AAU Professional skills Lab (ProLab): Promoting Transversal Skill Development in STEM through Student Self-Selected Interdisciplinary Workshops

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Abstract

The growing demand for well-rounded STEM professionals underscores the importance of developing non-technical professional skills like communication, collaboration, critical thinking, AI literacy, and systems thinking, or *transversal skills*, alongside technical expertise. Aalborg University (AAU) has long refined methods for fostering such transversal skills within its PBL framework. This paper presents AAU ProLab, a new initiative that replaced program-specific workshops with full-day interdisciplinary workshop events, bringing together students from various programs and semesters across the faculties of Engineering, Natural Science, and IT & Design. The initiative aimed to enhance motivation by allowing students to choose workshops aligned with their interests and connect across disciplines.

The evaluation, based on an online student survey, included three quantitative questions on recommendation, relevance, and achievement of learning objectives, alongside qualitative feedback. Results showed high satisfaction, with students valuing interdisciplinarity, workshop diversity, and freedom of choice. Suggestions for improvement centered on clearer communication, streamlined registration, and strengthening active learning.

Subsequent editions have already addressed these issues through a dedicated Moodle space for information, a simplified registration model, and revised workshop allocation. Most workshops now emphasize interactive, application-oriented learning, supported by feedback from both students and facilitators. ProLab thus represents a promising platform for supporting interdisciplinary learning and transversal skill development.

Keywords: Transversal skills, Interdisciplinarity, Active Learning, Evaluation

1 Introduction

In response to the increasing demand for well-rounded STEM professionals Aalborg University (AAU) launched a new experimental framework to support students' development of strong non-technical professional skills, or *transversal skills*, such as communication, collaboration, critical thinking, systems thinking, and digital literacy alongside their technical expertise. As society continues to grapple with increasingly complex and interdisciplinary challenges, universities are continuously rethinking engineering and science educational programs to foster broader skill sets that extend beyond disciplinary knowledge and support life-long learning (International Commission on the Futures of Education, 2021; OECD, 2018).

While the Aalborg problem-based learning (PBL) model does aim to foster initial development of generic competences in first year engineering education as well as progression throughout the education (Boelt et al., 2021; Clausen, 2021), students are often struggling to apply these competences in practice, particularly in interdisciplinary settings (Bertel et al., 2022). Thus, in 2024 Aalborg University piloted a new initiative, the AAU Professional skills Lab (ProLab), to consolidate previously local and isolated program-specific workshops into full-day interdisciplinary events open to students across all programs at the Faculty of Engineering and Science and the Technical Faculty of IT and Design. The initiative was deliberately designed to align with the progressive PBL learning objectives embedded within the curricula of the participating study programs. In this way, ProLab activities are closely connected to students' disciplinary and methodological competency development throughout their studies, while demonstrating transferability in an interdisciplinary setting.

AAU ProLab, running over several weeks across three campuses in Esbjerg, Aalborg and Copenhagen, featured joint introductions, multiple workshop rounds, and opportunities for cross-program networking. Students freely selected workshops based on their interests and needs, from a selection of topics such as ethical technology assessment, SCRUM techniques, conflict resolution, and AI in study practice. The workshop format of the initiative especially aimed at encouraging interdisciplinary collaboration and foster intrinsic motivation by allowing personalized learning paths and student self-direction. This paper presents findings from an evaluation of the inaugural AAU ProLab, in which both the successes and areas for improvement were highlighted by the students. Further, implications for future practice are discussed.

1.1 Background:

The ProLab concept was developed by AAU's Aalborg Centre for Problem Based Learning in Engineering Science and Sustainability under the auspices of UNESCO. The initiative was designed to replace a previous implementation with local, program-specific PBL workshops with joint, full-day yearly recurring events featuring a large selection of workshops open to science and engineering students across faculties. The rationale for the development was threefold:

1. To foster interdisciplinary collaboration by bringing students together across different programs and campuses.
2. To strengthen transversal professional competencies aligned with the evolving needs of industry and society.
3. To increase intrinsic student motivation through self-direction, allowing participants to choose workshops based on their interests and perceived needs.

