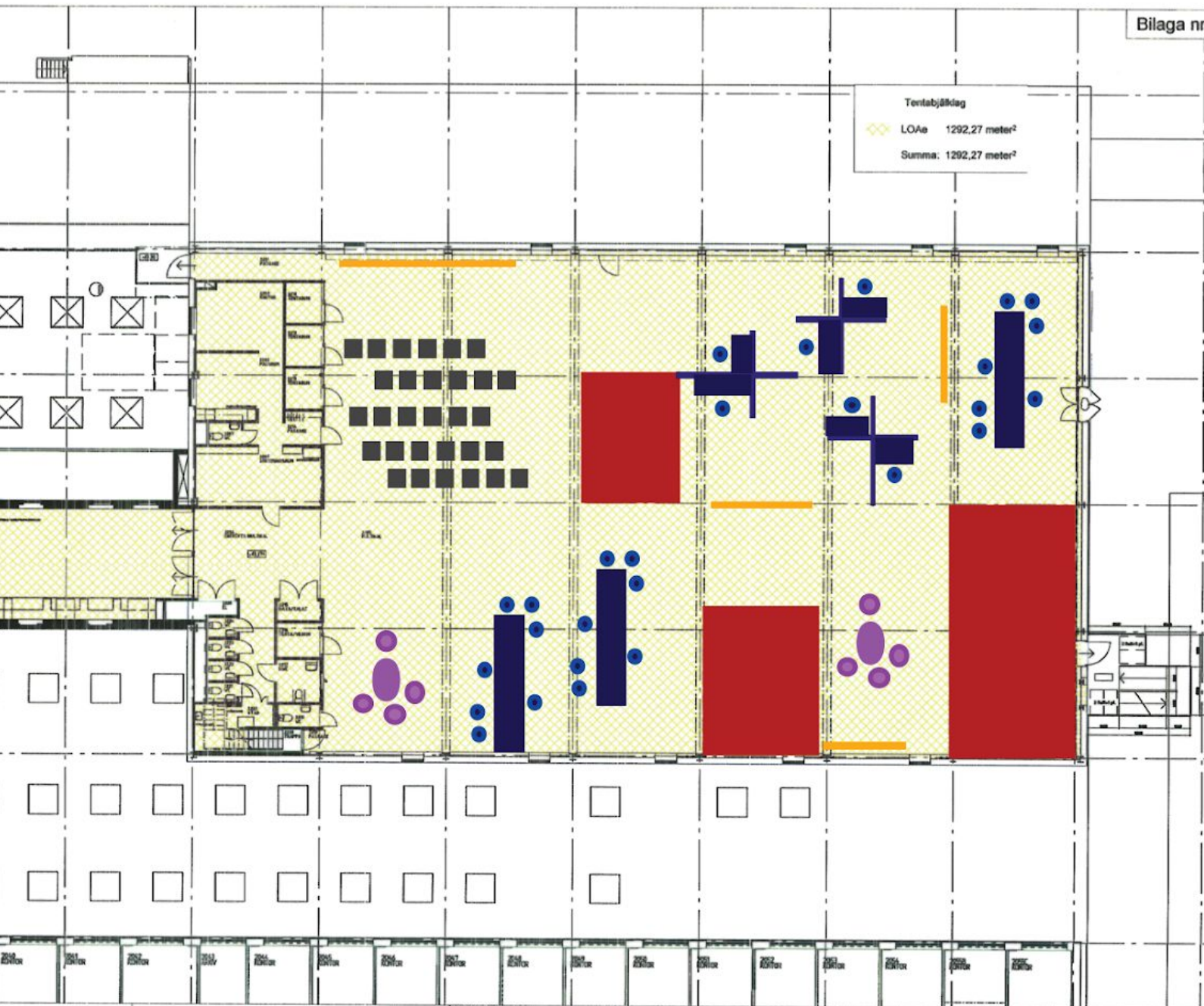


# Creation of conceptual challenge-driven space to foster trans-disciplinary collaboration at Chalmers campus Johanneberg

Frida Fischer - Tove Jensen - Illán Riestra Nava



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# 1. Introduction

## 1.1. About how we got here

Group 1 consists of Frida Fischer, Tove Jensen and Illán Riestra Nava. All come from different backgrounds but have similar interests, which turned out to be good for group work.

Frida Fischer has a bachelor's degree in civil engineering from Chalmers and is currently studying a master in design and construction project management. Between high school and Chalmers she spent two years creating relationships around the globe from traveling and, to some extent, working abroad. The choice of her university path is the result of these abroad experiences, together with her solution-driven life orientation. Relationships with people is what drives her, especially when her counterpart challenges her in thoughts and other philosophical matters. It is not a coincidence that she ended up taking a trans-disciplinary course in sustainable infrastructure and urban transformation.

Tove Jensen is a master student in Industrial Ecology. This program is about sustainability assessment through a system level perspective, taking into account not only environmental aspects but also economic and social. The social aspect is a favourite of Tove as she believes it is an important topic today and for our future development of the world. How engineers impact society is noticed very directly in the build environment and a course related to sustainable transitions of urban areas and infrastructure is thereby very relevant.

