

INSTITUTE FOR ADVANCED STUDY
IN PROBLEM-BASED LEARNING

ANNUAL REPORT 2025



INSTITUTE FOR
ADVANCED STUDY IN PBL

AALBORG
UNIVERSITY

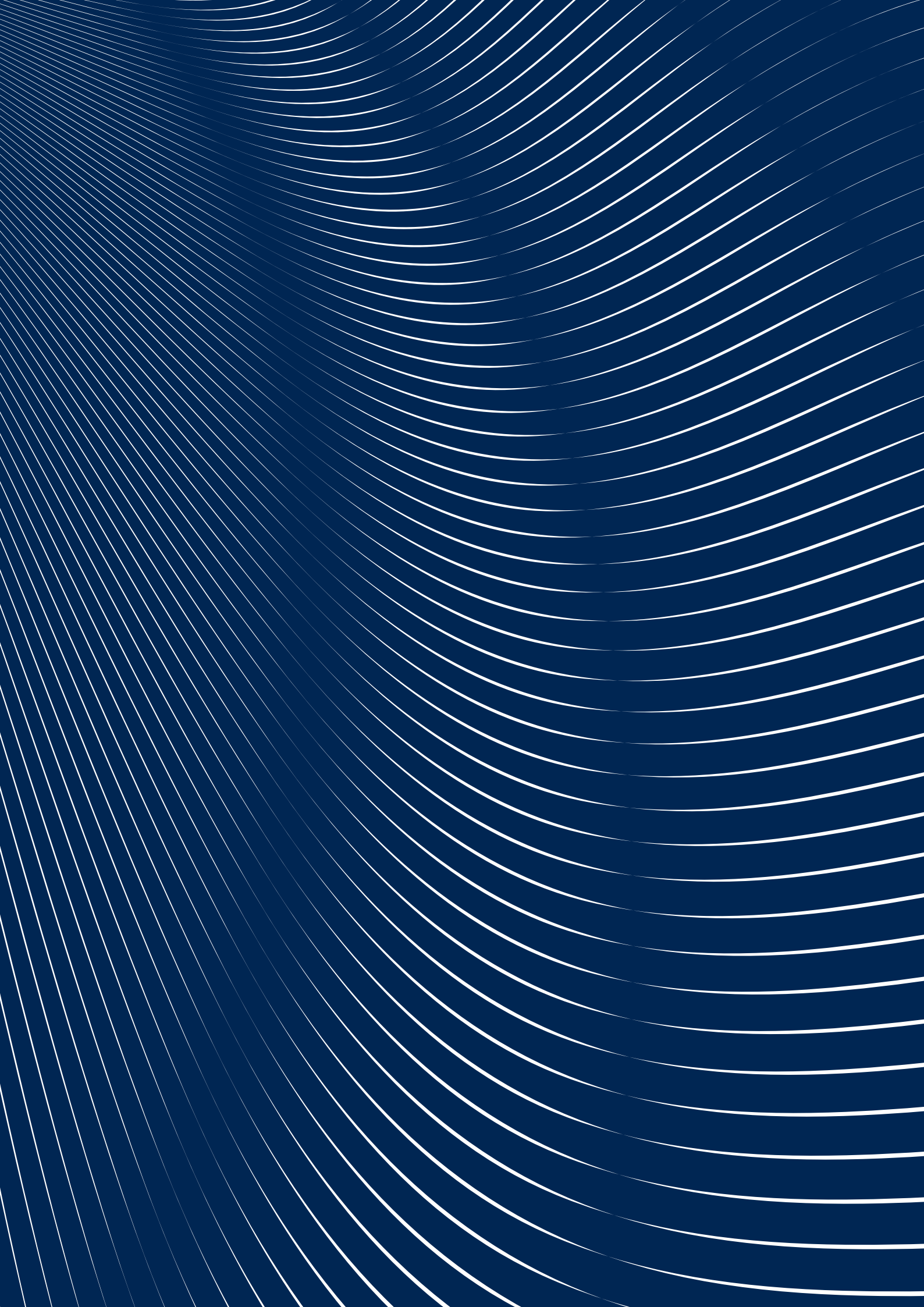


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INTRODUCTION

In 2025, the Institute for Advanced Study in Problem-Based Learning (IAS PBL) continued to strengthen the connections between PBL research, research-based educational development, and pedagogical practice across Aalborg University. This annual report presents selected research and development activities undertaken by IAS PBL during the year.

Since its establishment, IAS PBL has evolved into a well-established cross-faculty environment for research and educational development. Its research groups bring together researchers working on PBL and higher education across AAU's four faculties. This structure allows the groups to pursue in-depth research within their respective disciplinary fields and has also led to new collaborations and joint projects across the groups. Together, they contribute to advancing international PBL research and to strengthening and rethinking educational practice at AAU.

Through research and engagement at both strategic and operational levels, IAS PBL has supported, challenged and co-developed educational practice in collaboration with educational leaders and local educational environments across AAU. It has also strengthened research and practice in pedagogical competence development and supported teaching staff in the pedagogical, disciplinary, and digital dimensions of university teaching.

A major milestone in 2025 was IAS PBL's first research evaluation. The external evaluation recognised the strength of the research environments and the value of collaboration across the research groups, while also identifying important priorities for the years ahead.

The activities presented in this report reflect the commitment and expertise of colleagues across IAS PBL. I am proud of what we have achieved together and of the solid foundation now in place: strong research groups, productive collaboration across IAS PBL, and the dedicated work of our secretariat.

I have chosen to step down as director of IAS PBL in 2026 to gain greater flexibility in my daily life, spend more time with my family, and return more fully to research and teaching. In my research, I will continue my theoretical and empirical work on PBL and digital learning, pursuing a critical and constructive approach that can contribute to both international research and the continued development of digital teaching and learning practices at AAU.

I am pleased that the new director knows both IAS PBL and Aalborg University well and will bring new perspectives and ideas to the role. I am confident that the new director can build on what has been achieved, and I look forward to following and contributing to IAS PBL's future work.



**PROFESSOR
THOMAS RYBERG**

Director,
Institute for
Advanced Study in PBL





ORGANISATION, RESEARCH GROUPS AND UNITS

ORGANISATION

The Institute for Advanced Study in Problem-Based Learning (IAS PBL) is a cross-faculty unit established in 2022 to bring together researchers and research and development activities related to problem-based learning (PBL) across Aalborg University (AAU). IAS PBL supports all faculties and departments across AAU (see figure 1) and serves as a university-wide hub for PBL research, pedagogical development, and competence development.

IAS PBL is directly linked to Aalborg University's management and reports to the university's Pro-Rector for Education. Through this organisational position, the unit seeks to strengthen the university's strategic work on teaching and learning, ensuring alignment between research, development activities, and institutional priorities.

In 2023, IAS PBL adopted its **first strategy**, setting out a clear vision for advancing PBL at AAU. The strategy sets out key objectives to strengthen PBL research, support research-based pedagogical development, and increase the dissemination and impact of PBL knowledge.

IAS PBL comprises several research groups and units, as well as a central secretariat. The research groups are organisationally anchored in faculties and departments across the university, where their members are formally employed. This ensures their continued connection to local teaching environments. IAS PBL provides dedicated research time and a shared framework for collaboration across these research environments. Regular internal events and knowledge-sharing activities connect colleagues across organisational and disciplinary boundaries, and support the exchange of knowledge, the development of shared ideas, and the formation of new collaborations and projects. The groups and units are briefly introduced below.

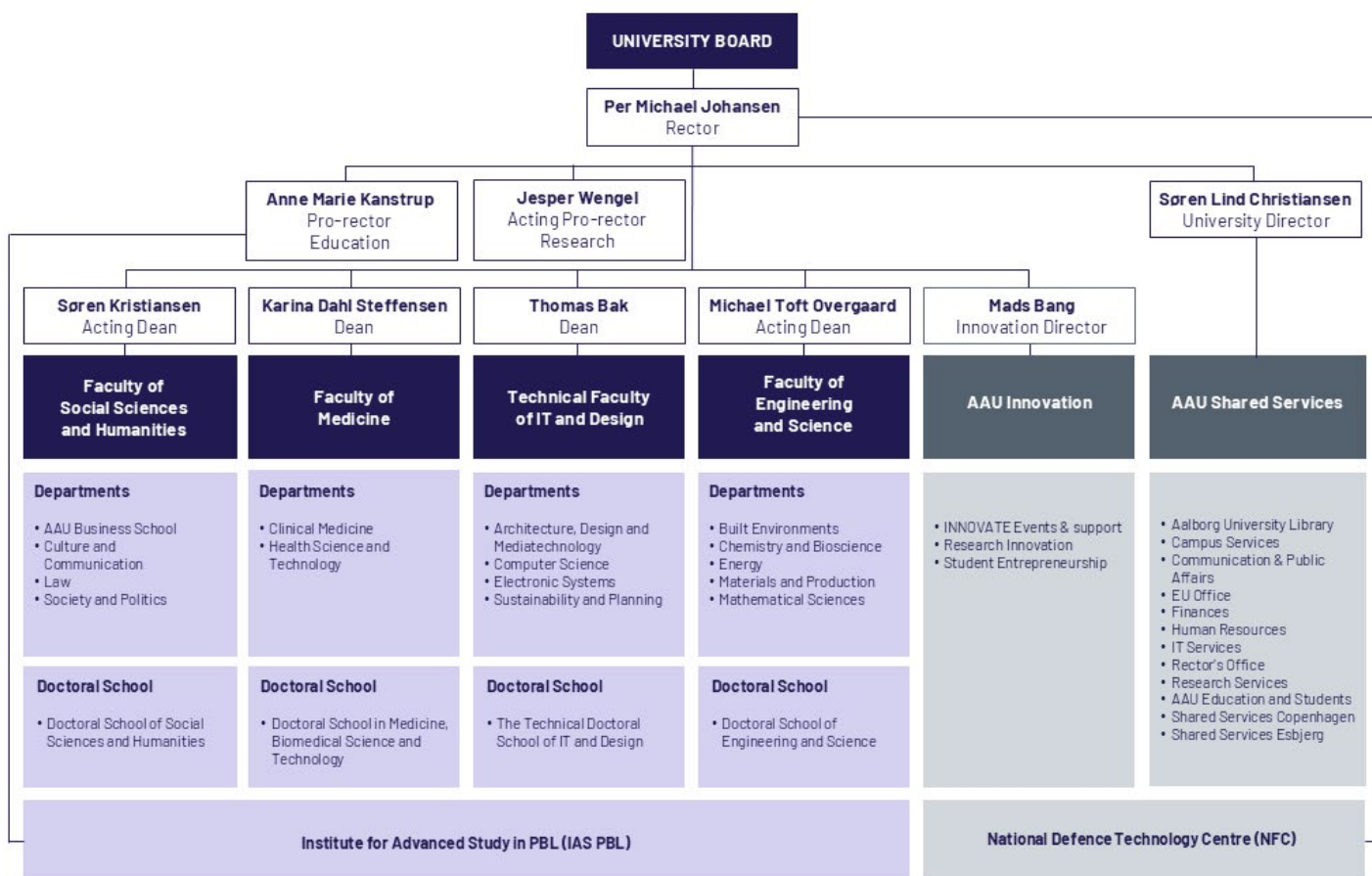


Figure 1: Aalborg University's organisational chart (as of June 2026)

THE AALBORG UNESCO PBL CENTRE

The Aalborg Centre for Problem-Based Learning in Engineering Science and Sustainability

The Aalborg UNESCO PBL Centre (UCPBL) is a category 2 centre under the auspices of UNESCO, established in 2014 and renewed in 2025. UCPBL functions both as a strategic research unit within Aalborg University and as a global hub for advancing problem-based learning (PBL) in engineering and science education.

