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Service Design and Systems Thinking in Developing Solutions for a Sustainable Future – A Case Study with Master's Degree Students

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Introduction

The strategy (Strategy 2030) of the Lapland University Consortium (LUC), formed by two universities, is focused on global arctic responsibility, sustainable tourism, future services, and governing distances. As part of the LUC community, the Lapland University of Applied Sciences (Lapland UAS) Master School is strongly committed to follow LUC's strategic choices and priorities in pursuit of the identified vision where sustainable viewpoints and responsibility issues are playing a central role. The strategic objectives can be seen as two-fold: to develop solutions to achieve sustainable development as well as to develop solutions that promote sustainability.

In design and development of the master's degree programmes of Lapland UAS, the LUC strategy is seen as a backbone to rely and lean on. In addition, the master's degree programmes are designed to strengthen the students' personal development path and professional carriers. The goals of the master programmes are derived from the report 'Osaaminen 2035', published by the Finnish National Agency for Education. Report points out that future working life will be characterized,

e.g., by the progress of digitalization, the rise of sustainable development and economic values and the need for continuous, life-long learning. Thus, it is seen as important that main choices of the LUC strategy, like sustainable approaches, have to be integrated to the content of master level courses while following the competence-based curriculum of Lapland UAS Master School.

In this article, we outline and report a "Proof-of-Concept" trial within an online course where we used a novel method that combines Service Design and Systems Thinking to boost sustainability related awareness and skills of students, while at the same time fulfilling the other objectives of the course. We describe the learning goals of the course, the implementation, the used methods and online tools, and the experiences and learnings of the students. We also reflect on our own lessons learned when using a novel design approach and implementation of its use during the course.

Implementation

The master's degree online course "Creation of Future – Out of the Box" was selected for our trial as its' objectives concerned to increase student's creativity and knowledge of future trends from viewpoint of innovating new business concepts.

Updating the objectives of the course to include sustainability

We decided to select 'sustainability' as the key focus for the course to support the learning of future work life skill development in this area. Thus, the main objectives for the course were updated for our implementation as follows:

- to increase students' knowledge of aspects of creativity and how to enhance creativity for empowering creation of sustainable solutions in organizations,
- to acquire and utilize information about future trends and weak signals in supporting creativity as well as
- to innovate new sustainable service and business concepts.

For the practical implementation of the course, we decided to trial one of the novel contemporary design approaches combining service design, systems thinking and sustainability, namely Planet Centric Design (PCD), to solve future sustainability related challenges. We selected the following seven business fields as the areas to be explored: 1) Buildings and homes, 2) Green energy, 3)

Tourism, 4) Transport and mobility, 5) Health and wellbeing, 6) Food, and 7) Online shopping. By the combination of business fields and applying the PCD approach in creating sustainable solutions for them, our aim was to gain experience with a “Proof-of-Concept" implementation of the course to support the development of a new course focusing on creation of sustainable future. Furthermore, the aim of using this type of method was to give the students a practical hands-on experience to work with sustainability and systems thinking aspects by using a design method aimed for real-life design cases for international markets (Planet Centric Design).

Implementation of the course

Altogether 35 students enrolled to the course. Before the first online contact session, a pre-assignment was assigned to the students, where they were asked to select their theme from the seven business fields. After selecting the theme of their interest, they were asked to explore digital services or products available for customers related to the theme. Each of the students reported shortly online in a joint discussion forum their findings on the exploration of solutions and identified gaps related to sustainability. This pre-assignment was aimed at supporting further working as a team on the selected theme during the first joint contact session online as well as during the later phases of the process.

