

INSTITUTE FOR ADVANCED STUDY
IN PROBLEM-BASED LEARNING

ANNUAL REPORT 2023



INSTITUTE FOR
ADVANCED STUDY IN PBL

AALBORG
UNIVERSITY

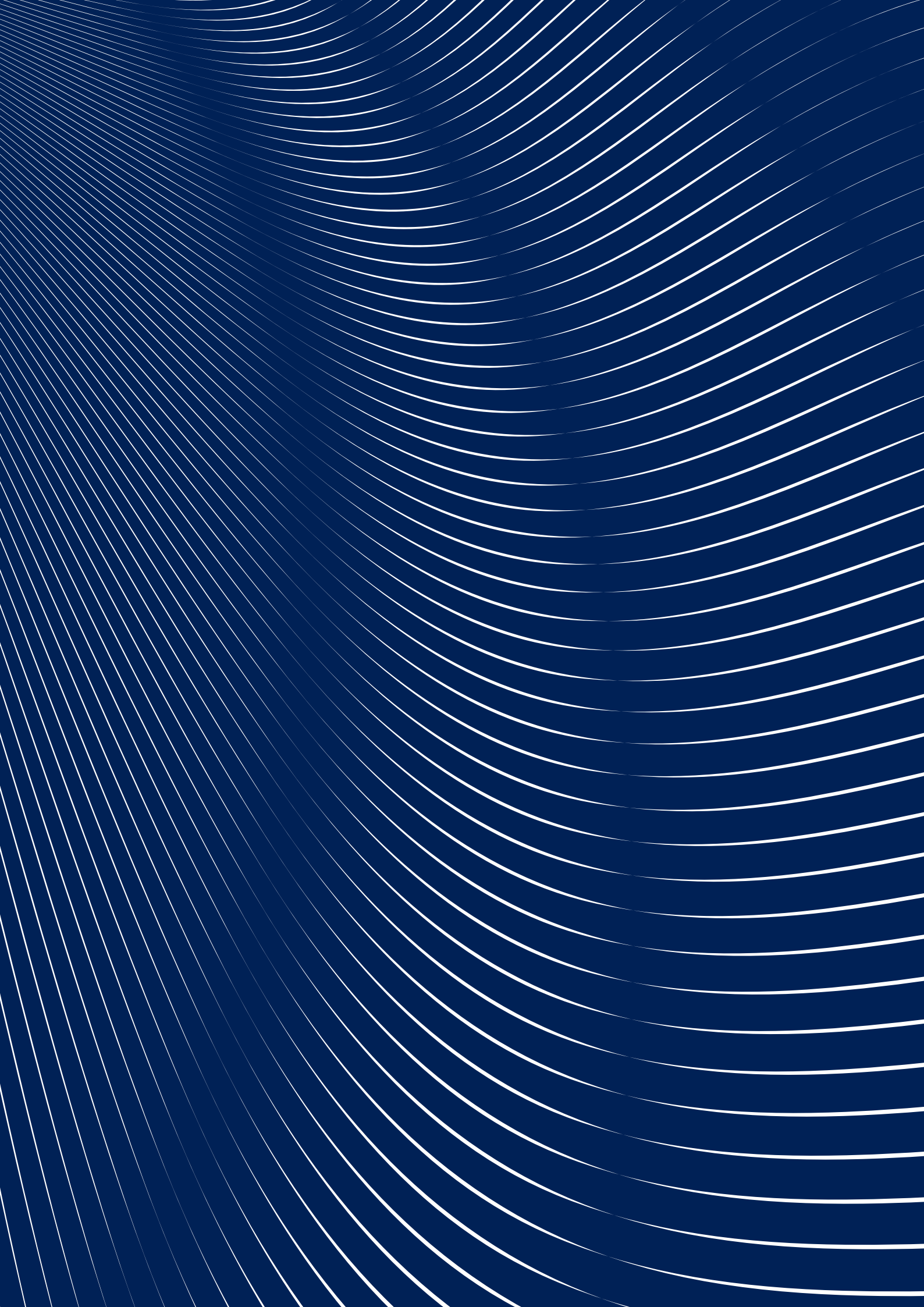


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INTRODUCTION

In 2022, Aalborg University created the Institute for Advanced Study in PBL as a cross-institutional unit with the overall ambition to:

- maintain AAU's unique and clear PBL profile
- maintain and expand the university's strong research position in PBL
- strengthen the synergy between PBL environments and staff members working with PBL
- ensure the connection between PBL research and PBL practice
- ensure that research breakthroughs inform practice

In 2023 these ambitions were crystallised in the IAS PBL strategy, "Imagining and Realising the Future of PBL through Research and Development". The strategy outlines four main objectives that encapsulate the overall vision of becoming an organisation with a strong and unique connection between foundational research and research-based development:

- Leading the field of international PBL research and breaking new grounds for PBL research and pedagogical practice
- Strengthening research-based pedagogical staff development and educational leadership activities

- Cultivating and enhancing a research-based approach to the educational development of PBL and pedagogical practice across Aalborg University
- Enhancing outreach and dissemination of knowledge in the field of PBL and pedagogical practice.

In this annual report, we highlight the research and development activities of IAS PBL that contribute to realising these strategic objectives. Everyone has worked hard to further develop IAS PBL as a cross-institutional unit that strengthens PBL research, creates new synergies across PBL research environments, and enables stronger connections between staff development and research.

In all the research groups and units within IAS PBL, excellent research is being carried out, projects are being formed, and PBL teaching is being developed. I would therefore like to use this opportunity to thank everyone in IAS PBL for their excellent work and contributions in 2023.



PROFESSOR THOMAS RYBERG

Director,
Institute for Advanced Study in PBL



IAS PBL RESEARCH GROUPS AND UNITS

ORGANISATION OF GROUPS AND UNITS

IAS PBL's relation to the rest of the university is depicted in the AAU organisational chart (see figure 1) which shows IAS PBL's direct link to the university management and its position as a supporting foundation for all faculties and departments.

As depicted in the IAS PBL organisational chart (Figure 2), IAS PBL consists of several groups and units divided into research groups and units connected to different AAU departments and IAS PBL administrative units. The following is a presentation of each of these groups and units.

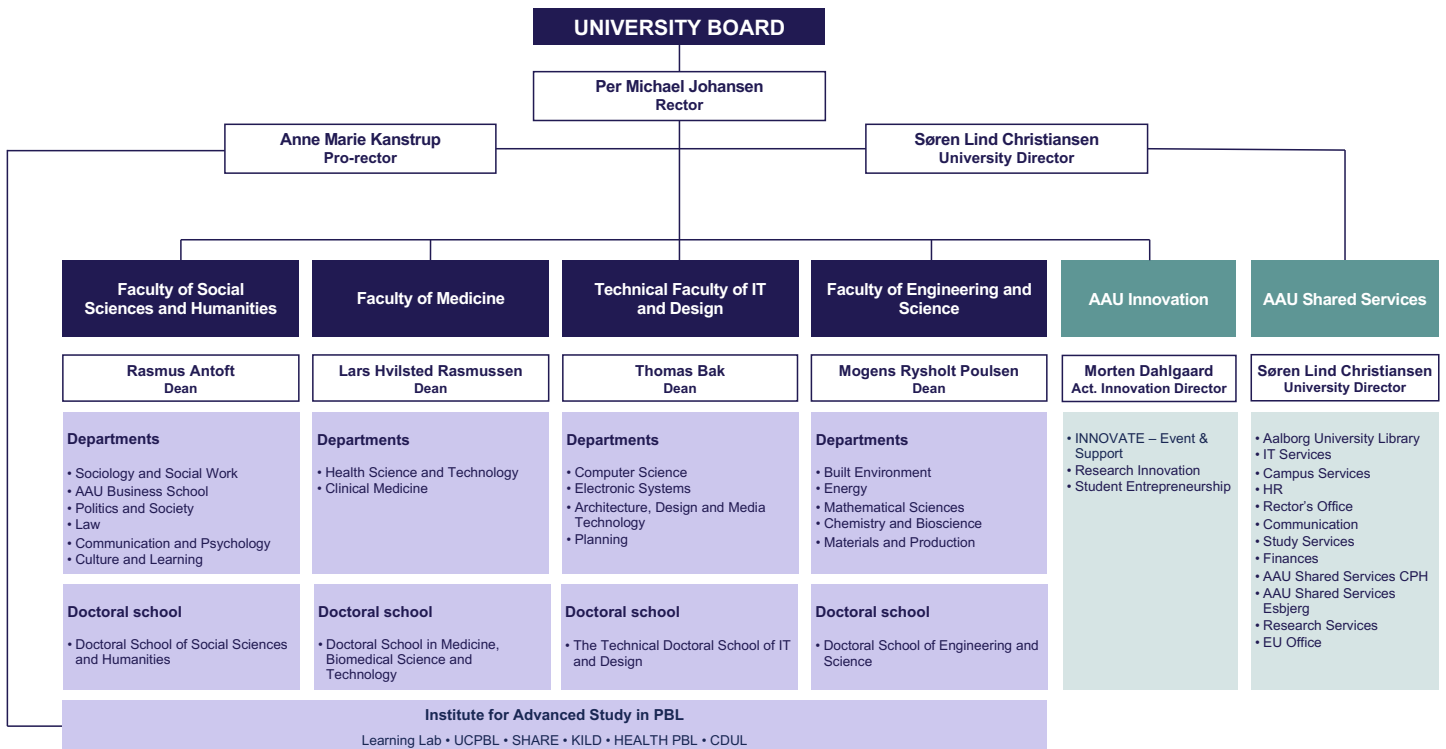


Figure 1: Aalborg University's organisational chart

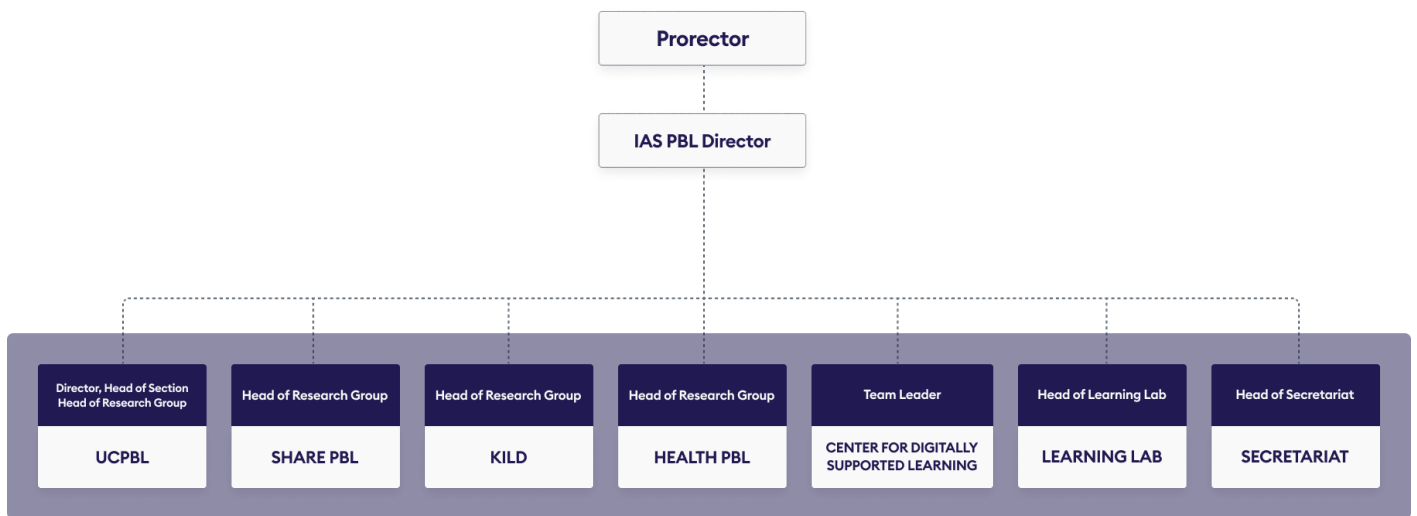


Figure 2: Institute for Advanced Study in PBL organisational chart

THE AALBORG UNESCO PBL CENTRE

The Aalborg Centre for Problem-Based Learning in Engineering Science and Sustainability (UCPBL) is a category 2 centre under the auspices of UNESCO, the centre was formally launched in 2014.

