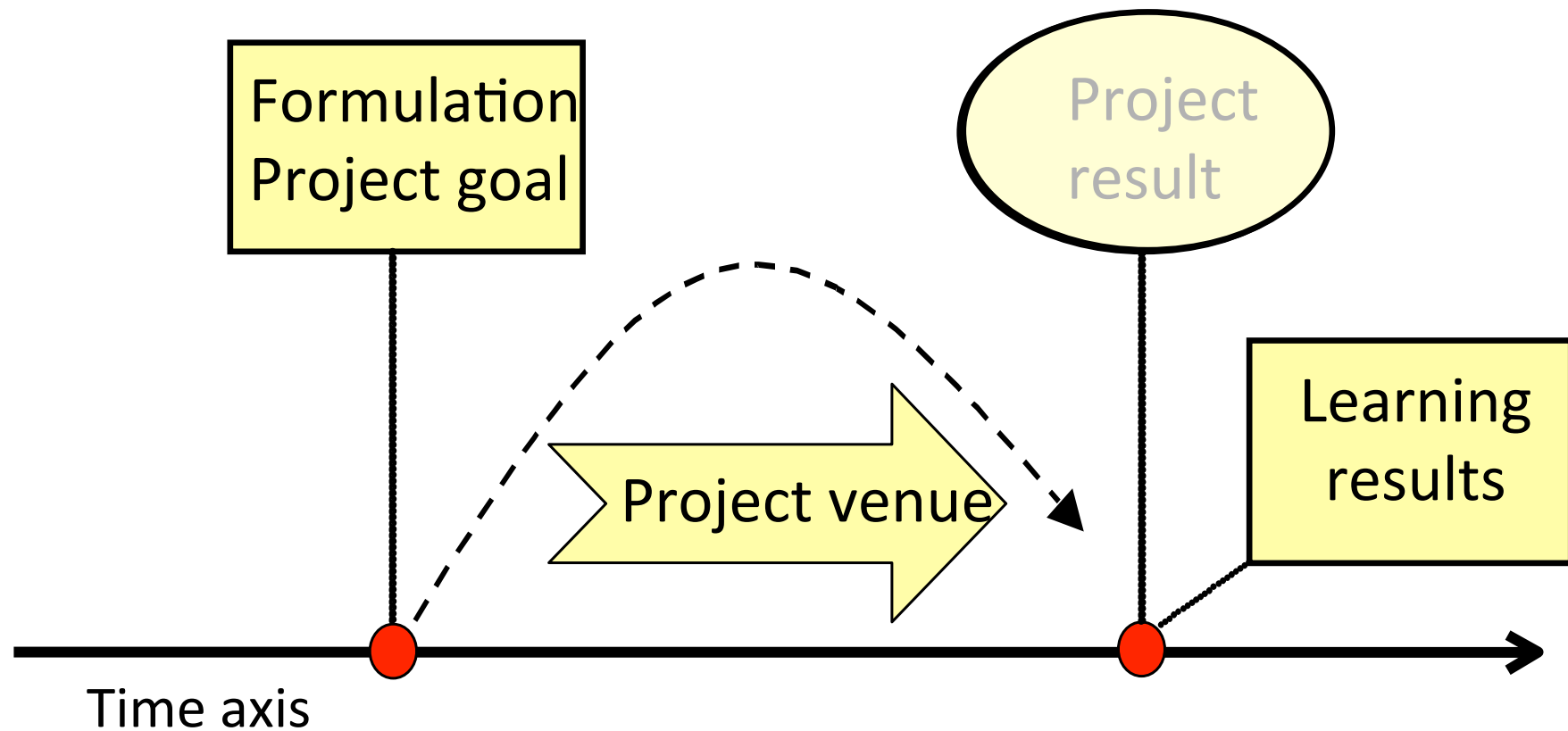
A natural solution:

- Engineers are creative problem solvers.
- In professional practice they collaborate with colleagues from the same and other disciplines.
- Engineers often work on projects
- Projects in education provide an excellent opportunity to learn in a context of practice

Working in a project



Learning by working on a project



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.

