Innovation Challenges as a Novel Multidisciplinary Learning Platform

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ABSTRACT

Innovation Challenges is a new course offered for the whole Tampere university community by Y-kampus entrepreneurship and innovation services, for the first time in fall 2019. Innovation Challenges offers practice-based cases that allow students to develop their creativity and problem-solving skills in a team. Learning is anchored in team coaching pedagogy, learning-by-doing attitude and entrepreneurial mindset. In this paper, we first describe the evolution that created a course called Innovation Challenges. Then, we describe course organization and the six challenges that student teams are currently solving.

CCS CONCEPTS

• **Applied computing → Collaborative learning**.

KEYWORDS

Multidisciplinary projects, innovation, learning platform

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1 INTRODUCTION

At the beginning of 2019 the Tampere university community was founded. It is constituted of Tampere University and Tampere University of Applied Sciences. Together these universities "are building a new model for higher education and research in Finland" [15]. This means for example combining research and innovation activities and co-creating value together with the business and the public sector [10]. The community hosts over 35.000 students and academy experts, and together with its partner network aims to co-create value [15]. The community offers various co-creation platforms for students as a means to learn new knowledge and enhance skills. The learning takes place in multidisciplinary teams that work on solving a project for a business or organization [14]. In addition to these co-creation platforms the university community is networked with several local actors that focus on supporting certain types of research or teaching fields. Co-creation activities are somewhat scattered in the community and the actors do not share information across activities as efficiently as they could.

Many universities and even some companies have their own innovation platforms and events. In Finland, most known multidisciplinary projects include Jyväskylä University's Team & Client Project Course [16] and Aalto University's Design Factory [1]. Ultrahack [18] and Junction [8] organise mainly two or three days hackathons in collaboration with companies to solve challenges. InnoEvent Tampere [6] is a 5-day innovation festival. During the event, multidisciplinary teams create and offer new ideas and solutions for the companies' real assignments. Challenge based education is also becoming an important educational model in Europe [17].

Tampere university community's newest innovation platform is a course called Innovation Challenges that started in autumn 2019. In this paper we present this new course and explain how it meets the community's needs with its course contents and pedagogy. This also forms basis for further analysis and evaluation of the course.

The paper is organized as follows. In Section 2, we describe the transitional process that created the Innovation Challenges course. In Section 3, we offer an overview of course organization. In Section 4, we describe the innovation challenges offered for fall 2019. Finally, we outline future research directions and conclude our work.

2 BACKGROUND - TOWARDS INNOVATION CHALLENGES

Recently, Tampere university community has began to embrace various co-creation platforms for the value they offer. In January 2019 Y-kampus [19], entrepreneurship and innovation services of Tampere university community, studied the internal research done in Tampere universities on existing co-creation platforms. Based on the research results by Suuronen et al. [14], only a few of the existing co-creation platforms were intentionally focusing on students as co-creators. Most of the existing platforms focused on university staff members co-creating value with local businesses and organizations.

