

Characteristics of value co-creation in a learning environment by service design and service-dominant logic frameworks

Jussi Haukkamaa, Pia Yliräisänen-Seppänen, Eija Timonen

jussi.haukkamaa@oamk.fi

Oulu University of Applied Sciences, P.O. Box 222, FI-90101 OULU, Finland

pia.yliraisanen-seppanen@ramk.fi

Rovaniemi University of Applied Sciences, Porokatu 35, FI-96400 ROVANIEMI, Finland

eija.timonen@ulapland.fi

Faculty of Art and Design, University of Lapland, P.O. Box 122, FI-96101 ROVANIEMI, Finland

Abstract

Presently, educational institutions exist as complex networks of expertise that fulfil the needs of their stakeholders and respond to the challenges of a transforming society. Therefore, educational services are subject to a constant design process in co-operation with the customers and other stakeholders. Co-operation between parties is strongly related to the value co-creation, since the customer is the co-producer of the value according to the concept of service-dominant logic.

Service design research has paid little attention to the value of co-creation in networked education services. This paper focuses on value co-creation in service-dominant logic and service design frameworks using a case study of supplementary healthcare education service. The case study is situated at the ENVI Virtual Center for Wellness Campus, which is a virtual and simulation learning environment for healthcare in Rovaniemi, Finland.

The goal of the three focus group interviews was to study which characteristics support networked value co-creation in design of educational services. Based on the research data, we have determined features that increase understanding in terms of the value-creation processes related to the networked education services: network transparency, trust and shared expertise. The paper also proposes some service design tools for the research and development of such services.

KEYWORDS: value co-creation, service design, service-dominant logic, education service

Introduction

During the last few decades, the economy has shifted from the dominance of manufactured goods toward the era of services (Vargo & Lusch, 2004). Simultaneously, resources for the public sector—including education—have constantly faced pressure to cut costs and develop services aimed at providing better satisfaction and performance.

Educational institutions are often complex networks of expertise, fulfilling the needs of their stakeholders and responding to the challenges of a transforming society. There is little research regarding the elements onto which networks of expertise develop their strengths. It is essential to identify these elements, especially when designing complex customer-oriented services, for example supplement education services. This paper studies the features of these networks.

The dominant value-creation logic for the twentieth century has been based on manufacturing tangible goods for markets at the lowest cost possible. This goods-dominant logic views the customers merely as a target for the marketing operations (Vargo & Lusch, 2004). The roles of “customer” and “producer” have been quite clear, and value creation has been considered as a series of activities managed by the producing firm. During the past decade, the focus has been shifting from the tangible toward the intangible; meaning concepts such as knowledge, skills, interactivity and ongoing relationships (Vargo & Lusch, 2004). Firm-centered, goods-dominant, value-creation logic has been considered outdated, and value co-creation has been suggested as a substitute for the dominant marketing theory (Prahalad & Ramasvamy, 2004; Vargo & Lusch, 2004; Vargo et al. 2008).

Customers now take a more active role, and have changed from being a target to being a co-partner, both in business-to-customer and business-to-business markets. According to service-dominant logic (SDL):

[The] customer is always the co-producer of the value—the customer becomes embedded in the service offering and ultimately is responsible for the value added to the process. (Ordanini & Pasini, 2008, p. 289)

Service firms and educational organisations are in a changing economic environment—in order to be competitive, they should understand their value-creation processes as well as the needs of their customers. Conversely, policy makers have suggested closer collaboration between designers and users of the public services "hoping to reinvigorate public services under pressure from a more demanding public, increasing social complexity and overstretched resources" (Bradwell & Marr, 2008, p. 10). The returns should be more effective and functional public services.

The SDL framework has been seen a model for creating knowledge about the mutual processes (Ordanini & Pasini, 2008). In the SDL model, the value of a service is realised at the same moment it is consumed. This removes the distinction between tangible and intangible products. The focus of the SDL is to explain how value is created, where in the process it is created, and by whom. In an SDL domain, value has been divided into two meaningful concepts: value-in-use is specified by the beneficiary (user, customer) at the moment of use. On the other hand, value-in-context emphasises the time, place and network relationships as key variables (Edman, 2009).