PBL in Engineering: the Aalborg Model

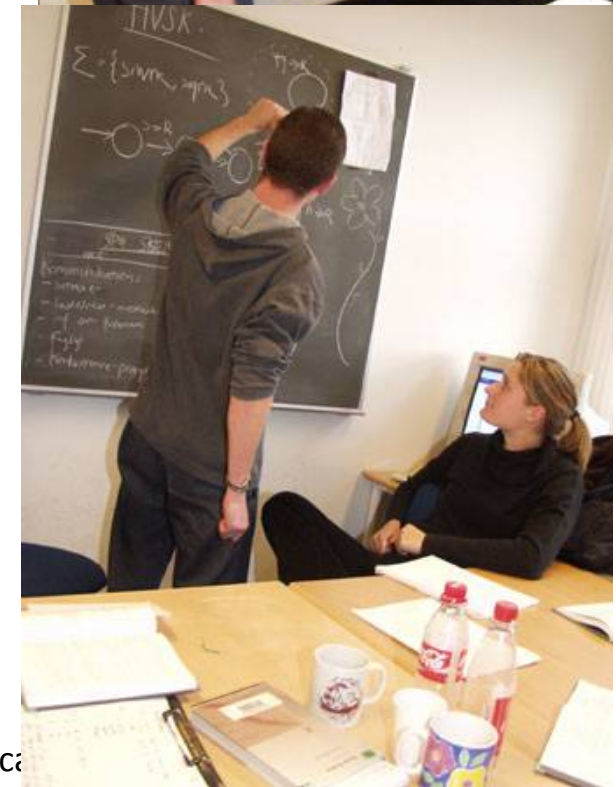
Students learn from working on real life problems
as a team of engineers:

- Problem Based
- Project Organized
- Cooperation in small groups





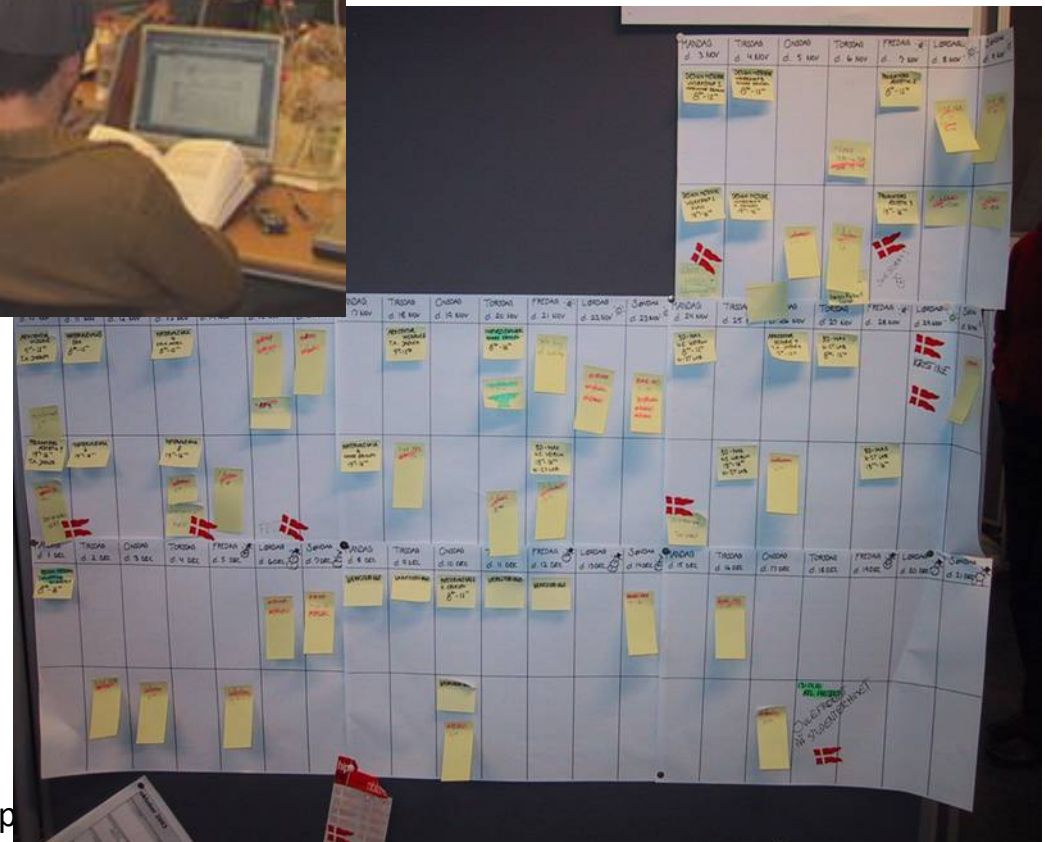
- Problem based
- Project based / organised
- Contextual learning





