DEVELOPING HIGHER EDUCATION: AGILE METHODS IN SERVICE DESIGN

Satu Luojus[1], Sami Kauppinen[1], Janne Lahti[1]

[1] Laurea University of Applied Sciences (FINLAND)

Abstract

In order to respond to the challenges posed by digitalization, new competence and methods that can be used to facilitate digital service design in both the public and private sectors are needed. This requires developing the content and practices of higher education in the field. This paper describes an experiment that addresses developing master's degree studies in service design at Laurea University of Applied Sciences.

The pedagogical starting point for the development work was a pedagogical model, Learning by Developing (LbD), that is based on learning through research and developing (R&D). Expertise and experiences are shared between teachers and multidisciplinary student teams as well as other project partners. While working in the project teams, students take part as equal partners bringing their expertise with them. The teacher members of the project team take part by providing their expertise to steer the progress of the work and, at the same time, the progress of learning. [11].

The objectives of the development work were: (1) to gain a research-oriented, developmental and problem-based higher education approach to studying; (2) to provide students with competence to use agile design methods flexible at all stages of the service design process; and (3) to provide students with competence to gather, structure and apply information in genuine R&D contexts. The development work focused not only on the pedagogical issues, but also on student and stakeholder participation in the innovation process, and on applying and developing appropriate service design tools and techniques for that purpose.

The outcome of the development work was an elective study unit in line with the five days sprint by Knapp et al. [10], with the aim of providing students with the ability to design digital services with agile methods. The developed study unit forms a dual innovation model comprising: (1) continuous development of methods through a test bed, and (2) the application of competence to Laurea's partnership network's R&D projects.

The structure of this paper is as follows. First, the paper describes the key concepts and theories; service design in digital context and agile methods. Next, it presents research and development cases where the agile methods were applied to digital service design in practice. Finally, the last chapter represents the research findings and benefits of the agile development methods in service design approach.

Keywords: service design, agile methods, digital service design, higher education, master's degree studies

1. INTRODUCTION

In order to respond to the challenges posed by networked and coplex digital constellations [], new competence and methods that can be used to facilitate digital service design in both the public and private sectors are required. Digital service developers should not only know the laws of interaction between humans and technology, but also understand the opportunities that arise from involving users to participate in the service innovation and design process [8]. The service design approach has been broadly disseminated and rapidly adapted among designers, because the service design methods and tools have proven to be very effective in bringing users and the service experience into the focus of service design process [12, 17]. On the other hand, agile methods seem to complement the service design approach by providing tools and procedures for iterative designing and testing of digital services. Together these have resulted in the need for developing the content and practices of higher education in the field of digital service design. The purpose of this paper is to understand suitability and appropriateness of the agility methods for service design process. The objective of the paper is to find out how service design approach could benefit from the agile development methods. This paper describes an experiment that addresses developing elective master's degree studies in service design at Laurea University of Applied Sciences.

For the purpose we developed an elective study unit “Agile methods in service design” (10 cr) in line with the five days sprint by Knapp et al. (2016), with the aim of providing students with the ability to design digital services with agile methods. The objectives of the development were: (1) to gain a research-oriented, developmental and problem-based higher education approach to studying; (2) to provide students with competence to use agile design methods flexible at all stages of the service design process; and (3) to provide students with competence to gather, structure and apply information in genuine R&D contexts. The development work focused not only on the pedagogical issues, but also on student and stakeholder participation in the innovation process, and on applying and developing appropriate service design tools and techniques, as well as agile methods for that purpose.

The pedagogical starting point for the development work was a pedagogical model, Learning by Developing (LbD), that is based on learning through research and developing (R&D). The key features for LbD consist of authenticity, partnership, experiential nature, creativity and a research-oriented approach. Expertise and experiences are shared between teachers and multidisciplinary student teams as well as other project partners. While working in the design teams, students take part as equal partners bringing their expertise with them. The teacher members of the project team take part by providing their expertise to steer the progress of the work and, at the same time, the progress of learning. [11].