Illán studied industrial design engineering in Spain. He is good at it, but he hates it sometimes. He thinks critically about everything, wants to know the purpose of things, and won't move until he is fully convinced that it is good. That means he is triggered about many things that nobody else finds bothering. Cinema? He doesn't like that. Music? Yeah, but very picky. You get the idea. On the other hand he loves things that nobody else finds interesting. Nerd facts about animals or history, sport things people have forgotten; all good conversation topics. And yes, that includes extensive research on how cities work and city design.

Through the first half of the course, the group had the chance to work with the different thematic blocks doing things that would later be useful for this project. The first thematic block was space. Flows on campus were analysed in order to find interesting spaces on campus which were defined as Chabo, Tvärgatan and Sven Hultins plats. In these first weeks the conversation was focused a lot about the feeling of the space, how to change it and what elements that affect it. The results of the conversations are now part of this project.

As to flows, the work was related to how to reduce or rearrange the congestion of traffic in the campus area. The main conclusion was that Gothenburg is very radial with its roads, having very few main roads that don't point to the city center. The consequence is that with only a few viable routes, cars will clog the same streets. In terms of this project, flows have been very important to make the decision on which spaces to focus on.

Information was a very interesting topic that was nearly the subject of the project. In this thematic block, the work was related to how digital twins could help reduce the size of a catastrophe by measuring the right indicators and streamlining them to simplify the decision-making process. The specific focus of the group was on old buildings and extreme weather.

The fourth block was “environment” and this block has had a high impact on this project. All the solutions to cope with noise and how to make rainfall something beautiful instead of an annoyance inspired during the design process. The final solution is a little bit more shy on this aspect due to the constraints in the feasibility of the solution.

In the last block, resources, focus was on the different activities that are carried out on campus. The focus of the group was on how it could be steered to better practices by reducing or adapting those flows of resources. Similarly to what happened with information, the topic fell a little away from the scope of this final project.

## 1.2. Background on the problem

The current global problems are of such complexity that the best solutions will not come through problem solving within the traditional borders of disciplines. Trans-disciplinary collaboration offers a way to approach complexity in a new way. However, most institutions and organizations still suffer from previous paradigms, and have inherited obsolete discipline focused structures and procedures. Among those most affected by this division are universities. The universities still work great to teach professions, however now they lag in the transformation towards trans-disciplinarity collaboration and problem solving.

Chalmers University of Technology has begun to take action towards the trans-disciplinary transformation, with the Tracks courses being the flagship in that process. However, the campus area still features many elements of the specialization focus. The most obvious being the “thematic buildings”, where generally only students and staff from similar programs spends their days. Of course there is the Union building, but while it works great to gather people from different disciplines, it fails to actually foster any connection.

To sum up, while the efforts of Chalmers are being noted and steer the education to the trans-disciplinary direction, the space in campus lacks any real space where people from different disciplines can work together. It would be very beneficial for Chalmers’ goals to have a space that promotes trans-disciplinary collaboration or at least promotes what Chalmers does towards that objective.

## 1.3. Aim and objectives

The aim of the project is to further develop Chalmers’s efforts towards trans-disciplinarity by creating a new space to suit the needs of this new approach. The space will have a high emphasis on coworking and project- or challenge-driven education. It will also be kept in mind other social aspects needed for successful trans-disciplinary coworking. As an additional aim, the challenge driven space defined should also support an interconnected city, meaning the campus use and relevance for the city of Gothenburg.

In order to achieve a well functioning challenge driven space at campus Johanneberg, the following research questions need to be answered:

- What type of space will it be and how will it be designed?
- How to attract users of the space and enable interaction among them?
- Who will manage the space and how?

This aim relates closely to the Sustainable development goal (SDG) 17 “Partnerships for the goals”. It has some relation to SDGs 9 “Industry” and 11 “Sustainable cities”. The aim also relates very closely to Chalmers own sustainability goals and areas of advance.

As to the thematic blocks of this course. The main thematic blocks the project have a connection to are *space, flows, environment* and *resources*. The location and the space are key for the solution and this is decided based on people flows. The thematic area environment is highly connected to the design of the space and the thematic area resources are taken into consideration when designing the space, especially in terms of utilization of an already existing space, modularity and multi functionality. Depending on the type of solution, it might have a strong link to *information*.

#### 1.4. Limitations

The first limitation of the project is to only design a concept for one of the defined spaces on campus suitable for a challenge driven space. More specifically this space is chosen as SB Multisal. The concept will be described through conceptual drawings with correlating descriptions of function and use. Detailed drawings and 3D models are not developed in this project. No financial plan or budget for the operation or implementation of the space will be created. This might be an important aspect to define at some point but is considered as out of scope in this project. Some similarities to Chalmers’ ChallengeLab can be found in the presented concept. ChallengeLab was presented to us close to the hand-in of the report and due to our late awareness of ChallengeLab, it has not been taken into consideration in this report. The concept presented in this report is more focused on space and the defined target group is different. Hence, fundamental differences between this concept and ChallengeLab exist.