Participant directed Team based learning

International Symposium on Project App



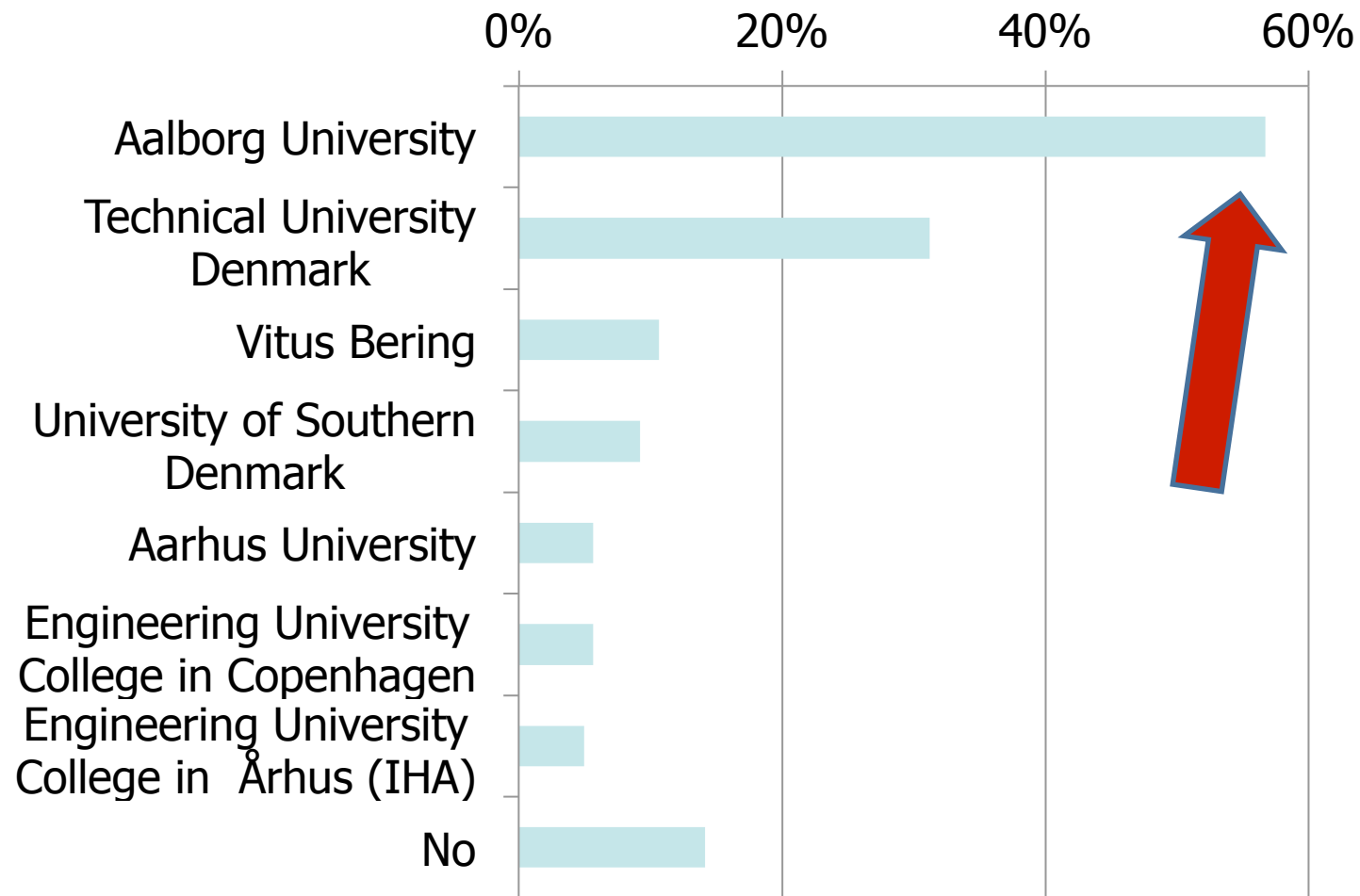
Theory-practice

- Interdisciplinary learning