One important practical implication of ProLab was that the pooling of more students allowed for a much more personalized learning experience for the individual student, since it afforded the organisers the opportunity to offer up and host a much wider selection of workshops. In developing these workshops, particular attention was paid to formats that reflected real-world relevance and encouraged active student participation.

Semester
2nd: 340
4th – 6th: 348
Campus
Aalborg: 495
Copenhagen: 168
Esbjerg: 25

ProLab was implemented as a series of events throughout March and April of 2024, hosted at the Copenhagen (CPH), Aalborg (AAL), and Esbjerg (ESB) campuses. A total of 688 students registered to participate across all campuses and semesters, as elaborated in Table 1. Students could receive a digital diploma or badge for participation, although the badge distribution process was noted to be complicated and in need of improvement.

Each ProLab day followed a standard format:

- 08.30 – 08.45: Joint Introduction
- 09.00 – 10.50: Workshop Round 1
- 11.00 – 12.50: Workshop Round 2
- 13.00 – 14.00: Lunch and networking (including optional student poster sessions)
- 14.00 – 15.50: Workshop Round 3

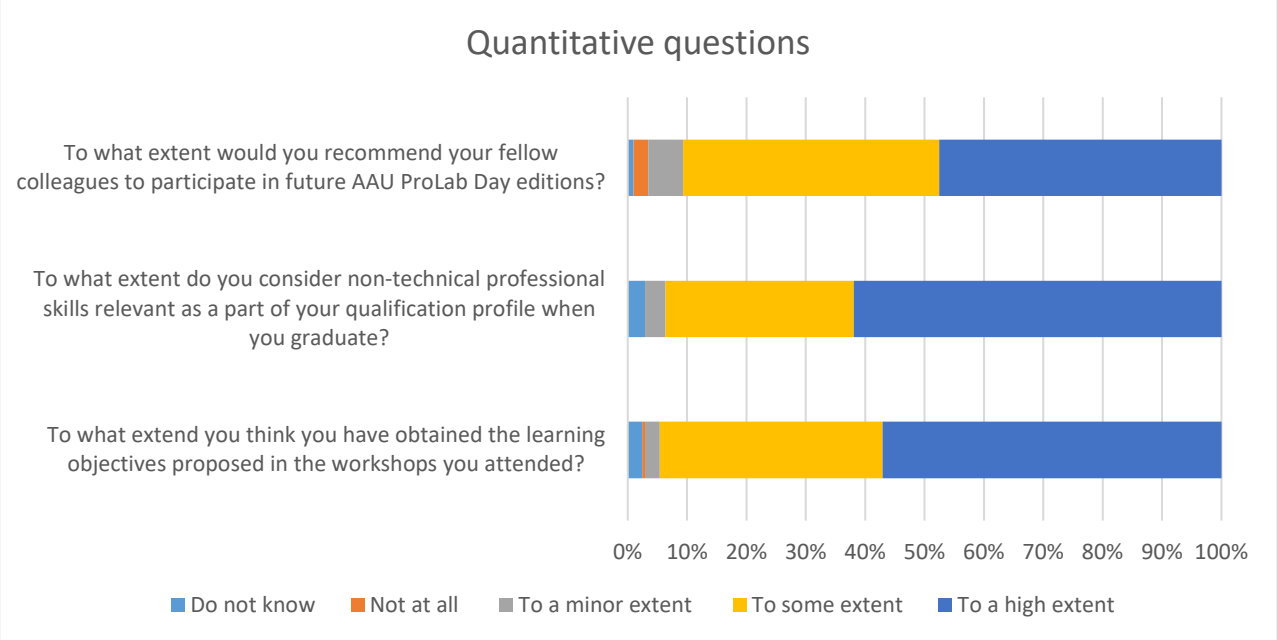
During the joint introductions students were introduced to the format of the day, workshops, their facilitators and reasoning behind the ProLab initiative. During the lunch break, some campuses offered an open poster session where students could present project pitches and their peers as well as academic supervisors were invited to participate and provide feedback.