#### 1.5. Method

The idea for this project appears after the reflection session about the first half of the course. Looking back at the lectures and the discussions during the workshops it was clear that one underlying question was common to all of them: “How does this change the campus feeling?”. All the changes made to the campus have an unavoidable impact on the campus feeling, shaping it. Therefore, it would be reasonable to design this feeling consciously instead of being an unexpected outcome of other changes. So the first step of this project consisted of deciding on the feeling that was wanted.

This decision was made in a group. Through a video-call, all the team members shared their views on the topic and together brought forward an answer to the question. Each offered a bit of their own expertise to the conversation, so the whole group had all the relevant information in every moment. This way, the group could work considering aspects that otherwise could have been missed. This approach was used during the whole duration of the project.

It was settled to focus the project on how to adapt the campus to the new trends in education, of which Tracks are the spearhead. In other words, provide spaces to create a more trans-disciplinary campus.

The first step was to find examples of existing spaces that are similar to what was expected from this project. Each team member looked for such examples of spaces and then they were analyzed to find the good and the bad in all of them. Part of the analysis was purely done through conversation during meeting calls, but also a more “official” SWOT was performed out of the three project relevant spaces. This conversation was fruitful to define better the objective and also to improve the understanding of it. It was also an important first step before defining the specifications of the solution, the concept. A further method used in order to find inspiration and understanding of what makes a successful challenge driven space was analysing a similar concept. For this, OPENLAB in Stockholm was used.

The definition of the concept specifications was performed in group, following the same procedure of the definition of the problem. These concept specifications brought a set of problems that needed fixing for a successful final solution. Each member helped with their particular skill set to those problems that were closer to them.

## 2. Research

The idea to create spaces to foster trans-disciplinarity has been pursued before by many. However, the intricate nature of the problem makes it harder to solve, and many of the existing examples have failed, at least partially, to accomplish their goals. In this part we will have a look at some of these previous solutions and try to understand what the greatest strengths, weaknesses and difficulties are. We will also identify locations on campus where a solution of this kind is more suited, validate the information, and summarize the key aspects to be kept in mind in the final solution.

### 2.1. Chalmers Campus Johanneberg

The location of the space will be key to make it successful. Different spots have different characteristics that can drastically change how the space is perceived. Therefore, it is crucial to understand the benefits and limitations of different locations to choose that place that suits best the desired solution.

Chalmers’ campus Johanneberg is located a stone’s throw from the most central parts of the city, it takes 10 minutes with public transportation to reach Gothenburg’s central station. Most of the surrounding buildings are residential buildings, but offices and other educational institutions also exist. The campus area is surrounded by four public transportation stops, namely Chalmers, Kapellplatsen, Chalmers Tvärgata and Sven Hultins Plats. The three first mentioned are highly trafficked. Chalmers students, Chalmers staff, office workers and Johanneberg residents commute from/to homes and their livelihood every day and the Chalmers campus area is a natural passage for all these people.

In the early stages of this course, a mapping of the flows of pedestrians, cyclists and autonomous vehicles were identified and presented in a map of Chalmers’ campus Johanneberg. In figure 1, the current people flows from this process are shown in pink. The figure also shows an estimation of how the people flows most likely will increase, visualized in blue. The flows will most likely increase in this way, based on the area’s detail plan (Göteborgs stad, 2019) which includes a new bus stop called Sven Hultin in the south part of the campus area. A larger size version of the figure 1 is available in appendix 1.