One of the main critiques towards SDL is that it lacks guidelines for concrete service development and implementation, which are the core competence of service design practice and theory (Edman, 2009). Therefore, it could be suggested that the two frameworks, SDL and service design, could complement each other. The use of the SDL perspective in combination with user-centred service design tools could help to develop services both practically and theoretically.

Service design is a human-centered and holistic approach that integrates user-oriented, team-based methods (Mager, 2007). Therefore, it offers a user-centred point of view to develop also education services for better operations and results. Service design research emphasizes the user's involvement by asking how and why the service experiences are triggered and what exactly triggers them (Edman, 2009).

Bessant and Maher (2009) discussed the need for new ideas to engage users as more active co-creators within the healthcare sector service innovation. They conducted a series of case study experiments in the UK, and argued that a potentially useful toolkit of design methods could be found. We are interested to explore if and how service design methods could be applied in networked education services.

The aim of this qualitative research is to study value co-creation in the healthcare service education using two frameworks: service design and service-dominant logic. The main research question is which characteristics support networked value co-creation in the design of education services? The results of this research create new knowledge for the design of education services, and can also be applied to the development and design of expertise organisations within a service design domain.

In the following chapters, we introduce The ENVI Virtual Center for Wellness Campus, which has been the case environment and source for the research material. Afterwards, we present the analysis, main results, and finally the conclusions.

Case environment: ENVI – Virtual Center of Wellness Campus

The ENVI Virtual Center of Wellness Campus™ is a virtual and simulation learning environment in Rovaniemi, Finland. It was created by Rovaniemi University of Applied Sciences (RUAS) and Lapland Vocational College during 2005–2007, and RUAS has been developing the environment since 2007. ENVI has been a target for research activities (Haukkamaa, 2010; Keskitalo, 2010; Yliniemi, 2009; Yliniemi, 2010; Yliräisänen-Seppänen & Timonen, 2010), e.g. in the MediPeda III project, which was aimed at developing pedagogical models, user-centred design methods and a value creation model for simulated and virtual learning environments for health and welfare (MediPeda III, 2010). ENVI simulates practical situations and environments in the field of health care and social services. ENVI is divided into four rooms (Fig. 1):

- » incident environment and ambulance transport
- » emergency treatment and intensive care ward
- » cardiac critical care (CCU), surgical ward and bed ward
- » maternity/child health clinic and distance consultation



Figure 1: ENVI Virtual Center for Wellness Campus™ includes nine operational environments. Published with permission from the Rovaniemi University of Applied Sciences and the Lapland Vocational College, copyright 2010.

Multi-professional care teams can practice seamless cooperation during the entire healthcare process, from the scene of an accident to a virtual hospital and finally to the rehabilitation process (ENVI, 2010). ENVI is a mixed reality learning environment, as it combines physical environments and simulation manikins with immersive full-scale 3D simulation projections. In the incident environment, users can view, navigate, and interact with handheld interaction devices, so it offers full-body movement in front of a large-scale projection display.

This research will be focused on the supplementary education at the incident environment, meaning it is a pre-hospital environment where an individual can learn first aid and acute care (Fig. 2 and 3). The utilisation rate of the ENVI learning environment is high, as there are several user groups: vocational college students, students of the RUAS, and work communities from Finland as well as other countries.

Simulation techniques in healthcare training have a wide range of positive driving forces, for instance, improvements in care, patient safety, learning, performance, efficiency, and uniformity of care. Moreover, simulation brings reductions in costs, errors, and “training” on patients (Gaba, 2004).



Figure 2 (left): The incident environment with 3D projection displays offers realistic and safe learning experiences at ENVI Virtual Center for Wellness Campus. Figure 3 (right): Training with a simulation manikin at the incident environment in front of the 3D projection displays. Pictures published with permission from the www.seven-1.com, copyright 2010.

Research data and analysis method

In this case study, focus group interviews have been seen as a suitable data collection method, because we aim to study the value co-creation between several parties. Focus group interviews can highlight the operational structures and relations in diverse manners, as the interviewees may comment and complement each other (Alasuutari et al., 2005; Ruusuvaori & Tiittula, 2005).