UCPBL conducts internationally recognised research on PBL and educational transformation, with a focus on areas such as sustainability, digitalisation, interdisciplinary competence, and student learning and development. The centre integrates research, educational innovation, and capacity-building to support the development of PBL as both a field of research and a transformative pedagogical approach across educational contexts.

Through collaboration with universities, organisations, and international networks, UCPBL contributes to research-based educational development, curriculum innovation, and professional development for teaching staff and educational leaders. The centre plays a key role in strengthening global PBL communities and advancing research-informed approaches to teaching and learning aligned with Aalborg University's strategic priorities.

UCPBL is the largest research group affiliated with IAS PBL. In 2025, the group consisted of 26 academic staff members, excluding externally affiliated staff. All UCPBL staff members are employed at the Department of Sustainability and Planning, and the group's teaching activities cover both the Technical Faculty of IT and Design and the Faculty of Engineering and Science.

At the beginning of 2026, UCPBL evolved into two research groups, PBL ACT and PBL Matter, each representing distinct but complementary research profiles.





SHARE-PBL

Social and Human Science Approaches to Research in Education and Problem-Based Learning

Established in August 2022, SHARE-PBL is an interdisciplinary research group that focuses on developing and promoting social science and humanities perspectives in research on problem- and project-based learning. The group brings together researchers across departments within the Faculty of Social Sciences and Humanities and contributes to strengthening the theoretical, empirical, and practice-oriented foundations of PBL research.

The group's research addresses educational issues across different levels and contexts, including higher education, professional learning, and informal learning environments. Its work spans topics such as interdisciplinarity, digital education, staff development and educational leadership, and pedagogical concepts and models. These are aligned with the group's strategic focus areas for 2025-2030.

Through both qualitative and quantitative research approaches, SHARE-PBL contributes to the development of pedagogical models, critical perspectives on digitalisation, and research-based practices supporting teaching and learning. The group plays a central role in linking research, educational development, and staff development activities within IAS PBL and Aalborg University more broadly.

In 2025, SHARE-PBL consisted of 13 staff members employed at four different departments within the Faculty of Social Sciences and Humanities.



KILD/L-ILD

Communication, IT and Learning Design (KILD) / IT and Learning Design (L-ILD)

The two IT and Learning Design (ILD) research groups, Communication, IT and Learning Design (KILD) and IT and Learning Design (L-ILD), collectively explore how digital technologies influence and enable learning processes in a digital and networked society. As part of IAS PBL, the groups contribute to the development of research-based approaches to digitally supported PBL across educational contexts.

The groups' research spans basic and practice-oriented research and focuses on the interplay between technology, pedagogy, and learning design, including areas such as game-based learning, digital collaboration, visual and aesthetic practices, and the role of emerging technologies such as AI in education. Through both design-based and ethnographic approaches, the groups develop new insights into how learning processes can be designed in close collaboration with practice, often in partnership with educational institutions, organisations, and companies.

In 2025, 12 academic staff within the groups were affiliated with IAS PBL. The group members are employed at the Department of Communication and Psychology and the Department of Culture and Learning at the Faculty of Social Sciences and Humanities.

HEALTH-PBL

HEALTH-PBL is an interdisciplinary research team within IAS PBL that brings together perspectives from health sciences, education, and related fields to explore problem-based learning and case-based learning in medical and health education. Operating within the Faculty of Medicine, the group helps align teaching activities with Aalborg University's educational profile and PBL principles.

The group's work spans theory- and practice-oriented approaches to PBL, including case-based and project-based learning in clinical and educational contexts. Drawing on diverse disciplinary backgrounds, HEALTH-PBL contributes to the development of pedagogical practices and educational approaches that support student learning, professional development, and innovation in health education.

HEALTH-PBL plays an important role in supporting curriculum development and in strengthening the pedagogical competences of teaching staff at the Faculty of Medicine. The group's activities are closely connected to both educational practice and broader research initiatives in areas such as clinical science, public health, digital health, and pedagogy.

In 2025, HEALTH-PBL consisted of seven staff members, all employed at the Department of Health Science and Technology under the Faculty of Medicine.

LEARNING LAB

Learning Lab is a research-based pedagogical competence development unit within IAS PBL dedicated to strengthening pedagogical competences across Aalborg University. The unit delivers professional development activities for both new and experienced teaching staff, most notably through the University Pedagogy Program, which prepares early-career academics for teaching, supervision, and assessment in higher education.

Learning Lab helps ensure alignment between pedagogical practice and Aalborg University's commitment to PBL by supporting the development of research-based pedagogical practices. In addition to the University Pedagogy Program, the unit offers courses and activities for academic staff and educational leaders, contributing to the development of high-quality teaching and learning practices across the university.

The unit operates as a network-based structure, drawing on expertise from across faculties and research groups within IAS PBL. Through this model, Learning Lab plays a central role in linking research, pedagogical development, and institutional priorities, and in strengthening the university's overall capacity for educational development.



Learning Lab Research

Learning Lab Research brings together IAS PBL researchers from different disciplines and research groups in a shared effort to strengthen the research base for the development of university pedagogical competence. The initiative focuses on developing a more systematic, research-based understanding of pedagogical practices at Aalborg University and on relating these to practices at other universities.

The research activities include assessing current pedagogical practices, contributing to the development of research-based approaches to staff development, and supporting cross-disciplinary collaboration in educational development. Through this work, Learning Lab Research contributes to advancing knowledge on what it means to teach at a PBL university and to ensuring that professional development activities at AAU are grounded in research and informed by international research. IAS PBL supports the development of this research area through dedicated research capacity, including a PhD fellowship and additional research support.

Members of the Learning Lab research group include researchers from all IAS PBL research communities.

CENTER FOR DIGITALLY SUPPORTED LEARNING

The Center for Digitally Supported Learning (CDUL) is a staff competence development unit focused on strengthening digital teaching and learning practices at Aalborg University. The unit supports academic staff, educational leaders, and programmes by providing pedagogical and technological guidance on the integration of digital tools in teaching and learning.



CDUL contributes to the development of digitally supported PBL by working in close collaboration with faculties and programmes across the university. Through co-development activities, the unit supports the design and implementation of digital learning practices aligned with institutional priorities and educational needs.

The unit operates through a partnership model in which CDUL consultants collaborate directly with faculties to support locally anchored initiatives and strategic development activities. In this way, CDUL plays a key role in supporting AAU's broader ambitions within digital education. In 2025, CDUL consisted of 11 staff members.

The activities described in this report relate to 2025. In April 2026, CDUL became part of AAU IT Services and is no longer a part of IAS PBL.

JOURNAL OF PROBLEM-BASED LEARNING IN HIGHER EDUCATION

The Journal of Problem-Based Learning in Higher Education (JPBLHE) is an international and peer-reviewed journal published by IAS PBL. The journal focuses on advancing research and practice in problem-based learning within higher education.

JPBLHE publishes original high-quality research articles and case studies that contribute to the development of PBL as a field of research and pedagogical practice. Through its publications, the journal supports knowledge sharing, academic development, and collaboration within the international PBL research community.

The journal is led by an editorial team of researchers affiliated with IAS PBL and supported by an international editorial board. This structure ensures academic quality and relevance and contributes to the journal's positioning within the field of PBL research. The editorial team and board members are listed on the [JPBLHE website](#).

In 2025, JPBLHE published its annual issue, Vol. 13 No. 1, continuing its dissemination of research on PBL in higher education.



IAS PBL RESEARCH



IAS PBL RESEARCH EVALUATION 2025

In 2025, three years after its establishment, IAS PBL underwent a research evaluation process. The evaluation was designed as a learning and development process intended to provide external perspectives on the quality, relevance, and strategic direction of research across IAS PBL and within its research groups. It was intended as a basis for reflection and the further strengthening of IAS PBL's research activities.

The evaluation addressed five main themes: research output; impact and visibility; external research funding; staff care, development and retention; and interdisciplinary research and collaboration. Particular attention was given to the quality and impact of IAS PBL research, collaboration across the research groups, and IAS PBL's potential to strengthen its position as a research and collaboration partner.

As part of the process, IAS PBL and the individual research groups prepared written material presenting their organisation, research activities, outputs, impact, and strategic considerations. An international panel consisting of Professor Diana Dolmans from Maastricht University, Professor Maggi Savin-Baden from the University of Oxford, and Professor John Mitchell from University College London visited IAS PBL in November 2025. The visit included presentations and dialogue sessions

with IAS PBL and each of the research groups, providing opportunities to discuss strengths, challenges and future directions for PBL research at AAU with the panel.

IAS PBL RESEARCH FUNDING INITIATIVES

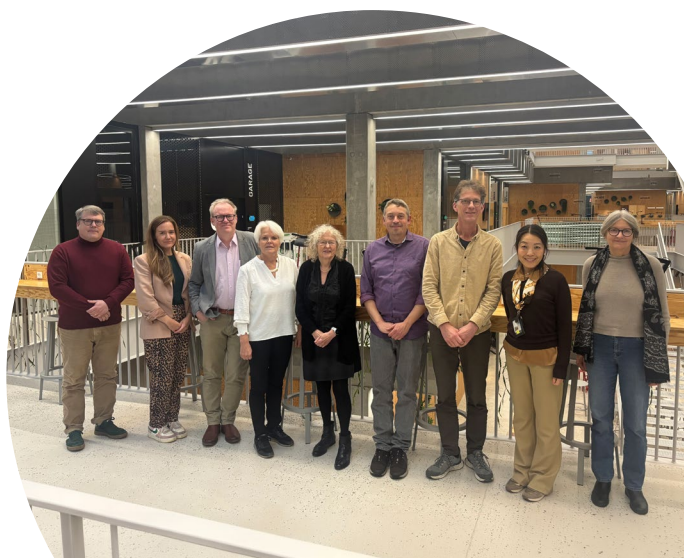
IAS PBL Development Projects 2025-2027

In 2025, IAS PBL launched two three-year development projects: *Missions and Interdisciplinarity* and *Flexible Education and Flexibility in Facilitation of Problem-Based Learning*. Closely aligned with IAS PBL's overall strategy, the projects bring together researchers from several IAS PBL research groups to generate new knowledge and advance PBL through research-based innovation, cross-group collaboration and the development of educational practice.