Workshops were organized around cross-cutting themes such as conflict resolution, systems thinking, ethical technology assessment, digital project practices, and generative AI in project work. The workshops were adapted to perceived semester-specific needs, e.g. 2nd semester students were offered more foundational topics such as interdisciplinary problem design and work-life balance, while 4th and 6th semester students engaged in more advanced sessions related to e.g. leadership, creativity, professional identity, and entrepreneurship. Across the board, students could choose from a wide range of topics as can be seen in table 2.

2nd Semester	**4th and 6th semester**
Interdisciplinary problem design	Designing and solving complex problems
Systems thinking in engineering	Systems thinking in engineering
Ethical technology assessment	Ethical technology assessment
Conflict resolution strategies	Conflict resolution strategies
Collaboration across disciplines	Culture, group dynamics and safety
Facilitating productive meetings	Professional communication with external partners
Further development of digital practices in project work	Project management and leadership
SCRUM techniques in project work	Further development of digital practices in project work
Generative AI in study practice	Professional identity development
Motivation, well-being and work-life balance	Creativity and entrepreneurship

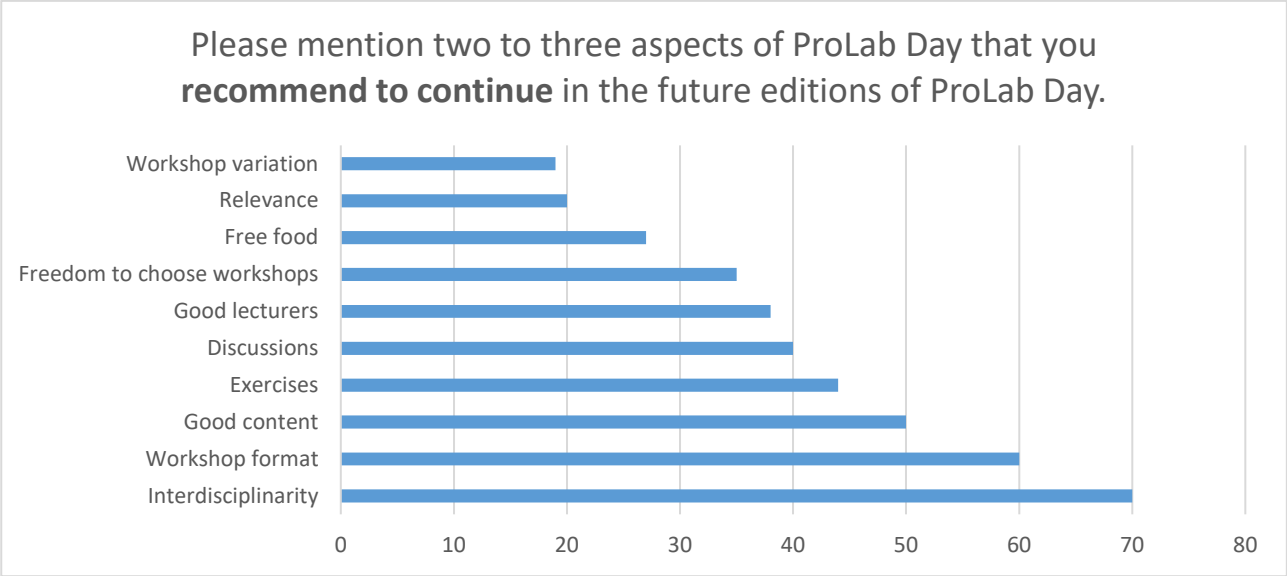
2 Evaluation

The ProLab pilot was evaluated through an online student survey distributed throughout the events where students answered 3 quantitative and 2 qualitative questions. 209 students answered the evaluation survey amounting to a response rate of about 30% of all registered students, however it is important to note that not all registered student attended the events, so the actual response rate is somewhat higher than the reported. All data analysis for this paper was conducted in MS Excel, Nvivo 14 and SPSS 29. The students answered the below quantitative questions on a 4-point scale:



Overall, the results from the quantitative part of the evaluation suggest that more than 90% of the students would to some or a high extent recommend their fellow colleagues to participate in future AAU ProLab days, consider non-technical professional skills relevant as a part of their qualification profile upon graduation and think that they have obtained the learning objectives proposed in the workshops they attended. The results indicate that the students value transversal skills and that they feel that the format and execution of ProLab support their development. While not all students found each workshop equally worthwhile, the evaluation indicate an overall satisfaction with and engagement in the themes of the ProLab concept.

The students also answered two qualitative questions where they were asked to note two to three things they would suggest improving or continue doing in future iterations of ProLab. The answers were submitted as free text and was later analysed and coded in Nvivo 14 by the authors according to the overall theme of the suggestions.



Three overall themes emerged from the question about what to continue in future editions of ProLab:

Interdisciplinarity (mentioned in 70 responses):

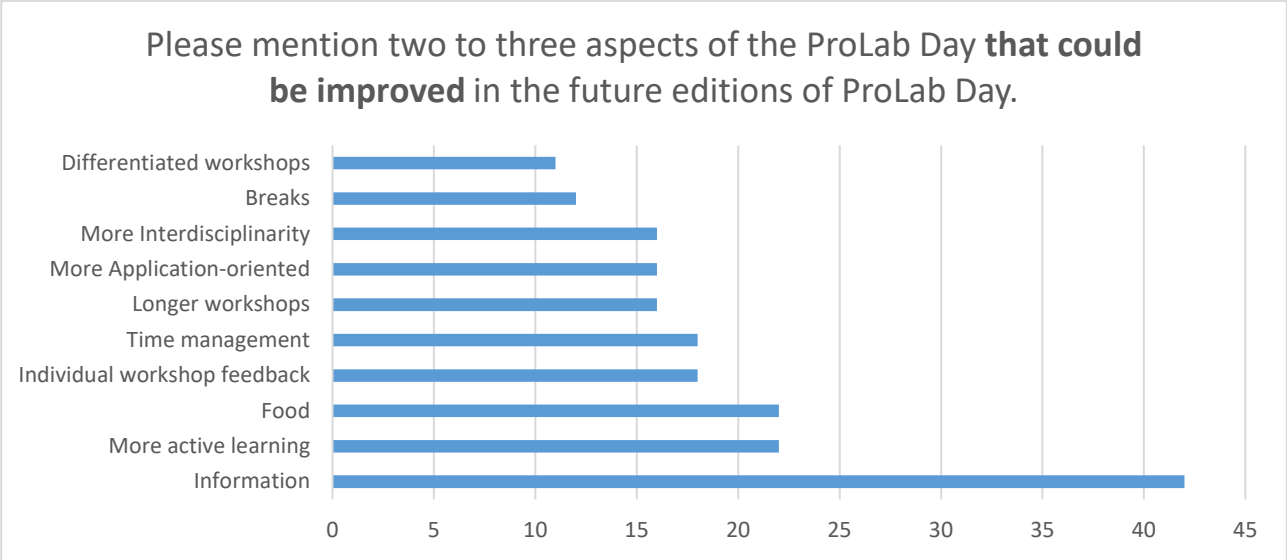
Students greatly valued the opportunity to work with peers from other study programs. One student described how the workshop context revealed how different academic competencies contributed to interdisciplinary collaboration. Another noted that being placed in diverse groups helped make the discussions and exercises much more interesting. Several students also indicated that the challenge of communicating their student work and projects to students from other educational programs was very rewarding.