Usually, innovations arise as a result of dialogue between multidisciplinary design team and end users. Interaction among designers and users, where the collaborative and descriptive methods and tools are used to gain shared understanding, can be regarded as a key part of a high-quality design process. Thus, the characteristic feature for integrating higher education teaching and R&D projects at Laurea is studying in multidisciplinary design teams. [13].

2. AGILE METHODS IN SERVICE DESIGN

Service design process and agile design sprint aim at different goals; where the SD process aims at launching the new service on the market, the latter primarily test the appropriateness of the developed concept in order to decide whether it has the potential for further development or not.

2.1 Service design in digital context

Service design is rapidly expanding multidisciplinary field of research that is described as a human-centered and iterative approach that allows customers to co-create valuable service experiences with service provider through a creative design thinking process. [15]. Several disciplines have had an impact on service design, such as service science, marketing management, design disciplines (e.g. industrial design, interaction design, graphic design), phycology, operations management, and information technology [20, 14, 1]. The literature describes a number of service design process models, consisting of three to six phases (e.g. Moritz, 2005, Design Council, 2007, Stickdorn et al., 2018), but fundamentally all models share the same logic and mind-set. In general, the starting point for all processes is to understand customers’ as well as stakeholders’ needs, which after the data is analysed and utilised in development phase and finally the created service is implemented. One of the service design process has introduced by British Design Council (fig.1) and it consist of four phases: discover, define, develop, and deliver. Diverge and converge steps alternate in different phases of the service design process.

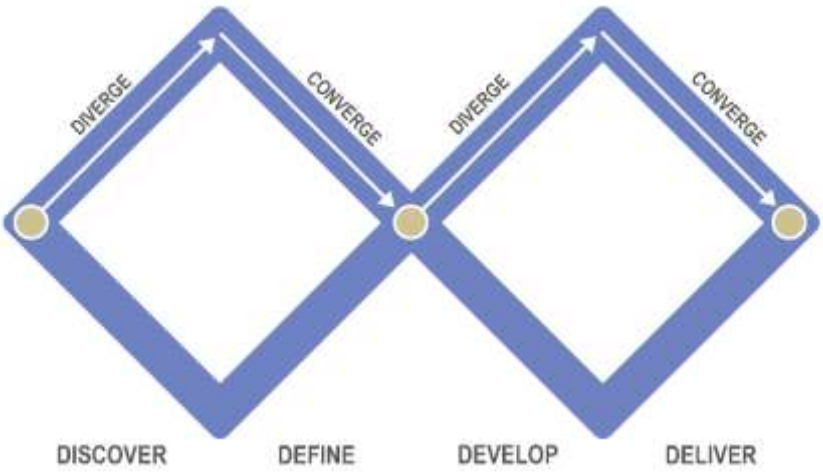

Figure 1. Service design process presented by British Design Council.

Ostrom et al. [14] highlight that services are increasingly produced and consumed in networked and complex digital constellations. Recent literature emphasizes the rapid digital transformation of modern societies, which creates opportunities, but also poses challenges for the service design process (e.g. Barrett et al., 2015; Blomberg et al., 2017). Calabretta and Kleinsmann [5] have examined how digital age affects design process from the perspectives of human-centered design, collaboration, and prototyping. In general, human-centered approach is based on the principles that can be found in "Human-centered design for interactive systems" (ISO 9241-210) and the main idea can be summarized as follows: (1) the design is based upon an explicit understanding of users, tasks and environments; (2) users are involved throughout the design and development process; (3) the design is driven and refined by user-centered evaluation; (4) the process is iterative by nature; (5) the design addresses the whole user experience and (6) the design team has multidisciplinary skills and perspectives. [9]. Calabretta and Kleinsmann [5] argue that digital era will change human-centered approach as "*digital innovations provides users flexibility to change and add functionalities, according to their individual needs*". Thus, there is need to conduct multiple iterations in order to fully understand form the users perspective all the possibilities and difficulties that they might face. Moreover, Prahalad et al. [16] defines co-creation as "*joint creation of value by the company and the customer*", which means active involvement of customers in shared process together with organisation [19]. In digital era co-creation should start in very early phase of design process with a minimum viable product (MVP) [5]. MVP enable to test a digital service a long period of time and develop it incrementally with users. Finally, Calabretta and Kleinsmann indicate that "Experience prototypes support stakeholders in thinking about integrated systems rather than the individual components" [5]. Consequently, digitalisation will change service design process as it need to take into account more complex digital environment and platforms and therefore more agile methods are needed.