While *Missions and Interdisciplinarity* explores student participation, leadership, and interdisciplinary collaboration in mission-driven education, *Flexible Education* investigates how flexibility can be understood and developed in relation to PBL, educational design and facilitation. Each development project comprises interconnected subprojects with distinct research questions and activities, while joint seminars, workshops, and dissemination activities support knowledge exchange and collaboration across the participating research environments.

Flexible Education and Flexibility in Facilitation of Problem-Based Learning

The IAS PBL development project *Flexible Education and Flexibility in Facilitation of Problem-Based Learning* addresses a growing need for flexibility in higher education, driven by changes such as new degree structures and changing expectations for lifelong learning. Within this context, the project explores how flexibility can be understood and developed in relation to problem-based learning, taking into account changing learning environments and the need to rethink teaching practices and competences.



The project builds on the premise that flexibility encompasses not only delivery formats but also pedagogical considerations, including how students and teaching staff engage with flexible learning environments. It therefore focuses on developing new understandings and approaches to flexible education and facilitation that support participation, engagement, and learning within a PBL context.

Associate Professor Maria Hvid Stenalt leads the project in collaboration with Associate Professors Lars Birch Andreassen, Heidi Hautopp and Bente Nørgaard, Assistant Professor Mia Thyrrer Sørensen, and Rikke Ørngreen and Sara Paasch Knudsen from the Department of Culture and Learning.

Subproject A: Flexible Education

This subproject investigates how flexible education can be understood and developed in relation to problem-based learning. It examines different conceptualisations of flexibility and how flexible education can support the values underpinning PBL.

Drawing on literature-based research and empirical studies, the subproject explores the experiences of teaching staff and students in flexible learning environments. It aims to contribute conceptual insights and develop frameworks and resources for organising and facilitating flexible education in ways that support PBL.

Subproject B: Flexible Facilitation Methods in Problem-Based Learning

This subproject explores how flexible facilitation methods can be integrated with and support problem-based learning. Using design-based and action research approaches, the project explores the opportunities, challenges and experiences associated with different facilitation methods.

The subproject aims to develop a framework and guidelines for flexible facilitation. Planned outcomes include professional development activities for teaching staff.

Missions and Interdisciplinarity

The *Missions and Interdisciplinarity* development project explores how students can become active contributors to Aalborg University's mission-driven innovation activities. Building on AAU's problem and project-based learning model and mission-oriented strategy, the project focuses on strengthening students' capacity for interdisciplinary collaboration, leadership, and agency, enabling them to participate actively in addressing complex societal and sustainability challenges.

The project comprises three interconnected subprojects. Together, they examine how students can participate in and co-create mission-driven innovation processes, how interdisciplinary collaboration and leadership can be supported in educational settings, and how Education for Sustainable Development competences can be integrated into PBL and cross-disciplinary curriculum development. Joint seminars, workshops and publications support knowledge exchange and the development of synergies across the three subprojects.

Subproject 1: Involving and Engaging Students to Become Agentic Co-Creators in Mission-Driven Innovation Processes at AAU

This subproject explores how students can become active and agentic co-creators in mission-driven innovation processes at Aalborg University. It aims to develop and pilot a progressive model for students' active participation in AAU's mission-driven strategy. The model follows three stages, moving from raising awareness of AAU's missions to engagement in mission-driven activities and, ultimately, the co-creation of project proposals and solutions with relevant stakeholders.

The subproject includes activities to raise awareness among students and teaching staff, empirical studies of engagement in mission-driven innovation, analyses of student projects, and workshops supporting competence development. Particular attention is given to students' capacity for interdisciplinary collaboration, systems thinking, complex problem design and agency, as well as their readiness to co-create and lead projects that address sustainability challenges and complex societal problems.

PhD Fellow Svend Hauekrog Christiansen leads the project. Associate Professors Aida Guerra and Nikolaj Stegeager also participate in the project, which includes collaboration with Jesper Vestergaard from AAU Innovation and Niels Bech Lukassen from the AAU Mission Secretariat.



Subproject 2: Student Collaboration and Leadership in Interdisciplinary and Mission-Driven Education

This subproject investigates student collaboration and leadership in interdisciplinary and mission-driven education. Building on research and experience from interdisciplinary educational initiatives at AAU, it aims to develop pedagogical models and theoretical frameworks for student collaboration and leadership in a PBL environment.

The subproject combines a review of existing research with empirical studies of current interdisciplinary educational activities and seeks to establish connections with international programmes and institutions undertaking comparable work. The resulting insights will be related to the model for mission-oriented education to identify overlaps, synergies and potential limitations. The findings will be disseminated through presentations, an inspiration catalogue and journal articles tailored to different purposes and audiences.

Assistant Professor Henrik Worm Routhe leads the project. Associate Professors Jette Egelund Holgaard and Kirsten Jæger participate in the project.

Subproject 3: Researching Sustainable Development LAB (SD LAB): How to Integrate ESD Competences into PBL and Cross-Disciplinary Curriculum Development

This subproject uses the *Sustainable Development Lab (SD LAB)* at AAU Copenhagen as a case study to generate research-based knowledge on interdisciplinary education for sustainable development. It investigates how Education for Sustainable Development (ESD) competences can be integrated into PBL and connected with students' disciplinary and professional learning in a setting where students, teaching staff and external partners collaborate on sustainability challenges.

The research examines students' perspectives and expectations; how they connect ESD competences and PBL with theories and methods from their degree programmes; and how teaching staff and supervisors incorporate ESD competences into students' project work. It also examines collaboration with companies and organisations and explores how student projects can engage with and contribute to AAU's missions.

The subproject primarily uses qualitative and participatory design methods to investigate educational practice in SD LAB and inform its continued development.

Professor Lone Dirckinck-Holmfeld and Associate Professor Heidi Hautopp participate in the project in collaboration with Maj-Britt Quitzau from the Department of Sustainability and Planning and Frida Skovgaard Sørensen from the Department of Communication and Psychology. The subproject also involves a broader panel of teaching staff and external case partners.

IAS PBL Seed Money

The IAS PBL seed money initiative is an internal funding scheme designed to support the growth of new research and development projects in PBL. The purpose of the scheme is to support novel ideas with potential to grow into larger initiatives and to foster new constellations and collaborations, both within IAS PBL and with external partners.

The scheme prioritises proposals that align with IAS PBL's strategic objectives and promote collaboration across research groups, AAU departments, or with external stakeholders.

In 2025, the following five projects were awarded seed money:

- *Building Emotional Intelligence in a PBL Environment through Empathy and Teamwork*
- *Co-Created and Community-Owned Chatbots in PBL*
- *Inclusion of Ethnic Minority Women in STEM Jobs – Development of a PBL-Based Guidance and Evaluation Concept and Research Collaboration*
- *Supporting University Student Proactivity for Social and Academic Well-Being: What PBL Can Do*
- *Thinking Skills in Interdisciplinary Co-Creation and Complex Problem-Solving*

These projects are described individually in the section below.

During 2025, IAS PBL also revised the seed money concept for the 2026-2027 period. The updated scheme places greater emphasis on developing research initiatives towards specific opportunities for external funding, while continuing to support collaboration and knowledge sharing across IAS PBL's research environments.

Building Emotional Intelligence in a PBL Environment through Empathy and Teamwork

This exploratory project investigates empathy and socio-emotional learning in PBL-based engineering education. It examines how PBL environments may support the development of student empathy and explores the perspectives of students and teaching staff on empathy, collaboration and conflict management. The project responds to the growing importance of these competences in higher education.

In 2025, the project collected data through interviews with students and teaching staff and designed, implemented and evaluated a student workshop on empathy and conflict management. A codebook for thematic analysis was developed in collaboration with Duke University. The project also produced two conference contributions addressing emotions in engineering education and empathy in education for sustainable development.

The project established research collaborations with Professor Ann Saterbak (Duke University, US), Dr. Inês Direito (University of Aveiro, Portugal), and Professor Diana Bairaktarova (Virginia Tech, US) and provided a foundation for continued work on socio-emotional learning, empathy, and collaboration in AAU's PBL environments.

The project is a collaboration between UCPBL and HEALTH-PBL and is led by Associate Professor Aida Guerra in collaboration with Associate Professors Stine Ejning-Duun and Patrik Kjærdsdam Telléus.

The project received DKK 90,000 through the IAS PBL seed money scheme.

Co-Created and Community-Owned Chatbots in PBL

This project explores how co-created, community-owned chatbots can support collaborative learning and project teamwork in problem and project-based learning environments. It examines how students can jointly develop a chatbot tailored to their project group's pedagogical intentions, agreements and collaborative practices, rather than relying on chatbots for individual task offloading.

In 2025, the project developed, piloted and refined a co-creation workshop in which students and teaching staff collaboratively wrote, tested and revised system prompts. The workshop combined hands-on development with reflection on ownership, transparency, and the limitations of general-purpose chatbots. The workshop format was well received and became a recurring activity in UCPBL's annual ProLab workshop format for students from the Faculty of Engineering and Science and the Technical Faculty of IT and Design.

The project also established collaboration with researchers at the Norwegian University of Science and Technology, North-West University and the University of Cape Town, who adapted the workshop to their contexts. Material from the workshops is being analysed and forms the basis for continued academic dissemination. Experience from the project has also informed subsequent work on the pedagogical use of custom chatbots, including the BuddhAi project described elsewhere in this report.

Associate Professor Niels Erik Ruan Lyngdorf, Assistant Professor Nicolaj Riise Clausen and PhD Fellow Sofie Otto participate in the project together with Lasse Krejberg. The project is a collaboration between UCPBL, CDUL and the University of Cape Town.

The project received DKK 91,930 through the IAS PBL seed money scheme.

Inklusion af etniske minoritetskvinder i STEM-jobs – udvikling af PBL-forankret vejlednings- og evalueringskoncept samt forskningssamarbejde

Inclusion of Ethnic Minority Women in STEM Employment – Development of a PBL-Based Guidance and Evaluation Concept and Research Collaboration

This project explores how PBL can be designed, adapted and reconfigured within the learning environment at ReDI School of Digital Integration. The project is grounded in a shared vision to support women and non-binary individuals with refugee and migrant backgrounds in developing skills and networks through PBL that can help them navigate and access the Danish tech job market.

The project investigated ReDI School's context through observations of admission interviews, teaching and learners' case presentations, interviews with volunteer teachers and a PBL workshop involving learners and teachers. It also included a PBL workshop for teachers and case-based learning experiments involving an IT software company. The project strengthened the collaboration between Aalborg University and ReDI School and supported ReDI School's work with PBL. Inspiration from case-based learning was adopted and implemented across several of ReDI School's courses. The collaboration also formed the basis for two external funding applications, and the partners continue to explore opportunities for joint funding.

The project is a collaboration between KILD/L-ILD and UCPBL. Associate Professors Heidi Hautopp and Stine Ejning-Duun participated in the project, which was carried out in collaboration with ReDI School of Digital Integration.

The project received DKK 49,000 through the IAS PBL seed money scheme.





Supporting University Student Proactivity for Social and Academic Well-Being: What PBL Can Do

This project explores how problem- and project-based learning environments can support university students' social and academic well-being, proactivity, and persistence.