The overall strategic goal of the Aalborg UNESCO PBL Centre, UCPBL, is to facilitate universities, and other higher education institutions, to take an active role in educating engineers and scientists so they can participate and contribute to the development of sustainable solutions

to the present and emerging social, economic, and environmental challenges. UCPBL conducts world-renowned research in problem-based learning within engineering and science education and teaches problem-based learning.

UCPBL is the largest research group affiliated with IAS PBL. In 2023, the group consisted of a total of 28 academic staff members, excluding externally affiliated staff. All UCPBL staff members are employed at the Department of Sustainability and Planning under the Technical Faculty of IT and Design which also makes this the largest university department in terms of IAS PBL researchers.

SHARE-PBL

Established in August 2022, the research group on Social and Human science Approaches to Research in Education and Problem-Based Learning (SHARE-PBL) is an interdisciplinary research group dedicated to developing our scientific understanding and practice regarding PBL, problem-oriented project work and other supporting pedagogical practices from a social science and humanities (SSH) perspective.

SHARE's work ranges from insights into global, international, and national educational policies and educational practices to understanding the dynamics of group formation and learning processes of groups and individuals.

SHARE-PBL consists of a total of 12 staff members employed at five different departments under the Faculty of Social Sciences and Humanities.



KILD: COMMUNICATION, IT AND LEARNING DESIGN

The research group Communication, IT and Learning Design (Danish abbreviation: KILD) explores how digital technologies can be adopted to develop new learning processes in a digital and networked society. This includes a strong interest in how to support PBL through the use of digital learning resources.

KILD carries out basic research as well as action- and practice-oriented research on IT and learning design in collaboration with external partners. The focus is on facilitating learning and qualifying learning designs to enhance creativity and innovation. This includes a special focus on employing visual and aesthetic practices, game-based learning, design processes and PBL in different learning contexts.

KILD consists of a total of 10 staff members employed at the Department of Communication and Psychology under the Faculty of Social Sciences and Humanities.

HEALTH-PBL

HEALTH-PBL is an interdisciplinary research team dedicated to research in theory-practice, case- and project-based problem-based learning. Operating within the education domain of the Faculty of Medicine, its members teach at the faculty and support its teaching activities to ensure alignment with Aalborg University’s educational profile and PBL principles. HEALTH-PBL is also involved in developing the pedagogical competence of the faculty’s teaching staff.

In 2023, HEALTH-PBL consisted of a total of nine staff members all employed at the Department of Health Science and Technology under the Faculty of Medicine.

LEARNING LAB

Learning Lab delivers research-based pedagogical competence development to new and existing staff members at Aalborg University; this includes the university pedagogy programme which is a research-based competency development activity that prepares early career university staff, primarily assistant professors, and postdocs, for their further teaching careers. The overall objective of the programme is to develop and ensure participants’ pedagogical competences in classroom teaching and planning, supervision, and examinations in university courses.

Learning Lab empowers staff to fulfil Aalborg University’s commitment to excellence in higher education teaching and learning and builds on current tertiary teaching research to identify and evaluate trends, apply best practices, and address gaps in the University’s delivery of higher education practices. Learning Lab aims to develop AAU’s organisational capacity and capability concerning high-quality university teaching and learning.

The Learning Lab management team consists of Nikolaj Stegeager (SHARE-PBL), Line Bune Juhl (SHARE-PBL), Merethe Hollen (CDUL) and Xiangyun Du (UCPBL).





JOURNAL OF PROBLEM-BASED LEARNING IN HIGHER EDUCATION

The Journal of Problem Based Learning in Higher Education (JPBLHE) is an official journal of the Institute for Advanced Study in Problem Based Learning at Aalborg University. The journal is international and peer-reviewed and is dedicated to advancing the field of problem-based learning (PBL) within the realm of higher education.

At the core of the journal's mission lies a dedication to publishing original, high-quality research articles and case studies that explore the intricacies of problem-based learning in the context of higher education at the top level of academia.

Published annually, with the addition of special issues, the journal is dedicated to promoting transformative and progressive pedagogical practices, fostering international collaboration, and nurturing the development of teaching and learning experiences.

The journal is led by a dedicated editorial team comprising the following researchers from IAS PBL: Patrik Kjærdsdam Telléus (HEALTH-PBL), Bettina Dahl Søndergaard (UCPBL), Jette Egelund Holgaard (UCPBL), Nikolaj Stegeager (SHARE-PBL) and Vibeke Andersson (SHARE-PBL). The journal is overseen by an editorial board consisting of renowned PBL experts from around the globe to ensure that the journal maintains rigorous standards of academic excellence and integrity. The editorial board members are listed on the [JPBLHE website](#).

In 2023, the journal published the annual issue, Vol. 11 No. 3 with several research articles and case papers, as well as two special issues Vol. 11 No. 1 "Strength in Diversity: Future-proofing PBL Research and Practice" and Vol. 11 No. 2 "Weaving Hybrid Futures: Sustainability in Higher Education with PBL Through Art, Science, and Robotics".

CENTER FOR DIGITALLY SUPPORTED LEARNING

The core mission of the Center for Digitally Supported Learning (CDUL) is to support management, teaching staff, and supervisors by providing pedagogical, IT didactic, and technological guidance and engaging in discussions on these topics, thereby contributing to the ongoing development of AAU's digital PBL practices.

CDUL is committed to supporting teaching staff from all faculties at Aalborg University in advancing their teaching methods, both digitally and pedagogically. CDUL provides insights into incorporating digital elements into PBL and remains updated on the latest learning technologies accessible to AAU staff. Additionally, CDUL remains attentive to IAS PBL's ongoing research in PBL, aiming to leverage this research when working with and supporting educators at AAU.

Furthermore, CDUL actively promotes knowledge sharing and inspiration for developing digitally supported learning through various channels. This includes maintaining an active presence on LinkedIn and hosting "The Digital Agora" podcast, featuring teacher-to-teacher conversations focused on the challenges associated with digitally supported learning. Additionally, CDUL actively engages in various projects and initiatives centred around digital technologies and teaching enhancement.

CDUL collaborates with numerous partners across AAU, in 2023, for example, CDUL has engaged in close collaborations with PBL-digital, AAU IT Services and Aalborg University Library. Collaboration across the university is set to continue in the future, as this promotes synergy in our joint projects.

In 2023, CDUL consisted of a total of 13 staff members.

IAS PBL RESEARCH

The following presents ongoing research projects and research projects concluded in 2023 by researchers affiliated with the Institute for Advanced Study in PBL. The projects are divided into internal and externally funded projects.

RESEARCH PROJECTS FUNDED BY IAS PBL

HEALTH-PBL Case Model

The Study Board of Medicine at Aalborg University's Department of Health Science and Technology offers two degree programmes in Medicine and Medicine with Industrial Specialisation both of which use a unique PBL model. The model combines cases and projects within the framework of problem-based learning pedagogy.

In recent years, this case-based model has generated very mixed student evaluations, particularly among bachelor students, and the proportion of students attending the case-based teaching activities offered has declined significantly. Consequently, the study board has initiated a project to examine this issue and propose strategies to enhance the quality of case-based teaching, aiming to boost student engagement.

The project seeks to revise the existing PBL case model and develop a new model to be applied across the degree programmes offered by the Study Board of Medicine.

The project is led by Associate Professor Patrik Kristoffer Kjærdsdam Telléus (HEALTH-PBL).

Hybrid Learning Space to Support Problem-Based Learning

Professor Mie Buhl (KILD) believes that technology should be adapted to PBL, not the other way around. In 2023, she welcomed students to Aalborg University's new Nordic Master in Visual Studies and Art Education, a collaboration between Aalborg University and Aalto University in Helsinki. In designing this new master's degree programme across two universities, she has designed a hybrid learning space with technologies that are combined in innovative ways to accommodate PBL and retain AAU's focus on problem-based learning. A research project will follow up on the experiences.

The programme is led by Professor Mie Buhl (KILD) with the participation of Heidi Hautopp and Maria Hvid Bech Dille (KILD).



Student Well-Being

In a cross-faculty collaboration, HEALTH-PBL seeks to identify the primary factors within a PBL-based study environment that have the biggest impact on student well-being. Based on an already validated survey originally developed by UCPBL for engineering students, the methodology will be adapted to survey first-year medical students. The survey was originally conducted in English, but by translating the survey from English to Danish, higher response rates are anticipated, enabling a more comprehensive understanding of the students' experiences.

Learning Lab Research Group

IAS PBL researchers across disciplines and research groups have joined forces in a newly formed research network that aims to provide a scientifically based perspective on pedagogical development in Higher Education. The Learning Lab research group will seek to assess the current pedagogical development practices at Aalborg University and compare internal practices with other universities and international research literature. The network aims to create a sound body of research within pedagogical competence development to ensure that professional development activities at AAU are based on well-documented and research-based methodology and practices.

The aim of the Learning Lab research group is to:

- Scientifically assess the current practices at Aalborg University in terms of pedagogical development
- Provide answers to the question, "what does it mean to teach at a PBL university – as seen from a pedagogical perspective?"
- Support cross-disciplinary collaboration on improving pedagogical practice for IAS PBL and subsequently AAU
- Support a research-based approach to the implementation of the Framework for Advancing University Pedagogy and teaching portfolio development at AAU
- Provide a scientifically based perspective on the problem-based approach to pedagogical development in Higher Education that may be adopted by international research environments

The Learning Lab research group is led by Associate Professor Nikolaj Stegeager (SHARE-PBL), Professor Xiangyun Du (UCPBL), Associate Professor Patrik Kjærdsdam Telléus (HEALTH-PBL) and Associate Professor Aida Guerra (UCPBL).

IAS PBL is funding a PhD fellowship and a research assistant.

The following research activities have been initiated by the Learning Lab research group:

Mentor Perceptions on Role and Practice in a Professional Development Program

This project seeks to identify different perceptions and practices among mentors in professional development. Both pedagogical- and subject mentors were involved in the study which made use of a mixed-method methodology based on 0-interviews. Results suggest that structured mentorship preparation programmes are needed in

addition to professional learning communities for pedagogical and subject mentors to work collaboratively to maximise impact.

Professor Xiangyun Du (UCPBL) and Associate Professor Nikolaj Stegeager (SHARE-PBL) lead the project.

Principles for Good Supervision at Aalborg University

This project seeks to identify and thus create a golden standard for supervision at Aalborg University that can be used in training new staff at Aalborg University but also to create awareness among supervisors and students of the various supervision practices applied at AAU. The study is an interview study in which those elected teacher of the year from each study board at AAU are interviewed to provide their perspective on effective PBL supervision.

Professor Xiangyun Du (UCPBL) and Associate Professor Nikolaj Stegeager (SHARE-PBL) lead the project.

Professional Learning Amongst Early Career University Academics in a PBL-Based Program

This project aims to identify pedagogical beliefs and practices among early career academics. The research question of the study is: "how do early career academics define their pedagogical beliefs to a pedagogical development programme, and how do their beliefs manifest in their pedagogical practice?" The findings indicate that while almost all participants express beliefs that are aligned with the core values of the university, their reported practices are quite diverse. Based on this, the study proposes a framework for understanding teaching development among early career academics centred on their individual development and their interaction with students. This framework may be of use when planning future pedagogical development activities.

The project is led by Associate Professor Nikolaj Stegeager (SHARE-PBL) and Professor Xiangyun Du (UCPBL).



EXTERNALLY FUNDED RESEARCH PROJECTS

Computational Play: Computational Play in Early Childhood Education and Care

Advanced and emerging technologies are increasingly being introduced into classrooms to support 21st-century skills, including computational thinking (CT). However, there is limited research on CT in Early Childhood Education and Care (ECEC). This project focuses on how computational play can facilitate problem-solving, reasoning, and learning.

Associate Professor Lykke Brogaard Bertel (UCPBL) participates in the project. External partners include the University of Stavanger, University College of Northern Denmark, and Halmstad University.

The project has received NOK 380,000 in funding from NordForsk.