2.2 Agile methods

The use of agile methods has significantly expanded when many private and public organizations have incorporated agile approach as a part of their innovation process [6]. However, there is no generally accepted definition for agile methods [7]. Instead, there are numerous different terms such as 'agile development', 'lean innovation' 'lean development,' 'lean enterprise,' 'lean start-up,' and 'lean business development'. However, most descriptions agree that agile methods are about working in a small team in same location in close contacts with customers [7]. According to Sutherland [18], 20% of the service or product features generate 80% of their value. Thus, aim of the agile methods is to identify the right features that have the highest value for the customer and to prioritize them.

Agile methods are most commonly used in software development [6]. The Manifesto for Agile Software Development, released in 2001, summarized the four principles of agile development as follows: 1) Individuals and Interactions *over processes and tools, 2)* Working Software *over comprehensive documentation, 3)* Customer Collaboration *over contract negotiation, and 4)* Responding to Change *over following a plan.* Blank [3] presents lean start-up as an iterative process (see fig 2) that emphasises rapid experiments with minimum viable product (MVP) in order to get feedback from potential users. First, the aim is to understand users' needs and more widely market opportunities, then ideate and create solutions, and finally test created solution with real users. The service will be developed more complete through multiple development cycles that lasts usually from two to four weeks. Knapp et al. [10] have presented a design sprint that take five days. Day 1) Make a map & choose a target, day 2) Sketch competing solutions, 3) Decide the best solution, 4) Build a realistic prototype, and 5) Test with users. Sprint gives design teams a shortcut to learning without the actual implementation and launch of the service or product [10]. Service design that concentrate on digital services would clearly benefit agile approach.

Figure 2. Lean start-up cycle (Adopted from Blank, 2013).

3. THE PROCESS AND METHODS OF THE STUDY

The purpose of this study is to understand suitability and appropriateness of the agility methods for service design process. The objective of the study is to find out how service design approach could benefit from the agile development methods. This paper describes two empirical case studies where agile methods were put in the practice. The case study research was selected because a contemporary phenomenon within its life context were studies, multiple sources of evidence were used; and the researchers had very little control over events under the study [21].

The research data was collected during the two separate implementations of an elective master's degree study unit called "Agile method in service design" in 2017-2018. Learning progressed in the both implementations of the study unit according to the Five Day Design sprint by Knapp et al. [10].

The phase of the Five Day Design sprint (by Knapp et al. 2016)	**The goal of the phase is to…**	**Assignment/task for the students**	**Relates to the stage of the 4D service design process (by the British Design Council)**
Challenge	The client launch a design challenge - an assignment - to the student teams.	- Build up your team.	Discover
DAY 1. Make a map & choose a target	- map out the design problem and to pick an important place to focus to understand	- Start at the end and agree to a long-term goal. - Make a map of the challenge. - Ask the experts to share what they know. - Pick a target: an ambitious but manageable piece of the problem that you can solve in one week.	Discover & Define
DAY 2. Sketch competing solutions	- sketch competing solutions on paper to diverge	- Review the existing ideas to remix and improve - Sketch competing solutions on paper. Follow a four-step process that emphasizes critical thinking over artistry. - Later in the week, the best sketches will form the plan for your prototype and test.	Develop
DAY 3. Decide the best	- make decisions about final features	- Evaluate each of the alternative solution in your sketch stack. - Decide which ones have the best chance of achieving your long-term goal. - Take the winning scenes from your sketches and weave them into a storyboard: a step-by-step plan for your prototype.	Develop
DAY 4. Build a realistic prototype	- make a testable prototype	- Create a storyboard. - Adopt a "fake it" philosophy to turn that storyboard into a realistic prototype.	Develop
DAY 5. Test with users	- test with usres	- Test your prototype with users – learn by watching them react to your prototype. - Based on user feedback - make improvements to your prototype/design solution.	Develop
Presenting	The designed digital service concepts were presented by the student teams and reflected in co-operation with the client, the teachers and the students.	-Presentation your design solution to the client and collect feedback.	Deliver