During the pre-planning phase, we discovered in preliminary discussions with ENVI personnel that the decision-makers of the education purchase (buyers) are seldom taking part in the actual training sessions at ENVI. There are two groups of stakeholders within the customer organisations: the buyers of the service who are usually in managerial position, and the supplement education students, who are mostly operative employees in various professions. Therefore, we selected three different groups.

The focus group interviews (n = 14) were conducted at Rovaniemi, Finland during May-June 2010 in three groups:

Group 1: Supplement education teachers and healthcare service sales manager of at RUAS (n = 3). Reason for selection: they are familiar with the education service and its customers.

Group 2: Purchase decision makers (buyers): chief physicians, surgeons, and head nurses at Central Hospital of Lapland (LCH, n = 5). Reason for selection: several departments of the LCH have been using the ENVI services, and therefore their interviewee group included professionals from many departments.

Group 3: ENVI Supplementary education students: group of Finnish Border Guards (n = 6). Reason for selection: this customer group was selected by their suitable schedule.

Two of the interviews were realized at ENVI, and the one at the LCH with their staff. All the interviews were audio recorded. The interviews have been only partly transcribed due to time constrains. The analysis of the data has been made using the qualitative content analysis method (Graneheim & Lundman, 2004), focusing mainly on the interfaces and interaction between the actors.

The interview data was read through several times and the data were sorted into three categories: co-creation parties, forms of co-operation and expectations for the co-operation. Based on these categories we raised three categorical analysis questions:

- » With whom are the parties co-creating related to the ENVI education service?
- » What kind of co-operation exists between the parties with the ENVI education service?
- » What kind of expectations do the parties have for the co-operation at the ENVI education service?

For the reasons of reliability and validity evaluation (Alasuutari et al., 2005; Graneheim & Lundman, 2004), readers should be aware that the three writers have been part of a research project MediPeda III (2008-2010), which has been funded partly by the RUAS. Additionally, one of the writers is currently an employee of the RUAS. However, besides the interview sessions with the ENVI personnel, the RUAS has not been involved in the planning or implementation of this research.

This research was conducted following the research ethics guidelines (University of Lapland, 2010; Kuula, 2006); all the interviewees have been informed about the objectives of the research and they all signed a consent form before the interviews. The research data materials are only accessible to the writers and are stored in confidentially.

The following section presents our essential research results. During the interpretation, the focus was especially on characteristics supporting networked value co-creation in design of education services.

Transparency between design parties of a service enables an internally strong network

We argue that the network of design parties of a service should be transparent in order to enable an internally strong and interactive development process. Presently, organisational knowledge and expertise are fragmented to various networks. Participation of the stakeholders has to be visible in order to build a vital and developing network. It is necessary to clarify the members and their needs.

The interview material revealed that the ENVI education service has a large network of stakeholders. Figure 4 presents many of the essential parties, for example educational institutions (RUAS and Lapland Vocational College), hospitals (LCH and others in northern Finland and Norway), cities and municipalities (health centres, day-care centres, patient transportation services, rescue service authorities and so on), private healthcare companies (e.g. patient transportation companies), county administration offices, Finnish Border Guards, non-governmental organisations (e.g. Finnish Red Cross), and some EU-funded health care projects.