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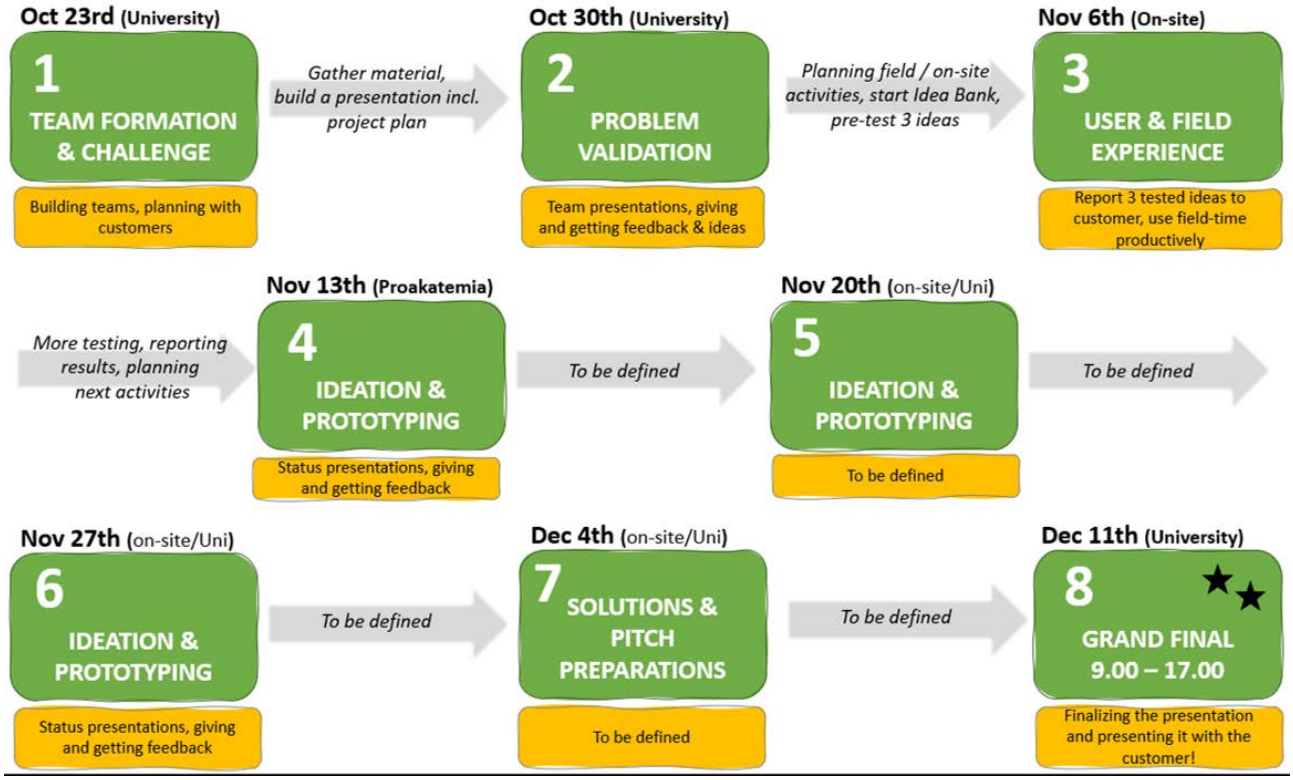

Figure 1: Challenge journey.

Although students had an opportunity to work in these projects or to be hired for small projects, the focus of these platforms was not on students. Only four platforms were identified as meeting the criteria of being student-focused as well as multidisciplinary. In 2019 the four platforms were SCIL [5], Demola [3], Challenge Based Innovations Project Course [2] and Growth makers [4].

In SCIL platform students work as experts in learning projects and aim to develop operations, services and educational content for their own higher education institutions. The SCIL project topics were internal to Tampere university community as described in [5] whereas in Demola platform the projects were commissioned by large corporations [12]. Demola [3] is a privately owned company selling project cases for corporations and recruiting students from universities to solve the cases. The Challenge Based Innovations project course [2] is run by Tampere University in collaboration with Cern, the European Organization for Nuclear Research. The collaboration model includes travelling and building of international teams which limit the number of potential participants. The fourth platform, Growth makers [4], is a 9-month and 30 ects development program targeted for masters students. The objective of the program is to boost company growth and further scale the business model with the help of a multidisciplinary student team.

With the aforementioned background in early 2019, Tampere university community, especially Y-kampus, aimed to design a more locally relevant innovation course, open for all university students with project assignments that tackle globally significant topics and aim to make the world a little better place for all. This is directly linked to the objective pointed out in [5] to attract more students from Tampere university, especially the students of human sciences, to become interested in innovation.

At the same time SCIL's role as Tampere university community's innovation platform was under consideration: how to broaden SCIL and its activities to better meet the community's mission to promote multidisciplinary learning and to co-create value with community's outer actors like local associations, companies, and public sector. After a few month's consideration and planning Tampere university community decided to integrate SCIL as part of the offering of Y-Kampus.

3 COURSE ORGANIZATION

Innovation Challenges [7] is an optional five credit unit course (later available as a 1 - 10 credit unit course) offered for the whole Tampere university community by Y-kampus, for the first time in fall 2019. Innovation Challenges offers practice-based cases that allow students to develop their creativity and problem-solving skills in a team. Learning is anchored in a learning-by-doing attitude and entrepreneurial mindset.

