

P B L

PROBLEM-BASED LEARNING



AALBORG UNIVERSITY
DENMARK



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**ALL EDUCATIONAL ACTIVITIES AT AALBORG UNIVERSITY INVOLVE
PROBLEM-BASED PROJECT WORK, WHICH TAKES AS ITS POINT OF
DEPARTURE A SET OF PRINCIPLES THAT CONSTITUTE THE AALBORG MODEL
OF PROBLEM-BASED LEARNING (PBL).**

The approach is internationally recognised and has, over the years, received great interest from universities, researchers and students in Denmark as well as abroad. The Aalborg model includes project work based on authentic problems, self-governed group work and collaboration.

The Aalborg model provides students with tools for independent acquisition of knowledge, skills and competences at an advanced academic level. During their studies, many students will also have the opportunity to cooperate with external partners on the solution of scientific problems.

The Aalborg model assumes that students learn best when applying theory and research based knowledge in their work with an authentic problem. At the same time, the model supports students in the development of their communication and cooperation competences, and in acquiring the skills required when taking an analytical and result-oriented approach.

THE AALBORG MODEL IS BASED ON THE FOLLOWING BASIC PRINCIPLES

The problem is the starting point directing the student's learning process. A problem can be both theoretical and practical. It must also be authentic and scientifically based. "Authenticity" implies that the problem is of relevance outside of academia. "Scientifically based" implies that the problem is comprehensible and may be analysed and solved, taking an interdisciplinary approach.

PROJECT ORGANISATION CREATES THE FRAMEWORK OF PROBLEM-BASED LEARNING

A project represents a time-limited and targeted process in which a problem may be phrased, analysed and solved, resulting in a tangible product. A project report, for instance. The target of the project is determined in the problem formulation; like the project methods, this will be developed continually during the course of the project.

COURSES SUPPORT THE PROJECT WORK

In order to ensure that they become familiar with a wide range of theories and methods which they can use in their project work, students will participate in obligatory as well as optional courses. The courses require a large amount of student activity, including lectures, workshops, seminars and exercises.

COOPERATION IS A DRIVING FORCE IN PROBLEM-BASED PROJECT WORK

A group of students work closely together in managing and completing a project over an extended period of time, taking a problem as the point of departure for their work. The students' mutual support is essential for the successful completion of the project. The group work includes aspects such as knowledge sharing, collective decision-making, academic

discussions, action coordination and mutual critical feedback. Student groups also engage in close cooperation with their supervisor(s) and with external partners, e.g. businesses or other project groups.

THE PROBLEM-BASED PROJECT WORK OF THE GROUPS MUST BE EXEMPLARY

The curriculum framework, supported by the supervisor, aims at ensuring that students' project work is exemplary as regards both content and approach. Exemplarity implies that learning outcomes achieved during concrete project work are transferable to similar situations encountered by students in their professional careers. This requires that the students understand the context of the problem and of the scope of the conclusions reached by the group. The exemplarity of the project ensures that through their project work, the students will acquire knowledge and competences which are applicable in a wider context than that of the project itself.

THE STUDENTS ARE RESPONSIBLE FOR THEIR OWN LEARNING ACHIEVEMENTS

Within the framework and objectives of the curriculum, the students are largely free to choose the content of their own projects, and thus to determine key elements of their study programme. At the same time, students are responsible for a considerable part of their own ongoing academic self-reflection. Critical self-reflection as regards the quality of their own work effort and basic knowledge of a given problem is an essential objective for students engaging in problem-based project work. The group is supported by one or more supervisors serving to ensure that the work undertaken by the group meets the requirements stipulated in the curriculum. However, the students themselves are responsible for their cooperation in the group, as well as for the organisation of the learning process and the course and outcome of the project.



PRINCIPLES

THE PROBLEM AS POINT OF DEPARTURE
PROJECTS ORGANISED IN GROUPS
THE PROJECT IS SUPPORTED BY COURSES
COLLABORATION - GROUPS, SUPERVISOR, EXTERNAL PARTNERS
EXEMPLARITY
STUDENT RESPONSIBILITY FOR LEARNING

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FIGURE 1

THE FIGURE ILLUSTRATES THE INTERACTION BETWEEN THE AALBORG MODEL'S BASIC PRINCIPLES OF PBL, THE EDUCATIONAL FRAMEWORK, STAKEHOLDERS' PRACTICES AND SUPPORT FUNCTIONS AT AALBORG UNIVERSITY. THE NUMBERS IN BRACKETS REFER TO INDIVIDUAL PARAGRAPHS IN THE DESCRIPTION OF THE AALBORG MODEL IN THE PAGES BELOW.