PCD approach was used in this course as the approach for developing sustainable solutions for the future related to the seven selected business fields. PCD consists of a toolkit with canvases and a handbook to support the design process. The canvases are used during the PCD process to analyze, design, and evaluate the various aspects related to sustainable solution development and the outcomes of the design process. The PCD methodology has been developed to combine the systems thinking approach to solve sustainability related challenges of organizations, and to aid in creating new opportunities for novel service or business models. The PCD approach combines systems thinking with design thinking and service design methods to solve sustainability related challenges in a collaborative and creative manner. The approach consists of five phases: prepare, understand, envision, create, and release. Each of the five phases provides 2-6 canvases for use, adding up to a total of 19 canvases, to support the design of sustainable future solutions. In the planning phase of the course, the company experts, who had been involved in the design and development of the PCD approach, gave the teachers guidance on choosing suitable canvases from the entire toolkit to be used by the student teams.

The first contact session was organized jointly with the sustainable service design experts from a Finnish, internationally operating company Vincit, who had designed the method - the Planet Centric Design (PCD) - to be used in the course. The first joint learning session consisted of an ideation session related to the chosen themes by the student teams. Based on the pre-assignment to find business field related services, and knowledge gained from these identified services, the students were ideating solutions in this session to a question "*How might we deliver [value] responsibly, systemically and transparently by 2030?*". "*How might we*" questions are typically used in service design processes as the question to which solutions are ideated to. First, the student teams needed to identify for the question the "value" to be delivered. Then the value to be delivered for each of the three areas was asked to be brainstormed. The students were encouraged to ideate in this phase freely, without criticism, to generate as many ideas as possible. The three viewpoints – responsible, systemic and transparent - for which ideas were generated for, were defined as follows. Responsible is related to not causing harm to the planet, systemic refers to collaboration between different partners, organizations, and other collaborators, and transparent stands for opening up the processes to end users and providing sustainable choices when using the service or solution.

An example question generated for the theme food was: "*How might we deliver better food experiences responsibly, systematically and responsibly by 2030?*" and similar questions were addressed by other theme groups. Student teams filled in their ideas to the "how might we…" questions on a Miro whiteboard online (Miro) to "Planet Centric Ideation" canvas. Miro is an online collaboration tool that provides support for distributed cooperation synchronously and asynchronously by providing a whiteboard as a workspace. After ideation all the teams came together to discuss the ideas. The company experts discussed with the students the identified problems and value propositions, and the ideas for the three sustainability related areas. Experts also raised questions and helped the students in formulating and refining the value propositions and ideas.

After this session, each of the student teams continued their PCD process online at their own pace during a one-month period. One of the teachers had created Miro boards with the chosen canvases and process phases for each of the teams to use in the PCD process. The process required the students to work as a collaborative team synchronously when brainstorming and developing

solutions. This differed from many of the earlier course implementations during their master's degree studies where they could do group work asynchronously and divide the work between the group members for independent working.

Students were asked to do the following phases and to use the related canvases from the PCD toolkit:

1. Analyze the selected service or product for development with App Disruption canvas (unless not applicable for the selected solution)
2. Identify what needs to be improved by using the following canvases: a) Behind the scenes, b) Influence/impact, and c) User journey.
3. Ideate solutions with canvases a) Planet Centric Ideation and b) Radical/Realist to create ideas.
4. Develop ideas to concepts with canvases a) Planet Centric Concept, and b) Systemic Touchpoints.
5. Go forward to develop concept further: a) Strategic Team, and b) Business model flip.
6. How would you get the message across - use canvas: Sustainability storytelling.

Figure 1 describes how the theme "food" was brainstormed beyond the Wolt service with PCD Planet Centric Concept canvas by one of the teams. This canvas supported the team to consider various viewpoints for the question "What makes our concept sustainable?".