In 2025, the project conducted longitudinal data collection across health and engineering programmes, qualitative interviews focused on sources of academic well-being and a Q methodology study of students' perspectives on psychological safety in teamwork. Based on these studies, the project developed a theoretical framework describing internal and external sources of academic well-being and identified close connections between well-being, psychological safety and creative teamwork. The findings also highlighted the importance of institutional support in creating learning environments where students feel safe to make mistakes, seek help and develop both academically and socially.

The project contributed to a peer-reviewed article published in Education Sciences in 2025, while project findings formed the basis for further publications in 2026. It also contributed to UCPBL joining the international Learning Well Coalition, supporting continued collaboration and knowledge exchange on student well-being, belonging, agency and meaningful learning.

The project is a collaboration between UCPBL, HEALTH-PBL, and SHARE-PBL. Assistant Professors Juebei Chen, Giajenthiran Velmurugan, and Nicolaj Riise Clausen; Associate Professors Søren Hansen, Trine Fink, Niels Erik Ruan Lyngdorf, Bettina Dahl Søndergaard, Aida Guerra, Nikolaj Stegeager, and Patrik Kjærdsdam Telléus; Professor Xiangyun Du; and PhD Fellow Anna Overgaard Markman participate in the project.

The project received DKK 80,000 through the IAS PBL seed money scheme.

Thinking Skills in Interdisciplinary Co-Creation and Complex Problem-Solving

This project developed and tested educational prototypes aimed at strengthening creative thinking and systems thinking as key thinking skills for complex problem-solving. The prototypes were implemented through full-day interdisciplinary workshops for bachelor's and master's students in Aalborg and Copenhagen as part of AAU's ProLab concept. Student surveys indicated high levels of satisfaction with both the content and the learning format.

At PhD level, the project contributed to the further development of a course on creative thinking, with data from the course forming the basis for research publications. The project also strengthened research collaboration across IAS PBL and established an international collaboration with MIT. The knowledge, methods, and learning designs developed through the project continue to inform PBL courses, ProLab workshops and PhD education at AAU and have provided a basis for the future development of an interdisciplinary elective course for master's students.

The project is a collaboration between UCPBL and HEALTH-PBL. Associate Professors Søren Hansen, Lykke Brogaard Bertel, Lars Domino Østergaard and PhD Fellow Sofie Otto participate in the project in collaboration with Ludvig Johan Torp Rasmussen from the Department of Health Science and Technology. The project includes collaboration with the Massachusetts Institute of Technology (MIT).

The project received DKK 80,000 through the IAS PBL seed money scheme.

RESEARCH PROJECTS

The following section presents an overview of research projects initiated in 2025 and involving IAS PBL researchers. The projects vary in their organisational anchoring, collaborative structure and sources of funding. A full list of research projects affiliated with IAS PBL is available [here](#).

AI-interaktive bevægelsesrum til fremme af fysisk, mental og social sundhed for ældre

AI-Interactive Movement Environments to Promote Physical, Mental and Social Health among Older Adults

The project explores how AI-supported interactive movement environments can contribute to the physical, mental, and social health of older adults. It brings together perspectives on health, movement, interactivity, and artificial intelligence.

Associate Professor Lars Domino Østergaard leads the project in collaboration with Kirsten Schultz Petersen from the Department of Health Science and Technology. The project includes collaboration with the activity centre at Fremtidens Plejehjem.

The project runs from August 2025 to March 2029.

AMAICE: Advancing Mathematics Education in Europe through AI-Driven Customizable Escape Games

The project explores the potential of digital escape games to support mathematics education. To address the limited availability of suitable games and the challenges involved in creating or adapting them, the project will develop a free, web-based escape game editor. The editor will enable teaching staff and students to create and customise mathematics-specific games with no prior programming skills.

The editor will use artificial intelligence to allow students to interact with game characters and interactive mathematical visualisations, thereby turning mathematical problem-solving into a dynamic, hands-on experience. The project will also develop ready-to-use and adaptable classroom games, an online database for sharing and reviewing games, and supporting resources including training materials, tutorial videos, and professional development workshops. Through these activities, AMAICE aims to strengthen student engagement, collaborative learning, and mathematical problem-solving while supporting collaboration and knowledge exchange among teaching staff across Europe.

Assistant Professors Erik Ottar Jensen and Maria Hvid Bech Dille participate in the project, which is led by the University of Siegen and funded through the Erasmus+ programme. The project includes collaboration with Goethe University Frankfurt and Comenius University.

The project runs from September 2025 to August 2028.

BuddhAi – A Multimodal Socratic AI Tutor for Novice Programmers

This project develops a multimodal AI tutor to support novice programming students in developing learner agency, self-efficacy, and independent problem-solving skills. General-purpose large language models can provide fast, answer-driven support but offer limited pedagogical grounding and scaffolding for thought and reflection. BuddhAi is designed to provide tailored, Socratic and self-directed support rather than solution-driven assistance.

The interdisciplinary project combines technical and educational expertise from three AAU departments and will integrate the tutor into two degree programmes across two faculties. The project also aims to develop a pedagogical framework, course materials and exercises, and an AAU policy document supporting continued use and possible wider application.

Associate Professor Niels Erik Ruan Lyngdorf and PhD Fellow Sofie Otto participate in the project in collaboration with Kasper Rodil, Ivan Adriyanov Nikolov and Oscar Bill Zhou from the Department of Architecture, Design and Media Technology, and Steffen Frahm from the Department of Health Science and Technology.

The project has received DKK 2,998,313 through the Novo Nordisk Foundation PREPARE programme.

The project runs from January 2025 to May 2028.

Early Career Engineers' Preparedness for Transition to Work

This project examines the transition of early-career engineers from university to the workplace. It explores key aspects of career development, including career readiness in terms of skills and competences and career preparedness in navigating workplace challenges.

PhD Fellow Anna Overgaard Markman, Professor Xiangyun Du and Associate Professors Bente Nørgaard and Aida Guerra participate in the project.

The project was initiated in January 2025.

Empathic Engineering Education for Sustainable Development

This project explores how empathy can be understood, developed, and integrated into engineering education to support sustainable development. Drawing on the EU GreenComp framework, the project positions empathy as a key competence for addressing complex societal challenges. It investigates how empathy is understood and experienced by engineering students and educators, and how it can be meaningfully embedded in engineering curricula.

The research combines a state-of-the-art literature review with a mixed-methods exploratory design to develop a framework for integrating empathy into engineering education. The project contributes to strengthening a humanistic and socially constructed approach to sustainability and to equipping future engineers with the interpersonal competences needed to address global challenges.

Associate Professor Aida Guerra participates in the project, which is led by the University of Aveiro. Collaboration partners include Virginia Polytechnic Institute and State University.

The project is funded by the Portuguese Foundation for Science and Technology (FCT).

The project runs from January 2025 to June 2026.

Generativ AI som ny faglighed i uddannelser på AAU ***Integrating Generative AI into Disciplinary Teaching and Learning at AAU***

The project aims to strengthen teaching staff's digital understanding in relation to their disciplines and to support the integration of generative AI into degree programmes across Aalborg University. Building on AAU's existing work within digital competence development and digitally supported problem-based learning, the project explores how generative AI can be incorporated into disciplinary teaching and PBL practices, including project work, collaboration, and real-world problems.

Through participatory and iterative processes, the project will develop teaching practices, courses, exercises, and guidelines that address the opportunities and challenges created by generative AI within and across disciplines. Teaching staff will also develop flexible teaching and supervision activities for use within their own programmes and among broader groups of students.

The project involves all four AAU faculties, enabling approaches to generative AI and PBL to be adapted to different disciplinary contexts.

Associate Professor Stine Ejlsing-Duun and Tom Lykke Skov Gregersen participate in the project in collaboration with Thomas Bjørner from the Department of Architecture, Design and Media Technology, Tom Nyvang from the Department of Communication and Psychology, and Thomas Ditlev Brunø from the Department of Materials and Production.

The project has received DKK 3.5 million from the Danish Ministry of Higher Education and Science.

Integrating Universal Design in Teaching at AAU

This project explores how universal design can be integrated into teaching across eight degree programmes representing AAU's four faculties. Drawing on AAU's problem- and project-based learning model, the project aims to strengthen students' ability to develop solutions that take account of human diversity, accessibility, and differences in users' circumstances and functional abilities.



Through workshops and development activities, teaching staff and researchers develop and test teaching approaches that combine universal design with PBL. The project also explores how universal design can be incorporated into AAU Innovation's entrepreneurship model and assesses the potential for applying the resulting approaches more widely in teaching at AAU.

Associate Professor Clara Bender co-leads the project, in collaboration with AAU Innovation, the Department of Health Science and Technology, the Department of Materials and Production, AAU Energy, the Department of Architecture, Design and Media Technology, and the Department of Culture and Learning.

The project has received DKK 5,140,000 from Bevica Fonden and runs from August 2025 to August 2027.

MINT: Mathematics Innovation in New Teaching: A Synergy of Student-Centered Methodologies and Virtual Reality

This project aims to transform mathematics education for STEM students in higher education by combining active learning methods with virtual reality applications. The project addresses the challenges associated with retaining STEM students, including difficulties in meeting basic mathematics requirements and recognising the practical relevance of mathematics, leading to a lack of motivation and engagement.

The project combines problem- and project-based learning, case-based learning and team-based learning in a holistic and dynamic approach to mathematics education, referred to as the MINT approach. Virtual reality experiences and real-world applications are intended to make abstract mathematical concepts more tangible, meaningful, and relevant. Through this approach, the project aims to strengthen student engagement and learning while developing transferable skills, including critical thinking, collaboration, problem-solving, and digital literacy. These skills are intended to enhance students' employability and prepare them to address real-world challenges.

Associate Professor Bettina Dahl Søndergaard and Assistant Professor Raimundo Elicer participate in the project with Morten Grud Rasmussen from the Department of Mathematical Sciences. The project is led by the University of Twente and includes collaboration with the University of Bergen and Łódź University of Technology.

The project has received EUR 400,000 through the Erasmus+ Cooperation Partnerships in Higher Education programme and runs from September 2025 to August 2028.