- Exemplary learning

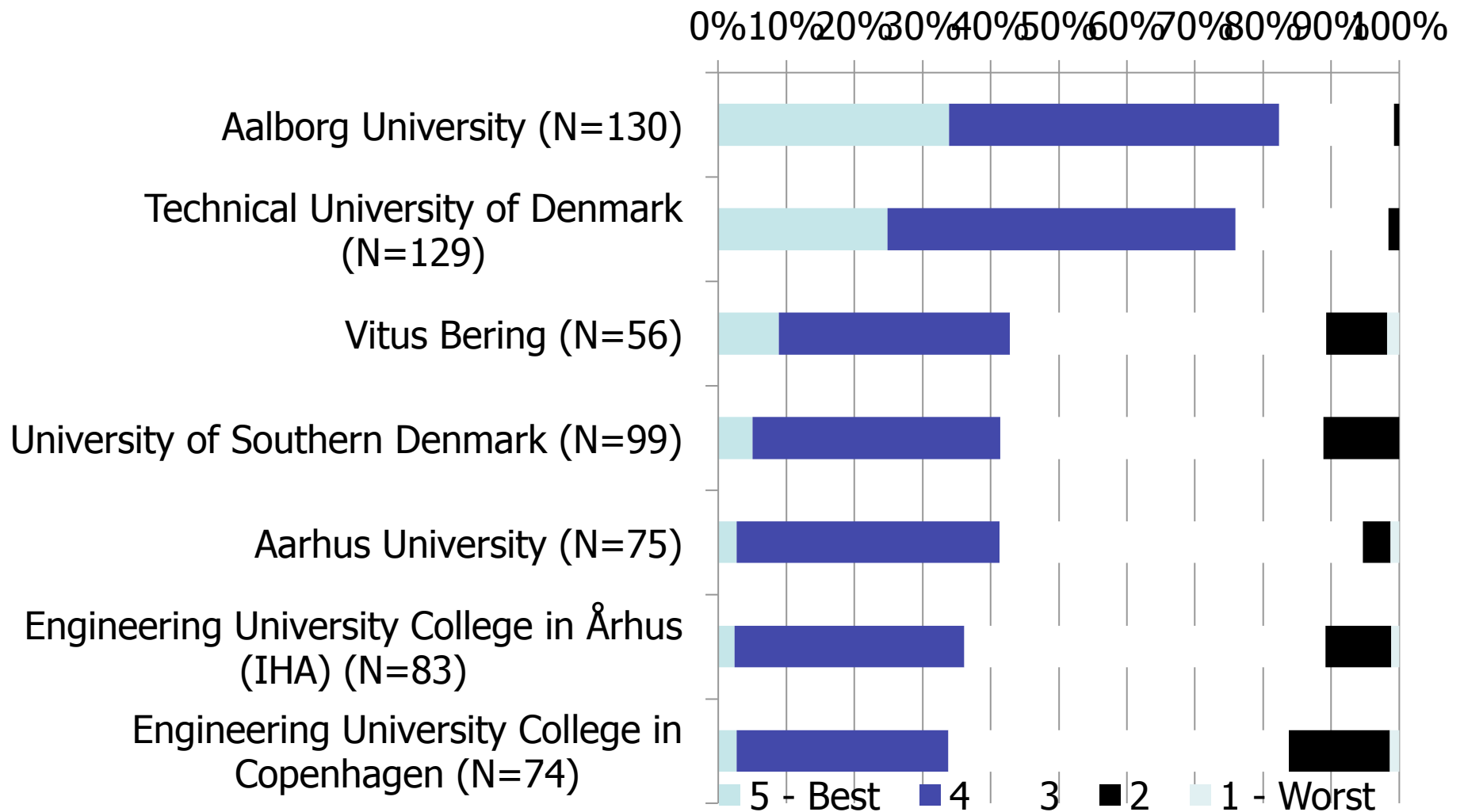


Results of a Survey among employers of engineering graduates (Ingeniøren, 2008)

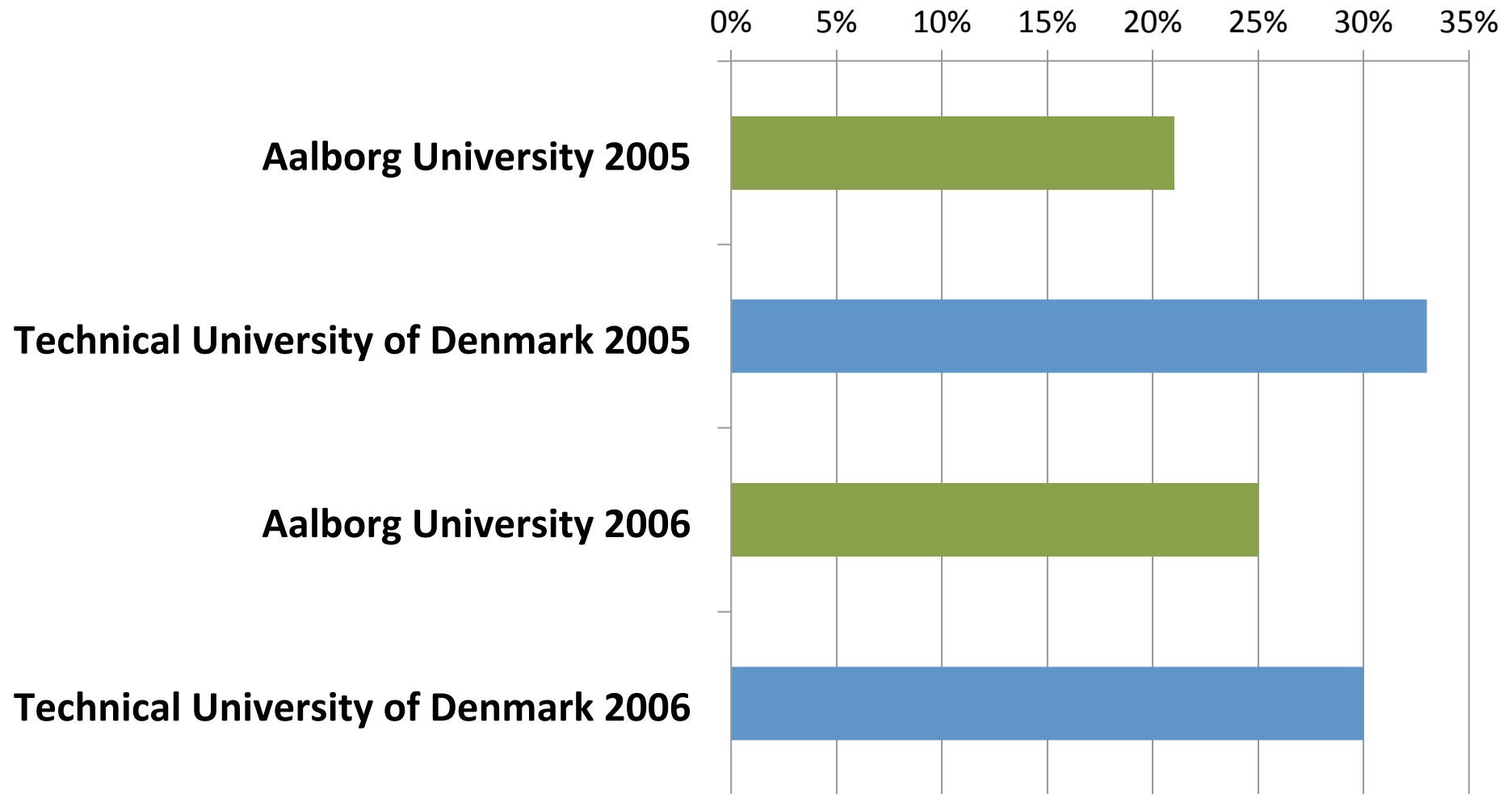
Questions: Are there one or more institutions which you find particular good at developing engineering education according to the needs of society and companies?