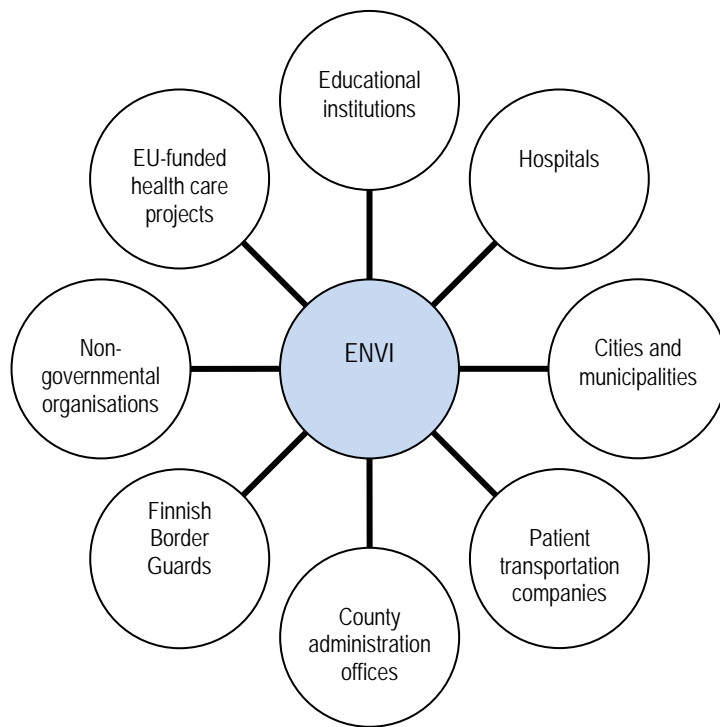


Figure 4. Some stakeholders of the ENVI Virtual Center for Wellness Campus.

Organisations cannot afford to recruit all the expertise they need for productivity reasons. Moreover, economic challenges in the public sectors (Parker & Heapy, 2006), strategic rationalisation, operational centralisation, outsourcing and similar efficiency activities have been common operations during the previous years. Thereby, the service organisations are increasingly dependent on one another. The intensity and depth of the co-operation between parties have an influence on the ability of shared knowledge and strength of the network.

When studying the co-creation stakeholders, the research material supported the argument that transparency enhances the network strength. For example, some of the network parties had a common development project, which created a new and regular First Respond Unit (a trained and equipped first aid group) for the northernmost parts of the Lapland by the Finnish Border Guards.

"This First Respond Unit development was a nice two years project, which created concrete results: training session, equipment etc. It brought real permanent results" [group 2, interviewee 3].

This project has resulted in a broader co-operation between several parties, even though the main parties have different motives for co-operation: for the Finnish Border Guards, it is learning operational first aid skills, whereas the LCH interviewees pointed out the need to develop teamwork skills and internal processes. Within the network, these parties can complete each other's, as it so happened in this case: the planning and implementation of the new groups were a co-operation project for many of the stakeholders at ENVI. For example, some of the LCH physicians were involved in this project. Currently, these first response units have training sessions at ENVI. A successful project has generated trust and new ways of co-operation within the ENVI network.

SDL suggests that more professionals from the participating organisations can become involved and understand each other for the value co-creation (Edman, 2009). This also requires more transparency between the parties in order to incorporate employees into the service design process.

Networks of expertise are multifaceted and all members have their own ambitions. Therefore, cooperation forms are changing case by case. In the design process, customer involvement is essential for the service design domain (Koivisto, 2009) when innovating new service offerings based on the needs of the stakeholders. All the members are tied to the common service development in order to get compensation on their investment in value co-creation.

When developing a complex service of expertise for education, we would like to suggest some potential service design tools for finding out the stakeholders, their relations and motivations. An ecology map (Edman, 2009), also known as an actor map, represents actors and their relations in the system. A customer journey map describes the user's route in a service emphasising the touch points of the service. A motivation matrix reveals the needs and expectations of each member. A system map describes stakeholders, relations, and flows of material, energy, information and money through the system (Tassi, 2010).

In this case, we would strongly propose the system map tool, which can effectively aid in previewing the service system. It visualizes the immaterial process and components of the service and builds a common understanding for the stakeholders. This tool could be useful, especially during the design and evaluation phases of education service development.

In our service-based society, similar networks of expertise are countless: new service networks are constantly being created and removed. Transparency of the service network is a vital attribute for an expert service when developing and co-creating mutual value for all the participants.

Trust between parties is based on rich co-operation

In expert network services, the trust between members is established on versatile, wide-ranging co-operation activities. Trust has implications in service business e.g. on expertise, performance, reputation, satisfaction and sales effectiveness (Johnson & Grayson, 2005), which are also meaningful factors for value co-creation. Thus, trust is based on the transparent relationships of the network members.

