

PROJECT PARTNERS



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GENERAL INFORMATION

Title of the case	Challenge Lab			
Sales pitch	<i>Where learners lead and leaders learn</i>			
Organisations	Chalmers University of Technology			
Country	Sweden			
Authors	Fernando Fernandez			
Nature of interaction	Multidisciplinary research network			
Level of mechanism	<input type="checkbox"/> Government policy (e.g. law, funding framework) <input type="checkbox"/> Organisational strategy (e.g. university/business/agency) <input checked="" type="checkbox"/> Structural element (e.g. centre, lab, office) <input checked="" type="checkbox"/> Operational level (e.g. activity or programme)			
Length of programme	<table border="1"><tr><td>Semester-long</td><td>Formality</td><td>Informal</td></tr></table>	Semester-long	Formality	Informal
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Curricula-bound, co or extra-curricular?	<table border="1"><tr><td>Co-curricula</td><td>Level of initiative</td><td>Cross-disciplinary</td></tr></table>	Co-curricula	Level of initiative	Cross-disciplinary
Co-curricula	Level of initiative	Cross-disciplinary		
Summary	Challenge Lab is a collaborative project that aims to reinforce students and the university as an active part of local and regional ecosystems. It exists around the facilitation of direct conversation amongst stakeholders that, led by the students' initiative, intend to identify contemporary issues and potential points of leverage for future action. This multidisciplinary cooperation tries to introduce systemic change in the university structure, bridging the gap between education and utilization.			

Linked to their Master Thesis, participating in the Lab does not entail extra credits for its participants. Instead, it offers students the opportunity to develop their understanding of the complexity of societal challenges, applying their own vision for a sustainable future and engaging with industry, academics, and municipalities to navigate the intricacies of their topic and strengthen the accuracy of their line of questioning. Priority is given to the adequate definition of the issue over the potential delivery of specific solutions.

Admission to Challenge Lab is subject to an application process. The programme is an elective and is available for students currently enrolled in a Master's programme within the faculties of Architecture and Civil Engineering; Engineering for Sustainable Development; Mechanical, Automation, Naval and Industrial Design Engineering; and Technology and Learning. In addition to this, students from Gothenburg School of Business, Economics and Law are also invited to apply.



CASE STUDY PROFILE

BACKGROUND

The engagement of Chalmers University in the larger society is well established. Prior to the development of the Challenge Lab, the role of Professor John Holmberg as Vice President of the University was key for the creation of five regional clusters in 2013. This brought together political leaders, businesses, and academics to identify the strengths of the region. These are currently defined as 'Urban Future', 'The Marine Environment and the Maritime Sector', 'Transport Solutions', 'Green Chemistry and Bio Based Products', and 'Life Science' [1], encouraging cross-boundary collaboration and innovation to optimize the performance of such fields.

This commitment to developing better solutions via inter-disciplinary exchange has also been evident at Chalmers University on an operational level. The creation of Areas of Advance [2] acknowledged the need for certain issues that are relevant for the university, industry, and society to be tackled with coordinated action. These topics, which undergo constant revision to enhance their effectiveness, establish a collaborative platform around specific societal challenges, allowing for a direct conversation between external stakeholders and a variety of departments within the university. This optimizes the impact associated with scientific research.

CONTEXT

Challenge Lab appeared in 2013 as a response to the resistance of societal actors to deeply engage in the conversation to solve modern urban issues. Inspired by a water management project completed in Barcelona, Professor John Holmberg proposed the creation of an independent body within the university to promote the development of concepts in pursuit of sustainable development. This autonomy from the traditional university structure aims to combine expertise from a variety of disciplines in order to tackle complex issues, such as urban mobility, waste production, housing or clean energy.

One of the most unique characteristics of Challenge Lab is the introduction of students as neutral, unthreatening intermediaries to drive the conversation with the hope that business, industry, researchers, and municipalities would play a more active role without the need to protect their own financial or intellectual stake. Innovation is enhanced by a strict criteria of multidisciplinary research where pairs of students allocated to specific topics are always from different academic backgrounds.

The combination of disciplines from students plus the variety of expertise provided by academics and practitioners creates a holistic understanding of specific issues and a robust line of research for the Master thesis. Participation in the Lab is elective (subject to admission) and independent from the completion of other modules.