Workshop format, Exercises and Discussions (mentioned in 60, 44 and 40 responses):

Students also greatly appreciated the workshop structure. Most workshops were made up of short presentations followed by exercises and/or discussions. Comments praised the use of analogue materials (e.g., paper, pencils, post-it notes, and other physical materials) for visualization and found the presentation–group work–presentation cycle applied in some workshops appropriate and effective. The participants also indicated that the format helped them relate abstract concepts to practical hands-on situations and stay focused and engaged throughout the day.

Freedom to choose workshops (mentioned in 35 responses):

Many students also highlighted the motivational effect of being able to select workshops that matched their personal interests and learning goals. This level of self-direction helped students feel more involved in the experience and they indicated that they used this to both target specific interests and perceived weaknesses.



From the question of what to focus on improving for future iterations of ProLab a few themes also emerged:

Information (mentioned in 42 responses):

Inconsistent terminology in communications led to confusion. Students received mixed signals from organisers, semester coordinators, supervisors etc. Some students also indicated that they had difficulties in finding and accessing adequate information on workshops, registration, schedule updates etc. Students indicated that these issues impacted both attendance and preparedness.

More Active learning, Application-oriented and Interdisciplinarity (mentioned in 22, 16 and 16 responses)

Along the same lines of the elements to continue, several students indicated that the interdisciplinary and active format of the workshops were greatly appreciated. Some students who had been in different workshops with differing levels of active learning indicated that the ones with the least active components could benefit from a redesign along more active methods.

3 Discussion

Our evaluation of the inaugural AAU ProLab, based solely on student feedback, suggests that the initiative was generally well received and perceived as a meaningful learning opportunity. The findings indicate that students appreciated the interdisciplinary format, the freedom to choose workshops based on personal interests, and the participatory and active learning formats. Several students pointed to increased motivation and engagement and highlighted how discussing and working with peers from other educational programs enhanced discussions and prompted reflections about their own professional discipline and competencies. The evaluation further suggests that students recognize the value of transversal competencies such as collaboration, communication, systems thinking, and digital literacy etc. and perceive them as relevant to their education and future. Furthermore, the evaluation suggests that these skills are perhaps better taught in contextually rich, interdisciplinary settings.

The evaluation however also points to areas needing improvement. Several students expressed confusion about registration procedures, workshop descriptions, and scheduling, indicating that clearer and more consistent communication across all channels is necessary. The perceived shortcomings also indicate that the foundational principles of active engagement, discussions and interdisciplinarity can, at least in some workshops, be enhanced and emphasized to an even greater extent.

Given the limitations of this evaluation, particularly its reliance on a limited self-reported survey and a response rate of around 30% of registered students, the conclusions should be interpreted with caution.

While the student feedback provides valuable insight into perceived strengths and weaknesses of the ProLab format, further evaluations could benefit from additional data sources, such as facilitator reflections, observational data, or follow-up interviews, to build a more comprehensive understanding.

In response to identified challenges, several concrete revisions were implemented in the subsequent edition of ProLab in the Spring of 2025. All information and communication were consolidated into a dedicated Moodle space, providing students with one point of entry through a familiar platform. However, timely and standardized dissemination at semester start remained a challenge, with a planned introductory video for coordinators suggested as one potential solution for the Spring og 2026. Registration has been streamlined through a single contact email and a revised allocation model that pre-determines workshops based on demand, thereby reducing complexity and improving fairness. Finally, concerns about active learning appear largely resolved in the 2025 edition, with workshops now consistently emphasizing interactive and application-oriented elements. To strengthen evaluation, feedback is also collected from both students and facilitators, offering a more comprehensive view of workshop quality and engagement as well as suggestions for new workshops for future editions of ProLab.

In summary, this initial student evaluation indicates that ProLab holds potential as a platform for fostering interdisciplinary learning and supporting the development of transversal competencies for AAU students. Conversely, the findings highlight several practical considerations for refinement that should be taken into consideration in planning future iterations of ProLab. With careful attention to communication, workshop design, and integration into broader educational initiatives, ProLab may continue to evolve as a valuable component of AAU's approach to problem-based learning.

4 References

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