Science scenarier – identitet og praksis ***Science Scenarios: Identity and Practice***

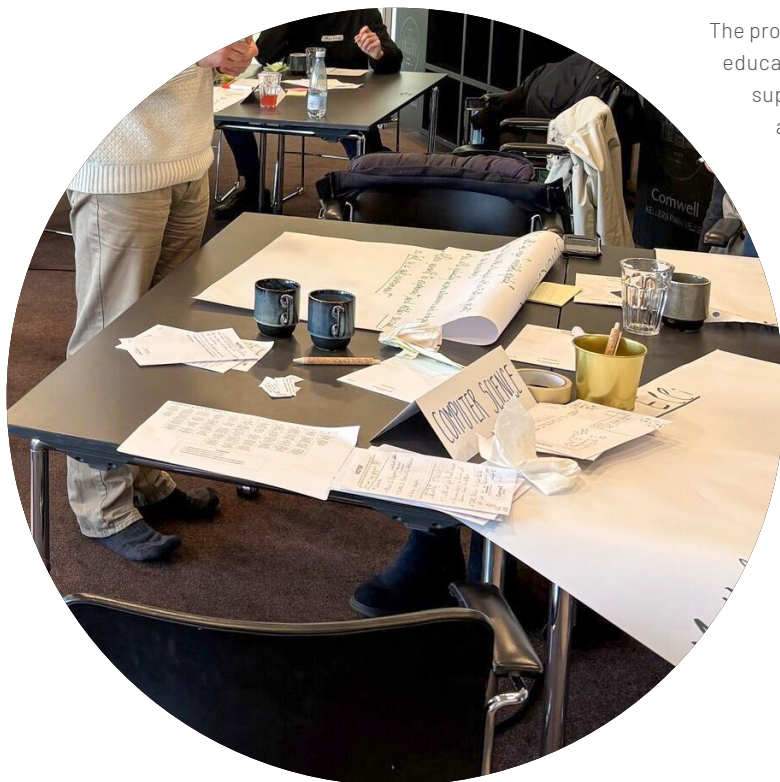
This project aims to strengthen science education in six upper secondary schools in Northern Jutland by making science subjects more relevant and engaging for students and supporting the development of their science identities.

The project develops narrative teaching scenarios that connect science education with current research and real-world challenges. It also supports the professional development of science teaching staff and the integration of new technologies into inquiry-based and practice-oriented teaching.

The project is led by Vesthimmerlands Gymnasium & HF in collaboration with five other upper secondary schools and Aalborg University.

Associate Professors Lykke Brogaard Bertel and Søren Hansen, Assistant Professor Gertrud Lynge Esbensen and Research Assistant Christian Skelmos Jensen participate in the project.

The project has received DKK 4,021,850 from the Novo Nordisk Foundation and runs from January 2025 to December 2028.



VISUALITY: Empowering Educators to Harness the Power of Visuals for Inclusive and Accessible Education

This project aims to strengthen inclusive and accessible teaching by supporting teaching staff in the purposeful use of visual pedagogy. Focusing on higher education and adult education, the project explores how structured visual pedagogy can enhance accessibility and engagement for disadvantaged learners.

The project will develop a certified online course and a micro-credential programme for teaching staff, pilot and evaluate visual teaching strategies, and disseminate knowledge and resources through European higher education and adult education networks. The project seeks to support the longer-term integration of visual teaching practices into professional development and curriculum design.

Professor Mie Buhl leads the project. Associate Professor Heidi Hautopp and Assistant Professor Maria Hvid Bech Dille participate in the project in collaboration with Emma Svendsen from the Department of Communication and Psychology. Collaboration partners include Fundació Solidaritat UB, Johannes Gutenberg-Universität Mainz, Polytechnic University of Milan, the European E-learning Institute, and Momentum Marketing Services Limited.

The project has received EUR 400,000 through the Erasmus+ programme and runs from January 2025 to March 2028.

PHD PROJECTS

Affordances for Professional Identity Development in Community-Based Dental Education: Undergraduate Dental Students' Perspectives in Qatar

This PhD project explores how community-based dental education (CBDE) supports the development of professional identity among undergraduate dental students and prepares them for future professional practice. It examines how learning in authentic community settings may help connect classroom-based education with clinical practice and contribute to students' development across personal, clinical, interpersonal, and sociocultural dimensions.

Based on three interrelated studies, the project investigates how community-based learning supports the development of professional values, confidence, clinical, and decision-making abilities, communication skills, and responsiveness to community needs. The project aims to contribute a framework for understanding professional identity development in community-based dental education and to provide insights relevant to the design of multicultural dental education environments.

The project is led by PhD Fellow Sruthi Sunil and supervised by Professor Xiangyun Du, Associate Professor Trine Fink and Professor Kamran Ali from Qatar University.

Capacity4Transition

This Industrial PhD project explores how learning designs can enable change at individual, organisational, and systemic levels within sustainability transitions.

The project bridges academic inquiry and real-world implementation through Educational Design Research. The study adopts a multi-level perspective across two empirical cases in Kenya and Indonesia, both focusing on the transition of waste management systems towards circularity. It examines how participants in professional courses draw on insights, networks, and experiences from the courses in their everyday professional practice.

To capture developments at the individual level, the study employs a visual mapping and interview technique designed to understand participants' work and changes from a contextual perspective. Developments at the organisational and systemic levels are examined through focus groups and social network analysis.

The project is led by PhD Fellow Simon Skårhøj and supervised by Professor Lone Dirckinck-Holmfeld and Director Ulla Næsby Tawiah from Danida Fellowship Centre. The project is funded by Danida Fellowship Centre and Innovation Fund Denmark.

Complex Group Work and PBL in Lower Secondary Education

This PhD project investigates how students organise and participate in complex group and project work in lower secondary education. It examines how students establish, negotiate, and adapt ways of working as they engage with open-ended tasks, digital resources, and changing demands throughout their collaborative processes.

The project aims to develop knowledge about the conditions that support students' participation and organisation in complex group work and PBL, and to contribute pedagogical principles for designing and facilitating such learning environments.

The project is led by PhD Fellow Jonatan Kolding Karnøe and supervised by Professor Thorkild Hanghøj and Associate Professor Jacob Gorm Davidsen.

Digital Problem Based Learning for Facilitating the Acquisition of Collaborative Competencies

This mixed-method study investigates the possibilities of Digital Problem-Based Learning within medical education programmes at AAU by exploring and testing digitally supported pedagogical design options for facilitating the acquisition of collaborative competencies.

The project is led by PhD Fellow Camilla Rams Rathleff and supervised by Associate Professor Patrik Kjærdsdam Telléus and Professor Thomas Ryberg. The project is funded by IAS PBL and the Department of Health Science and Technology.

En bedre start: Refleksive praksisfællesskaber for nyuddannede lærere gennem social Virtual Reality

A Better Start: Reflective Communities of Practice for Newly Qualified Teachers through Social Virtual Reality

The project aims to support the development of newly graduated teachers' professional judgment concerning classroom management through reflective communities of practice with more experienced colleagues.

The project focuses on designing and conceptualising digital learning spaces which utilise 360° video and Immersive Virtual Reality. The purpose of these spaces is to support collaborative reflection within teacher training. The project is funded by the Danish PhD Council for Educational Research.

The project is led by PhD Fellow Lucas Paulsen and supervised by Associate Professor Jacob Gorm Davidsen and Associate Professor Susanne Dau from University College of Northern Denmark.

Generative AI in Science Education

This PhD project investigates how generative AI chatbots can be used in lower secondary science education. It examines whether a chatbot can support students' understanding of scientific language and concepts, and their ability to relate scientific topics to societal issues. The project also explores how students perceive and interact with the chatbot.

Working with four science teachers and their classes, the project develops and tests practice-oriented principles for using a generative AI chatbot in different learning situations. The principles draw on dialogic learning theory, and the project aims to contribute both guidance for educational practice and new research knowledge.

The project is led by PhD Fellow Anne Sofie Brodersen Lütken and supervised by Associate Professor Stine Ejlsing-Duun.

The PhD project forms part of NAFA's science education research programme.

Interdisciplinary Teamwork in PBL

This PhD project investigates how institutional structures, facilitation, and student experiences shape interdisciplinary collaboration in engineering education. Through the development and application of the CO-SPACE framework, the project examines how students navigate and form participation spaces across different learning contexts.

The project contributes knowledge about how interdisciplinary participation spaces emerge, evolve, and are continuously negotiated through the interaction between institutional structures, social goods, people, and student agency. It aims to inform and contribute new knowledge to the design and facilitation of future interdisciplinary learning environments in higher education.

The project is led by PhD Fellow Maiken Winther and supervised by Associate Professors Lykke Brogaard Bertel and Jette Egelund Holgaard.

Learner and Professional Agency across Educational Transitions in Undergraduate Dental Education

This PhD project explores how undergraduate dental students experience and develop learner and professional agency as they move between preclinical education and clinical practice. It examines how students' agency is shaped and reconfigured through the interplay between their personal resources, their participation in learning and clinical activities, and the opportunities and constraints provided by different educational environments.

Drawing on a scoping review, focus group studies, and Q methodology, the project investigates learner agency in relation to self-regulated and self-directed learning and examines how students navigate increasing responsibility, supervision, and patient care during their transition into clinical practice. The project aims to contribute knowledge that can support stronger alignment between preclinical learning environments, clinical expectations, and institutional support in undergraduate dental education.

The project is led by PhD Fellow Nidhi Gupta and supervised by Professor Xiangyun Du, Associate Professor Trine Fink and Professor Kamran Ali from Qatar University.

Negotiating Professional Identity: A Transformative Perspective on Early-Career Academics, Identity Construction through Experiential Learning and Collaboration in a Professional Development Program

This PhD project explores how early career academics learn about teaching and how they construct and negotiate their professional identities through participation in a long-term professional development programme based on collaboration. The expected contribution of the project is to provide detailed, processual knowledge on how early career academics construct and negotiate their professional identities collaboratively, including the factors, dynamics, and interactions that support the construction of university teacher identities. The practical long-term implications of the research will contribute to how pedagogical development and professional learning in higher education institutions can be strengthened, qualifying teachers to provide high-quality education.

The project is led by PhD Fellow Karoline Ballieu Kjærgaard and supervised by Associate Professor Nikolaj Stegeager and Professor Xiangyun Du.



Technological Literacy in Science Education

This PhD project investigates how technological literacy can be meaningfully integrated into problem-based science education in Danish primary schools. In collaboration with in-service teachers and teacher educators as well as pre-service teachers, the research explores how technology is understood in educational practice and how science teaching is designed and evaluated to support students' development of technological literacy.

The project is led by PhD Fellow Camilla Guldberg Hundahl and supervised by Associate Professors Lykke Brogaard Bertel and Stine Ejning-Duun, Martin Sillasen from VIA University College and Maria Møller from University College of Northern Denmark.

The PhD project is funded by CESE/NAFA.

Tosprogede kvinders læring og deltagelse i SOSU-uddannelser:

GenAI som kognitiv partner

Bilingual Women's Learning and Participation in SOSU Education:

GenAI as a Cognitive Partner

The project is part of the larger research initiative, ***2SOSU-AI: Generative AI in Vocational Education and Training: Strengthened Participation Opportunities for Bilingual Women in SOSU Education***. The PhD project focuses specifically on investigating how bilingual women use GenAI as a learning tool and how this affects their participation and learning in SOSU education. The project uses activity theory as a framework to investigate how GenAI can function as a mediating tool in learning processes. The research design is based on ethnographic approaches and qualitative action research. This includes participant observations of the women's daily school and training routines, as well as video recordings and interviews to collect detailed data on their learning practices and the barriers they face.

The project is led by PhD Fellow Amina Sabah Karim and supervised by Associate Professors Antonia Scholkmann, Jin Hui Li and Assistant Professor Anne-Birgitte Rohwedder from the Department of Culture and Learning.