Despite being currently linked to the academic curriculum, the Lab was not originally conceived as an educational tool. The project was initially seen as a mechanism to provide the University with a better opportunity to engage with societal stakeholders. In addition to this, it would allow students to gain access to multidisciplinary learning and the development of leadership in sustainable development.

From a conceptual point of view, Challenge Lab combines a social, experimental, and systemic perspective [3]. All stakeholders are invited to participate as co-creators in an iterative process that will help define concepts and solutions. The main objective is the identification of causes linked to modern urban issues, with priority given to solutions that address core shortcomings of the system over those targeting narrow questions.

OBJECTIVES AND MOTIVATIONS

- To equip students with a network of stakeholders that are active players in the topic of their thesis. This can allow the project to extend beyond the end of the course, integrating ideas into real life solutions.
- To kickstart a multi-disciplinary discussion on modern societal issues, inviting all stakeholders to engage not only for the delivery of a solution, but also for the participation in an open dialogue.
- To introduce students as neutral actors in the university-industry-municipality dialogue, reducing the potential resistance and protectionism by stakeholders with a financial stake in the conversation.

- To expose students to real-life scenarios, introducing utilization and social impact as a reference for their research.
- To increase employability of Master students by developing their soft skills and growing their networking opportunities.

STAKEHOLDERS

Chalmers University of Technology is represented by a variety of actors:

- **Students:** they play an active role as leader of their Master Thesis from the definition of research topics to the final presentation. Also, they lead the collaborative sessions with other stakeholders, steering the conversation and encouraging feedback from experts.
- **Academics:** they participate as supervisors of the research project, ensuring topics remain aligned with the academic component of the course and facilitating the development of ideas that are relevant to practitioners.
- **Researchers:** their participation is related to the definition of topics, offering their expertise to define issues, identify barriers, and leverage points for students to investigate.
- **Challenge Lab's staff:** the dedicated team, operating as an independent office, helps with the facilitation of events, communication between students and stakeholders, production of good quality outputs, and maintaining the institutional relationship of Challenge Lab within the university ecosystem.

There are other local stakeholders involved with Challenge Lab:

- **City of Gothenburg, Region Västra Götaland:** acting on behalf of the population of the city and the region, their members take part in the events to provide their experience, present their priorities, and contribute to the delivery of research that is relevant and that contributes to sustainable development.
- **Industry:** members of the business community participate in the dialogue by providing expertise from the point of view of marketization and utilization of ideas.

PROCESS

INPUT

The input of **Chalmers University** in the development and functioning of Challenge Lab includes a variety of elements:

- **Physical resources:** there is a dedicated lab space, available full time, for students to undertake their tasks, interact with their peers, and organize events with external stakeholders [4].
- **Human resources:**

- Dedicated Challenge Lab full-time staff: in charge of all of the supporting activities and communication aspects of the Lab.
- Thesis supervisors: guiding students in the development of research projects.
- Academic community: providing their scientific knowledge to support students through their thesis

- Financial resources: contribution towards the completion of events and the daily functioning of the Lab.

Also, **external stakeholders** contribute with their expertise, participating in creative events.

ACTIVITIES

The **Master Thesis Lab** complements the standard Master Thesis module, and offers a co-creative environment for students to deliver a research project with real life impact. Each thesis is completed in pairs, accepted by the departments of Architecture and Civil Engineering; Engineering for Sustainable Development; Mechanical, Automation, Naval and Industrial Design Engineering; and Technology and Learning. It is also accepted by the Gothenburg School of Business, Economics and Law. This joint research method is considered to increase the quality of the thesis.

During the semester prior to the beginning of the programme, students are introduced to fundamental sustainability principles, encouraging their own approach and exposing them to concepts that will inform their thesis. This course, called 'Leadership for sustainability transitions', is part of the department of Space, Earth and Environment, and its completion increases the probability for students to be accepted to the Master Thesis Lab.

Access to the programme is via open application in September-October, including a motivation statement. After screening and holding a series of interviews, the acceptance of candidates aims to have a diverse range of students with different backgrounds and with a flexible approach to modern urban issues.

The Lab runs between January and June, and can be divided in two phases:

- **Phase 1** (4 weeks) introduces students to the structure of the programme and their prospective project partners. These sessions combine the conceptual understanding of sustainability and the definition of status quo with the personal perspective of each individual, discovering their priorities and outlining potential topics for their research.