Table 1. Comparison of agile development and service design approaches.

The multidisciplinary student teams developed their competence by producing new digital service concepts in design teams of four students coming from different educational backgrounds. The assignment given to the student teams was to create a new digital service concept that meets the needs, hopes and wishes of the users and the client (e.g. JUST – The new social and health center of City of Järvenpää and SRV) (Fig x – y). During the study unit, the students worked on three levels: (1) studying the agile design process, methods, and tools, as well as their theoretical backgrounds; (2) applying the theory in practice; and (3) evaluating the theory, models, development process, practice, and tools.

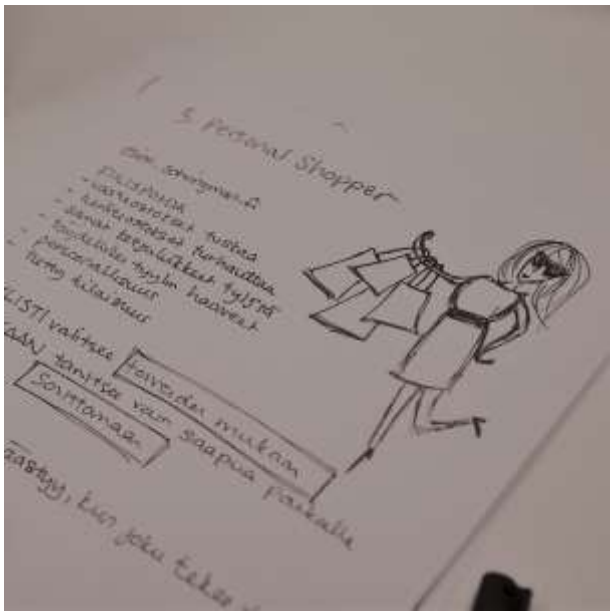

Figure 3. Customer insights visualized by a student team.

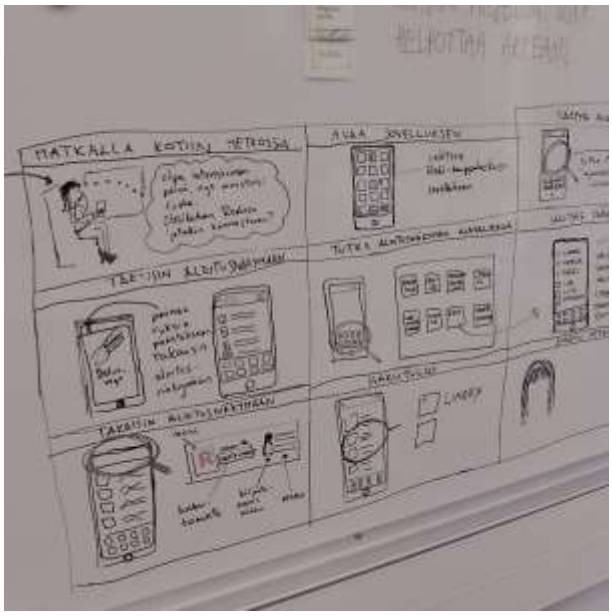

Figure 4. A storyboard created by a student team.