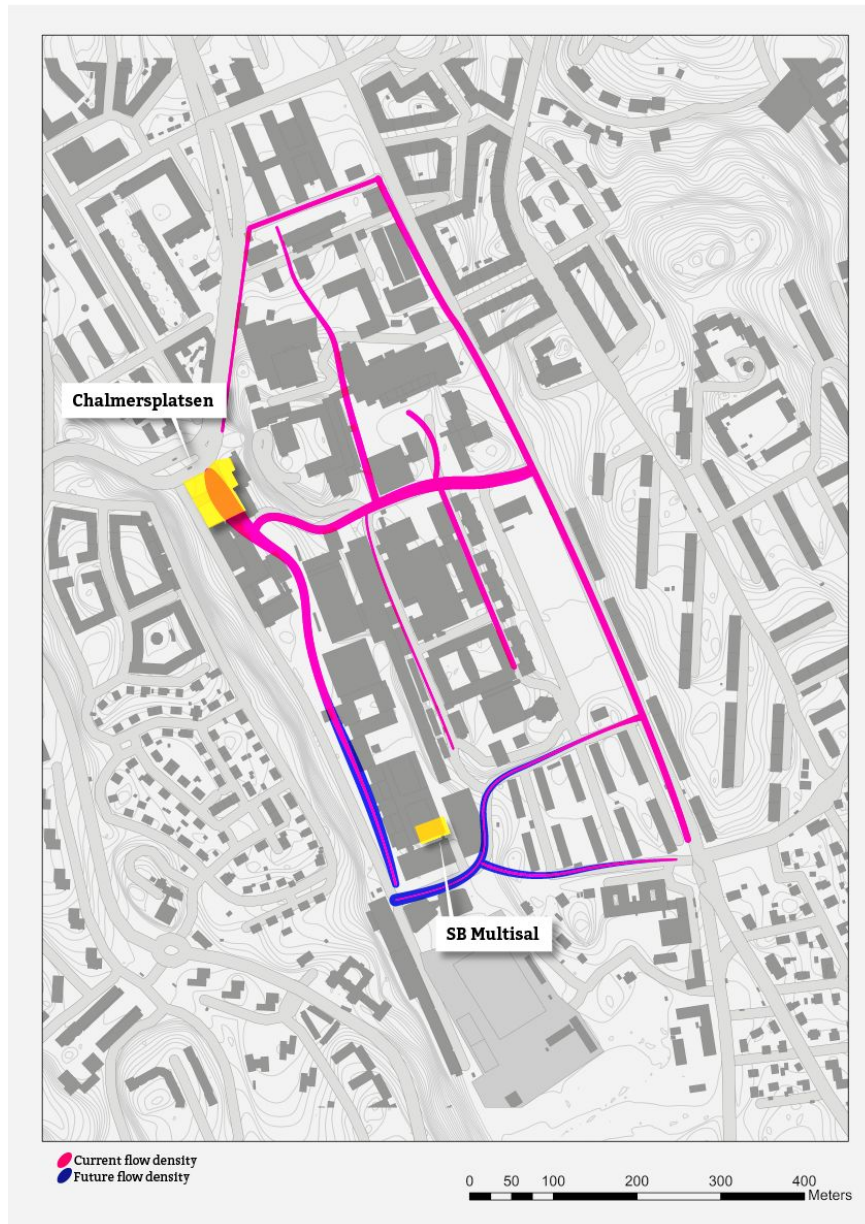


Figure 1. Current and estimated future flows of people on Chalmers campus Johanneberg.

As also visualized in figure 1, two strategic locations for a challenge driven space have been identified based on the flows. These locations are the already existing space SB Multisal and the area Chalmersplatsen. It is evaluated that the open space Chalmersplatsen has a high potential for future development. However, the already existing space, SB Multisal, is the only space which will be further examined. This choice is based on the argument that it is not sustainably defensible to carry out yet another exploitation, it is more resource and environment defensible to focus on development of an already existing space.

SB Multisal is mainly used as an examination room 5-7 weeks a year. The SB Multisal is also occasionally used for career fairs and lectures. According to Akademiska hus, SB Multisal is approved for about 300 people and the rectangular room is 1014 m<sup>2</sup> (39 m x 26 m). A 2D drawing of SB Multisal and the rest of the floor level can be found in Appendix 2. In order to understand the space even better, a SWOT analysis was carried out and the results are shown in figure 2 in chapter 2.2.

## 2.2. SWOT analysis

This chapter presents three carried out SWOT analysis. The first one for SB Multisal as it is used today. The two other analyses are done of two existing spaces which, to some extent, aims to foster trans-disciplinary meetings.

### 2.2.1. SB Multisal



Figure 2. A SWOT analysis of the SB Multisal

As chapter 2.1 and the SWOT analysis reveals, SB Multisal is today not used to its full potential. It is heavily used only a few weeks a year, and the rest of the time, the space is empty and locked for spontaneous activities. Given that SB Multisal most of the year is empty and that this is a huge room where creativity can set the boundaries of its internal design, this space has big potential in terms of creating a challenge driven problem-solving space.



### 2.2.2. Dome of visions



Figure 3. A SWOT analysis of Dome of Visions

The dome of visions is one space with many good elements, but also some key things to avoid. Some of the strengths it has have to do with its shape and location: it captures the attention and does not just vanish in the background. It looks “cool” and it transmits that to those who are near, really appealing to them and triggering them to maybe see how it is inside. In its interior, many activities can be done, from working to just relaxing, which is one feature that is interesting to have in co-working spaces.

However, one of the major drawbacks comes by design. The Dome of Visions was not thought to be an open space for people to use freely. While there are many good reasons to do this, in our case it would not be recommended. The welcoming aspect is very important when the space that is going to be created needs to trigger spontaneous involvement by random people who see or know about it.

### 2.2.3. Veras Grasmatta



Figure 4. A SWOT analysis of Veras Grasmatta

Similarly to the Dome of Visions, Veras Gräsmatta excels in showing a relaxed feeling even from the outside, see figure 4. It is also versatile in the sense that it incorporates lecture spaces with relaxing spaces and working spaces. On top of that, it has a very strong sense of purpose, which can be due to the “thematic areas” (dedicated areas for presentations, relax...). This comes at a cost of freedom to arrange the space, the architecture of Veras Gräsmatta is rather fixed and it is hard to imagine how it could be reorganized should it be necessary. In any case, these limitations are so by design, and make sense, but in our case it would probably go for a more free arrangement while trying to keep some of the versatility.

Apart from the fixed arrangement, it has another problem. Part of why it has a strong purpose feeling is because it is only rented for a narrow range of events. That’s also the reason behind the locked distribution of elements. It would not work right with the open “free” concept that would be desirable for the purpose of this project. It is also in a hidden spot in the building that is located the furthest from campus center, it is likely that not many people know of the existence of this space.