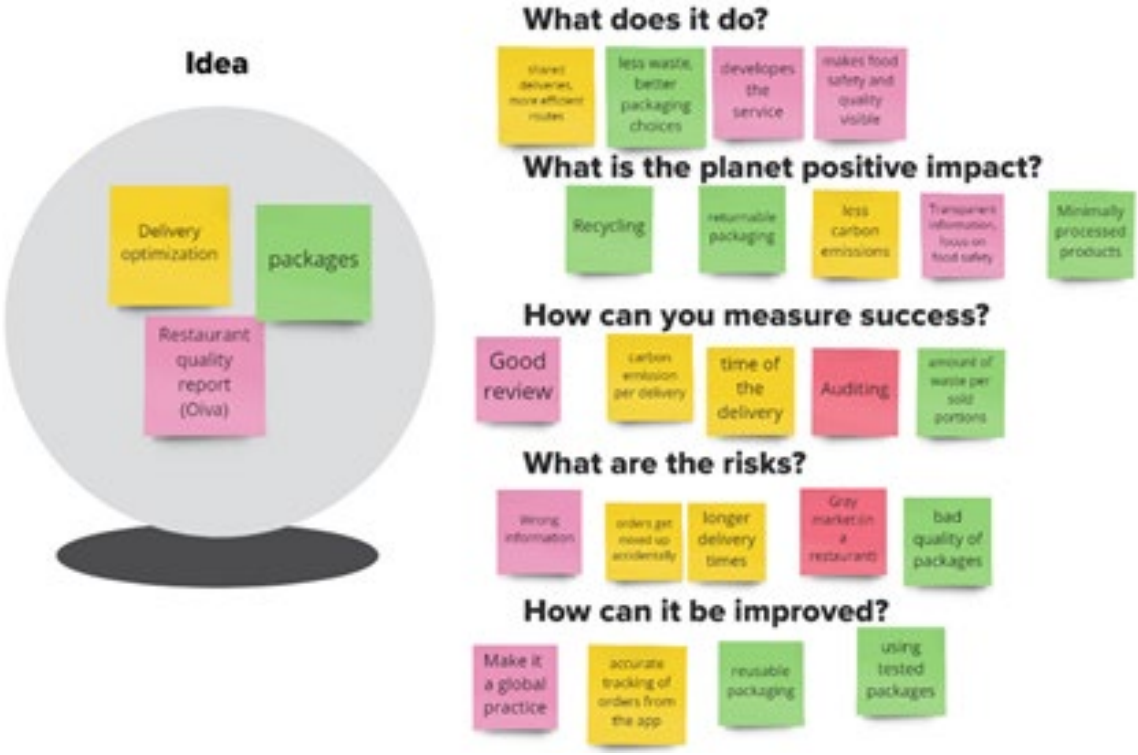

Figure 1. Brainstormed concept to improve the service sustainability by the theme group "Food".

In the end of the course, the students were asked to

a. report their design process with its phases and outcomes with a short 10 min video and
b. write a blog post on the learnings on the creative process and the use of the method as well as reflect on the ideas and thoughts on applying the learnings and methods in their worklife.

In the final joint learning session at the end of the course, each student team was asked to facilitate a 15-minute discussion based on the 10-minute video presentation by one of the other teams. Instructions for how to prepare and run facilitated discussions were given to the students to help them prepare their facilitation, including introductions to the theme and the presenting team members, questions to the presenting team and leading the discussion based on the video.

Created solutions

Each team followed the PCD methodology as introduced before. Students created either improved or totally new sustainable concepts of products or services related to their theme. There were creative ideas for mobile application to save energy in buildings, a platform of green energy market

for energy sellers and consumers, new features for Wolt application to save environment, a sustainable concept for online shopping (Wish), a novel service to support sustainable tourism choices, new requirements for developing sustainable smart watches, and a sustainable Citybike solution. Figure 2 illustrates what kind of sustainable requirements were created for a future smart watch in the "Health and wellbeing" team.

Figure 2. Brainstormed ideas for future sustainable smart watch by the group Health and wellbeing.

This team justified created sustainable requirements of the new smart watch as follows: "*It was important for our team to pay attention to the environmental impact of the watch as well as its recyclability. Our product differs from our competitors in their durability. Our watch has a long warranty and all the parts can be changed into a new or recycled, and the watch can be recycled properly. We also thought that it's important to be able to repair the old watch, so that it would always be more profitable for the consumer to repair than to buy a new one.*".

The used PCD methodology promoted the student teams to work in close collaboration within the team. Based on their experiences and their team practices,one team formulated key tips for running successful workshops (Figure 3).