The definition of current issues triggers the primary research by students, which is then complemented with workshops and student-led sessions, where specific topics are discussed with experts from academia, business and government bodies. These meetings, of around 1h 45min, allow students to present ideas and experts to offer their perspective. Leverage points are identified, allowing students to define their research question and develop their methodology.

At the end of week 4, students present their initial research question and preliminary approach.

Phase 2 (16 weeks) concentrates around the development of these proposals and the gathering of information from different stakeholders. The progress is based on the iteration of ideas and is frequent for students to redefine their question and research method. With the assistance of their supervisor, a planning report must be presented to the department.

During the semester, students remain in contact with a variety of stakeholders within their topic. Interviews or individual exchanges and informative sessions are organized where students share their progress and get feedback from experts. This dialogue allows participants to shape the remaining of the research and to keep track of the evolution of the different proposals.

Students submit their thesis at the beginning of June followed by a presentation in open format. This is also broadcasted online, making it accessible for all stakeholders and groups of interest. After this presentation, students receive their feedback around mid-June, marking the end of the project.

Using a recent project as an example, the thesis called 'Strategies for Increasing Urban Cycling', published in 2017, can illustrate the process. One of the authors of this project was enrolled in Transportation Engineering while the other was majoring in International Project Management. In phase 1, students engaged in discussions with practitioners and academics to define challenges and leverage points. After each pair was allocated to specific questions, the definition of research methods was based on the evaluation of sustainability principles and the suitability of the proposed topic.

During phase 2, the presentation of theoretical background was combined with the compilation of data via interviews and case studies. Students used the Challenge Lab facilities to carry out stakeholder workshops, with representatives of the triple helix as well as civil society.

Through the different stages of their thesis, students had access to representatives from the following public agencies:

- Regional planning office
- National transport administration authority
- Local transportation office



OUTCOMES AND IMPACT

OUTPUTS

- Local working groups are built around the topics, establishing a collaborative culture and enabling direct lines of dialogue between parties involved in specific urban issues.

- Students already have a network of interested stakeholders after their thesis, facilitating their transition into their professional career.
- Consistent, direct communication between research projects carried out by the university and local stakeholders, including local and regional government, business, and industry.

IMPACTS

The development of the Master Thesis Lab allows students to tackle modern issues while considering a wider range of perspectives. Thanks to the implementation of multidisciplinary approaches, and the focus on systems innovation, **students develop a deeper understanding of the complexity of social challenges** allowing for more inclusive and comprehensive research.

This holistic model, and the iterative process with academics and practitioners, **helps students deliver research that is relevant and with high level of applicability**. Despite the focus of Challenge Lab being centred on the conversation between stakeholders, the consistent engagement of businesses and municipality creates an opportunity for the outcome of research projects to be developed and implemented.

With regards to the dialogue between researchers, industry, and municipality, the more casual debates led by students facilitate an **increase in the engagement by external stakeholders**. Not being subject to the formal requirements of institutionalized exchange, representatives of businesses and governing bodies perceive the Lab as a place to discuss modern issues, support the student community, and access an innovative source of ideas.

SUPPORTING ENVIRONMENT & SYSTEM

SUPPORTING MECHANISMS

The creation and development of Challenge Lab was triggered by the contribution of Professor John Holmberg. With a background in sustainability and a strong focus on the delivery of a transformative university experience, his time as Vice President allowed for strong institutional support of innovative learning methods. This long-term commitment enabled Challenge Lab to be established and successfully funded, bypassing the potential resistance by the traditional academic community.

Also, the success of Challenge Lab is due to the development and execution of a well-structured process designed to encourage successful collaboration amongst stakeholders while empowering students to guide the line of research. This is the product of continuous feedback and optimization, delivering a structure that will minimize uncertainty for students and maximize the probability of success for their research.

BARRIERS AND DRIVERS

Drivers:

- By creating a more informal, student-led dialogue, Challenge Lab intends **to build trust between stakeholders**, achieving a more productive conversation on societal challenge and bypassing the initial resistance identified in traditional collaborative methods.
- The iterative nature of the project, with consistent engagement between students and stakeholders, aims **to collect more comprehensive feedback** on ideas and proposals, refining potential outcomes and optimizing the experience for future editions.