DiCoTe: Increasing Professional Digital Competence in ECTE

The project aims to boost the digital skills of Norwegian preschool student teachers by creating resources for preschool teacher education. These resources will be implemented across all relevant institutions in Norway, focusing on enhancing children's play with technology. Specifically, the emphasis will be on coding games for 3-5-year-olds, enabling them to program a robot through direct interaction without screens.

Associate Professor Lykke Brogaard Bertel (UCPBL) participates in the project. The project is led by University of Stavanger.

The project has received NOK 12 million in funding from the Research Council of Norway.

E-MEDIC

HEALTH-PBL is a partner in the E-MEDIC (Effectiveness of Medicine E-learning Distance Courses) project which is an EU project funded by the Erasmus+ Programme. Spanning from 2023 to 2025, this initiative seeks to bridge existing gaps in continuing professional development and training for health professionals and to increase training opportunities in digital skills and e-learning. Ultimately, the project aims to provide practical strategies and learning modules tailored for academic staff within the health sector.

Associate Professor Patrik Kjærdsdam Telléus (HEALTH-PBL) leads AAU's work in this project which includes partners from Italy, Portugal, Ukraine and Greece.

The project has received € 400,000 in funding from the Erasmus+ Programme of the European Union.



Entrepreneurship and Employability. A Teaching Programme

The project is focused on initiatives which university lecturers can initiate to encourage and improve the entrepreneurial and sustainability skills of university graduates in collaboration with external partners, thereby increasing their opportunities for rapid employment. As part of a 9th semester course, students are presented with the opportunity to solve a task in collaboration with a company, often an SME or a start-up, or an organisation, to strengthen the students' opportunities for external collaboration, where they can leverage their academic skills in real-world settings. This can make them attentive to employment opportunities in fields other than those they would normally focus on, such as sustainability and entrepreneurship, which may be unfamiliar to them but are nonetheless relevant.

The project is led by Associate Professors Vibeke Andersson (SHARE-PBL) and Helene Balslev Clausen.

The project has received DKK 98,850 in funding from the Danish Foundation for Entrepreneurship.

Entrepreneurship, Sustainability and Problem-Based Learning (PBL)

PBL and Entrepreneurship go hand in hand and are central elements in the idea of a mission-driven university. We address entrepreneurship based on our (teaching) experience and research, which perceives entrepreneurship competencies as opportunities and good ideas that create value for others. The value is both cultural, social, and economic, ensuring skillsets that can cope with sustainability challenges.

By offering a module with a focus on integrating entrepreneurial skills in teaching, the module will address one of AAU's visions of supporting the skills that are considered necessary to ensure a future green and sustainable transformation of society, where active value creation is central, and where action and the involvement of the outside world are essential.

The project is led by Associate Professor Vibeke Andersson (SHARE-PBL), Associate Professor Helene Balslev Clausen and Professor Euan Lindsay (UCPBL).

The project has received DKK 96,250 in funding from the Danish Foundation for Entrepreneurship.

HIP: Hacking Innovative Pedagogies: Digital Education Rewilded

The project aims to 'rewild' higher education, focusing on just and fair pedagogies using bottom-up selected digital tools. In response to the challenges of building a more equitable and inclusive digital society, the project seeks to reimagine traditional university education. The project leverages transformative pedagogical approaches, involving networked communities to co-create innovative ways of 'rewilding' outdated models. Its vision involves transforming the higher education ecosystem by connecting and cultivating unique teaching and learning approaches, creating rewilded habitats of transformative pedagogy for digitally enhanced and inclusive learning experiences.

Assistant Professor Niels Erik Ruan Lyngdorf (UCPBL) participates in the project. External partners include the University of Graz and Dublin City University.

The project has received € 221,220 in funding from the Erasmus+ Programme of the European Union.

Interdisciplinary PBL Methodologies in Engineering Education and Work – Inter-PBL

Inter-PBL will contribute to the development of innovative educational models to educate engineers to work proactively and interactively in an interdisciplinary working environment to deal with the increasing complexity of engineering and contribute to the sustainable development of society. The project will develop models for students' learning of interdisciplinary generic competences in a PBL curriculum based on case studies at Grundfos, the Port of Aalborg and Aalborg University. Inter-PBL thereby contributes new knowledge on interdisciplinary collaboration and learning to overcome boundaries in education as well as companies.

Professor Anette Kolmos leads the project. Project participants include Jette Egelund Holgaard, Henrik Worm Routhé and Maiken Winther (UCPBL).

The project has received DKK 5,844,471 in funding from the Poul Due Jensen Foundation.

KLUMP: Competence Development of Mathematics Teachers at Vocational Schools

The project seeks to inspire teachers to collaboratively develop and implement innovative teaching methods in mathematics and other subjects in which mathematics plays a role. The goal is to boost students' motivation and skills in mathematics, thereby reducing dropout rates in vocational schools.

The project is led by Associate Professor Bettina Dahl Søndergaard (UCPBL) and includes partners from Tradium Erhvervsskole and Nationalt Center for Udvikling af Matematikundervisning (NCUM).

The project has received DKK 1,423,948 in funding from the Novo Nordisk Foundation.

LabSTEM Nord

Through an integrated and cohesive effort across the entire education chain, and based on problem-based learning, the project aims to ensure that children and young people in North Jutland maintain their interest in STEM subjects.

Associate Professor Lykke Brogaard Bertel (UCPBL) leads the project. IAS PBL project participants include Camilla Guldborg Nielsen, Bettina Dahl Søndergaard, Sofie Otto, Søren Hansen and Christian Skelmosé Jensen (UCPBL). Collaborative partners include a range of primary and upper secondary schools from the North Denmark Region.





In 2023, the project received an extension and an additional DKK 1,375,000 for the year 2024/2025. In total, the project has received DKK 4,325,000 in funding from Den Nordjyske Teknologipagt, the North Denmark Region.

NAFA: Naturfagsakademiet

Naturfagsakademiet (the science academy) is a Danish programme designed to promote motivating and rewarding science education in Danish primary schools by strengthening the training of future and current science teachers. The vision is to boost the interest, motivation and competences within the natural sciences among children and young people, thus aiming for a larger proportion of young people to venture into further education and employment within this field.

Associate Professor Lykke Brogaard Bertel (UCPBL) participates in the project which is led by University College Copenhagen and participants include a range of Danish universities and all Danish university colleges. The project has received DKK 200 million in funding from the foundations Villum Fonden and the Novo Nordisk Foundation.

NCUM: Nationalt Center for Udvikling af Matematikundervisning

NCUM (National Centre for the Development of Mathematics Education) covers the entire education system and aims to provide new perspectives on teaching and learning in mathematics. It seeks to inspire how mathematical activities can become meaningful for children and young people, thereby enhancing their learning experience.

Associate Professor Bettina Dahl Søndergaard (UCPBL) is head of the expert group for mathematics in vocational schools.

The Ministry of Children and Education has allocated a total of DKK 25 million for the establishment and operation of the centre. NCUM has been extended until the end of 2024 with DKK 1,100,000 in supplementary funding.

Problem-Based and Project-Oriented Learning in Rebild Municipality

The project sets an ambitious direction for competence development in primary and lower secondary schools for many years to come. The project seeks to increase the motivation of both pupils and teachers and strengthen skills that will prepare children and young people for the demands of the future.

The project aims to strengthen the learning culture throughout the primary school cycle at schools in Rebild Municipality and to increase knowledge sharing between the schools.

The project spans four years from 2022 to 2026 and is led by Associate Professor Nikolaj Stegeager (SHARE-PBL).

The project has received DKK 4,500,000 in funding from A.P. Møller Foundation.

IAS PBL PHD PROJECTS

The following presents ongoing PhD projects by PhD fellows affiliated with the Institute for Advanced Study in PBL. The projects are listed alphabetically by title.

Collaboration, Leadership, and Sustainability in Higher Education: How Universities Operate and Align Sustainability in Education

This PhD project explores two aspects of higher education through the lens of sustainability: cross-institutional collaboration in engineering education contexts and middle-manager leadership in higher education. The project involves a systematic review, qualitative interviews, and current work on sustainability in student projects within a PBL

environment. Finally, the project aims to integrate findings from previous studies, assuming that collaboration is a prerequisite for education at all levels. Insights from middle-manager leadership highlight challenges in managing researchers and differing perceptions of institutional initiatives. As a result, students are considered a relevant target group for sustainability efforts, especially in semester projects where they are required to progress academically. The project currently focuses on inviting students to a workshop to further explore sustainability in their education/semester projects at Aalborg University.

The project is led by PhD Fellow Svend Haekrog Christiansen and supervised by Professor Xiangyun Du and Associate Professor Aida Guerra (UCPBL).

Digital Problem-Based Learning for Facilitating the Acquisition of Collaborative Competencies

This mixed-method study will investigate the possibilities of "Digital Problem-Based Learning" within the medical education 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 (HEALTH-PBL) and supervised by Associate Professor Patrik Kjærdsdam Telléus (HEALTH-PBL) and Professor Thomas Ryberg. The project is funded by IAS PBL and the Department of Health Science and Technology.

Engineering Students' Perspectives on the Learner Agency Development in an Intercultural PBL Context in Denmark

The importance of learner agency in engineering education has been increasingly recognised due to its potential influence on professional identity and decisions to continue studies. Learner agency involves taking ownership of learning, making choices, setting up goals, regulating learning activities, and interacting with the environment. Aligned with problem- or project-based learning (PBL), learner agency fosters student-centred, active engagement. However, contemporary challenges require engineers to develop intercultural competencies for addressing complex social issues. This PhD project investigates how engineering students' learner agency is developed in an intercultural PBL setting.

The project is led by PhD Fellow Dan Jiang and supervised by Associate Professor Bettina Dahl Søndergaard and Professor Xiangyun Du (UCPBL).

Interdisciplinary Teamwork in PBL

This PhD project focuses on interdisciplinarity and PBL, complexity and progression in team collaboration.

The project is led by PhD Fellow Maiken Winther and supervised by Professor Anette Kolmos and Associate Professor Jette Egelund Holgaard (UCPBL).

Management and Leadership in Interdisciplinary Projects in Engineering Education

The purpose of this PhD project is to examine how coordination, management and leadership are expressed in engineering education with a focus on interdisciplinary student projects. Points of departure are from the perspectives of students, faculty, and research.

The project is led by PhD Fellow Henrik Worm Routhe and supervised by Professor Anette Kolmos and Associate Professor Jette Egelund Holgaard (UCPBL).

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 from the project is to provide detailed, processual knowledge on how early career academics construct and negotiate their professional identities collaboratively, including which factors, dynamics and interactions that contribute to supporting the construction process 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 (SHARE-PBL) and supervised by Associate Professor Nikolaj Stegeager (SHARE-PBL) and Professor Xiangyun Du (UCPBL).

Proactive Career Development of Students in Technology and Engineering Education

This PhD project centres on the proactive career development of students within technology and engineering education, which operates within the larger framework of science, technology, engineering, and math (STEM) education.

The project is led by PhD Fellow Anna Overgaard Markmann and supervised by Professor Xiangyun Du and Associate Professor Bente Nørgaard (UCPBL).

Self-Directed Learning in Problem-and Project-Based Learning: A Study of Self-Direction in the Aalborg PBL Model

This PhD project focuses on the development of self-directed learning in students in an AAU PBL environment. The project approaches this concept in various ways, primarily empirically, utilising both quantitative and qualitative methods.

The project is led by PhD Fellow Nicolaj Riise Clausen (UCPBL) and supervised by Professor Anette Kolmos (UCPBL) and Associate Professor Claus D. Hansen (Department of Sociology and Social Work).

Teacher Learning as a Complex Dynamic System in the Process of Implementing PBL in a South African K12 Context

Focusing on teacher learning in a context of implementing PBL in a South African K12 context (primary and secondary education) which is the subject of this research, is critical as South Africa introduces new approaches to learning and teaching.

The project is led by PhD Fellow Sizwe E. Nxasana and supervised by Professor Xiangyun Du and Associate Professor Lykke Brogaard Bertel (UCPBL).

A Better Start: Reflective Communities of Practice for Newly Graduated Teachers through Social Virtual Reality (En bedre start: Refleksive praksisfællesskaber for nyuddannede lærere gennem 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 (KILD) and supervised by Associate Professor Jacob Gorm Davidsen (KILD) and Associate Professor Susanne Dau (University College of Northern Denmark).