### 2.3. Analysis of OPENLAB Stockholm

In lieu of conducting SWOT analysis of nearby located spaces that connect to the same idea and ambition as the Chalmers challenge driven spaces, OPENLAB will be studied. OPENLAB is a space located in the central parts of Stockholm with the vision to bring people together across disciplines and professions to find innovative solutions to societal challenges. This initiative is driven by a combination of stakeholders including Kungliga Tekniska Högskolan (KTH), Södertörns Högskola, Stockholms Universitet, Karolinska institutet Region Stockholm and Stockholm stad. This means that OPENLAB is a collaboration with several different educational institutes and the regional governmental bodies.

The OPENLAB is chosen as this is a very similar concept to what is aimed at in this course and therefore a suitable object of analysis. In the analysis we have focused on a few particular questions that are the most crucial in the project. These are defined below:

- Who is the caretaker of the space and how is the operation managed?
- What are the requirements of something to be a challenge?
- What is the idea behind the challenges and how were they derived?
- What activities other than courses are connected to the challenges?
- How are key specifications involved (businesses, municipality, students)?
- How do the potential users of the space find their way to OPENLAB?

OPENLAB was contacted for an interview but no response was received. The analysis was instead carried out with the support of available information online in combination with accumulated knowledge from the TRACKS course workshops and seminars. As a first step, the main segments that create OPENLAB are summarized in figure 5.

From analysing figure 5 one can see that the combination of main “activities” (co-working, courses, conferences and projects) seem to serve the purpose of gathering different groups well. The facilities also seem to play an important role in the success of the space. There is a need for different types of areas, rooms structures and tools in order to facilitate the variety of different activities that are taking place in the lab.

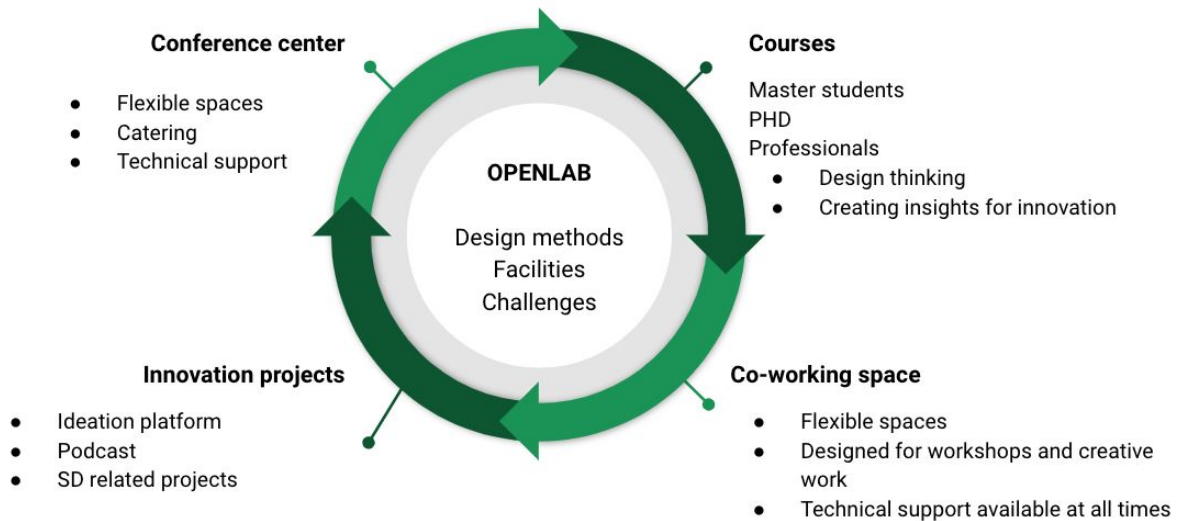


Figure 5. Schematic overview of the main components of OPENLAB created in the TRACKS project

The challenges that make out a part of the core of OPENLAB are clearly defined. These challenges are *sustainable urban development, ageing population, health and education*. The challenges seem to steer the direction of projects conducted and the courses available. One can also see that the different stakeholders in the initiative have defined the challenges after their interest and expertise. Karolinska institutet is a stakeholder that might have influenced the choice of “*health*” as a challenge and where the regional stakeholders (Stockholm stad and Region Stockholm) might have influenced the challenge “*sustainable urban development*” and “*aging population*”. The mix of stakeholders creates a dynamic and most likely more specific choice of challenges than if one stakeholder alone would have decided on challenges.

When looking more closely into the location and facilities, the building has a central location in Stockholm, see figure 6. It is located on a main road with multiple transport roads available nearby (metro station Tekniska Högskolan and railway station Stockholm Östra). This creates easy access and a large flow of people passing by naturally. The design of the indoor facility is also interesting to analyse. There are a variety of different rooms that can enable several meetings at the same time, for different sized groups. However, there are not so many single spaces or an open area where many can be located at the same time. This might be available inside the “Restauranglabbet”, but this is not completely clear.