The competences enhanced during the course are the following: Innovation and development, Learning to learn and critical thinking, Ethical way of working and team skills, Interaction and communication, and Business and leadership skills with societal understanding. Altogether 30 students from various faculties are

Table 1: Teams with students' degree programmes.

Challenge	Students' degree programmes
Hiedanranta - Planning a sustainable city	Administrative studies, Administrative studies, Automation Engineering, Open studies, Social sciences
Rekki - Customer journey	Computational big data analytics, Environmental and energy engineering, Marketing and sales, Social sciences
Daily carbon dioxide budgeting	Journalism and communication, Nursing and health care, Open studies, Social sciences, Sustainable business
Scouter as a business platform	Automation engineering, Entrepreneurship, Industrial engineering and management, Library studies, Open studies
Rekki - Opinion leadership	Administrative studies, Computing sciences, Multilingual communication and translation, Nursing and health care, Social sciences
Gofore - knowledge worker's stress	Business studies, Human technology interaction, Leadership for change, Management and information technology, Social sciences

accepted to the course and divided into six teams, each team consisting of five students. The number of teams derives from the number of offered challenges. The course is evaluated as pass or fail. All students - who have not failed the course - will receive a diploma in the end stating they have passed the course.

The course consists of eight pre-scheduled meetings, beginning with a kick-off on October 23rd, 2019 (Fig. 1). After the kick-off all students will attend weekly meetings (á 3 hours) as a group with the coaches. In addition, all students will work 10-15 hours a week between the weekly meetings in various locations: on-site at the customer/organization premises, doing field work, virtual meetings, meeting at cafes etc. The eighth meeting time on December 11th is a longer day for final presentations - the students will present their main ideas and findings accompanied with their customer. This will allow students to hear immediate feedback from the customer and the audience.

The focal subjects in the course are the students in their teams, together with the customers. In addition, the course is hosted by two coaches: a principal lecturer and a third-year bachelor student. The coaches act as facilitators and encourage and challenge the teams to make progress. A specific "course atmosphere" is emphasized and enhanced in many ways: 1) all participants (customers, students, coaches) are equal with one another resulting in feelings of empowerment; 2) honesty, presence in the moment and communication based on a respectful and assertive dialogue generating trust and a sense of psychological security; 3) all ideas, trials and errors are openly welcomed and accepted fostering courage and innovativeness; and 4) the atmosphere is also concretely supported e.g. by sitting in circles, having background music and drinking coffee supporting a positive and relaxed ambience.

Various student-centered pedagogical methods are applied during the course. For example, MeCard is used with effective team introductions and with Weekly Reflections students are asked to reflect on past activities in a repetitive and systematic manner, paying specific attention to individual and team growth (see Räsänen [13]). Scaffolding is used as a method for becoming aware of various activities as students explain them in the students' own wordings. The coaches pay attention to enabling and letting the students to learn with team learning methods (e.g. the "law of non-intervention" when in trouble). The coaches further enable positive progress by asking empowering questions, challenging students to make and act on their initiatives and to embrace innovative ideas. The coaches give students the space and momentum to find significance in what they are doing and letting the teams grow into taking ownership of their project efforts and outcomes. Students are also given material on project planning and design thinking and encouraged to start testing and piloting as many ideas as quickly and as 'raw' as possible. [11]

When working in multidisciplinary teams, students are encouraged to be curious about other team members' competences and perspectives. At the same time, the individual student also shares his/her competences and initiatives with others; preferably using the kind of vocabulary that is not too degree/content-specific. This will crystallize for the student - perhaps for the first time - how much s/he has already learned and into what kind of an expert s/he is growing into when the audience is not from her own field of studies. When the team becomes aware of each members' potential input, then they are able to figure out together, how they can best combine their skills and ideas into solving the challenge.