2023 PHD GRADUATES

The following presents PhD projects concluded in 2023 by PhD fellows affiliated with the Institute for Advanced Study in PBL. The projects are listed alphabetically by their original title.

Engineering Students' Development of PBL Competences in a PBL Curriculum: Exploring Students' Reflections of Teamwork Competences in PBL

This PhD project aims to inquire into conceptualisations and representations of generic and PBL competences as they appear from a formalised and institutionalised perspective, and how they emerge in students' articulations based on experiences in PBL.

The project was led by PhD Fellow Anders Melbye Boelt and supervised by Professor Anette Kolmos and Associate Professor Jette Egelund Holgaard (UCPBL). The project was concluded in 2023, and the thesis is available [here](#).

No More Neat Fugues: Singing the Praises of Problem-Based Learning in a Minor Agential Realist Key Slightly Out of Tune

Based on a posthumanist and performative account that questions the humanist assumptions undergirding many contemporary understandings of learning, teaching, pedagogy, and education, the main aim of this project has been to explore what thinking with agential realism about problem-based learning (PBL) might do to the theory, practice, and research on this approach to learning.

The project was led by PhD Fellow Kathrine Liedtke Thorndahl and supervised by Associate Professor Patrik Kjærdsdam Telléus (HEALTH-PBL) and Diana Stentoft. The project was concluded in 2023, and the thesis is available [here](#).

Games, Learning, and Mathematics Learning – A Scenario-Based Education Perspective (Spil, læring og matematikundervisning – et scenariedidaktisk perspektiv)

The PhD project seeks to generate new knowledge about games and mathematics learning by examining students' participation in games in primary school mathematics education. The project is based on the hypothesis that students' gaming experiences from their leisure time influence the potential for learning with games in mathematics education, but there is insufficient knowledge on how this occurs.

The project was led by PhD Fellow Erik Ottar Jensen (KILD) and supervised by Professor Thorkild Hanghøj (KILD), Senior Associate Professor Charlotte Krog Skott, University College Absalon and Professor Morten Misfeldt, University of Copenhagen. The PhD project was concluded in 2023, and the thesis is available (in Danish) [here](#).

DISTINCTIONS AND AWARDS

SEFI LEONARDO DA VINCI MEDAL

At the 2023 SEFI (European Society for Engineering Education) annual conference, Professor and founding director of the Aalborg UNESCO PBL Centre, Annette Kolmos, was awarded the prestigious SEFI Leonardo Da Vinci Medal. Recipients of this award are selected by the SEFI Board of Directors for their outstanding contributions to engineering education which have had international significance. In receiving this award, Anette Kolmos was awarded for her dedication, leadership, and pioneering spirit which have been instrumental in shaping the landscape of engineering education and inspiring countless individuals to take on leadership roles and drive innovation within this field.

During the conference, Anette Kolmos also presented a keynote presentation entitled *Interdisciplinary Projects - Moving from transfer to transformation in Learning*.



DEVELOPMENT PROJECTS AND INITIATIVES

The Institute for Advanced Study in PBL is involved in multiple projects and initiatives that call for the expertise of its researchers and staff to address various challenges and opportunities within the university context. These include both short-term and long-term projects and activities.

REASSESSMENT OF THE AAU PBL PRINCIPLES

As part of AAU's quality system, the PBL principles are scheduled for reassessment and review every sixth year. This process has been underway since the beginning of 2023 and is scheduled to be completed by mid-2024, led by a working group comprised of several members from IAS PBL (Jette Egelund Holgaard (UCPBL), Casper Feilberg (SHARE-PBL), Louise Pape-Haugaard (HEALTH-PBL), Thomas Ryberg and Tom Skov Gregersen (CDUL)).

The primary objective of this group is to explore the potential need for revising AAU's PBL principles by engaging in dialogue with relevant stakeholders and subsequently preparing a report with recommendations based on these discussions. To facilitate this, the group has devised a research design aimed at conducting semi-structured interviews with relevant stakeholders. These interviews were carried out throughout November and December 2023 and aimed to provide a comprehensive understanding of the variation across programmes.

SSH-STEM INITIATIVE

IAS PBL plays a central role in the strategic SSH/STEM integration project. The initiative is created with the ambition to sustain students' development of deep disciplinary expertise, while also providing them with the competencies and abilities to collaborate across disciplines to solve societally important challenges.

IAS PBL Director, Thomas Ryberg, is a member of the steering committee and the chairperson of the project working group. Louise Pape-Haugaard (HEALTH-PBL), Jette Egelund Holgaard (UCPBL) and Kirsten Jæger (SHARE-PBL) are also part of the SSH-STEM working group. Since 2022, the working group has been developing concepts that foster collaboration across disciplines with different levels of collaborative interdependency. The concepts

build on the university's existing PBL model and seek to develop students' collaborative competencies. The concepts have been tested in pilot projects during the autumn of 2023 and will continue to be tested and reviewed throughout 2024. The results of this pilot phase will be used towards drawing up a proposal for how these concepts can be meaningfully integrated into educational programmes across the university. The integration process will begin in 2025.

IAS PBL is conducting research in relation to the initiative. This includes a review of international literature and experiences, as well as empirical investigations related to the pilot projects. This research project is carried out by Postdocs Mia Thyrre Sørensen (UCPBL) and Maria Hvid Stenalt (SHARE-PBL) together with Jette Egelund Holgaard (UCPBL) and Kirsten Jæger (SHARE-PBL). A total of four articles are expected to be published during 2024. Along with the research process and articles, an ongoing evaluation of the pilot projects and other relevant information will be gathered throughout AAU. Administrative support for this project is provided through a partnership between the IAS PBL secretariat and the AAU Rector's Secretariat. The project is funded by IAS PBL.



AALBORG UNIVERSITY STUDY ACTIVITY MODEL

The Aalborg University study activity model was introduced in 2019 to support AAU students' study intensity and learning outcomes. The model may be applied to both engage in dialogue with students about what is expected of them as full-time AAU students and as a tool to organise courses, semesters and degree programmes. The study activity model is based on AAU's model for problem-based learning and as such is connected to IAS PBL and the university's PBL principles, IAS PBL is responsible for the development of the study activity model and the activities related to the model.



Beginning in 2023 and extending into 2024, IAS PBL will discuss the application of the model with some of AAU's study boards and study coordinators to learn how the model is applied in practice and how IAS PBL can support this going forward. The IAS PBL secretariat supports this process.

IMPLEMENTATION OF DANISH FRAMEWORK FOR ADVANCING UNIVERSITY PEDAGOGY

The Danish Framework for Advancing University Pedagogy was developed in 2021 by Universities Denmark as a common tool for the recognition and advancement of the pedagogical competences of university teaching staff. The framework must be implemented at all Danish universities while respecting the distinctive features of each institution.

At AAU, the framework is implemented and operationalised with a specific focus on the university's two distinguishing features: PBL and interdisciplinary learning, and based on the Danish framework, an AAU-specific framework has been developed. In collaboration with the university's HR department, IAS PBL is involved in following up on the implementation of this framework at Aalborg University. The IAS PBL secretariat supports this process.

IAS PBL SEED MONEY

The IAS PBL seed money initiative is a newly established internal funding scheme initiated to support research and development projects within PBL at AAU. All IAS PBL staff members can apply for seed money to cover various expenses associated with innovative PBL projects. The

seed money scheme seeks to support projects that align with IAS PBL's strategic objectives and involve collaboration with partners from other IAS PBL groups or units or external collaboration partners.

In the pilot phase of the seed money scheme in 2023, eight projects applied for funding, all of which were successfully granted support. Subsequently, the application period for IAS PBL seed money 2024 was concluded by the end of 2023. IAS PBL received ten applications for the 2024 seed

money, each detailing interesting initiatives related to PBL. Regrettably, since the total amount applied for far surpassed the available funds, not all projects could be accommodated. Thus, a total of six projects will be awarded funding from IAS PBL in 2024:

- Interdisciplinary PBL through design and use of learning games
- PBL Professional Days – a new PBL workshop concept to support progression in students' professional competences through cross-departmental collaboration and interdisciplinary engagement
- Exploring generative AI in PBL Problem Based Learning: new insights from students' perspectives
- Micro-PBL in mathematics using Virtual Reality (myPBL-VRMath)
- Heatmapping PBL competency profiles
- Teacher conception of AI learning, AI teaching and approaches to design

MASTER'S DEGREE WORKSHOPS

During November 2023, IAS PBL designed and facilitated workshops on all three AAU campuses, in Aalborg, Esbjerg and Copenhagen, that invited AAU staff, AAU teaching staff and programme management in particular, to discuss how the new flexible master's degree programmes for working professionals and professionally oriented master's degree programmes with company collaboration may be designed to best fit the practices of Aalborg University. The new master's degree programmes are part of a reform currently being designed, and the workshop discussions not only provided an opportunity for teaching staff and teaching management to discuss possible solutions, but the intention was also to provide the AAU management with relevant input for the AAU rector's participation in the national decision-making process in the national master's committee.

GENERATIVE AI

In recent years, generative AI has become a prevalent topic of discussion. It is a technology that the higher education sector cannot afford to disregard, and throughout 2023, IAS PBL staff has been involved in several development and research initiatives centred around generative AI.

In the spring of 2023, CDUL joined forces with multiple departments across AAU to launch [a dynamic website](#) dedicated to generative AI at AAU, tailored specifically to meet the needs of students. Furthermore, the production team has developed an AAU Micro, also known as a micro-credential, focusing on the [practical application of generative AI](#) along with educational material on methodology and source criticism. Through these initiatives, we aim to equip students with the necessary skills to navigate the complexities of generative AI responsibly and critically.

During the autumn of 2023, CDUL hosted a series of competence-developing activities, including workshops and webinars, offering participants insights into the intersection of generative AI and education. Additionally, CDUL introduced an [online inspiration catalogue](#) aimed at providing teaching staff with practical ideas on effectively integrating generative AI into various educational settings, thereby unlocking new possibilities for teaching and learning.

GENERATIVE AI AND EXAMINATIONS

In the autumn of 2023, a working group consisting of experts in AI and learning, along with representatives from all faculties was established. IAS PBL leads this group whose primary aim is to make recommendations regarding examinations and generative AI. Specifically, the group aims to develop recommendations on how written exams can be adapted to the advancements in AI while maintaining credibility and fairness. Considering the rapid pace of developments, the initial recommendations from the working group will only concern exams scheduled for and conducted in 2024.

Furthermore, the working group has been tasked with making recommendations regarding project work, focusing on ensuring the ethical and legitimate use of AI within projects and promoting healthy collaboration within project groups. Lastly, the group will also provide recommendations concerning long-term matters related to examinations and AI.

CDUL'S PARTNERSHIP MODEL

In 2022, CDUL developed its partnership model. The partnership model is designed to establish a framework for offering strategic guidance and feedback to local educational management regarding digitally supported PBL. The partnership model is primarily tailored for faculty, department, and study board management.

As part of this model, each faculty at the university is paired with a digital learning consultant from CDUL who serves as the main point of contact for matters related to teaching and educational development within the context of digitally developed PBL. At the end of 2023, the partnership model was evaluated with the faculties at the annual evaluation and status meetings. The meetings were productive and as a result of the meetings, adjustments were made to the partnership model and concept. CDUL and UCPBL have initiated a collaboration which involves UCPBL conducting follow-up research to assess the effectiveness and value created by CDUL's partnership model within local educational settings.

AAU MICRO

The realm of further and continuing education, along with the development of degree programmes, remains an area of continuous advancement. This is particularly evident in light of the heightened emphasis on lifelong learning, flexibility, and on-demand teaching. In response to this, CDUL's production team is actively involved in developing [AAU Micro](#) in close collaboration with the Faculty of Engineering and Science and AAU teaching staff.

CDUL's production team plays a crucial role in all phases of the development of microcredentials at AAU. Thus, the team is well-positioned to support AAU teaching staff right from the outset, starting with envisioning, designing, and planning the course content, all the way through the development and recording phases to the implementation process.