EDUCATIONAL VISION

AALBORG UNIVERSITY HAS A CLEARLY ARTICULATED VISION FOR PROBLEM-BASED PROJECT WORK AND LEARNING IN ALL ITS STUDY PROGRAMMES.

- ▶ The University's objectives describe the framework for examinations, subject modules and the pedagogical competences of academic staff; these elements in combination constitute the foundation of problem-based learning.
- ▶ The objective of the University is to strengthen the students' skills as regards problem identification, problem analysis, problem formulation, problem solving, communication, cooperation and the evaluation of work processes and the quality of their own work.
- ▶ The students are encouraged to reflect critically on the point of departure and outcome of their project work; in doing so, they should apply a perspective that extends beyond the individual discipline and the organisational framework of this work.
- ▶ The Aalborg model spans across all faculties of the University.
- ▶ The University management supports and takes responsibility for the ongoing development of the Aalborg model.
- ▶ The students know the Aalborg model of PBL and work in accordance with this.
- ▶ External organisations are familiar with the Aalborg model and cooperate actively with the University on students' project work.
- ▶ The University's collaboration with external organisations contributes to ensuring that students are able to work with contemporary issues that are relevant to their discipline or profession.



CURRICULUM

THE AALBORG MODEL'S BASIC PRINCIPLES ARE INCORPORATED INTO ALL CURRICULA AT THE UNIVERSITY. THIS IMPLIES THAT THE CURRICULA

- ▶ include problem-based project work as a central and recurrent element
- ▶ ensure that the students' problem formulations take their point of departure in authentic problems
- ▶ contain the credit-bearing problem-based project work
- ▶ describe overall educational objectives which support the development of competences in problem-based project work as well as the specific learning objectives of the programme
- ▶ combine obligatory basic modules, elective modules and obligatory project modules
- ▶ provide for student orientation to examples and basic theory and method in the obligatory modules in which the project work is anchored
- ▶ establish an overall theme frame within which problems, project proposals and elective modules may be formulated and offered
- ▶ ensure, in interaction with the project supervisors, that the students' problem formulation enables an exemplary project within the project's theme frame and the learning objectives set by the curriculum
- ▶ provide students with the opportunity to use relevant experience-based knowledge together with knowledge and skills communicated by the theme frame
- ▶ encourage students to collaborate with or apply for an internship in private or public organisations in Denmark and abroad.



ASSESSMENT

THE PROJECT WORK IS COMPLETED BY AN EXAMINATION WHICH ASSESSES STUDENTS' INDIVIDUAL PERFORMANCES IN THE PROJECT WORK. EMPHASIS IS ON THE ASSESSMENT OF THE INDIVIDUAL STUDENT'S KNOWLEDGE, SKILLS AND COMPETENCES. THE ASSESSMENT TAKES PLACE IN CONNECTION WITH THE STUDENTS' PRESENTATION AND DISCUSSION OF THEIR PROJECT, INCLUDING THE APPROACH TAKEN AND THE RESULTS ACHIEVED BY THE GROUP.

- ▶ All group members are present for an examination involving the group's supervisor(s) as well as an external examiner. The students are assessed individually.
- ▶ During the examination, the examiner will focus on the quality of the project work, including the extent to which the individual students have acquired the learning objectives of the project module, as stipulated in the curriculum.
- ▶ In basic modules and elective modules, students are assessed individually. When planning the examination, the structure that best supports the assessment of the module's learning objectives will be selected.