4 FALL 2019 INNOVATION CHALLENGES

When selecting the challenges for the course, new elements related to content and pedagogy were emphasized in comparison to the earlier SCIL platform. Contentwise, the challenges should allow the students to work on topics that are meaningful for them, not only to the project provider. Societal perspectives were underlined by management of Tampere university community as well as sustainable development which are close to many students' hearts. In addition, one university faculty was also invited to participate in assigning two challenges. In this pilot Tampere University's Social sciences department and the vice-dean proposed two topics.

From a pedagogical viewpoint, team learning pedagogy is applied in Innovation Challenges [9]. The pedagogy underlines each team's full ownership of the challenge and each individual member's accountability for the team which - as a whole - is responsible for the customer.

The six innovation challenges were offered by four customers. Case Hiedanranta (offered by the Faculty of Social Sciences, Tampere University): what is needed for developing a sustainable city. The challenge focuses on understanding the types and combinations of multidisciplinary knowledge that may be applied when planning sustainable solutions for a novel residential area.

Case Rekki - Customer Journey (offered by Rekki Ltd.): Blow up customer journeys and enable clothes to live longer lives. The challenge focuses on sparking young adults to move their good quality, unused clothes to the next user and understanding what kind of a customer journey would support these activities.

Case Daily carbon dioxide budgeting as part of our daily decision making? (Offered by the Faculty of Social Sciences, Tampere University): The challenge focuses on understanding what is needed to remove and replace daily obstacles and habits that are preventing us from making sustainable choices.

Case Scouter (offered by Rideascout Ltd.): a two-seat electric bicycle as a business platform. The challenge focuses on innovating new business with a novel looking bicycle powered by foot pedaling and electricity.

Case Rekki - There is no first or second hand - taking opinion leadership (offered by Rekki Ltd.): The challenge focuses on shaking off old-fashioned prejudices related to using second hand clothes and taking opinion leadership in the market with a responsible business.

Case Better working life for enthusiastic knowledge workers (offered by Gofore Ltd.): The challenge focuses on understanding the challenges and risks of burning out when work is independent, the employee is leading one's own work and is eager to do one's best.

Altogether 36 students applied to the course in fall 2019, out of which 29 students confirmed their participation in the designated teams - covering four faculties and two schools of Tampere university community. In more detail, six students represented the Faculty of Social Sciences, six the Faculty of Management and Business, five the Faculty of Information Technology and Communication Sciences, five the Faculty of Engineering and Natural Sciences, two the School of Health Care and Social Services, two the School of Business and Services, and three students enrolled in an open study program. The students are studying both in bachelor (4) and master level (23) programs.

In the pilot course a third of the applicants communicated in English, therefore English was chosen as the official course language and at least two English-speaking students attended each challenge. The teams were formed based on the students' challenge preferences as well as keeping in mind the multidisciplinary perspectives that will benefit each challenge.

5 CONCLUSIONS

University, as an organization with thousands of students from many different disciplines and nationalities, offers an excellent base for organizing multidisciplinary innovation projects and co-creating value for all stakeholders and participants. Continuous course development is a de facto activity in all university level courses. The course development is carried out by teachers and researchers as well as students representing various disciplines and areas of expertise (pedagogy, management and business, computer science, etc.,). This type of cooperation offers multidisciplinary perspectives and versatile viewpoints for course development. In addition, the midterm feedback from students is encouraging, examples of their take-aways from the course so far: *"You feel not afraid to innovate and let ideas fly"*, *"Ability to learn and experiment with real cases and understanding there is no one right idea"*, and *"Being able to see the challenge from other persons' perspectives who come from different fields of study and from different cultures"*.

As for Innovation Challenges, there are plenty of future plans for course and platform development. For the future we need to consider e.g. different durations for the projects, projects arranged outside the normal academic semester like in summer, scaling the execution of the projects, international collaboration with other universities and companies, and novel methods for gathering data and feedback. To answer these issues we need careful evaluation of the current projects.

We have recognized several research questions for further research: What kind of practices (teaching, meeting, group work, customer collaboration, coaching, etc.) and tools (communication, ideation, visualization, etc.) best support innovation processes, the resulting learning and outcomes? What kind of a challenge brief would offer the most ideal starting point for a team to begin their challenge journey?

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