PBL KNOWLEDGE SHARING – DEN DIGITALE AGORA

CDUL's focus areas include PBL knowledge sharing, primarily aimed at teaching staff at Aalborg University. CDUL produces a podcast entitled "Den Digitale Agora" as part of this initiative. Hosted by Associate Professor Jes Lynning Harfeld, each episode features a guest invited to engage in an inspiring conversation about their teaching experiences, aiming to explore diverse approaches for addressing challenges that may arise in education.

A total of eight episodes were produced throughout 2023.



bers are assigned both a pedagogical and an academic supervisor, and the study groups meet regularly with their supervisors during the year of the programme.

In conjunction with supervisors, the participants are responsible for the academic content of the group meetings. This is where they can discuss topics that are particularly relevant to their teaching or current issues they face in their role as teacher or supervisor.

The new university pedagogy programme has been developed based on Danish and international research in the field. During the process, drafts were discussed in the university's Strategic Council for Education, with pedagogical experts from all faculties, supervisors in the university pedagogy programme, and the expert group for the university pedagogy programme.

NEW UNIVERSITY PEDAGOGY PROGRAMME

Aalborg University's pedagogical training programme for early career academics, the University Pedagogy Programme has been redesigned to mirror the teaching practices of the university and to subject teaching staff to problem-based learning as seen from a student perspective. During 2023, the last batch of early career academics completed AAU's University Pedagogy Programme in the format that has been in place since 2016.

The new format offers a fresh take on the programme, offering a higher degree of flexibility and an increased focus on the participants' own teaching practices. The programme previously contained a series of compulsory lectures and a number of elective modules. The new university pedagogy programme abandons all these – with the exception of a single online course focusing on digital pedagogy. However, this does not mean that instruction is abandoned completely, it just takes a different and more flexible form and provides participants with a greater degree of co-determination over their individual development as teachers. Instead of the compulsory lectures and teaching sessions, an intensive two-day residential seminar with short presentations, group work, walk-and-talks and similar activities has been introduced. In addition, two joint seminars, teaching observation and a number of compulsory meetings in small groups are included.

The participants in AAU's new university pedagogy programme are divided into smaller study groups of four to five people. All group mem-

TEACHING CULTURES SURVEY

IAS PBL has been involved in analysing and advising on AAU's results in the Teaching Cultures Survey which is a cross-institutional survey that measures the teaching culture and status of teaching at selected universities worldwide. The results are based on questionnaires sent out to AAU academic staff and the final of three surveys is expected to be completed in 2024/2025.

Professor Xiangyun Du (UCPBL), Associate Professor Nikolaj Stegeager (SHARE-PBL) and the IAS PBL secretariat support this process.

OUTREACH

During 2023, the Institute for Advanced Study in PBL welcomed visitors from all over the world, some of these visited as part of a research collaboration with IAS PBL researchers while others visited IAS PBL to learn more about PBL and the Aalborg PBL model by participating in our PBL workshop for visitors.

In November 2023, UCPBL welcomed Professor Franziska Trede, who is a professor in Higher Education and professional practice at the University of Technology Sydney. Franziska Trede visited Aalborg to speak at the European Conference on Reflective-based Learning, ECRPL 23 which is hosted and organised by the University College of Northern Denmark. As part of her visit, she presented her work to IAS PBL. In April 2023, Professor Diana Dolmans visited HEALTH-PBL and presented her PBL research to IAS PBL as part of her visit. Renate Klaassen, TU Delft, the Netherlands visited UCPBL and IAS PBL in April. As part of her visit, she gave a presentation on interdisciplinarity for AAU researchers and teaching staff as part of the SSH-STEM initiative. In May 2023, Professor Jonte Bernhard, Upsala University, Sweden and PhD candidate Gitte van Helden, TU Delft,

the Netherlands visited KILD and IAS PBL to present their research. Later that month, Professor Anna T. Danielsson, Stockholm University, Sweden and Associate Professor Maria Berge, Umeå University, Sweden visited IAS PBL. During their visit, they presented their work and hosted a workshop attended by IAS PBL staff.

Other visits in 2023 included visits from Canada, Norway, Turkey, Brazil, Australia, Slovakia and Japan.

VISITORS' WORKSHOP

May and October 2023, Aalborg

Since IAS PBL was launched, we have experienced great interest from international researchers who wish to visit AAU and gain knowledge about PBL. Last year, we welcomed over 60 researchers from all over the world. To meet the great interest of international scholars, IAS PBL has collaborated with UCPBL to develop a new concept for their PBL workshop for visitors, which UCPBL has run with great success for many years now. In the new concept, researchers from all AAU faculties have contributed to developing the programme and will organise visits to departments and staff in their respective faculties.

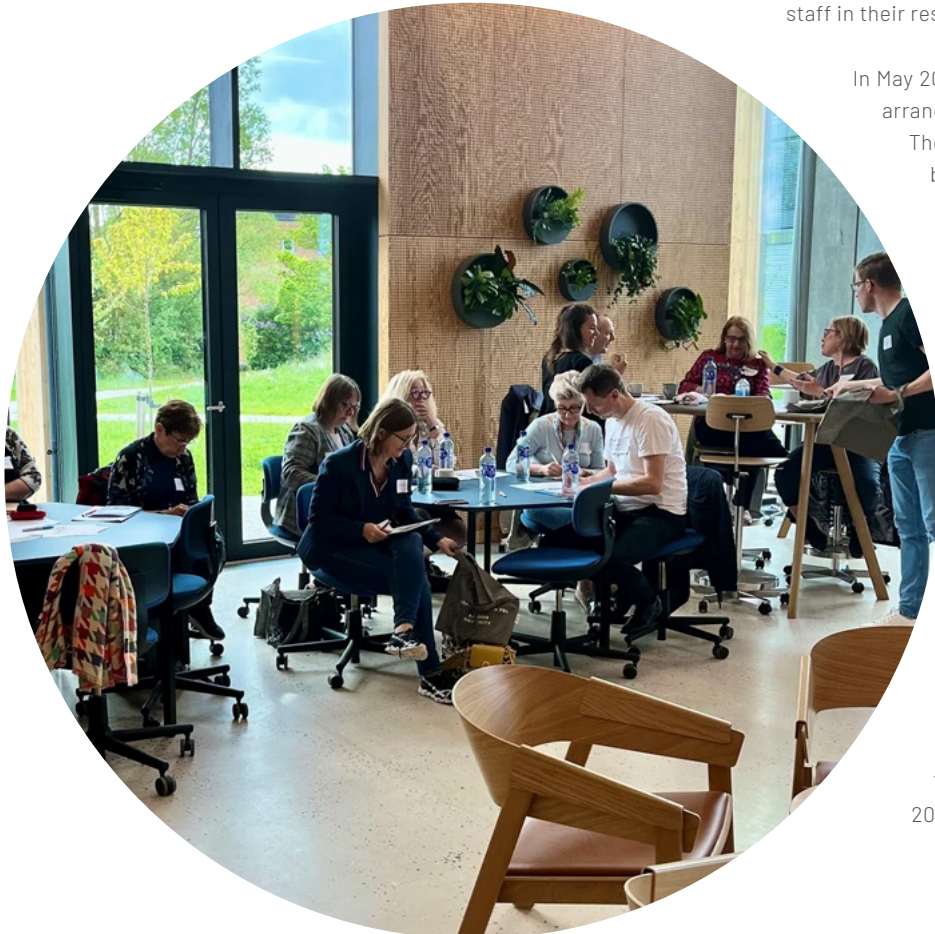
In May 2023, IAS PBL hosted the first PBL workshop for visitors arranged in a partnership between UCPBL and SHARE-PBL.

The workshop was based on the design initially developed by UCPBL to introduce visitors to problem-based learning and to how PBL is applied at AAU. With the establishment of IAS PBL, we wanted to create a workshop that would be able to cater to visitors from all academic disciplines.

The workshop takes place twice each year in Aalborg. It spans two consecutive days, the first of which focuses on introducing participants to Aalborg University's PBL principles, curriculum organisation and assessment and evaluation. In contrast, the second day invites participants to visit AAU departments to both observe educational practices and meet students and teaching staff.

15 visitors attended the spring workshop in May 2023, visiting from Poland, Mexico, Qatar, and Scotland.

16 visitors attended the autumn workshop in October 2023, visiting from Germany, Norway, and Ireland.





ANNUAL NATIONAL CONFERENCE ON EDUCATIONAL LEADERSHIP

May 2023, Copenhagen

Associate Professor Nikolaj Stegeager (Learning Lab and SHARE-PBL) is engaged in the planning and implementation of the Danish National Conference on Educational Leadership (in Danish: National conference for uddannelsesledere ved danske universiteter). The conference attracts educational leaders from all Danish universities. In 2023, the conference theme was Educational Leadership in Everyday Lives and Throughout the University Career, and the theme for 2024 is Educational Leadership in the Age of Artificial Intelligence.



UCPBL ADVISORY BOARD MEETING

October 2023, Paris

The Advisory Board meeting for the UCPBL centre was hosted by UNESCO at their building in Paris. This provided an opportunity to reflect upon the role of UCPBL as a UNESCO Category 2 Centre and to explore opportunities for collaboration with other centres and with UNESCO more broadly. In particular, UNESCO will be the lead agency for the upcoming 2024-2033 International Decade of Science for Sustainable Development, which strongly aligns with UCPBL's strategic goals as a centre.

IRSPBL 9TH INTERNATIONAL RESEARCH SYMPOSIUM ON PBL – TEE23

June 2023, Boston

Transforming engineering education was the theme of the 9th International Research Symposium on Problem Based Learning (IRSPBL 2023), convened by the MIT School of Engineering, Harvard's John A. Paulson School of Engineering and Applied Sciences, and the Aalborg Centre for Problem-Based Learning in Engineering Science and Sustainability under the auspices of UNESCO.

How can engineering education be transformed so that students develop the required skills to perform in globalised contexts and address global challenges? What learning can be shared by higher-education institutions that have embarked on educational transformation processes? What do other stakeholders in higher education, industry and society have to say about these efforts?

These are examples of questions that were discussed during the conference. The IRSPBL 2023 collected 55 contributions from 16 different countries. **[IRSPBL 2023 conference proceedings are available here.](#)**

DANISH-AMERICAN WELL-BEING SEMINAR 2023

October 2023, Aalborg

In October, Aalborg University hosted the Danish-American Well-Being Seminar which focused on well-being in higher education and how Danish educational institutions can help create the best conditions for their students' well-being and thus facilitate optimal learning.



The event marked the end of “Designing a Happier Student Life for Better Learning” – a two-year project run by the Ministry of Higher Education and Science and Innovation Centre Denmark, Boston and Silicon Valley. Among the results is a report that provides American inspiration for how educational institutions can support student well-being. Keynote speakers from Stanford University provided their perspectives, and IAS PBL Professors Xiangyun Du and Euan Lindsay (UCPBL) were invited to talk at the seminar.

MEETING WITH THE AMBASSADOR FROM SOUTH AFRICA

November 2023, Aalborg

Problem-based learning was at the top of the agenda when Ambassador to Denmark Fikile Sylvia Magubane and a delegation from the University of Pretoria met with Aalborg Mayor Lasse Frimand Jensen and representatives from AAU, University College of Northern Denmark (UCN) and Aalborg Children & Youth.

The School of Cooperation in South Africa is well advanced in applying problem-based learning in primary schools, and the South African ambassador is pleased to be able to further strengthen the use of PBL with the help of AAU.

INSPIRATION FROM IAS PBL TO UPPER SECONDARY SCHOOLS

November 2023, Aalborg

In November 2023, IAS PBL received an invitation to join a meeting with representatives from the North Jutland upper secondary schools. During this session, Professor and Director Thomas Ryberg introduced IAS PBL and presented a value-based introduction to digitalisation, as well as the current efforts to integrate SSH and STEM in AAU degree programmes. Additionally, Associate Professors Stine Ejsing-Duun and Lykke Brogaard Bertel delved into discussions on engineering capital, technological literacy, and Artificial Intelligence for the attendees, who were predominantly rectors from upper secondary schools.

PHD COURSES

In 2023, IAS PBL researchers organised the PhD courses listed below.

Applying the Danish Code of Conduct for Research Integrity to Your Research

Organisers include Associate Professors Trine Fink and Antonia Scholkmann

This course examines the Danish Code of Conduct for Research Integrity that guides the research practices of scientists, researchers, and their collaborators. The course introduces the principles of research integrity, dwells on the basic standards for conducting responsible research and introduces the current administration for misconduct.