STUDENTS

STUDENTS AT AALBORG UNIVERSITY ENGAGE IN PROJECT-BASED WORK, WHICH INVOLVES THAT THE STUDENTS

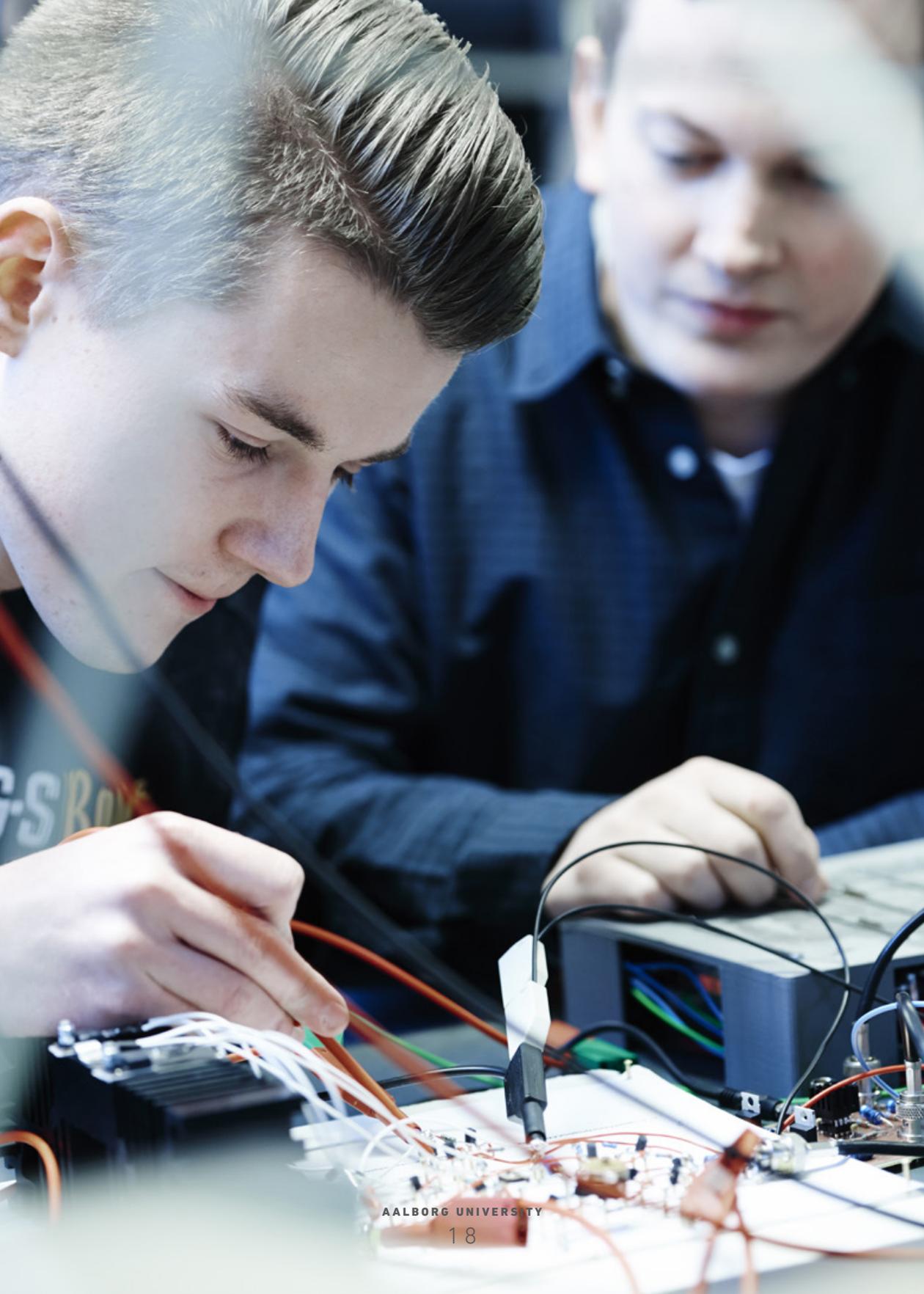
- ▶ receive an early introduction to the Aalborg PBL model and the reasons for its application
- ▶ are supported in their efforts to integrate the problem-based, project-oriented approach in their academic work
- ▶ are supported in successfully addressing any conflicts that arise in their work
- ▶ develop, throughout their studies, strategies for project cooperation as well as project organisation and the management of learning processes
- ▶ are motivated and take responsibility for implementing the problem-based approach in their studies
- ▶ are motivated to create synergies between different cooperation cultures by collaborating with external partners and engage in interdisciplinary learning environments
- ▶ support one another in their academic work and contribute to a strong culture of cooperation in their studies
- ▶ are free to manage their own project work within the framework of the project module
- ▶ will have the opportunity to participate actively in the evaluation of the study programmes
- ▶ demonstrate commitment as regards improvements, critical analysis and constructive feedback
- ▶ take part in curricular development through systematic evaluations and study board participation



ACADEMIC STAFF

ALL ACADEMIC STAFF AT AALBORG UNIVERSITY IMPLEMENT THE AALBORG MODEL IN THEIR PEDAGOGICAL ACTIVITIES. THIS IMPLIES THAT THE ACADEMIC STAFF

- ▶ are introduced to the Aalborg model and its implementation through in-house activities, continuing education courses etc.
- ▶ ensure that the approach is implemented in and adapted to the teaching activities and the educational objectives of the programmes
- ▶ conduct their supervision of the students' project work on the basis of the basic principles in the Aalborg PBL model, including cooperation, conflict management and project organisation
- ▶ support interdisciplinary group cooperation whenever possible
- ▶ comply with the University's guidelines for project supervision, in terms of both structure and extent
- ▶ are represented on study boards and take part in the development and maintenance of curricular activities as well as their ongoing assessment
- ▶ play a central role in the development of semester themes, the organisation of courses and supplemental academic activities
- ▶ pursue and maintain contact with external organisations in order to ensure the social relevance of the programme.