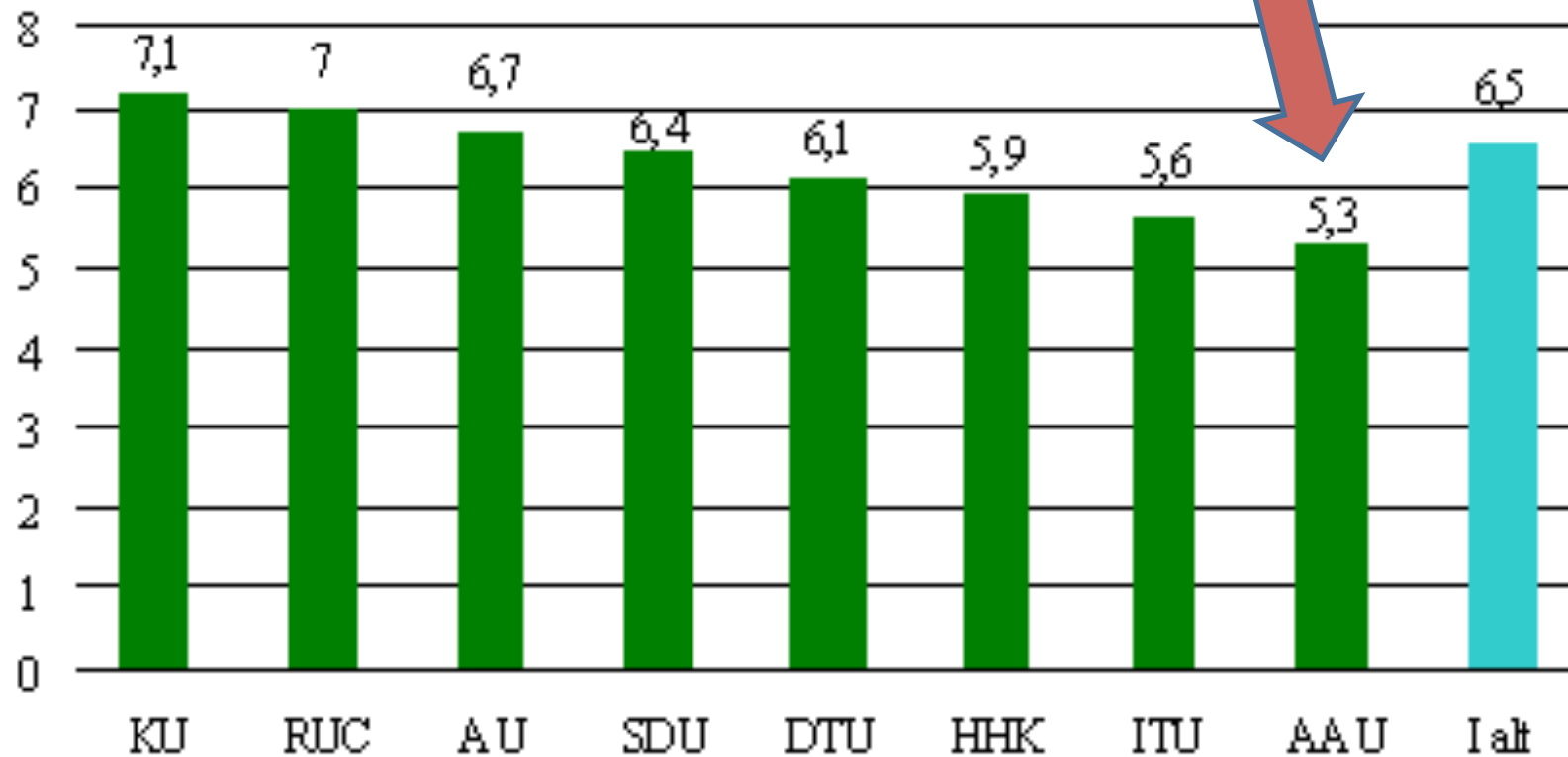
Overall assessment of Danish Engineering Institutions by companies (Ingeniøren, 2008)