Figure 5. Student team evaluating their alternative design solutions.

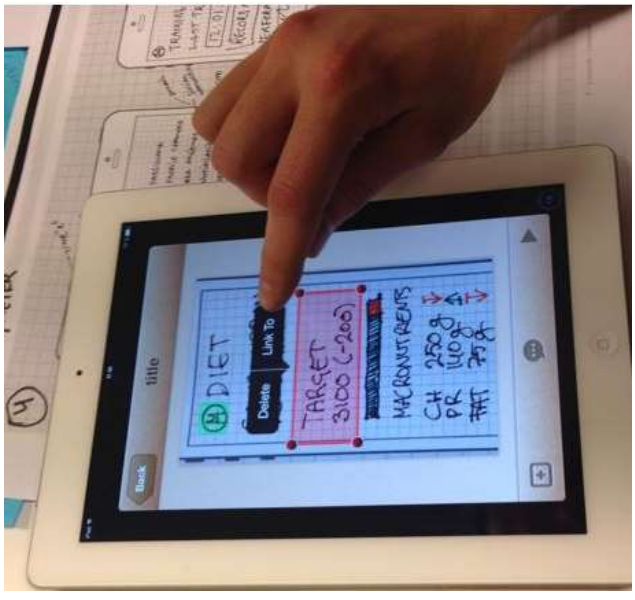

Figure 6. Building a realistic prototype of the digital service concept.

3.1 Case (2017): JUST - City of Järvenpää's new social and health-care center

JUST is City of Järvenpää's new social and health-care center (opened 2017) that offers basic health care, such as doctor and nurse consultations, emergencies, rehabilitation, laboratory, X-rays, specialist doctors, nutritionist, diabetes clinic, and medical equipment dispensation for those with long-term illnesses.

At the beginning of the study unit one contact day was organized in order to introduce agile methods, the Five-day-sprint, and the design challenge. The assignment for the student teams was to design new digital service concepts for JUST. The topics of design challenges were: (1) to design a digital service that guides the visiting relatives to comply with hospital practices at JUST, or (2) to design a mobile self-care service concept. Next the students formed teams of 4-5 people, each with different challenges. The following week consists of five contact days which progressed according to the Five Day Design sprint. Each day the teachers gave a short introduction to the theme of the day and to the methods supposed to use during the day, as well as provided their expertise to steer the progress of the sprint and, at the same time, the progress of learning. However, the student teams made their design decisions mostly independently and changed the roles to deeper their understanding of the methodology and the roles in the sprint. The sprint ended up testing the service prototypes with users.

There was no time to complete the concept presentation during the sprint. The final concepts were presented to the client on online-seminar later in the summer. At the same occasion, the design solutions were reflected in co-operation with the client, the teachers and the students. Each student teams had positive feedback from client and teachers. Design challenges were understood and outcomes were outstanding.

3.2 Case (2018): SRV - REDI

SRV is Finland's top project management contractor that develops and builds commercial and business premises, residential units as well as infrastructure and logistics projects. The publicly listed company is established in 1987 and it operates in selected growth centres in Finland, Russia and Estonia.

SRV is building eight tower buildings and the largest shopping center in the heart of the Kalasatama district in Helsinki. When ready, it will offer a home to 2000 residents and a shopping center. All tower buildings are scheduled to be ready year 2022. Shopping center called REDI opened its doors at September 2018. REDI has been planned to be part of a new kind of compact urban construction. REDI has 63,000 square meters of leasable space, which makes it one of Finland's largest shopping centers. There are just over 200 leased business premises, occupied by nearly 180 operators.