Barriers:

The ethos of Challenge Lab is perceived as a threat to the traditional university model. The **existing systems and structures present in the HEI** compartmentalize the educational framework, restricting the permeability of ideas and lines of research. This traditional approach creates resistance to the implementation of the Lab, which relies on being multidiscipline as essential for the discussion on modern challenges. This barrier is both theoretical and operational with the Lab struggling to integrate within the existing departments' structure and failing to collaborate with more traditional educational disciplines. The innovative learning experience created by **the Lab is often misunderstood by other departments, which fail to understand the operations, potential, and benefits** for the university, its students, and the external stakeholders.

Financially speaking, the role of Challenge Lab requires a **very intensive depletion of resources**. Full time dedicated staff, the organization of events, communication activities, and engagement with stakeholders raise the cost of the project, hindering its position when competing for university funding. Also, **the lack of methods to evaluate short-term progress** and success can damage the Lab's position within the HEI.



LESSONS LEARNED

CHALLENGES

The main challenge is to optimize the integration within the university. Due to the characteristics of the programme, based on the redefinition of roles within the triple helix, the most prominent challenge is to create a better fit within the university ecosystem, minimizing friction with the traditional educational structure and ensuring stable funding that will allow the project to develop.

The future development of Challenge Lab aims to expand the multidisciplinary aspect, integrating more courses and allowing for a more flexible educational offer that will allow all students to access the benefits of the Lab.

KEY SUCCESS FACTORS

There are a series of factors that have facilitated the success of Challenge Lab

- **Support from high tiers of management** and decision making within the university, offering physical, financial, and institutional backing.
- The **multidisciplinary component of the programme** promotes innovation through coordinated dialogue, combining education and utilization.
- The **selection of candidates**, ensuring diversity of background, gender, educational paths, etc. This allows for a genuinely holistic approach, with students proving their open-mindedness and motivation to develop innovative ideas.

With full time dedicated staff and institutional support, Chalmers University has shown commitment to its innovative spirit and their collaborative culture. Despite this stability since its creation, Challenge Lab is not linked to a specific university department, nor is it an independent department itself. As such, it still relies on the allocation of funding, the growth of the project, and the continuous positive feedback within the community to ensure its continuity.



FURTHER INFORMATION

AWARDS AND RECOGNITION

Challenge Lab received the Green Gown Award in 2016, in the category of Student Engagement for Europe. These awards are organized by the Global Universities Partnership on Environment and Sustainability (GUPES), and supported by United Nations Environment Programme and the Environmental Association for Universities and Colleges (EAUC). [5]

TRANSFERABILITY

Full transferability of the model depends on the degree of collaboration embedded in the regional and local ecosystem, as well as the level of support by decision makers within the university.

Challenge Lab is already being replicated by HEIs across Europe, with direct support from members of Chalmers University to facilitate the successful implementation of the dedicated process. Institutions in South Africa have also shown interest in the development of a similar project.

PUBLICATIONS

1. Larsson, J. and Holmberg, J., (2018). Learning while creating value for sustainability transitions: The case of Challenge Lab at Chalmers University of Technology. *Journal of Cleaner Production*, 172, pp.4411-4420. <https://doi.org/10.1016/j.jclepro.2017.03.072>
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3. Holmberg, J., Lundqvist, U., Svanström, M. and Arehag, M. (2012). The university and transformation towards sustainability: The strategy used at Chalmers University of Technology. *International Journal of Sustainability in Higher Education*, 13(3), pp.219-231. <https://doi.org/10.1108/14676371211242544>
4. Polk, M., Kain, J.H. and Holmberg, J. (2013). *Mistra urban futures: a living laboratory for urban transformations. Regenerative sustainable development of universities and cities: the role of living laboratories.* Edward Elgar, Cheltenham, UK, pp.173-304.

LINKS

<http://challengelab.chalmers.se>

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RESOURCES

- 1) Kullendorf, C. (2013) Five Clusters. Region Västra Götaland. https://alfresco.vgregion.se/alfresco/service/vgr/storage/node/content/workspace/SpacesStore/f5c47a50-9b87-48f8-8266-d36fcd777467/Five_Clusters_2013.pdf?a=false&guest=true
- 2) Chalmers University. Areas of Advance. <http://www.chalmers.se/en/areas-of-advance/Pages/default.aspx>
- 3) Hassan, Z. (2014) *The Social Labs Revolution: A New Approach to Solving our Most Complex Challenges*, Berrett-Koehler Publishers

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- 5) Sustainability Exchange. GUPES Green Gown Awards 2016 – Europe – Chalmers University of Technology – Winner
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