In 2023, a total of four courses were completed.

Fundamentals of Clinical Data Science

Organisers include Associate Professor Louise Pape-Haugaard

This course introduces the disciplines involved in the full value chain of clinical data science, defined as the scientific field, which turns healthcare data into clinically useful applications. The course covers the transformation of data to model and to applications, to give an overview and understanding of the processes, rather than how to perform them.

Health Research with Vulnerable Groups

Taught by Associate Professor Verena Lenneis

This course aims to provide PhD students with a space for reflecting on the numerous conceptual, methodological, and ethical dilemmas that follow when conducting research with vulnerable groups.

Introduction to the PhD Study Spring 2 (MEDICINE)

Organised by Associate Professor Trine Fink

The course provides PhD students with a basic understanding of the PhD programme at Aalborg University. It aims to support PhD students in developing their study plans and provides practical information on how to work on research projects.

Learn How Creative Thinking Can Transform Your Research

Organised by Assistant Professor Søren Hansen

The course offers a deep understanding of creative thinking in research and aims to enable PhD students to make room for creative thinking and methodology in their research. The systematic use of creative thinking can be particularly helpful in generating new ideas, hypotheses, experimental designs, and data interpretation as well as in the communication of research.

Mixed Methods research and Interdisciplinary Inquiry

Organised by Professor Xiangyun Du

The course intends to support participants in developing interdisciplinary inquiry skills by analysing the needs for mixed-method research and designing mixed-method research using diverse strategies. A problem

and project-based learning approach is adopted in this course, involving participants working in groups on real-life issues identified on their own.

Professional Communication

Organised by Associate Professor Aida Olivia Pereira de Carvalho Guerra and Professor Euan Lindsay

The course aims to train and improve the participants' skills in oral communication, especially at scientific conferences and in university teaching by taking both a theoretical and a practical approach to scientific communication.

In 2023, a total of two courses were completed.

Qualitative Research within Health Science

Organised by Associate Professor Henrik Vardinghus-Nielsen

This course provides participants with the basic competences for designing a qualitative study and experiences with the benefits and limitations of using qualitative methods within the health sciences. The course specifically focuses on designing a study, selecting appropriate methods, collecting data, and finally analysing the data.

Teaching with Problem-Based Medical Cases: Theoretical and Practical Foundation for Case Facilitators

Taught by Associate Professor Patrik Kristoffer Kjærdsdam Telléus

This course provides a solid introduction to the theoretical and practical foundation of case facilitation with problem-based learning. A special focus is on the role of the case facilitator, and the practicalities of case facilitation, down to the level of what to bring to a session and other experiences.

The Aesthetic Experience and the Aesthetics of Slowness – PhD summer school

Organised by Professor Lone Dirckinck-Holmfeld

An interdisciplinary course that combines perspectives of artists, art critics, philosophy, learning, human-computer interaction, and other theories and examines the concept of aesthetic experience through the aesthetics of slowness in both theory and practice.

Understanding Theory of Science

Organised by Associate Professor Patrik Kristoffer Kjærdsdam Telléus

The course provides participants with the opportunity to practice the art of the theory of science, to better acquaint themselves with the field, and learn how to apply its thoughts and positions. The course focuses on current problems in the theory of science that are relevant for research within the health sciences and the technological and natural sciences.

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 of research outcomes and projects are 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/)

[linkedin.com/company/ias-pbl](https://www.linkedin.com/company/ias-pbl)

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🏠 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 will function as a hub for research, knowledge sharing, competence development, collaboration and experiments with PBL. As a hub for research, development and knowledge sharing, a central task for IAS PBL is to engage and work closely with local environments in all faculties, departments, and organisational units.

PUBLICATIONS 2023

The following is a list of publications, including journal articles, conference articles, review articles, editorials, books, anthologies, book chapters, conference articles and abstracts, papers, reports and net publications, published in 2023 by IAS PBL staff.

- Abou-Hayt, I., & Dahl, B. (2023). Is the Drawing of Free Body Diagrams a Threshold Concept? In A. Guerra, J. Chen, R. Lavi, L. B. Bertel, & E. Lindsay (Eds.), *Transforming Engineering Education* (OA ed., pp. 160-166). Aalborg Universitetsforlag.
- Ali, K., Du, X., & Lundberg, A. (2023). **Does problem-based learning facilitate enactment of learner agency in undergraduate dental curricula? A Q study.** *European Journal of Dental Education*, 27(4), 823-832.
- Ali, K., Daud, A., Ba Hattab, R., Philip, N., Matoug-Elwerfelli, M., Anweigi, L., Al Khabuli, J., & Du, X. (2023). **Development of self-regulation amongst dental students in problem-based learning curricula: A qualitative study.** *European Journal of Dental Education*, 27(2), 388-395.
- Al-Thani, H., Chaaban, Y., & Du, X. (2023). **Factors influencing discipline-specific facilitators' roles in a multi-tiered professional learning programme in higher education.** *Research in Post-Compulsory Education*, 28(3), 530-549.
- Andersson, V. (2023). **T-shaped and Transferable Skills. How can University Graduates' Employability be Strengthened?** *Innovative Practice in Higher Education*, 5(1).
- Andresen, M., & Dahl, B. (2023). **Discussion about the Role of Teacher Authority when making a Transition into Creative Problem-Solving in Mathematics.** *Acta Didactica Norden*, 17(1), Article 23.
- Beagon, U., Kövesi, K., Tabas, B., Nørgaard, B., Lehtinen, R., Bowe, B., Gillet, C., & Spliid, C. M. (2023). **Preparing engineering students for the challenges of the SDGs: what competences are required?** *European Journal of Engineering Education*, 48(1), 1-23.
- Bender, C., Cichosz, S. L., Telléus, P. K., & Hejlesen, O. (2023). **Introducing a Problem Analysis Tool Implies Increase in Understanding Problem Analysis Among Students: a PBL Case.** *Journal of Problem Based Learning in Higher Education*, 11(3), 74-89.
- Bernhard, J., Davidsen, J. G., & Ryberg, T. (2023). **Group practices in a collaborative design project – A video-ethnographic study.** In R. Lyng, J. Bennedsen, L. Bettaieb, N. R. Bodsberg, K. Edstrom, M. S. Guojonsdottir, J. Roslof, O. K. Solbjorg, & G. Oien (Eds.), *19th CDIO International Conference, CDIO 2023 - Proceedings* (pp. 732-745). NTNU SEED.
- Bernhard, J., Davidsen, J. G., & Ryberg, T. (2023). **Engineering students' dynamic and fluid group practices in a collaborative design project.** In *Book of Proceedings for the 51st Annual Conference of the European Society for Engineering Education* (pp. 192-202). European Society for Engineering Education SEFI.
- Bertel, L. B., Møller Jeppesen, M., & Lisborg, S. (2023). **Problembaseret læring på tværs af uddannelseskæden: Hvordan kan vi styrke overgangen i STEM gennem arbejdet med autentiske problemer?** EMU Danmarks Læringsportal.
- Beskorsa, O., Mendel, I., Fasching, M., Otrell-Cass, K., Costello, E., Lyngdorf, N. E. R., & Brown, M. (2023). **Hacking Innovative Pedagogy: Innovation and Digitisation to Rewild Higher Education – A commented atlas.** Technical University of Graz Publishing.
- Boelt, A. M., Holgaard, J. E., & Kolmos, A. (2023). A Thematic Analysis of Engineering Students' Experiences of Teamwork in Problem-Based Learning. *International Journal of Engineering Education*, 39(3), 627-642.
- Boelt, A. M., & Clausen, N. R. (2023). Participant Direction. In A. Kolmos, & T. Ryberg (Eds.), *PBL in a Digital Age* (pp. 39-52). Aalborg Universitetsforlag.
- Chen, J., Kolmos, A., & Clausen, N. R. (2023). **Gender differences in engineering students' understanding of professional competences and career development in the transition from education to work.** *International Journal of Technology and Design Education*, 33(3), 1121-1142.
- Chen, J., Hasan, M. A., Du, X., & Kolmos, A. (2023). **Exploring Students' Perception of the Influence of PBL Elements on the Development of Engineering Identity.** *I E E E Transactions on Education*, 66(4), 393-403.
- Chen, J., Du, X., Chaaban, Y., Velmurugan, G., Lyngdorf, N. E. R., Nørgaard, B., Routh, H. W., Hansen, S., Guerra, A. O. P. D. C., & Bertel, L. B. (2023). **An Exploration of Sources Fostering First-year Engineering Students' Academic Well-Being in a PBL Environment.** *I E E E Transactions on Education*, 66(5), 421-430. Article 10126080.
- Chen, J., Bai, S., Chaaban, Y., & Du, X. (2023). **Sources Fostering Academic Well-Being: Students' Perspectives In A PBL Context.** In G. Reilly, M. Murphy, B. V. Nagy, & H-M. Jarvinen (Eds.), *SEFI 2023 - 51st Annual Conference of the European Society for Engineering Education: Engineering Education for Sustainability, Proceedings* (pp. 256-264).
- Christensen, R. B., Dahl, B., & Fajstrup, L. (2023). Transforming First-Year Calculus Teaching for Engineering Students – Field Specific Examples, Problems, and Exams. In A. Guerra, J. Chen, L. Rea, L. B. Brogaard, & E. Lindsay (Eds.), *Transforming Engineering Education* (OA ed., pp. 303-308). Aalborg Universitetsforlag.
- Christiansen, S. H., Chen, J., & Du, X. (2023). **Cross-institutional collaboration in engineering education – a systematic review study.** *European Journal of Engineering Education*, 48(6), 1102-1129.