The study unit implementation was carried out in the same way as the JUST case; one contact day for orientation and design challenges, five contact days for design sprint, and online-seminar at the end of the summer. In the REDI case the design challenges set were more open than in the JUST case: to design a digital service that (1) helps customers to find the services they want from the REDI shopping center or (2) helps the operators of the business premises to provide their own services and combinations of various service providers' services to potential customers in an appropriate and attractive way. The sprint lead to different service concepts. At the online-seminar the student teams presented the designed service concepts and reflected them together with other students, clients and teachers. According to client, concepts were novel and useful for future development of REDI's digital services. Based on the student feedback, more than a few students had experienced multidisciplinary teamwork very fertile and rewarding. This also contributed to the success of the sprint and thus, also to the quality of the learning outcome, the digital service concept. According to students feedback the intensive implementation of the Five-day-design-sprint involved team members in close project working, which despite its intermittent harshness was rewarding and supported learning:

> *"I had the best team ever (efficiency and participation), even if I include into account my own countless work projects and team works! I believe that the client was very satisfied and output really helped her (at least with the individual functionalities add value) - it solves :) In fact, at least I am very pleased with the outcome."*

> *"One of the best courses, if not the best! I think this was more rewarding to our group, since we did not know each other before the course. The feeling of teamwork during Sprint was fun to experience!"*

4. RESULTS AND DISCUSSION

This paper described an experiment that addressed developing master's degree studies in service design at Laurea University of Applied Sciences. For the purpose an elective study unit "Agile method in service design" (10 cr) in line with the five days sprint by Knapp et al. (2016) was developed [10]. The aim of the study unit was to provide multidisciplinary student teams with the ability to design digital services with agile methods. The development work focused not only on the pedagogical issues, but also on student and stakeholder participation in the innovation process, and on applying and developing appropriate service design tools and techniques, as well as agile methods for that purpose. The outcome of the development work was an elective master's degree study unit called "Agile method in service design" (10 cr) in line with the five days sprint developed by Knapp et al. (2016), with the aim of providing students with the ability to design digital services with agile methods. The developed study unit forms a dual innovation model comprising:

1. **Continuous development of methods through a test bed**. According to the pedagogical model LbD, teaching and learning progresses through R&D projects that are carried out in collaboration with clients (e.g. companies, public or 3rd sector actors). Continuous development of methods through a test bed means that the study unit forms a safe experimental environment, a test bed, for both the development of R&D methods, as well as for the shared learning of multidisciplinary student teams.
2. **The application of competence to the partnership network's R&D projects.** Connecting studies to an authentic R&D context forms a new, motivating dimension for studying and learning. Co-operation within the study unit provides students with the opportunity not only to learn new competences, but also to network with Laurea's partner organizations. This opens up new opportunities for cooperation and employment for students. The active involvement of the client in the implementation of the R&D project and giving truthful feedback to the students is vital for success of the R&D project and learning.

The purpose of the case study was to deepen understanding suitability and appropriateness of the agile methods for service design approach. The objective of this study is to find out how service design approach could benefit from the agile development methods. The main the research findings relate to benefits of the agile development methods in service design approach. According to our experiences of the two case studies shows that:

1. Digital services are usually complicated. Agile methods instruct to divide extensive and complex services into parts and test them one by one. In our case studies, our client organizations wanted to test parts of their complex digital service entities. The test results were delivered to the client after a one week. During testing, multidisciplinarity enriches the interpretation of research material. Thus, **agile methods accelerate the digital service design process**.
2. Due to their different goals, agility sprint and service design process emphasize different phases of the design process. The Five-days-design-sprint concentrates heavily on the Develop-phase in SD process. The Discover & Define phases were paid only little attention, because sprint does not require the involvement of users / customers / stakeholders. Any existing customer insights are introduced to the design team at the beginning of the sprint. However, **a prerequisite for the successful design solution is gathering a deep customer insight** before the sprint starts.
3. Even though the principles and emphasis in the design process first seems to be contradictory, we regard **the agile methods are highly compliant with SD process**: (1) the agile design sprint could be embedded into the digital SD process. In the other words, we propose adopting of the Five-days-design-sprint as a significant procedure for iterative designing and testing of digital services in the Develop-phase of service design process; (2) Iterativity requires that few sprints to be implemented when testing in the Develop phase.