EXTERNAL RELATIONS

WORKING WITH AUTHENTIC ISSUES IMPLIES THAT THE UNIVERSITY MAINTAINS CLOSE CONTACT WITH EXTERNAL ORGANISATIONS. THIS IMPLIES THAT AALBORG UNIVERSITY

- ▶ provides external organisations with information about the Aalborg model
- ▶ facilitates and supports the contact between university staff, students and external organisations
- ▶ ensures that through their collaboration with external partners, students are given the opportunity to work with authentic issues that can be addressed in their project work
- ▶ supports research projects in collaboration with external organisations who can inspire students in their project work
- ▶ maintains contact to experts who may act as external examiners and assessors of the students' project work
- ▶ has policies pertaining to collaboration issues of confidentiality and intellectual property
- ▶ makes sure that feedback from external organisations on project internships, study programmes and graduate skills is provided so as to ensure the societal relevance of the programmes.

RESOURCES

THE UNIVERSITY ACQUIRES AND DEPLOYS RESOURCES IN WAYS THAT CONSISTENTLY SUPPORT THE AALBORG PBL MODEL. THIS IMPLIES THAT AALBORG UNIVERSITY

- ▶ provides access to information and systems for the students to use in their project work
- ▶ provides space for the students to work together. This space may be individual rooms for each group, meeting rooms or virtual space provided for students during the project period.
- ▶ makes classrooms of different sizes available to cover the needs of the different educational activities
- ▶ maintains a university library that provides students with access to cutting edge research from specialist journals, periodicals and scientific literature
- ▶ places laboratories at the disposal of project groups to enable them to carry out experiments
- ▶ provides, to a certain extent, computers, research equipment and software for students attending courses and project work



STUDENT ORGANISATION AND PROGRAMME ADMINISTRATION

THE ADMINISTRATION OF THE STUDY PROGRAMMES IS UNDERTAKEN PRIMARILY BY SCHOOLS, STUDENT COUNCILS AND STUDY BOARDS AS WELL AS BY SUPPORT STAFF. ADMINISTRATIVE DECISIONS REGARDING STUDY PROGRAMMES ARE MADE IN SCHOOLS AND STUDY BOARDS. WITHIN EACH STUDY PROGRAMME, SEMESTER COORDINATORS ARE APPOINTED; THESE WILL HAVE AN OVERVIEW OF THE PROGRAMME DETAILS FOR THAT SEMESTER.

THE UNIVERSITY HAS ESTABLISHED ORGANISATIONAL AND ADMINISTRATIVE STRUCTURES WHICH FACILITATE EFFICIENT AND DEVELOPMENT-ORIENTED APPLICATION OF THE AALBORG MODEL. THIS IS IMPLEMENTED THROUGH COOPERATION BETWEEN SCHOOLS, STUDENT COUNCILS AND STUDY BOARDS, ENSURING THAT

- ▶ students are provided with the necessary knowledge of the Aalborg model and the competences required to implement this through the course of their studies
- ▶ cooperation is made possible for students across study programmes during project work if this is necessary to solve the project problem
- ▶ study programmes are being continually developed on the basis of semester evaluations within the framework of the Aalborg model
- ▶ students, academic staff and support staff are involved in the follow-up work based on semester evaluations
- ▶ semester evaluations and summarised evaluation data are published on the websites of Aalborg University's schools.



RESEARCH IN PBL

AALBORG UNIVERSITY CONDUCTS TARGETED RESEARCH WITHIN PROBLEM-BASED AND PROJECT-ORIENTED LEARNING. THE OBJECTIVES OF THIS RESEARCH ARE TO

- ▶ document the effect of the Aalborg model for both internal and external purposes
- ▶ develop an internal system for improving the Aalborg model
- ▶ document the impact of current and emerging practices of the Aalborg model
- ▶ relate educational practice to theory
- ▶ relate data and research findings to international research results.

AALBORG UNIVERSITY SUPPORTS THIS RESEARCH THROUGH

- ▶ research units engaging in research in subject matter didactic as well as general didactics
- ▶ close cooperation between the environments engaged in subject matter didactics and the educational environments, with a view to developing the Aalborg model on the basis of current practice
- ▶ an inter-faculty unit in the shape of a PBL-Academy, ensuring synergy and consistency between the pedagogical activities of individual faculties and the pedagogical activities of individual programmes.

RESEARCH IN PBL IS, TO A CERTAIN EXTENT, BASED ON UNIVERSITY EVALUATION RESULTS, ENABLING THE UNIVERSITY TO DOCUMENT RESULTS AND ADAPT AND DEVELOP THE AALBORG PBL MODEL.



MORE INFORMATION

PBL ACADEMY
PBL.AAU.DK



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