PHD GRADUATES

Navigating Teacher Learning in a Context of Implementing Project-Based Learning in South African K12 Education

This PhD project investigates how South African teachers navigate professional learning as they implement project-based learning within the context of national education reforms. Drawing on complexity theory and design-based research, the study explores shifts in teachers' beliefs, classroom practices, and engagement with professional development. The findings reveal tensions between teachers' support for PBL and their actual practices while also highlighting how collaborative and reflective professional development can support more sustainable pedagogical change.

The project was led by Sizwe Nxasana and supervised by Professor Xiangyun Du and Associate Professor Lykke Brogaard Bertel.

The project was concluded in 2025, and the thesis is available [here](#).

Bridging Visions and Practice Enabling Mission-Driven Innovation in Higher Education

This PhD project examines how universities can translate mission-driven strategies, such as sustainability goals, into concrete institutional practices. Through studies of cross-institutional collaboration, academic middle leadership, and student engagement, the research identifies key barriers, including fragmented structures and unclear incentives. The findings emphasise the importance of coordinated governance, collaborative leadership, and meaningful student involvement in advancing mission-driven innovation in higher education.

The project was led by Svend Hauekrog Christiansen and supervised by Professor Xiangyun Du and Associate Professor Aida Guerra.

The project was concluded in 2025, and the thesis is available [here](#).

Engineering Careers in Transition: Perspectives of Students and Early-Career Professionals from a Systemic PBL Environment

This PhD project explores how engineering students and early-career professionals experience career development within a problem-based learning environment. Using a mixed-methods approach, the study examines career values, aspirations, and transitions from education to working life. The findings highlight challenges related to career awareness and the education-practice nexus, while underscoring the role of self-efficacy, networks, and experiential learning in shaping career trajectories.

The project was led by Anna Overgaard Markman and supervised by Professor Xiangyun Du and Associate Professor Bente Nørgaard.

The project was concluded in 2025, and the thesis is available [here](#).



DEVELOPMENT PROJECTS AND INITIATIVES

Revising the AAU PBL Principles

As part of Aalborg University's quality assurance system, the university's principles for problem- and project-based learning are reassessed every six years to ensure that they remain relevant in light of developments in education and society. In 2025, a working group coordinated by IAS PBL completed the reassessment and revision of the principles.

A proposed revision was discussed during dialogue meetings held across the university in the spring of 2025, enabling teaching staff and other members of the educational environments to provide input into the process. The feedback informed the working group's ongoing revision of the principles.

The revised principles were approved by AAU's Executive Management in 2025. They retain six principles: *problem orientation*, *project organisation*, *student direction*, *collaboration*, *process orientation*, and *exemplarity*. Following the approval, a folder presenting the revised principles and their purpose was developed. The subsequent work focused on supporting local dialogue and contextualisation rather than on an extensive central communication initiative. As the principles are intended to be interpreted and applied in relation to each degree programme, local educational leadership plays a central role in supporting their translation into educational practice. Further activities to facilitate this local work were planned for 2026.

AAU's revised principles for problem- and project-based learning are available at: www.en.aau.dk/about-aau/profile/pbl

Developing Inspiration Material on Assessment Formats

In 2025, AAU's Strategic Council for Education established a working group on assessment formats chaired by IAS PBL. The group brought together representatives from AAU's four faculties, the secretariat for Educational Law, and IAS PBL. The working group was tasked with mapping existing assessment formats, identifying inspiration for new approaches, and examining the strengths and limitations of different formats.

During 2025, the working group developed the structure and thematic framework for online inspiration material for AAU teaching staff and study boards. The material was designed to cover different assessment formats and broader aspects of examination practice and delivery, including considerations related to generative AI. As part of the process, input was collected from all four faculties to ensure that the framework reflected the needs and experiences across AAU's educational environments.

At the end of 2025, the working group presented its recommendations to the Strategic Council for Education. These included a proposal to establish a group to further develop the contents of the material within the structure prepared by the working group.

An overview of the assessment formats used at AAU is available on [IAS PBL's website](#).

Supporting the Implementation of the Master's Degree Reform

In 2025, IAS PBL contributed pedagogical expertise to AAU's preparations for the implementation of the national Master's degree reform. The university established working groups to support the development of new 75-ECTS Master's programmes and industrial Master's programmes based on AAU's PBL model, and IAS PBL researchers participated in relevant parts of this work.



The revised AAU PBL principles were introduced as an important point of reference for the working groups. Through its participation, IAS PBL contributed perspectives on problem-based learning and educational development to AAU's preparations for the new programme formats.

IAS PBL Consultation and Advisory Services

In 2025, IAS PBL completed the pilot phase of its consultation and advisory services for educational environments across Aalborg University. The initiative connects IAS PBL research with local teaching practice by offering research-based support adapted to the needs and context of the requesting educational environment. The pilot phase focused on testing and refining suitable formats in collaboration with educational environments.

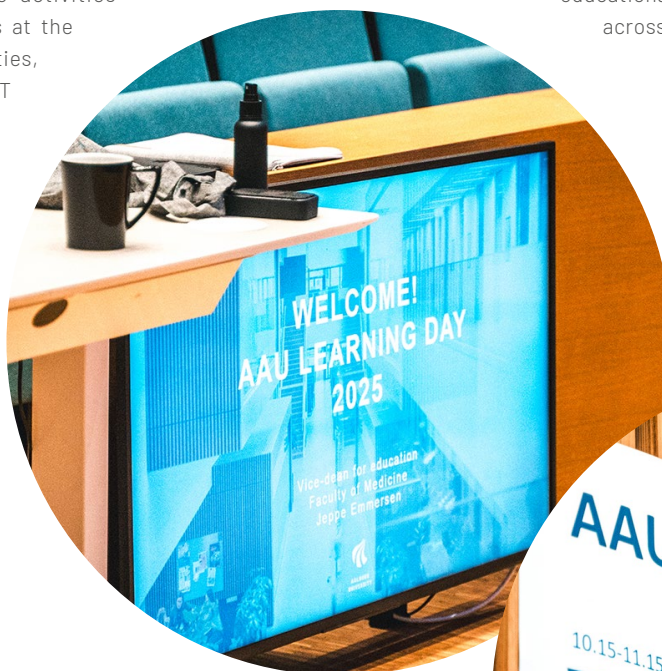
During 2025, IAS PBL completed nine activities requested by educational environments at the faculties of Social Sciences and Humanities, Medicine, and the Technical Faculty of IT and Design. Seven were shorter activities, such as presentations, workshops and consultation meetings, while two involved longer-term collaboration.

The activities addressed topics such as teaching and interaction, group formation, student retention, generative AI in education, assessment, and mathematical learning difficulties.

AAU Learning Day 2025

IAS PBL is responsible for coordinating AAU Learning Day, the university's annual event dedicated to teaching, learning, and pedagogical development. In 2025, the event took place in Esbjerg on 2 May and in Aalborg and Copenhagen on 9 May, with 275 registered participants across the three campuses.

The programme combined keynote presentations, talks, workshops, and networking centred around teaching and learning. Keynote presentations by the Danish Evaluation Institute (EVA) offered insights into how AAU can enhance students' academic engagement and social connectedness and strengthen their well-being. Through workshops and opportunities for dialogue and knowledge sharing, participants exchanged experiences and reflected on teaching, educational development and PBL practices across disciplines and faculties.



AAU Learning Day 2025 Workshops

10.15-11.15	
TEACHING SUSTAINABILITY: FROM TRAUMA TO RESILIENCE	11.00.033
DEVELOPING MICROCREDENTIALS: A HANDS-ON WORKSHOP	14.01.004
CO-CONSTRUCTING A FRAMEWORK FOR AAU PBL-SUPERVISION	
AI-LAB - HIGH-PERFORMANCE COMMUNICATION AND TEACHERS	

The event also recognised pedagogical achievements through the presentation of the AAU Teacher of the Year award and the AAU Pedagogy Prize. While the Teacher of the Year award recognises excellence in teaching, the Pedagogy Prize highlights promising early-career teaching staff and pedagogical development projects completed as part of the University Pedagogy Program.

AAU Learning Day continued to provide a shared university-wide setting for teaching staff to exchange practices, build networks, and reflect on teaching and PBL. By bringing together participants across campuses and academic environments, the event supports dialogue and the shared development of teaching and learning at AAU.

University Pedagogy Program

In 2025, 79 early-career academics from across Aalborg University participated in the University Pedagogy Program (UP). The year-long programme supports participants in developing their teaching, supervision, and assessment practices through collaboration, reflection, and research-based pedagogical development. Problem-based learning is a central component of the programme with activities focusing on PBL facilitation and supervision, and structured reflection on participants' roles within university teaching and supervision.

The programme was redesigned in 2024, and the first cohort following the redesign was subsequently evaluated by the Learning Lab research team. The research-based evaluation informed several changes to the 2025 programme, including a stronger emphasis on the role and pedagogical preparation of department supervisors, the establishment of a peer learning community for pedagogical supervisors and closer collaboration between pedagogical and departmental supervisors. The programme also introduced a draft institutional framework for PBL facilitation at AAU. Together, these developments illustrate how research into the programme continues to shape its development.

Leadership, Education and Technology

In spring 2025, IAS PBL completed the professional development course *Ledelse, uddannelse og teknologi (LUT) (Leadership, Education and Technology)* for heads of studies and study board chairs. Developed in collaboration with the Master of ICT and Learning programme and PBL Digital, the course supported participants in reflecting on educational leadership in relation to technological developments and pedagogically informed decisions about degree programme development. The course also made explicit connections to the Danish framework for advancing university pedagogy. Seven participants completed the programme.



Teaching Cultures Survey

In 2025, Learning Lab completed Aalborg University's participation in the third and final round of the Teaching Cultures Surveys. The international survey examines how teaching is experienced, valued, and supported across universities and provides a basis for following developments in teaching cultures over time. AAU has participated in all three surveys conducted since 2019.

The 2025 survey addressed the university's educational environment, institutional culture, and commitment to rewarding university teaching; the role of teaching in formal review and promotion processes; and future priorities for changes to the recognition and reward of teaching. The international findings were discussed at the Advancing Teaching conference hosted by AAU in Copenhagen in October 2025, which brought together university leaders and experts in university pedagogy from across the international Advancing Teaching network.

IAS PBL is using the survey as a reference point in its continued work to strengthen the teaching culture at AAU. This includes considering how pedagogical competence development can respond to the needs and priorities identified through the survey.

IAS PBL Seminar 2025

IAS PBL held its biannual research seminar near Vejle on 29-30 April 2025, bringing together researchers and administrative staff from across IAS PBL for knowledge exchange, dialogue, and networking.

The programme included a future workshop exploring how current and future research may shape PBL practices at AAU and beyond. Participants developed possible future scenarios across research groups and faculties and reflected on steps towards realising them. The seminar also included a session organised by the IAS PBL Early Career Community, which brings together research assistants, PhD fellows and postdoctoral researchers, as well as workshops on well-being and PBL and on hybrid learning. Themes from the seminar were subsequently followed up at the IAS PBL Summer Presentation in June.