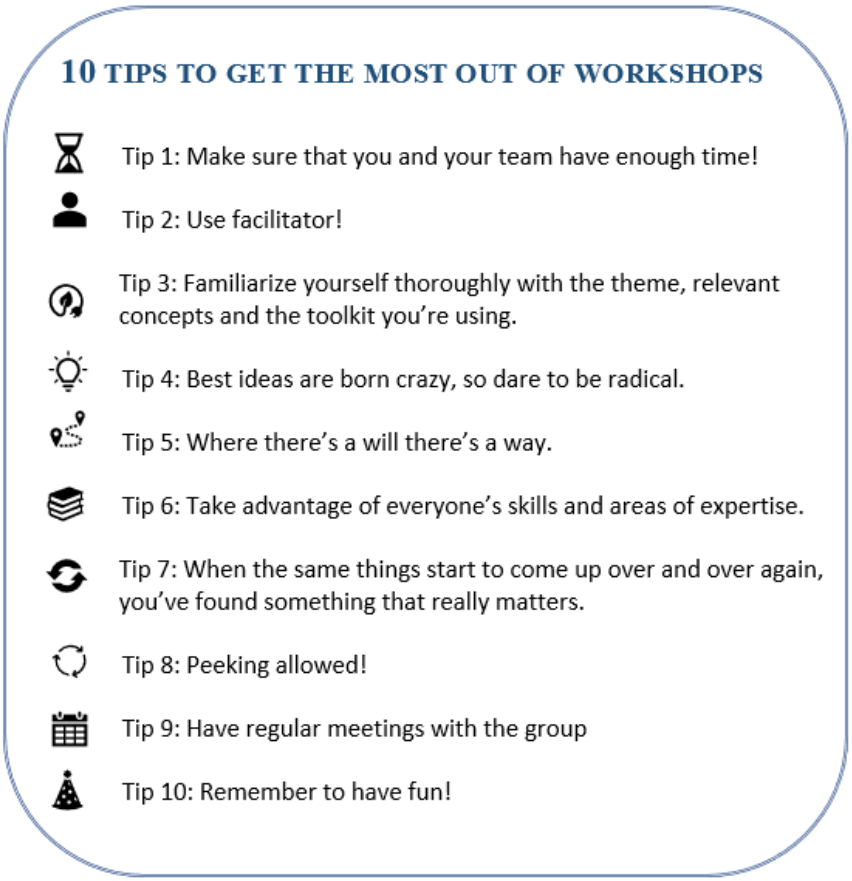

Figure 3. Ten tips to get the most of workshops during the course

As teachers, we were especially happy that the tip "*Remember to have fun!*" was included: creativity and ideation could never be too serious or hard work.

Reflection of using the approach and students' experiences

Initial student feedback on best and hardest things in the process

After the discussions in the final joint learning session, the students were asked two questions to be answered in the AnswerGarden tool (AnswerGarden):

- Fill in the sentence: "Hardest thing in the process was..."
- Fill in the sentence: "The best in the learning process was..."

By far the most often mentioned best thing in the learning process was teamwork (Figure 4). The mentioned challenges (hardest thing) were related to using English language, to get started with

the process, learning to use the canvases or understanding some of them, and understanding the PCD process. The challenges mentioned by the students gave us insights on what to consider and improve in future implementations related to using new types of design methods in the courses. Although the students had as self-study materials the PCD handbook and Toolkit documentation, a more in-depth introduction into the approach, its process and phases as well as to the canvases would help the students in the process. On the other hand, first reading the materials individually, followed peer learning with the team when working hands on on their problem to be solved by the new method, enhances also work life skills, as exemplified later in a quote by a student.