REFERENCES

[1] T.W. Andreassen, P. Kristensson, L. Lervik-Olsen, A. Parasuraman, J.R. McColl-Kennedy, B. Edvardsson and M. Colurcio, "*Linking service design to value creation and service research*", Journal of Service Management, 27(1), 21-29, 2016.

[2] M. Barrett, E. Davidson, J. Prabhu & S. L. Vargo, "S*ervice innovation in the digital age: key contributions and future directions"*. MIS quarterly, 39(1), 135-154. 2015.

[3] S. Blank, *"Why the lean start-up changes everything".* Harvard business review, 91(5), 63-72. 2013.

[4] British Design Council. http://www.designcouncil.org.uk (Retrieved 15.6.2015)

[5] G. Calabretta & M. Kleinsmann, "*Technology-driven evolution of design practices: envisioning the role of design in the digital era*". Journal of Marketing Management, 33(3-4), 292-304. 2017.

[6] S. Denning, *"Why Agile can be a game changer for managing continuous innovation in many industries".* Strategy & Leadership, 41(2), 5-11. 2013.

[7] L. Hannola, J. Friman & J. Niemimuukko, "*Application of agile methods in the innovation process*". International Journal of Business Innovation and Research, 7(1), 84-98. 2013.

[8] J. Holgersson, & F. Karlsson, *"Public e-service development: Understanding citizens' conditions for participation".* Government Information Quarterly, 31(3), 396-410. 2014.

[9] ISO 9241-210. "*Human-centered design processes for interactive systems"*. Geneve: International Organization for Standardization. 2011.

[10] J. Knapp, J. Zeratsky & B. Kowitz. Sprint: How to Solve Big Problems and Test New Ideas in Just Five Days. New York, NY: Simon and Schuster. 2016.

[11] S. Luojus, S. Kauppinen & J. Lahti, "*INTEGRATING TEACHING AND R&D IN HIGHER EDUCATION - THE WELIVE PROJECT*". In Proceedings of the 8th International Conference of Education, Research and Innovation. 2015.

[12] S. Luojus & J. T. Harviainen, "*Designing for Service Experiences*". In: Turner, P. & Harviainen, J. T. (eds.) Digital Make-believe: A New Perspective on Interaction. Springer: New York, NY. 2016.

[13] S. Luojus, S. Kauppinen, Sami, J. Lahti & L. Tähtinen, "*Forming Multidisciplinary Master's Degree Student Teams by Means of Gamification Case: The WeLive Design Game*". In Proceedings of the 10th International Conference of Education, Research and Innovation. 2017.

[14] A. L. Ostrom, A. Parasuraman, D. E. Bowen, L. Patricio & C. A. Voss, "*Service research priorities in a rapidly changing context*". Journal of Service Research, 18(2), 127-159. 2015.

[15] L. Patrício & R. P. Fisk, "Creating new services". Serving customers globally. 185-207. 2013.

[16] C. K. Prahalad & V. Ramaswamy, "*Co-creation experiences: The next practice in value creation*". Journal of interactive marketing, 18(3), 5-14. 2004.

[17] M. Stickdorn, M. Hormess, A. Lawrence & J. Schneider, *"This is service design doing*". Canada: O'Reilly Media. 2018.

[18] J. Sutherland & J.J. Sutherland, "Scrum: the art of doing twice the work in half the time". Currency. 2014.

[19] S. L. Vargo & R. F. Lusch, "*Evolving to a new dominant logic for marketing*". Journal of marketing, 68(1), 1-17. 2004.

[20] K. Wetter-Edman, "Design for Service: A framework for articulating designers' contribution as interpreter of users' experience". University of Gothenburg. Faculty of Fine, Applied and Performing Arts. 2014.

[21] R. K. Yin, "*Case study research. Design and methods".* Newbury Park, CA: SAGE Publications. 2009.