PhD Writing Retreat: Collaborative Research and Community Building

In 2025, three PhD fellows completed the collaborative writing process initiated through the IAS PBL PhD Writing Retreat in autumn 2024. Organised and facilitated by Associate Professor Patrik Kjærdsdam Telléus, the initiative brought together PhD Fellows Camilla Rams Rathleff, Svend Hauekrog Christiansen and Jonatan Kolding Karnøe in an interdisciplinary writing community.

The process began with an introductory meeting and a three-day retreat at Klitgaarden in Skagen in November 2024. It continued in 2025 through follow-up meetings, shared readings, empirical research, and collaborative writing. Rather than being tied to the participants' individual PhD projects, the process was organised around a jointly selected topic, format, and methodology based on their shared interests. The initiative was intended to strengthen the participants' research and writing abilities as well as their experience of network-based academic collaboration.

The group presented reflections and findings from the writing retreat process at the IAS PBL Christmas Greetings event in December 2025. The presentation marked the conclusion of the year-long initiative and provided an opportunity to share experiences from the collaborative process with colleagues across IAS PBL.

AI in Education

In 2025, IAS PBL and CDUL continued to contribute to AAU's university-wide work on artificial intelligence in education. A cross-unit working group brought together representatives from AAU's Study Service, Aalborg University Library, IT Services, and PBL Digital. Its activities included two webinars on AI and generative AI, one for students and one for teaching staff, as well as the coordinated development of introductory material for use across the university. IAS PBL and CDUL also contributed to related working groups and to the development and distribution of a university-wide student survey on generative AI. Distributed to all AAU students in 2025, the survey provided a basis for subsequent analysis and the continued development of student guidance on AI.

CDUL contributed to Teach GenAI, an IT-Vest-funded collaboration between Aalborg University, Aarhus University, and the University of Southern Denmark. The initiative supports teaching staff in exploring responsible and discipline-specific integration of generative AI into teaching through professional development, teaching experiments, and cross-institutional knowledge exchange. It also includes an open online course introducing students to the use of generative AI in academic work.





Another initiative was the GIRAF project, *Generativ, Interaktiv, Refleksiv AI i Faglig forankring*, which received DKK 3.5 million in funding from the Danish Ministry of Higher Education and Science and began in January 2025. During the year, participants from all four faculties developed eight locally anchored projects for implementation in 2026 and 2027. The projects explore how generative AI can be integrated in AAU's degree programmes.

AAU Micro

In 2025, CDUL continued its collaboration with AAU's four faculties on the development and production of microcredential courses (AAU Micros) for continuing education, regular degree programmes, and pedagogical competence development. The production portfolio covered a broad range of academic and educational topics, reflecting the different needs and priorities identified by the faculties.

The production portfolio included resources on feedback practices, business models, calculus teaching, fieldwork safety, cybersecurity, digital and data-driven healthcare, anatomy, PBL and case-based learning, and German language learning. CDUL also contributed to AAU Micros for pedagogical competence development focusing on digital learning environments, digitally supported PBL, and digital agency.

In October 2025, the Strategic Council for Education decided to establish a working group to consider the future strategic direction and further development of AAU Micro.

CDUL's Contributions to the PBL Digital Master Plan

In 2025, CDUL continued its contribution to AAU's PBL Digital master plan through activities addressing educational leadership, the organisational implementation and support of digital technologies, and the digital competence development of teaching staff. The activities were undertaken in collaboration with PBL Digital, IT Services, IAS PBL researchers, and other internal partners.

Organisational Implementation and Support of AAU Digital Essentials

In 2025, CDUL continued its collaboration with AAU IT Services to strengthen the guidance for teaching staff using AAU's core digital technologies, AAU Digital Essentials. The support initiative transitioned into regular operations during the year. Workshops across AAU's campuses and resources made available through Moodle supported the wider implementation of AAU Digital Essentials.

The PBL Teacher of the Future

In 2025, the former *Digitally Competent Educators* initiative was developed into a flexible professional development concept entitled *The PBL Teacher of the Future*. Developed by CDUL in collaboration with IAS PBL researchers, the concept focused on digital learning environments, digitally supported PBL, and digital agency. It combined workshops, AAU Micros, and individual consultation, enabling teaching staff to select activities according to their professional development needs. The initiative supports the overall goal of enhancing digital teaching competencies.

OUTREACH

During 2025, the Institute for Advanced Study in PBL welcomed international visitors through its interdisciplinary Visitors' Workshops, institutional delegation visits, and other activities related to research and educational development. Visitors came to learn about Aalborg University's PBL model, exchange experiences, and explore opportunities for educational and institutional collaboration.

The year included visitors from countries such as the United States, Chile, Nepal, Lebanon, Poland, Estonia, Lithuania, Portugal, Switzerland, Germany, Hungary, and Norway.

Visitors' Workshop

April and October 2025, Aalborg

IAS PBL continued its interdisciplinary Visitors' Workshop in 2025, welcoming 23 international participants across two workshops in April and October.

The spring workshop brought together

12 participants from the USA, Poland, Estonia, Lithuania, Portugal, and Lebanon, while the autumn workshop welcomed 11 participants from Switzerland, Germany, Poland, and Hungary.

The workshop format builds on UCPBL's longstanding experience and brings together contributions from IAS PBL research groups across faculties. The two-day programmes introduced participants to Aalborg University's problem- and project-based learning model through sessions on PBL principles and pedagogical models, curriculum design, preparing students and teaching staff for PBL, assessment, and digital PBL. Departmental visits enabled participants to learn about educational practices and engage with students, teaching staff, and supervisors.

By bringing together participants from different academic disciplines, the workshops also provided opportunities to exchange experiences and consider how PBL might be adapted to their own institutional and educational contexts.





Renewal of the Aalborg UNESCO PBL Centre

August 2025, Aalborg

In 2025, UCPBL's status as a UNESCO Category 2 Centre was renewed for a further eight-year period, extending UCPBL's mandate until 2033. The renewal recognises the international relevance of the centre's work in PBL, engineering education, and sustainable development.

The renewal supports UCPBL's continued efforts to promote interdisciplinary education in engineering and sustainability, develop international research and PhD training in PBL, expand its global network, and strengthen collaboration between the Global North and Global South. The renewal was celebrated at a reception at AAU INNOVATE on 18 August 2025, bringing together colleagues, partners, and representatives from local and international institutions.

10th International Research Symposium on Problem-Based Learning, IRSPBL 2025 November 2025, Pretoria, South Africa

The 10th International Research Symposium on Problem-Based Learning, IRSPBL 2025, was held at Future Africa in Pretoria, South Africa, on 17-21 November 2025 under the theme Anchoring Conversations: Connection, Collaboration, and Co-Creation for the Future. The event brought together communities working with problem-based learning, engineering education, and the scholarship of teaching and learning.

The programme included paper sessions, workshops, keynote presentations, and panel discussions. The conference covered a broad range of topics related to PBL research and practice, including pedagogical innovation and competence development, institutional implementation, technology and artificial intelligence, sustainability, professional practice, well-being, and collaboration. Researchers from IAS PBL contributed to the symposium, and representatives from primary schools in Aalborg working with PBL also participated.

The peer-reviewed contributions were published in open-access proceedings as part of the IRSPBL series. The symposium continued the Aalborg UNESCO PBL Centre's longstanding collaboration with international partners to support research exchange and the development of the global PBL community.



PHD COURSES

Basic Bioethics

Organised by Associate Professor Patrik Kjærdsdam Telléus

This course introduces PhD students to bioethical reflection in health science research. In addition to formal systems for ethical review and approval, it examines questions of values, scientific integrity, responsibility, risks and benefits, and relationships among those involved in research.

Through lectures, exercises, and workshops, participants explore ethical theories and approaches to formal and informal ethical assessment. Drawing on their own PhD projects and experiences, they reflect critically on their role as researchers and on the wider societal implications of their research.

Creative Research Design Presentation and Analytical Practices

Organised by Associate Professor Patrik Kjærdsdam Telléus

This course introduces PhD students to creative approaches to research design, analysis, and presentation, including creative analytical practices, speculative methods, and arts-based inquiry. Participants critically examine the scientific value, validity, possibilities, and limitations of these approaches in relation to established research practices.

Through lectures, exercises, and workshops, participants experiment with selected creative methods and develop a presentation based on their own work. The course encourages them to reflect on whether and how creative practices may contribute to their research.

A Cross and Inter-Disciplinary Approach to Systems Thinking – Theories and Methodologies

Organised and taught by Professor Xiangyun Du and Associate Professors Aida Guerra and Lykke Brogaard Bertel

This course introduces PhD students to systems thinking as an approach for understanding and addressing complex problems across disciplinary boundaries. Participants explore different theoretical perspectives on systems thinking and apply them to interdisciplinary, transdisciplinary, and cross-disciplinary research.

Based on a problem- and project-based learning approach, the course supports participants in developing and critically evaluating research designs that combine systems thinking with collaboration across disciplines.

Interdisciplinary Perspectives on Participatory Research: Advancing Methodologies for Social Impact

Organised and taught by Associate Professors Verena Lenneis and Stine Ejning-Duun

This course introduces PhD students to participatory research across disciplines and research traditions. Participants explore approaches such as design-based research, user-centred design, co-production, and participatory action research, with particular attention to different degrees of participation and questions of inclusion, power, and ethics in the research process.

Based on a problem- and project-based learning approach, participants work with challenges from their own PhD projects in interdisciplinary groups. The course supports them in critically evaluating participatory research designs and methods and reflecting on how research participants and stakeholders are positioned and involved in their research.

Mixed Methods and Interdisciplinary Inquiry

Organised and taught by Professor Xiangyun Du

This course introduces PhD students to mixed methods research and its potential for investigating complex research problems within and across disciplinary boundaries. The course intends to support participants in exploring how qualitative and quantitative approaches can be combined in relation to research questions, data collection, and analysis, theoretical perspectives, ethics, and the presentation of findings.

Based on a problem- and project-based learning approach, the course involves participants working in groups on real-life issues identified by the participants themselves, providing opportunities for the practical application of mixed methods.

Professional Communication

Organised by Professor Euan Lindsay

Taking both a theoretical and practical approach, the course aims to help PhD students become aware of the many dimensions of effective communication and to develop their competencies to prepare them for communicating in a professional research context. In 2025, two courses were completed.



Qualitative Research within Health Science
Organised and taught by Associate Professor
Henrik Vardinghus-Nielsen

This course introduces PhD students to qualitative research in the health sciences, both as an independent approach and as part of a mixed-methods design, equipping participants with the basic competences for designing qualitative studies, selecting appropriate methods, collecting and analysing data, and addressing ethical considerations.

The course examines the characteristics, possibilities, and limitations of qualitative research and introduces participants to different qualitative methods and analytical strategies.

Teaching with Problem-Based Medical Cases: Theoretical and Practical Foundation for Case Facilitators
Lecturers include Associate Professors Patrik Kjærdsdam Telléus and Trine Fink

This course introduces participants to the theoretical and practical foundations of facilitating problem-based medical cases in the bachelor's programmes in Medicine and Medicine with Industrial Specialisation at Aalborg University.