- Christiansen, S. H., Markman, A. O., Guerra, A., & Du, X. (2023). **A Scoping Review: Examples on Mission-Driven and Mission-Oriented Innovation in Engineering Education Research.** In G. Reilly, M. Murphy, B. V. Nagy, & H-M. Jarvinen (Eds.), *SEFI 2023 - 51st Annual Conference of the European Society for Engineering Education: Engineering Education for Sustainability, Proceedings* (pp. 1813-1829). European Society for Engineering Education SEFI.
- Chaaban, Y., Qadhi, S., Al-Thani, H., Floyd, A., & Du, X. (2023). **Supports and constraints to middle leadership development in higher education: A Q-methodology study.** *Educational Management Administration and Leadership*.
- Chaaban, Y., Al-Thani, H., & Du, X. (2023). **University teachers' professional agency for learning and leading sustainable change.** *Professional Development in Education*, 49(6), 978-993.
- Chaaban, Y., Du, X., Lundberg, A., & Abu-Tineh, A. (2023). **Education Stakeholders' Viewpoints about an ESD Competency Framework: Q Methodology Research.** *Sustainability (Switzerland)*, 15(3), Article 1787.
- Dalsgaard, C., & Ryberg, T. (2023). **A theoretical framework for digital learning spaces: learning in individual spaces, working groups, communities of interest, and open connections.** *Research in Learning Technology*, 31, Article 3084.
- Davidson, J. G., McIlvenny, P., & Ryberg, T. (2023). **Researching Interactional and Volumetric Scenographies – Immersive Qualitative Digital Research.** In P. Jandrić, A. MacKenzie, & J. Knox (Eds.), *Constructing Post-digital Research: Method and Emancipation* (pp. 119-136). Springer.
- Dirckinck-Holmfeld, L. (2023). **SMART Cities: Social Design. Visiting Professor. Pontifical Catholic University of Rio de Janeiro. the CAPES program.** Aalborg University.
- Dirckinck-Holmfeld, L., Bygholm, A., & Tabo, G. O. (2023). **Transforming education through ICT: Exploring students' study practices in a resource-constrained university setting.** *British Journal of Educational Technology*, 54(6), 1463-1483.
- Du, X., Al Khabuli, J. O. S., Ba Hattab, R. A. S., Daud, A., Philip, N. I., Anweigi, L., Matoug-Elwerfelli, M., & Ali, K. (2023). **Development of professional identity among dental students – A qualitative study.** *Journal of Dental Education*, 87(1), 93-100.
- Du, X., Ibiapina, C. D. C., Kassab, S. E., & Yan, A. (2023). **Good advice from authors working in under-represented countries.** *Medical Education*, 57(6), 493-495.
- Du, X., Guerra, A. O. P. D. C., Chen, J., Lindsay, E., & Nørgaard, B. (2023). **Supporting change in Polish higher education: Academic middle leaders' perspectives.** *Educational Management, Administration & Leadership*, 1-26.
- Ejsing-Duun, S., & Pischetola, M. (2023). **'Does it matter?': Learning through Aesthetic Experiences in a Higher Education Communication Design Course.** *Postdigital Science and Education*, 5(3), 799-822.
- Ellemose Lindvig, K., Nøhr, L., & Stenalt, M. H. (2023). *Fra idealer til skyggesider – hvordan får vi det hele med i universitetspædagogiske forløb?* Abstract from Dansk Universitetspædagogisk Konference 2023, Kolding.
- Elmose, S. (2023). **Naturfagskapital hos naturfagslærere: et teori- og metodeudviklingsstudie.** *MONA - Matematik- og Naturfagsdidaktik*, 23(2), 44-63. Article 3.
- F. C. Servant-Miklos, V., Holgaard, J. E., & Kolmos, A. (2023). **Sustainability Matters: The Evolution of Sustainability Awareness, Interest and Engagement in PBL Engineering Students.** *Journal of Problem Based Learning in Higher Education*, 11(1), 124-154.
- Floyd, A., Qadhi, S. M., Al-Thani, H., Chaaban, Y., & Du, X. (2023). **An integrated systems model for understanding experiences of academic leadership development in Qatar.** *Journal of Higher Education Policy and Management*, 45(6), 690-705.
- Friedrichsen, D., Winther, M., & Kolmos, A. (2023). **The Need For Interdisciplinarity: A Case On Employees' Perspectives.** In G. Reilly, M. Murphy, B. V. Nagy, & H-M. Jarvinen (Eds.), *SEFI 2023 - 51st Annual Conference of the European Society for Engineering Education: Engineering Education for Sustainability, Proceedings* (pp. 468-476)
- Gamborg, M. L., Rasmussen, S., Andersen, S., & Telléus, P. K. (2023). *Building bridges through reflective portfolios in clinical clerkship.* Poster presented at AMEE 2023, Glasgow, United Kingdom.
- Guerra, A. O. P. D. C., Nørgaard, B., & Du, X. (2023). **University Educators' Professional Learning in a PBL Pedagogical Development Programme.** *Journal of Problem Based Learning in Higher Education*, 11(1), 36-59.
- Guerra, A., Chen, J., Lavi, R., Bertel, L. B., & Lindsay, E. (Eds.) (2023). **Transforming Engineering Education.** (OA ed.) Aalborg Universitetsforlag. International Research Symposium on PBL
- Guerra, A. O. P. D. C., Ruge, G., & Ranito, J. J. (2023). Who am I and why am I here? Academic staff viewpoints on CBL and towards a sustainability mindset. In *Transforming Engineering Education* (OA ed., pp. 138-142). Aalborg Universitetsforlag.
- Guerra, A., & Jiang, D. (2023). **Building Collaboration and Learning Mechanisms for Sustainable Development.** In G. Reilly, M. Murphy, B. V. Nagy, & H-M. Jarvinen (Eds.), *SEFI 2023 - 51st Annual Conference of the European Society for Engineering Education: Engineering Education for Sustainability, Proceedings* (pp. 3158-3162). SEFI: European Association for Engineering Education.
- Hanhøj, T. (2023). **Students as Educational Board Game Designers: Learning Opportunities and Design Dilemmas.** In T. Spil, G. Bruinsma, & L. Collou (Eds.), *Proceedings of the 17th European Conference on Games Based Learning, ECGBL 2023* (pp. 234-241). Academic Conferences and Publishing International.

- Hansen, S., & Bertel, L. B. (2023). **Becoming a Creative Genius: How a Creative Learning Environment Can Facilitate Transdisciplinary Engagement and Creative Mindsets in a Life-Long Learning Perspective.** *Journal of Problem Based Learning in Higher Education*, 11(2), 34-53.
- Hautopp, H., Hanghøj, T., Händel, V. D., Laraignou, A. S., Jensen, E. O., & Gundersen, P. B. (2023). **Facilitating an Educational Board Game Jam: Analysing Different Game Design Strategies.** In T. Spil, G. Bruinsma, & L. Collou (Eds.), *Proceedings of the 17th European Conference on Games Based Learning, ECGBL 2023* (1 ed., Vol. 17, pp. 242-250). Academic Conferences and Publishing International.
- Holgaard, J. E., Romme, A., Routhe, H. W., & Kolmos, A. (2023). Facilitating PBL Meta-competences in Engineering Education. In A. Guerra, J. Chen, R. Lavi, L. Brogaard Bertel, & E. Lindsay (Eds.), *Transforming Engineering Education* (OA ed., pp. 75-80). Aalborg Universitetsforlag.
- Horvath, A-S., Beloff, L., Bertel, L. B., Boros, J., Sarahuja, L., Fricker, P., Hamidi, F., Hanczyc, M. M., Jochum, E., Löchtefeld, M., Merritt, T. R., & Vissonova, K. (2023). **Weaving Hybrid Futures: Sustainability in Higher Education with PBL Through Art, Science, and Robotics.** *Journal of Problem Based Learning in Higher Education*, 11(2), I-VII.
- Händel, V. D. (2023). **Student teacher's prerequisite to be embodied playful presence in lessons with playful approaches to learning.** *Journal of Play in Adulthood*, 5(1), 82-106.
- Händel, V. D., Schrøder, V., Birkefoss, K., & Händel, M. N. (2023). **Interplay between playful learning, digital materials and physical activity in higher education: A systematic review of qualitative studies using meta-aggregation and GRADE-CERQual.** *International Journal of Educational Research Open*, 5, Article 100284.
- Haase, L. M., Holgaard, J. E., & Kolmos, A. (2023). The Complexity of Engineering Education in a Mission Driven PBL University. In A. Guerra, J. Chen, R. Lavi, L. Bertel, & E. Lindsay (Eds.), *Transforming Engineering Education* (OA ed., pp. 172-177). Aalborg Universitetsforlag.
- Jensen, E. O., Nehammer, E. M. H., & Eriksen, A. L. (2023). **Enhancing Mathematical Reasoning in Primary School with the Strategic Board Game Othello.** In T. Spil, G. Bruinsma, & L. Collou (Eds.), *Proceedings of the 17th European Conference on Games Based Learning, ECGBL 2023* (Vol. 17, pp. 289-295). Academic Conferences and Publishing International.
- Jiang, D., Dahl, B., Chen, J., & Du, X. (2023). **Engineering Students' Perception of Learner Agency Development in an Intercultural PBL (Problem- and Project-based) Team Setting.** *I E E Transactions on Education*, 66(6), 591-601. Article 10124721.
- Jiang, D., Dahl, B., & Du, X. (2023). **A Systematic Review of Engineering Students in Intercultural Teamwork: Characteristics, Challenges, and Coping Strategies.** *Education Sciences*, 13(6), Article 540.
- Johri, A., Lindsay, E., & Qadir, J. (2023). **Ethical concerns and responsible use of generative artificial intelligence in engineering education.** In G. Reilly, M. Murphy, B. V. Nagy, & H-M. Jarvinen (Eds.), *SEFI 2023 - 51st Annual Conference of the European Society for Engineering Education: Engineering Education for Sustainability, Proceedings* (pp. 2244-2253). SEFI: European Association for Engineering Education.
- Juhl, L. B., Stegeager, N., Ravn, O., & Davidsen, J. G. (2023). **Problem-based Learning as a Driver for Organizational Change.** Paper presented at European Conference on Educational Research, Glasgow, United Kingdom.
- Knudsen, S. P., Sterregaard, J. S., Ørngreen, R., Jensen, R. G. H., Hautopp, H., & Vesterheden, L. R. (2023). **Fremtidens undervisningslokale: Undersøgelse af brug af Sony Edge Analytics på AAU.**
- Knudsen, S. P., Ørngreen, R., Jensen, R. G. H., Hautopp, H., Sterregaard, J. S., & Vesterheden, L. R. (2023). **Fremtidens undervisningslokale: XR-teknologier.**
- Kolmos, A., & Ryberg, T. (Eds.) (2023). **PBL in a Digital Age.** Aalborg Universitetsforlag. Studies into Problem Based Learning in Higher Education
- Kolmos, A., & Ryberg, T. (2023). New Realities and PBL Futures. In *PBL in a Digital Age* (pp. 11-26). Aalborg Universitetsforlag.
- Kolmos, A., & Ryberg, T. (2023). Bringing it Together - Four Problem-Based Learning Scenarios. In *PBL in a Digital Age* (pp. 145-158). Aalborg Universitetsforlag.
- Kolmos, A. (2023). *A Journey in an Academic Life.* Aalborg Universitet.
- Korning, I. M. L., & Nørgaard, B. (2023). *Continuing Engineering Education New Paradigms?* Abstract from ETALEE: Exploring Teaching for Active Learning in Engineering Education 2023, Horsens, Denmark.
- Korning, I. M. L., & Lindsay, E. (2023). **Academics' experiences of participating in a microcredentials development experiment.** In *Proceedings of the 34th Annual Conference of the Australasian Association for engineering education (AAEE 2023)* AAEE - Australasian Association for Engineering Education.
- Korning, I. M. L., & Nørgaard, B. (2023). **European and National Strategies Supporting Development and Implementation of Continuing Engineering Education at Scandinavian Universities.** In *SEFI 2023 - 51st Annual Conference of the European Society for Engineering Education: Engineering Education for Sustainability, Proceedings* SEFI: European Association for Engineering Education.
- Larsen, B., Larsen, G., & Dirckinck-Holmfeld, L. (2023). **'Master of Science (MSc) in Information Science (Information Studies) ved Aalborg Universitet, København Campus 2017 - 2023.**
- Lindenskov, L., Hoogland, K., & Søndergaard, B. D. (2023). **Algebra i erhvervsskolen.**

Lindsay, E., & Jahromi, M. N. S. (2023). **The development of an artificial intelligence classifier to automate assessment in large class settings: Preliminary results.** *ASEE Annual Conference and Exposition, Conference Proceedings*, Article 37769.

Lindsay, E., Geil, O., & Møller Jeppesen, M. (2023). Microcredentials to support PBL. In *Transforming Engineering Education* (OA ed., pp. 39-43). Aalborg Universitetsforlag.

Lisborg, S., Hansen, S., Bertel, L. B., Møller Jeppesen, M., Dahl, B., Otto, S., Nielsen, C. G., Henriksen, L. B., & Krarup, J. F. (2023). Work-in-Progress: STEMification - towards a framework for supporting teachers' professional development in PBL with a focus on engineering education transitions. In A. Guerra, J. Chen, R. Lavi, L. B. Bertel, & E. Lindsay (Eds.), *Transforming Engineering Education* (OA ed., pp. 224-229). Aalborg Universitetsforlag.

Lolle, E. L., Scholkmann, A., & Kristensen, N. S. (2023). Reflections: What are they and how to work with them? In A. Kolmos, & T. Ryberg (Eds.), *PBL in a Digital Age* (pp. 89-102). Aalborg Universitetsforlag.

Lyngdorf, N. E. R., Du, X., & Lundberg, A. (2023). **First-year engineering students' learner agency sources in a systemic PBL environment: A Q study.** *European Journal of Engineering Education*, 48(6), 1130-1147.

Lyngdorf, N. E., Ruggaard, S. T., Otrell-Cass, K., & Costello, E. (2023). **The Hacking Innovative Pedagogies (HIP) framework: Rewilding the digital learning ecology.** Aalborg University.

Lyngdorf, N. E. R., & Leegaard, J. H. (2023). **A Framework for a Scoping Review of Digital Transformation of Engineering Education.** In G. Reilly, M. Murphy, B. V. Nagy, & H-M. Jarvinen (Eds.), *SEFI 2023 - 51st Annual Conference of the European Society for Engineering Education: Engineering Education for Sustainability, Proceedings* (pp. 855-862). SEFI: European Association for Engineering Education.