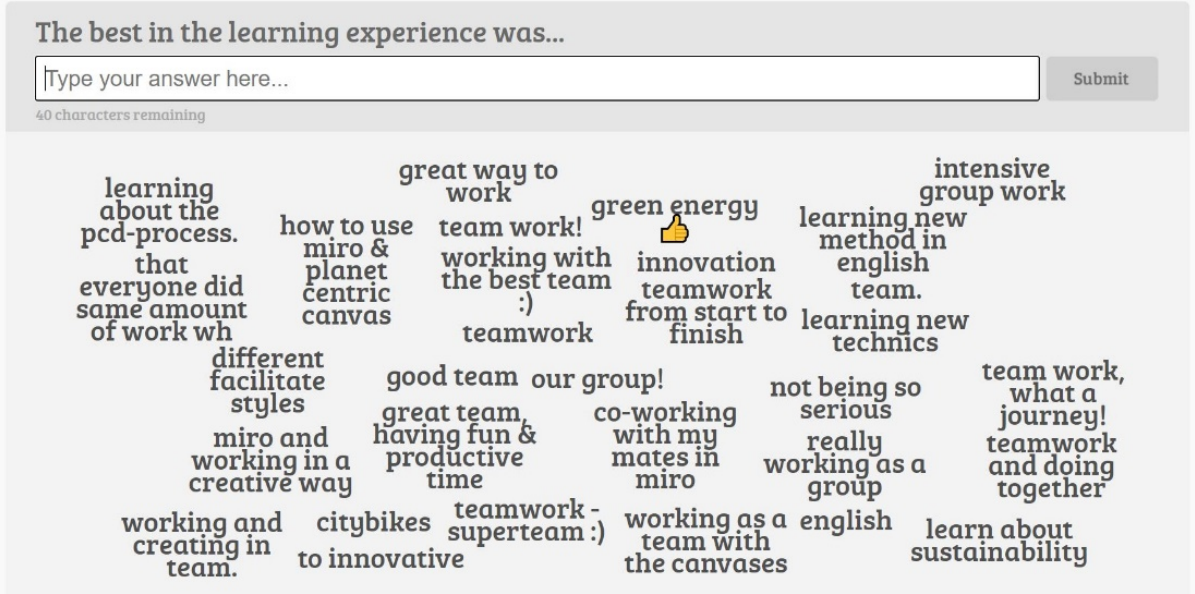

Figure 4. Students answers to the question on what was best in the learning process.

The teams and students overcame the challenges related to the PCD process during the course, as the final self-assessment questionnaire and the Peppi study information system feedback questionnaire revealed. Students were asked at the end of the course in a self-assessment questionnaire to analyze and reflect verbally their own learning, capability for out-of-the box thinking, sustainability related thinking, and future readiness. In addition, they were asked to describe their learning experience, e.g., what was easy, what was hard, and how they could apply or improve their skills further. The students' learning experiences and reflections are described next.

Teamwork and creativity

The students' self-reflection revealed as the most often mentioned themes teamwork and creative nature of the PCD process. Students described the teamwork as "*fun*", "*inspiring*", and "*refreshing*". The importance of team support was mentioned by several students exemplified by the following quote: "*I have really started to enjoy working in teams, because with a team you don't have to figure out everything alone. Being able to trust the team members you can be so much better than individuals. So, I think teamwork and solving the problems together, being able to trust each other was the best part.*" Regarding teamwork, it was also mentioned that the course and the use of PCD method "*required strong cooperation*", and one of the students described another point of view – challenging oneself and teammates to learn new skills - to team work as follows: "*I like the idea that you have to challenge yourself and your teammates to understand a new way of thinking with a new tool. These are modern skills that you have to learn all the time.*"

The creativity the applied PCD process required was mentioned by some of the students as hard for them, but in the end all the students mentioned that the PCD process strengthened their skills and abilities as well as confidence to be creative. "*Learning the new tool together at the same time without any negative etc. feedback giving point of views and ideas, sharing thought with members was great, and creative.*" Many students mentioned that brainstorming required a new type of mindset as well as skill development: "*Doing group work taught me how to get through a fast-paced brainstorming session. In creative thinking one must be open to everything; there is no right and wrong. Nor should perfection be sought because it kills creativity. […] it is good to step outside the comfort zone […]*." Since supporting creative skill development was one of our core goals in this course, the student feedback is positive in terms of reaching this goal.