Official statistics: Drop out rate



Duration rates for Danish universities, 2007, Official statistics



Strengths and Weaknesses of projects in Engineering Education: Two sides of the medal

- Think **2 min** List up to three advantages and three disadvantages of projects in EE
- Pair **5 min** Compare your lists with two neighbors and compile a joint list (max three positive and negative)
- Share In the plenary



Positive aspects of Projects in Education

- Highly motivating
- Teamwork skills and intercultural communication
- Learning in practice context
-
-
-
-
-

Negative aspects of projects

- Free riders
- Lack of project space
- Costly
-
-
-
-
-

The other side of the coin

Strength: Projects are highly motivating

However,

- It depends on the project assignment
- It depends on ownership of the project
- It depends on the team leadership and communication
- We have to teach them the basics first

Remember: Self-directed learning is more efficient than traditional teaching



- You have to teach them at least the basics

The other side of the coin

Strength: Projects provide an opportunity to learn teamwork skills.

However,

- first the development of teamwork skills needs to be fostered to get started.
- facilitation is the key to success or failure

Teamwork is a skill



The other side of the coin

Strength: Learning in the workplace builds knowledge for practice

However,

- the selection of problems in practice is haphazard, and
- the conditions of practice may be at odds with optimal learning.

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

Conclusion

Things are not always what they seem to be at first glance:

- Projects are good when it is done the right way!
- A good lecture can serve as a source of inspiration for project work.
- What is bad, is uninspired routine teaching, frustrating the students rather than supporting them in a process of self-directed learning