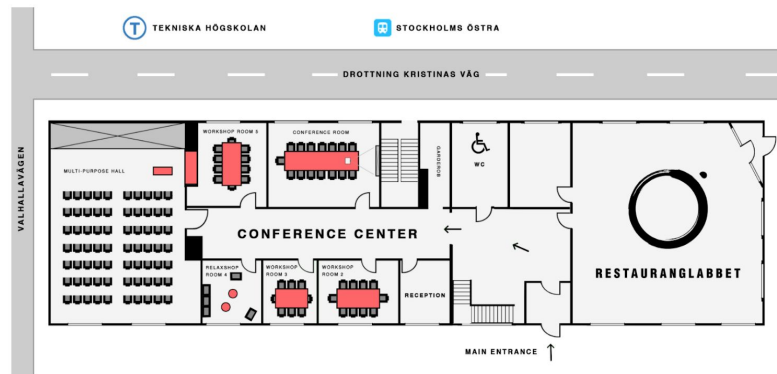


Figure 6. Schematic overview of the OPENLAB space

As a concluding section of the analysis of OPENLAB, the project group have looked at user schemes and the membership program that is related to OPENLAB. One of the most important questions and challenges in creating a challenge driven space at Chalmers campus is the *operation* of the space. Therefore it is important to pay special attention to this aspect in order to find an appropriate approach for our specific cite and needs. The OPENLAB has membership schemes in different levels depending on needs and user type. Their membership schemes are called “Community Friend”, “Community Member”, “Community & Co-working Member” and “Community Premium Member”. The first membership type is free while the last named type is available for 7000 SEK per month. The different packages target different user groups and include different things.

As a conclusion, some important design traits will be noted and kept in mind for the design of the Chalmers concept. The OPENLAB space is very strategically located, close to connection points for public transport where many people pass by. The lab provides activities for many different stakeholders, not only staff and students of nearby universities but also for professionals, small businesses and the general public looking for a place to network. They have defined clearly different levels of membership for different types of users to ease communication and understanding of their concept.

## 2.4. Suitable challenges

In order for the space to be challenge driven there is a strong need for clearly defined challenges. Challenges that will engage and create interest and that results in use of the defined space as well as interaction among the users.

Chalmers University of Technology has a vision, “Chalmers for a sustainable future” and the university declares that all operations carried out within the university should support the fulfillment of this vision (Chalmers, 2020). In relation to this vision, four more concrete sustainability targets have been formulated in the sustainability policy:

1. Chalmers students must have access to an internationally recognised **world-class education** that enables them to make a difference in the transition to a green economy and to contribute to sustainable development in society and the business sector.

2. **Excellent research** must enable Chalmers employees to contribute to quality long-term solutions to current and future challenges.
3. **Effective sustainable utilisation** must enable us to collaborate with the world around us to proper development towards a sustainable and climate neutral society.
4. We must create an **excellent internal environment** for students and employees, with campuses that reflect our ambitions in the transition to a green economy and sustainable development

In lieu of these targets, Chalmers have defined six areas of advance. These focus areas are framed as “*the key to a multidisciplinary and challenge driven perspective*” and thereby an important addition to the sustainability targets (Chalmers, 2019). The six areas of advance are defined as:

- |                       |                                |
|-----------------------|--------------------------------|
| A. Energy             | D. Production                  |
| B. Health Engineering | E. Transport                   |
| C. Materials Science  | F. Information & Communication |

A part of the aim of the project was to also include a wider range of stakeholders to the project and have campus Johanneberg more interlinked to the city of Gothenburg. In order to include aspects important for the city and its related stakeholders, a further set of sustainability targets are taken into consideration. The municipality of Gothenburg, Göteborg Stad, currently has 12 environmental targets adopted and applied as a part of their sustainability plan (Göteborg Stad, 2018). However, a new program for the ecological sustainability of the city is planned to be adopted in 2021 (Göteborg stad, 2020). Therefore, this new plan is instead taken into consideration. This new program is presented in figure 7.



Figure 7. Proposed new sustainability strategy of Göteborg Stad 2021-2030

The main difference from the current environmental targets is that social and climate aspects are more defined. The new suggested policy do also have a strong correlation to the national environmental targets as well as the Sustainable Development Goals (SDGs) from agenda 2030 (Göteborg stad, 2020).

With the targets and areas of advance from Chalmers together with the new strategy from Göteborg stad, the driving challenges for the spaces to be created are defined. Analysing Chalmers four sustainability targets, some keywords related to this project are sustainable development, collaboration, transition and reflected ambition. The areas of advance are more detailed examples of scientific areas that are important for a sustainable development. The future sustainability targets of Göteborg Stad are much focused on impacts on land and ecosystems. Also taking into account more detailed environmental problems like toxicity, air quality and recreational areas. With regards to the proposed climate targets of Gothenburg, food and to serve “climate meals” is included. That corresponds slightly to one of the areas of advance of Chalmers, health. Aspects also taken into account in the new Gothenburg strategy are mobility and circular economy. These aspects are possible to connect to the area of advance transport (E) and sustainability target of excellent internal environment (4).

### 3. Final solution - MultiChallenge Room

Based on the research in previous chapters, this chapter will present the final solution for the challenge driven concept applied to SB Multisal, called the MultiChallenge room.

#### 3.1. Concept

The challenge driven space concept defined for SB multisal is visualised in figure 8. The concept is based around five activities that all together creates a variation of activities for the defined stakeholder groups. In the center of these activities there are five defined challenges that are derived with support from the Chalmers sustainability targets and areas of advance, in combination with the new sustainability strategy of Göteborg Stad. These challenges create a broad interest in the activities taking place, still framed in an open manner to foster creativity and new ideas.