Sustainability

Students reflected on sustainability from the point of view of working on it with the PCD method, as well as from the point of view of applying the learned in the future both in work life and personal life: "*I was surprised how difficult and foreign it was to think sustainable. The canvases really helped on that, and I learned a lot. I have noticed that I think many things more sustainably in my everyday life now after this course*." Another student commented on the relevancy of the chosen topics to work on, the benefit of doing a pre-task on finding existing services and the multiple views that sustainability requires to work on: "*Learning sustainability in the context of food*

application was a topical and relevant topic. Doing the pre-task was a lot of help in completing and learning the task. Sustainability is a challenging topic that needs to be learned and thought about from multiple perspectives. Black and white thinking is not appropriate." Using a systematic process with the focus on sustainability and its different perspectives seems to give concrete tools and aid to the students in understanding the concept of sustainability and its different areas as well as capability to take sustainability into account and make sustainable choices in the future..

One of the students raised the difficulty of making sustainable choices: "*I think that I learned a lot in this course how to be creative but also how to be sustainable. It really hurt me to understand, that I do similar choices than everyone else in [service] app and it is harmful to environment and it doesn't offer long term solution to me or the company. I think it will be easy in the future to think way more sustainably, when we have learnt about it first according to [service]. Somehow it will be hard to think that there is a lot different online stores that we don't know anything about and we still use them without thinking about sustainability. This will be the hardest thing to do, when you need to choose if some store is sustainable enough to use it. I can improve these skills only by reading things and paying attention more when using online stores*." Working on a concrete case in teams gave first hand understanding on the sustainability related issues and the difficulty of considering sustainability and making sustainable choices – as exemplified in case of online stores.

Applying in work life what was learned

Many of the students mentioned that they were planning to use some parts of the PCD approach in the future. One of the students planning to use the approach, reflected on the method and the true value and environmental friendliness of the solution in the end of the development: "*The PCD process was interesting and led the idea well forward. The PCD toolkit opened up new perspectives for myself to develop services with environmental values in mind. One thing in the process was particularly memorable. At the end of the process, the true environmental value of the product or service was also verified. Even if the actual product or service is environmentally friendly, the entire production chain may not be so… In other words, the product envisioned at the beginning may not look so good for sustainable development at the end of the process. I intend to use the method or parts of it as a model for annual development seminars. I found the course very necessary for myself and at least for my part it changed my way of thinking*."

Students also raised that the increased awareness on sustainability will help them in the future work life. "*I have been trying think as much as possible in a sustainable way. Of course, it's very challenging in a modern working and personal life. The course gave good ideas how to think in a more sustainable way in working life. There's a lot what I and my organization could do more sustainably. It's very good that you have to think these things more in depth, because then these ideas can really be applied in practice*." Another student described pushing the limits on sustainability as a learning for oneself: "*The sustainability aspect of this course was really interesting and I feel our choice to have cycling as a topic of our assignment was really useful, because we were able to challenge ourselves to push the concept of a quite eco-friendly product/service even further and that is a great lesson for years to come: to always challenge myself to question whether something good can be even better*." It seems that the course has at least short-term impact on sustainability thinking of the students in work life – and hopefully a longer lasting effect as well.

PCD approach and the course implementation generally

One of the students wrapped up the learning experience as follows: "*This course was a really nice combination of freshening my language skills, learning a new method, innovation, and finding a mind-set for the future.*" Overall, the course received positive feedback on the novel type of implementation compared to other studies and how it motivated the work: "*The whole course and how it was done was very different compared to the previous courses and this way it got me even more excited about really diving into the course*." Another student commented on the team work outcomes: "*The course was a nice variation as you didn't have to do a group essay, instead you got to come up with something new.*"