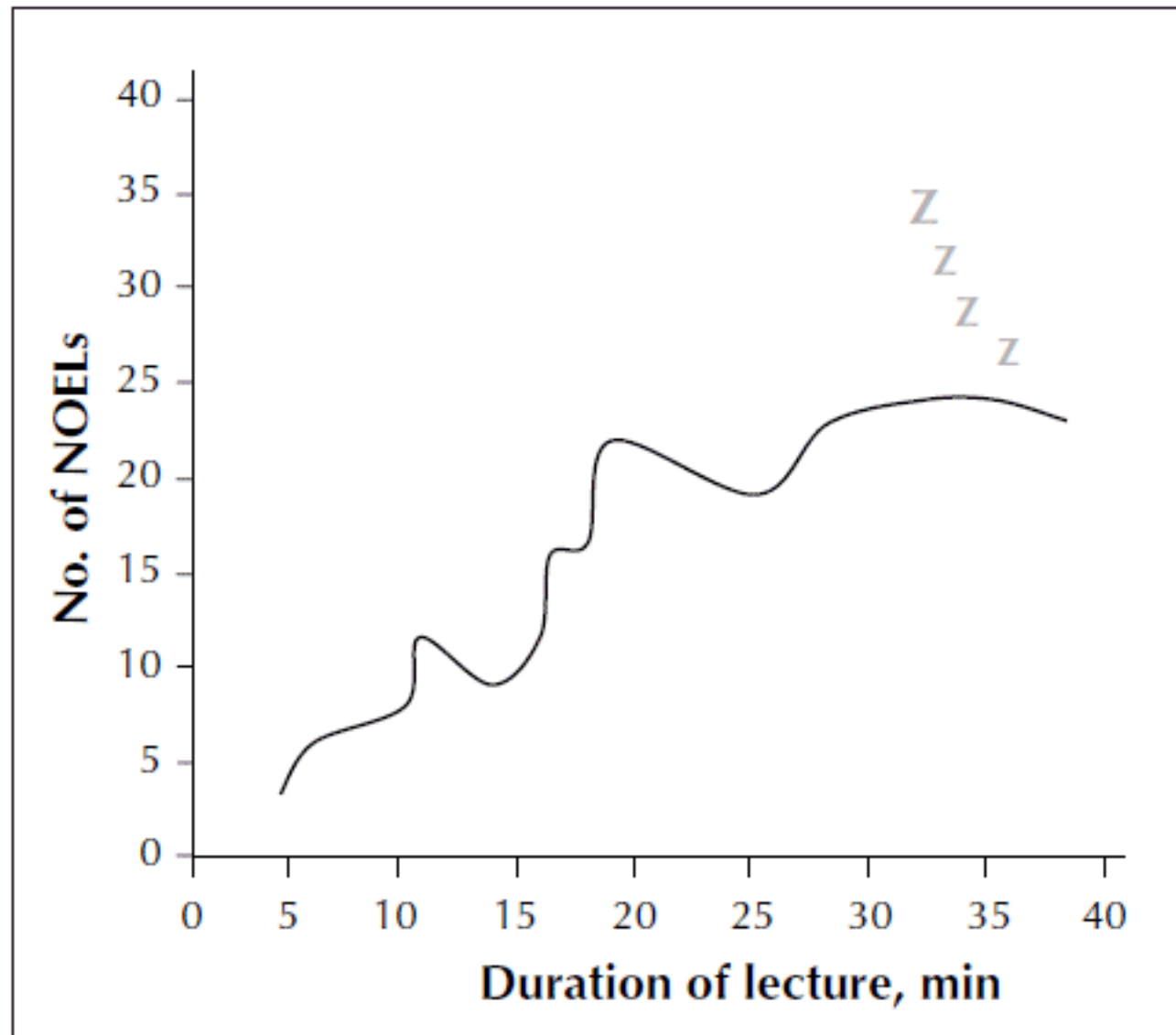
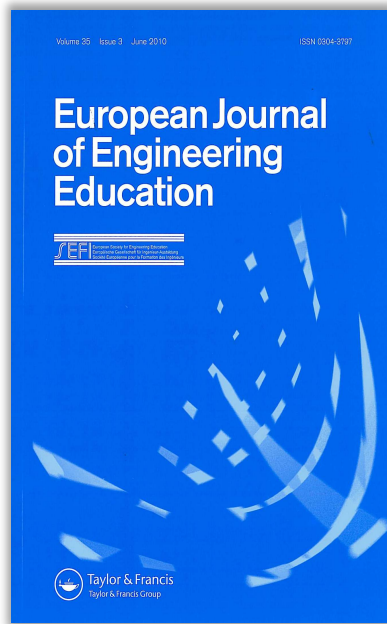


Fig. 1: Special incidence density curve, showing number of nodding-off events per lecture (NOELs) per 100 attendees over length of time of presentation.



Questions ?



<http://www.tandfonline.com/loi/ceee20>

European Journal of Engineering Education