Figure 8. Visualisation of defined concept for a challenge driven space in SB Multisal



Figure 9. Defined challenges

The challenges defined for the MultiChallenge room are presented in figure 9. These challenges are formulated to engage the various stakeholder groups at campus Johaneberg and the city. One aspect that is different towards the areas of advance as well as the sustainability targets of Chalmers and Göteborg Stad is the social challenge called “collaborative transition”. With this challenge included, the ambition is to also enable discussions and projects related to the social aspect of sustainable development that do not get as much focus in the everyday research conducted. To achieve this goal, it would be necessary to involve some important stakeholders in the field. Some of those are Chalmers University of Technology, University of Gothenburg, the city of Gothenburg, Business region Gothenburg, Älvstranden utveckling and Akademiska hus.

Within the activities, several examples of activities are included. The first activity, allocated courses, could involve Tracks, Sustainable development or engineering mathematics. All courses involve different modes of space needed. Individual space where you can focus, social space for breaks, small rooms for group discussion and tutoring. All these aspects are available in the same space defined in this concept. This means that you can stay within the room for a longer consecutive time and avoid going around campus to find the appropriate spot. However, the space should not be limited to Chalmers’s education since that would defeat the purpose. The solution should be extended beyond study programs to link university work to “the real world”. Through various activities like guest lectures or challenges like “hackathons”, the space can escape the university life and become an active part in societal development.

The concept also includes one aspect of visualising research and projects relating to the challenges. That could be through talks in the presentation area and also through natural conversations starting in the social area in between events or work.

The space can also function as a meeting place for organisations like the Gothenburg center of biodiversity studies (just to mention one example) and activities organised by them. This could fit well to the challenge of biodiversity preservation.

### 3.2. The Space

A proposal of how the space could be designed in order to enable the concept is presented in figure 10. The main idea is to keep this space open to all the stakeholders using the campus, meaning no booking of the pods and the individual workplaces. The aim is to keep the thresholds for users to enter the space low and make everyone feel welcome. To use the SB multital is somehow resource efficient as no new building is needed. With a carefully chosen interior, the multifunctionality of the space can also be kept and enhanced. This

enables SB Multisal still being used for exams in addition to this utilised the remaining months of the year. A nicely designed space will also contribute to the campus feeling, an innovative campus contributing to the vision of Chalmers.



Figure 10. Proposal of space design of SB Multisal

### 3.3. Impact

The impact of the MultiChallenge room can be divided into “internal” and “external”. The internal impact is that which affects Chalmers and those engaging directly in Chalmers’s activities: students and staff.

The main impact the solution will produce is fostering trans-disciplinary connections. In the early stages it will ease connections among students of Tracks, but that will extend lately to any other student that uses the space. The implications of this is a more cohesive campus ecosystem where groups have more power, knowledge and tools to develop their own



projects. This translates into greater innovativeness, and greater impact coming from those related to Chalmers.

Another side benefit is that it promotes participation. The space also works as a symbol of co-working, visibilizing, communicating and normalizing trans-disciplinary collaboration. In other words, it promotes this way of working in a seemingly way. The existence of a space dedicated to trans-disciplinary co-working reminds users (direct users and passive users, such as passersby) of this approach. This makes them more conscious about its existence and, therefore, more likely to resort to it when they get a chance.

To sum up, the solution has an impact on many different stakeholders. Firstly, it impacts students and staff at Chalmers by providing a space to develop projects together. Therefore, it increases cohesion in the campus area and increases innovativeness. It has an impact on society through the projects that will be developed. It also changes the mentality of students and staff, steering them to consider trans-disciplinary collaboration.

### 3.4. How it should operate

Delivering a concept like this requires an organization and people in charge who can lead the operation and corresponding activities. First of all, it is suggested for the MultiChallenge room to be a part of a Chalmers institution so that it will have an initial natural flow of people involved in the concept. As illustrated in figure 8, this space could be the heart of Chalmers' Sustainability courses and Chalmers' TRACKS courses. Today, many of Chalmers' sustainability courses are run from the institution Technology Management and Economics (TME), hence a logical institution allocation for the concept could be TME.

The concept requires full time dedicated roles and suggestions of roles are inspired from the areas presented in figure 8. An overall responsibility for the space could be assigned to a facility manager. The facility manager could work closely with a creative leader/mood manager who could have the responsibility to design the space for social interaction and coordination of exhibitions for example. Further, it is needed to have someone who has the responsibility for challenges, course development and coordination. Lastly, a partnership and stakeholder coordinator is needed in order for the collaborations to be fruitful. Budgeting and regular administration could be performed on the institution level (TME). The mentioned permanent roles are essential for real change toward sustainability. This group will have the overall responsibility to follow through the challenges as well as the solutions the trans-disciplinary teams will find.

The above roles are permanent employment, but this concept would thrive if further engagement was possible. Therefore, it is suggested that a project group is selected once every half year. It is preferable that this project group will be involved, not only in supporting the permanent employees, but also involved in the challenges. The project group should consist of students, university staff, Gothenburg citizens and key stakeholders representatives.