As discussed earlier, at first, students had challenges to work on their topic with a completely new approach and applying the PCD process and canvases in practice: "*During the course, I became acquainted with a new method where ideation and innovation got to shine. The method was a little difficult to absorb at first. It required strong cooperation to do this course. I think the most challenging was learning the method. I managed to learn how to use the method by reading the instructions many times*." One of the key things in design thinking and service design is that although the process is messy, ambiguous and creative, there is clear structure and discipline in the process. One of the students exemplified this and reflected own learnings as follows: "*The*

canvases helped me to refine ideas closer to practice in the end. It`s difficult for me to tolerate ambiguity and chaos, and I need clear structures. The canvases gave the structure but the working process was from time to time quite unclear and we all approached it differently. I think, I learned a lot about teamwork and how to give space for discussion even it went from time to time off the topic. I learned to listen to others more and tried to continue their thoughts. It was nice to let go of the control and it was easier because the whole team was active."

Working in English in a creative process and the confidence gained to use English was discussed by many students as described by one of the students: "*The language made the course more challenging, but it was no barrier to learning. It was actually refreshing to study in English*." Another student raised that creativity can be harder in a foreign language: "*This course taught me a lot. First of all, I think I learned to work in English, and I'm happy that I had the courage to participate in this course. Doing creative work in a foreign language was of course challenging, but also really instructive and memorable.*" Overall, even if the use of English may have been difficult, the students found that the course implementation in English was useful in combination with thinking about the future: "*Expressing myself in the richest form was sometimes a little challenging in English, but I feel this was a very necessary course. The things I want to keep improving after this course, besides my language skills, I want to take the sustainability thinking as part of my daily work and also the mindset for thinking about the future*."

The PCD approach emphasizes systems thinking as part of the process. One of the students wrapped up the learning experience as follows: "*... it was mind-blowing to use the PCD-method, because it underlined the sustainability thinking and the fact, how everything affects each other. It was really useful design tool to think matters out-ot-the-box*."

Quantitative feedback from an online course feedback questionnaire

At Lapland UAS, students' feedback is requested through the Peppi study information system after the end of each course. A total of 12 students recorded their feedback to this course implementation. The weakest average 4.5 (on scale 1-7) was given to the item "*During the course, I received feedback on the development of my skills.*". In this course students worked mainly in teams and thus the feedback and guidance were mainly addressed to team work outputs. The best average 6.8 was given to the item "*I was active in completing the course*.". This pointed out how intensively the students worked during the course. The second-best average 6.3 was given to the

item "*I achieved my competence goals*.". The item "*I am happy with the course.*" and the item "*The collaboration with the teachers worked well*." were evaluated as a the third-best with the average 6.2. Overall, even with the early challenges of getting started with the PCD approach and the difficulty of working through some of the canvases as well as using English as a language on this course, the student feedback was promisingly positive. This gives us as teachers confidence in planning the future implementations for similar type of courses. Furthermore, this "Proof-of-Concept" implementation is promising for planning future oriented course implementations, where sustainability is interwoven to the course goals and practical hands-on work to create new solutions – services or business models – is set as a learning goal.

Conclusions

We applied a new approach – Planet-Centric Design – that combines service design with systems thinking to increase master degree students' awareness of sustainability in the design of new services and business concepts. Based on the student feedback, the implementation of the course was successful even though the applied approach and Miro as an online collaboration tool were not familiar to the students in advance, and students found that understanding at first the process and some of the canvases was hard. Students were especially happy with the teamwork, the increased confidence in own creativity and using English as a work language, learning and applying the new method in practice, increasing their own awareness of sustainability and the creative process itself together with the team. Many students also mentioned planning to apply the method or some parts of it in their own organizations.

As teachers, we found that the implementation of the course was successful in increasing the student's capabilities and confidence in creative design process, creating novel service and business concepts, the use of English language in distributed teamwork, as well as increasing awareness of sustainability aspects. The aim of this "Proof-of-Concept" course implementation of using a practical real-life design process specifically addressing sustainability issues in combination with service design and systems thinking, gave us confidence in planning a new course "Creation of Sustainable Future" and its implementation for master's degree students. We are further planning to trial and apply alternative future oriented design approaches in the new

course, to gain experience with various future oriented methods and their suitability for creation of solutions for sustainable services, products, and business concepts.

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