Through lectures, practical exercises, and a simulated case session, participants explore the role of the case facilitator, the different stages of case facilitation and the preparation and development of effective cases. The course prepares participants to facilitate case sessions in the two bachelor's programmes.



University Teaching in Social Science and Humanities
Organised by Associate Professor Nikolaj Stegeager and taught by Associate Professors Maria Hvid Stenalt, Lars Birch Andreassen and Nikolaj Stegeager

This course supports PhD students in developing foundational competences for university teaching corresponding to level 1 of the Danish framework for advancing university pedagogy. It seeks to prepare participants to plan and carry out teaching, supervision, and assessment activities, and to evaluate their own teaching activities and create constructive learning environments.

Taking participants' own teaching as its starting point, the semester-long course combines practical exercises and reflection in professional learning communities with peer observation and feedback. Participants also develop a teaching portfolio documenting their teaching practice and pedagogical development.

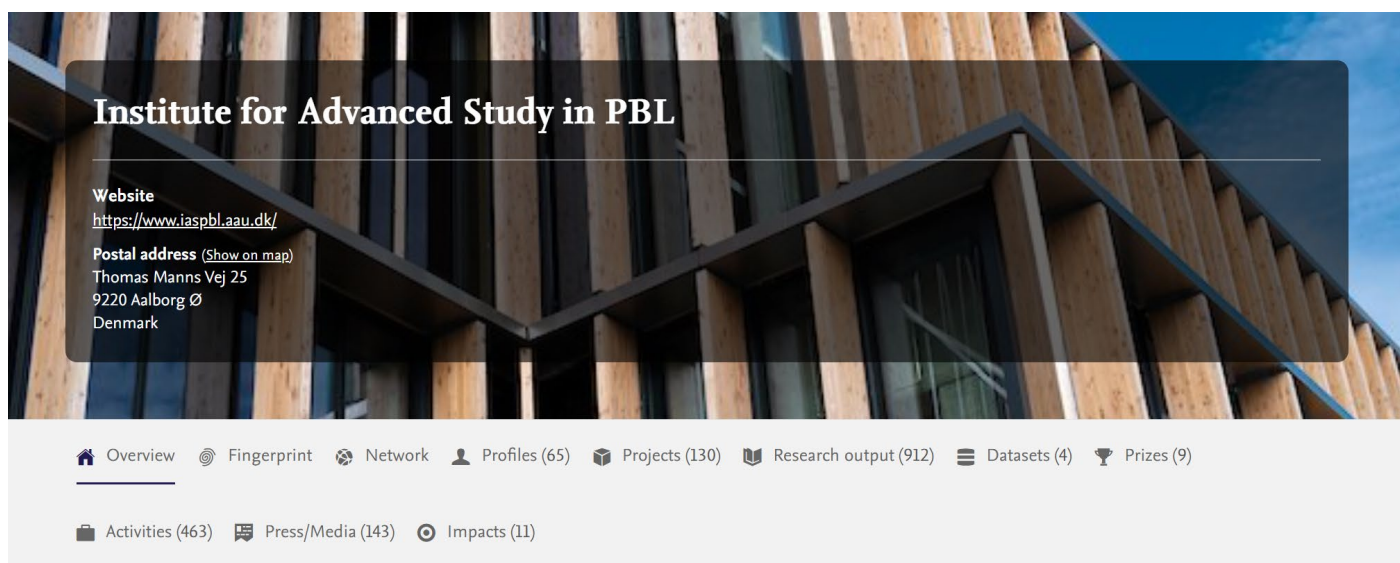
IAS PBL DISSEMINATION

Researchers affiliated with the Institute for Advanced Study in PBL continuously publish research on problem-based learning within all AAU disciplines. A full list of publications and research projects is available on our [Research Profile](#).

For more information on the Institute for Advanced Study in PBL, please visit our website or our LinkedIn company page:

[iaspbl.aau.dk](https://www.iaspbl.aau.dk/)

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Overview Fingerprint Network Profiles (65) Projects (130) Research output (912) Datasets (4) Prizes (9)

Activities (463) Press/Media (143) Impacts (11)

Organisation profile

Organisation profile

The Institute for Advanced Study in PBL (IAS PBL) is a cross-faculty unit that aims to strengthen the quality and development of PBL research and practice across AAU.

IAS PBL serves as a centre for research, knowledge sharing, skill development, collaboration, and innovative practices in PBL. A key role of IAS PBL is to engage and collaborate closely with local environments within all faculties, departments, and organisational units. AAU's pedagogical approach is deeply rooted in PBL, and we are committed to maintaining, strengthening, and evolving the Aalborg PBL model to benefit students, researchers, staff, and the surrounding community. IAS PBL will be at the forefront of facilitating this ambition in close partnership with the rest of AAU by connecting researchers, research groups, pedagogical development, support, and strategic initiatives.

PUBLICATIONS 2025

The following is a list of publications, including journal articles, conference articles, review articles, editorials, books, anthologies, book chapters, abstracts, papers, reports, and net publications, published in 2025 by IAS PBL staff.

Abou-Hayt, I., & Dahl, B. (2025). **Using a Realistic Context to Motivate and Teach Engineering Students the Chain Rule**. *Education Sciences*, 15(4), Article 433.

Alendal, G., Brun, M., Bethuelsen, S. A., Mango, J. M., Dahl, B., Støve, B., Oleynik, A., & Mureithi, E. (2025). **Innovative Learning: Data Science Education with Local Knowledge and Real-World Data**. In *Book of Abstracts: ARUA 2025 Fifth Biennial International Conference, 29–31 October 2025, Makerere University, Uganda* (pp. 62–63).

Alendal, G., Mureithi, E., Dahl, B., & Mango, J. M. (2025). **Mathematics for Sustainability**. In *Book of Abstracts: ARUA 2025 Fifth Biennial International Conference 29–31 October 2025, Makerere University, Uganda* (p. 63).

Andrade, M. D. O., Dahl, B., & Wolff, K. (2025). **Same but Not The Same: Describing and Shaping Meaning-Making in Engineering Mathematics problems**. In J. Chen, L. Smith, Y. B. Abouarabi, K. Wolff, Z. Simpson, & A. Guerra (Eds.), *10th International Research Symposium on Problem-Based Learning: Anchoring Conversations (IRSPBL 2025)* (pp. 246–258). Aalborg University Open Publishing.

Awacorach, J., & Balslev, H. (2025). **Rethinking Transformative Learning in Higher Education: Contextualizing Pedagogical Tools to Create Employable Graduates at Gulu University, Northern Uganda**. In L. Dirckinck-Holmfeld, T. O. Geoffrey, C. N. Okumu, M. K. Kattenhøj, & I. Lassen (Eds.), *Transforming Higher Education for Community Development: Participatory Reflection on a Decade of Mutual Capacity-Building in Northern Uganda* (pp. 264–282). De Gruyter Brill.

Bertel, L. B., Craps, S., Deprez, H., Guerne, M. G., Josa, I., Kittou, G., Kövesi, K., Horvat, A. K., Mottl, P., & Simarro, C. (2025). **Attracting Future Engineers: Students' Choices and Core Concepts in Secondary Education**. In R. Kangaslampi, G. Langie, H.-M. Järvinen, & B. Nagy (Eds.), *SEFI 2025 – 53rd Annual Conference of the European Society for Engineering Education: Engineering and Society, Proceedings* (pp. 1967–1972). Société européenne pour la formation des ingénieurs (SEFI).

Bertel, L. B., Lavi, R., Rathcke, K., Coelho, N. F., & Dyremose, S. C. S. (2025). **Towards a Framework for Assessing Systems Thinking in Collaborative Problem-Solving in STEM**. In *2025 ASEE Annual Conference & Exposition*. American Society for Engineering Education.

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Boelt, A. M., Møller, A. K., & Lyngbye, M. C. (2025). **Returning from Practice to Theory to Practice Too**. In S. Dau & T. Kjærsgaard (Eds.), *Proceedings for the European Conference on Reflective Practice-Based Learning 2025* (pp. 65–80). Aalborg University Open Publishing.

Boelt, A. M., & Feilberg, C. (2025). *Ecology of Problems in Problem and Project-Based Learning*. Paper presented at ECER, Belgrade, Serbia.

Bundgaard, A. M., & Jensen, E. O. (2025). **Teacher's Perspectives on Guided Plays Role in Students' Meaningful Mathematical Learning**. In A. Cusi, A. Maffia, S. Palha, & A.-M. Vogler (Eds.), *Proceedings of the conference Game-Based and Playful Approaches to Mathematics Education*. European Society for Research in Mathematics Education.

Bundgaard, K., Møller, A. K., Boelt, A. M., & Kaup, C. F. (2025). **Generative AI in Collaborative Learning Environments**. *Akademisk Kvarter*, 31, 3–9.

Bygholm, A., Dirckinck-Holmfeld, L., & Tabo, G. O. (2025). **Advances toward Digital Learning: A Scoping Review of Research and Practices from East Africa**. In L. Dirckinck-Holmfeld, G. Olok Tabo, C. Nelson Okumu, M. K. Kattenhøj, & I. Lassen (Eds.), *Transforming Higher Education for Community Development in Northern Uganda: Participatory reflection on a decade of mutual capacity-building* (pp. 221–245). De Gruyter Brill.

Caratozzolo, P., Smith, C. J. M., Gomez Puente, S. M., Nørgaard, B., & Urendamoris, M. (2025). **Exploring The Transformative Potential of Pan-European Networks to Enhance the Continuing Engineering Education Ecosystem**. In R. Kangaslampi, G. Langie, H.-M. Järvinen, & B. Nagy (Eds.), *SEFI 2025 – 53rd Annual Conference of the European Society for Engineering Education: Engineering and Society, Proceedings* (pp. 201–209). Société européenne pour la formation des ingénieurs (SEFI).

Chaaban, Y., Tarlochan, F., Chen, J., & Du, X. (2025). **Exploring Sources of Engineering Students' Academic Well-Being through O-Methodology Research**. *Teaching in Higher Education*, 30(4), 915–934.

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Fredskilde, P., & Bertel, L. B. (2025). **"Novel Roboting": A Playful Learning Approach to Digital Literacy in Early Childhood Education Through Story-Tinkering and Computational Play with Robots**. In O. Palinko, L. Bodenhagen, J.-J. Cabibihan, K. Fischer, S. Šabanović, K. Winkle, L. Behera, S. S. Ge, D. Chrysostomou, W. Jiang, & H. He (Eds.), *Social Robotics: 16th International Conference, ICSR + AI 2024, Odense, Denmark, October 23–26, 2024, Proceedings, Part II* (pp. 283–289). Springer.

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Gundersen, P., Hanghøj, T., & Jensen, E. O. (2025). **Teacher Positions and Play Qualities in Esports at Specially Planned Youth Education Programmes**. In H. D. I. Sigurdardóttir, & R. I. Munkvold (Eds.), *The Proceedings of the 19th European Conference on Games Based Learning*: 19(1)(pp. 348–356). Academic Conferences & Publishing International (ACPI).

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