Talking of key stakeholders, it is suggested that Chalmers University of Technology, University of Gothenburg, the city of Gothenburg, Business region Gothenburg, Älvstranden utveckling and Akademiska hus could be the partnering companies to the concept. Further, the concept is supposed to be open for everybody, including external companies. These

companies can contribute with guest lecturing, cooperation with key stakeholders in matters of challenges as well as engagement in particular challenge projects.

Fundings are of particular matter and it is suggested that the key stakeholders could pay for a yearly membership, in exchange these stakeholders will get their interests covered in the challenge topics. For external companies getting involved just occasionally, piecewise monetary contributions are of relevance.

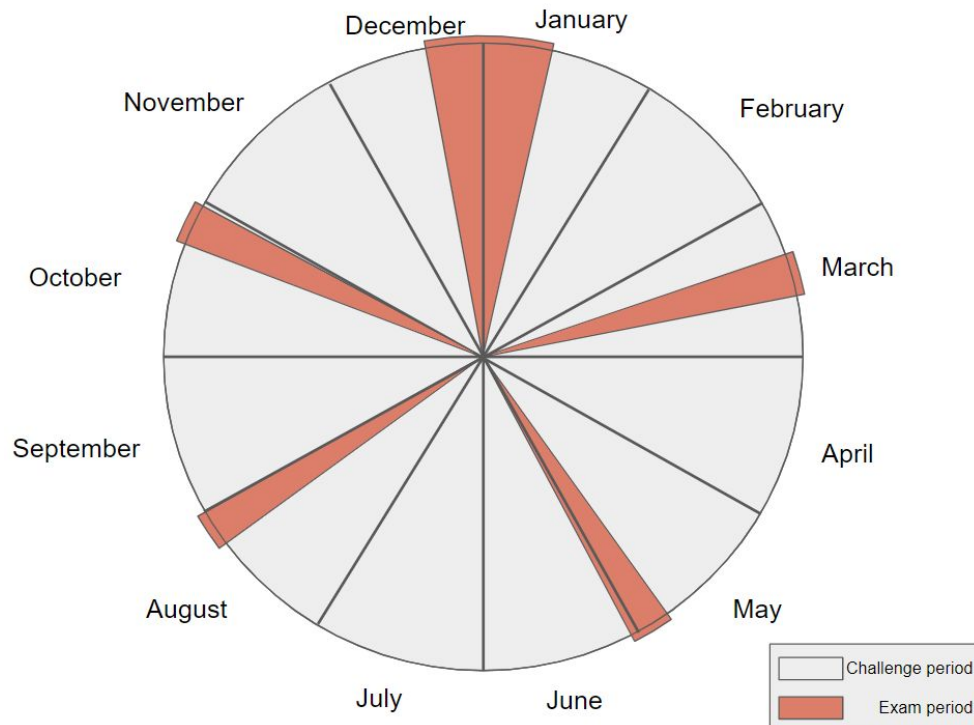


Figure 11. Five exam periods during a year opens up for five different challenge periods

Lastly, it is important to address the cycles of the challenges. Based on the SWOT analysis of SB Multisal (figure 2), it is clear that the room has to be emptied before all exam periods. The exam periods are run approximately every two months. Clearing the concepts interior out is an opportunity for design change within the room. A natural challenge cycle is thereby formed based on the exam periods. So, the cycle of the room's use is deciding the cycles and duration of the challenges, see figure 11. This also means that the room will be dynamic and the room can be designed for the following two months of one focus challenge. Appropriately, the challenge periods count to five, exactly as many as the five challenge areas (see figure 9).

### 3.5. Resources needed and action plan

To conclude the chapter of the final solution, needed actions and resources in order to implement the idea will be addressed. As mentioned in section 3.4, the organizational structure of the space in order for it to be realistic. A monetary investment is also needed in order to have access to the SB multisal at all times as well as to find the needed furniture, however this is defined as out of scope for this project. A next step in order to realise the space is to create a strong group of the involved stakeholders that can work as ambassadors for the concept and steer the work forward.

## 4. Conclusions and reflections

The scope of the project was to create a space optimized for co-working that would help Chalmers in their efforts towards trans-disciplinary education and campus. The MultiChallenge room fills in the requirements to be successful in this regard. It uses a space currently used only seldom and provides it with a new purpose to set it as the spearhead of Chalmers's strategy.

In terms of the thematic blocks, the project scope was set on a higher level: the higher emphasis on concepts, feelings and broad definition was maybe not the friendliest approach to be in close connection to the five thematic blocks. However, that does not mean that these five topics were ignored. The most connected one was space and a great part of the discussion focused on this. The project proved to be very useful to think a lot about these spatial conditioners and their repercussions. Both the work and learnings within this thematic block were notable. Another thematic block that was treated extensively was environment. Maybe because of its connection to space, another great part of the discussion focused on environmental aspects. The final solution does not provide an accurate vision of the work done within the environment block during the design phase. The team discussed the noise and rainfall issues, mainly when considering the option of having a space outside.

In conclusion, the proposed solution does offer an answer to the original aim and the next steps would be to implement the idea in test runs. It is also worth noting that all the work done during the first half of the course was useful, and the learnings from them were put into practice during the duration of the project, even if the final solution does not reflect that.

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# Appendix

## Appendix 1