Løkke, S., Nielsen, H. N., & Holgaard, J. E. (2023). **Problem-Based Learning Approach Facilitating Sustainable Waste Management.** *Journal of Problem Based Learning in Higher Education*, 11(3), 119-129.

Markman, A. O., Christiansen, S. H., & Du, X. (2023). Exploring Engineering Students' Perception of Their Career Preparedness in a Systemic PBL Context in Denmark. In G. Reilly, M. Murphy, B. V. Nagy, & H-M. Jarvinen (Eds.), *SEFI 2023 - 51st Annual Conference of the European Society for Engineering Education: Engineering Education for Sustainability, Proceedings* (pp. 873-882). SEFI: European Association for Engineering Education.

Milner, A. L., & Scholkmann, A. (2023). **Future teachers for future societies: transforming teacher professionalism through problem-based professional learning and development.** *Professional Development in Education*, 49(4), 739-751.

Mokoka, B., Smith, L., Wolff, K., & Bertel, L. B. (2023). Work in progress: Project-based learning and culturally-responsive pedagogy: An approach to foster self-efficacy and inclusivity in Undergraduate Engineering Education. In A. Guerra, J. Chen, R. Lavi, L. B. Bertel, & E. Lindsay (Eds.), *Transforming Engineering Education* (OA ed., pp. 272-276). Aalborg Universitetsforlag.

Napoleone, A., Bertel, L. B., & Andersen, A-L. (2023). PBL Requirements and Challenges for Teachers in Industrial Engineering Education. In *Transforming Engineering Education* (OA ed., pp. 211-218). Aalborg Universitetsforlag.

Nielsen, C. G., & Jensen, C. S. (2023). Action competence in PBL: Revitalizing educational ideals to foster meaning and engagement in engineering education for sustainable development. In A. Guerra, J. Chen, R. Lavi, L. Bertel, & E. Lindsay (Eds.), *Transforming Engineering Education* (OA ed., pp. 143-147). Aalborg Universitetsforlag.

Nielsen, K., Bertel, L. B., Kaltoft, P., & Krabbe Sillasen, M. (2023). **Behov for et tydeligt teknologibegreb: om teknologi og teknologisk dannelse i STEM.** *MONA - Matematik- og Naturfagsdidaktik*, 4, 95-115.

Nunez, H. C., Dirckinck-Holmfeld, L., & Tabo, G. O. (2023). **How to support teachers in becoming teachers as designers of student-centred approaches.** *Design and Technology Education: An international journal*, 28(2), 170-190.

Nxasana, S. E., Chen, J., Du, X., & Ahmed Hasan, M. (2023). **Teachers' Pedagogical Beliefs in a Project-Based Learning School in South Africa.** *Education Sciences*, 13(2), 140-157. Article 140.

Nøhr, L., Ellemose Lindvig, K., & Stenalt, M. H. (2023). *Fra nødundervisning til "ny normal" undervisning - indblik i succeser og skyggesider.* Abstract from Dansk Universitetspædagogisk Konference 2023, Kolding.

Nøhr, L., Stenalt, M. H., & Hagood, D. (2023). **University Teachers' Agency in Relation to Technology Use in Teaching: A Quantitative Investigation.** *EduTec, Revista Electrónica de Tecnología Educativa*, 86, 40-61.

Nørgaard, B., Korning, I. M. L., Bárcena-Caballero, L., & Caratozzolo, P. (2023). Practices and Trends in Continuing Engineering Education at Scandinavian and Mexican Universities. In A. Guerra, J. Chen, R. Lavi, L. Brogaard Bertel, & E. Lindsay (Eds.), *Transforming Engineering Education* (OA ed., pp. 7-11). Aalborg Universitetsforlag.

Nørlem, J., & Korsgaard, H. (2023). Mattering - elevers oplevelse af betydningsfuldhed i arbejdet med materialitet i PBL. In P. Andersen, & M. Sonne Kaa Sunesen (Eds.), *Projektbaseret undervisning* (pp. 99-120). Dafolo Forlag A/S.



Otrell-Cass, K., Mendel, I., Reicho, M., Costello, E., Beskorsa, O., & Lyngdorf, N. E. R. (2023). Rewilding Higher Education Pedagogy: A Partnership Project. In *University of Graz EERA - European Educational Research Association*.

Otto, S., & Bertel, L. B. (2023). Engineering Students' Perceptions of Digital Competences in a PBL Environment. In A. Guerra, J. Chen, R. Lavi, L. Brogaard Bertel, & E. Lindsay (Eds.), *Proceedings of the 9th International Research Symposium on PBL (IRSPBL2023): Transforming Engineering Education* (pp. 118-123). Aalborg Universitetsforlag.

Paulsen, L., Davidsen, J. G., Larsen, D. V., & Rasmussen, S. (2023). **Kol-laborativ læring i social 360VR: Et systematisk review af et nyt digitalt læringsrum**. *Tidsskriftet Læring og Medier (LOM)*, 16(27).

Paulsen, L., Dau, S., & Davidsen, J. G. (2023). **Immersive spaces for participation and collaborative reflection**. In M. Georgsen, S. Dau, & L. Helverskov Horn (Eds.), *Proceedings for the European Conference on Reflective Practice-based Learning 2023 : Aalborg, November 20th-22nd 2023* (pp. 15-16). Aalborg Universitetsforlag.

Routhe, H. W., Holgaard, J. E., & Kolmos, A. (2023). **Experienced Learning Outcomes for Interdisciplinary Projects in Engineering Education**. *IEEE Transactions on Education*, 66(5), 487-499.

Ryberg, T., & Kolmos, A. (2023). Hybridisation, Variation and Reflection: New PBL Curriculum Principles. In *PBL in a Digital Age* (pp. 27-38). Aalborg Universitetsforlag.

Scholkmann, A. (2023). **Who are the frontline workers of digital transformations in higher education? A conceptual elaboration**. In R. Pinheiro, L. Barman, L. Degn, L. Geschwind, & C. E. Tømte (Eds.), *Digital Transformations in Nordic Higher Education* (pp. 175-195). Palgrave Macmillan.

Scholkmann, A., Stegeager, N., & Miller, R. (2023). **Integrating the Integration: The Role and Challenges of Problem-Based Learning in Bringing Together Social Science and Humanities (SSH) and Science, Technology, Engineering and Mathematics (STEM)**. *Journal of Problem Based Learning in Higher Education*, 11(1), 98-123.

Scholkmann, A., Boelt, A. M., Lolle, E. L., & Kolmos, A. (2023). PBL Competences and Progression. In A. Kolmos, & T. Ryberg (Eds.), *PBL in a Digital Age* (pp. 103-116). Aalborg Universitetsforlag.

Scholkmann, A., Tretow-Fish, T. A. B., Otrell-Cass, K., & Lolle, E. L. (2023). **Researching Student Competence Development through the Lens of Cultural Historical Activity Theory**. *Teaching in Higher Education*.

Servant-Miklos, V., Dolmans, D., & Ryberg, T. (2023). PBL, Change or Risk Irrelevance: A Friendly Warning. *Health Professions Education*, 9(1), 9-12.

Servant-Miklos, G., Du, X., Holgaard, J. E., & Stegeager, N. (2023). **Strength in Diversity: Future-proofing PBL Research and Practice Special Issue**. *Journal of Problem Based Learning in Higher Education*, 11(1), I-VI.

Stegeager, N., Korsgaard, H., Jensen, L. B., Thomsen, T. L., & Nørlem, J. (2023, Jun). **PBL – Problem- og projektbaseret læring**.

Stegeager, N., & Traulsen, S. J. (2023). *Pædagogisk overbevisning og praksis blandt deltagere på universitetspædagogikum ved Aalborg Universitet*. Paper presented at DUN konference 2023, Kolding, Denmark.

Stegeager, N., Korsgaard, H., & Thomsen, T. L. (2023). **Professional Learning and Pedagogical Development in Primary Education: Problem-based Learning as a Driver for Professional Development**. Paper presented at European Conference on Educational Research, Glasgow, United Kingdom.

Stenalt, M. H., & Rossen, D. S. (2023). **DUT Guide on meaningful digital teaching-learning interactions**. *Dansk Universitetspædagogisk Tidsskrift*, 18(34), 59-69.

Søndergaard, B. D. (2023). **Formativ og summativ evaluering af matematiske kompetencer set ud fra SOLO-taksonomien**. *Sammenlignende Fagdidaktik*, 2023(7), 137-156.

Søndergaard, B. D. (Performer). (2023). Præsentation af ekspertgruppen erhvervsskole v. Bettina Dahl Søndergaard. Sound/Visual production (digital).

Søndergaard, B. D., & Telléus, P. K. (2023). **Eighteenth Issue of the Journal of Problem Based Learning in Higher Education**. *Journal of Problem Based Learning in Higher Education*, 11(3), i-iii.

Sørensen, M. T., Bruun-Pedersen, J. R., Ryberg, T., & Velmurugan, G. (2023). New Forms of Collaboration. In A. Kolmos, & T. Ryberg (Eds.), *PBL in a Digital Age* (pp. 69-87). Aalborg Universitetsforlag.

Tarlochan, F., Labda, W. K., Naji, K. K., & Du, X. (2023). Work-In-Progress: Examining Engineering Students' Perception of Student Agency in Solving Complex Engineering Problem. In *Transforming Engineering Education* (OA ed., pp. 277-281). Aalborg Universitetsforlag.

Telléus, P. K., Bertel, L. B., Velmurugan, G., & Kofoed, L. B. (2023). Problems, Complexity and Interdisciplinarity. In A. Kolmos, & T. Ryberg (Eds.), *PBL in a Digital Age* (pp. 53-67). Aalborg Universitetsforlag.

Telléus, P. K. (2023). **Wittgenstein, Problem-based Learning and Higher Education**. In A. Skilbeck, & P. Standish (Eds.), *Wittgenstein and Education: On not sparing others the trouble of thinking* (pp. 151-161). Wiley.

Thorndahl, K. L., Kuby, C., Telléus, P. K., & Stentoft, D. (2023). Playful Encounters With Problematic Paradoxes in Problem-Based Project Work: An Impressionist Expeculation in Three Parts. In L-M. Geberth, & L-T. Woller (Eds.), *University in the 21st Century* (pp. 191-201). Information Age Publishing.

Velmurugan, G., Munk Andersen, S., Lisborg, S., & Ejsing-Duun, S. (2023). Work-in-Progress: How to assess Collaboration in Problem-Based Learning to Promote Sustainability in Future Engineers. In A. Guerra, J. Chen, R. Lavi, L. B. Bertel, & E. Lindsay (Eds.), *Transforming Engineering Education* (pp. 148-153). Aalborg Universitetsforlag.

Velmurugan, G., & Friedrichsen, D. (2023). **Improving Employability with a Competence Profile**. In G. Reilly, M. Murphy, B. V. Nagy, & H-M. Jarvinen (Eds.), *SEFI 2023 - 51st Annual Conference of the European Society for Engineering Education: Engineering Education for Sustainability, Proceedings* (pp. 3003-3012). SEFI: European Association for Engineering Education.

Wichmand, M., Pischetola, M., & Dirckinck-Holmfeld, L. (2023). **How to Design for the Materialisation of Networked Learning Spaces. A Cross-Case Analysis**. In *Sustainable Networked Learning* (pp. 145-165). Springer.

Wollscheid, S., Scholkmann, A., Sutherland Olsen, D., & Capasso, M. (2023). **Digital transformations in higher education in result of the Covid-19 pandemic: Findings from a scoping review**. In R. Pinheiro, L. Barman, L. Degn, L. Geschwind, & C. E. Tømte (Eds.), *Digital Transformations in Nordic Higher Education* (pp. 217-242). Palgrave Macmillan.

Zhao, Y., & Du, X. (2023). Work-In-Progress: Using research-focused PBL to support computer engineering students' learning engagement in a systemic PBL environment. In *Transforming Engineering Education* (OA ed., pp. 287-291). Aalborg Universitetsforlag.

Østergaard, L. D. (2023). Teori-praksis kobling i idrætsundervisningen – hvad er meningen? In *BRIDGING 2023. BOOK OF ABSTRACTS: HVAD ER MENINGEN? Leg, glæde og dannelse i bevægelse* (pp. 6)



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