An actual training situation can be seen as the most significant moment for the value co-creation (Vargo et al., 2008), but also the co-operation activities that occur before and after are remarkable for the building of commitment and trust in value co-creation. This argument was noticed when studying the aspect of "how" between the participation of the network members. Based on the research material, we introduce the co-operation process for supplement education training in the ENVI (Fig. 5). The preliminary goals for the education content are usually negotiated between the buyers and ENVI teachers. The cost estimate and contract are discussed with the healthcare service sales manager at RUAS. The teachers plan the final content with the purchasing parties: managers of the departments, or professionals who will join the sessions as students. In the beginning of a training session at ENVI, the teacher presents the content and goals of the session with the students for a discussion together. After the training session, the teacher collects feedback and aggregates a summary for the customer. Main co-operation tools between buyers and teachers are e-mail, phone and planning meetings, education sessions and feedback reports.

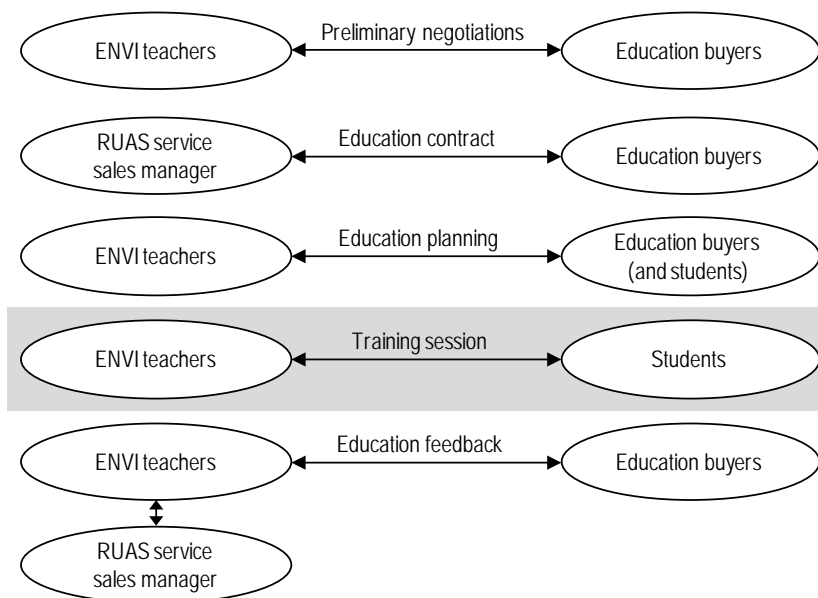


Figure 5. The process model of the ENVI supplement education services.

In the SDL framework, the value is co-created at the same time that the service is consumed in co-operation between the customer and the service provider (Ordanini & Pasini, 2008). Based on the research material, there are various touch points in which value is co-created both before and after the actual training session (see Fig. 5). These interaction points are important for both the service content and the service process development. Therefore, the designers of the education services should take into consideration all the touch points within the value co-creation parties.

Service organisations are motivated to increase trust between the parties and to engage their customers in the development of the service in order to keep the relation dynamic (Parker & Heapy, 2006). Thus, service providers should be familiar with their customers so as to make them feel as though they are valued partners in the design process. However, this co-operation model can be realized only if there is trust between the actors and the upper administrative levels, where the decisions for co-operation resources are made. In addition, mutual trust is also an important element in terms of confidence. When the parties ask for certain supplemental education content, they also reveal their shortcomings or targets for development.

Based on the interviews, students have been motivated in training sessions. As an example, LCH personnel wanted to improve co-operation between their internal departments. They arranged a training session at ENVI, which was designed to help teamwork operations in practise :

It has been said, that the (team) co-operation needs to be improved a great deal -- and maybe therefore it has been seen important to participate in training and it (training in the ENVI) has created successful experiences in real work [group 2: interviewee 5]

In this case the interviewee was both an education buyer and a participant in the training session. Their team had the opportunity to design the content for the training session beforehand and was thusly motivated by it. Afterwards, she was satisfied by the improvements in their team's processes and work practice. This example underlines the importance of engaging customers with the design process.

A conceptual element of value-in-context in the SDL framework expressly emphasizes the network relations and the time and place dimensions between the parties (Edman, 2009). There seems to be a connection to the notion of trust, e.g. with expertise, performance and similarity (referring to the presence of common values and interests) (Johnson & Grayson, 2005). Value creation in an education service requires certain a place (physical or digital) and time for activities and the existence of a network of the teachers and students. Conversely, the concept of value is not usually explicitly discussed in the design discipline, but it is present in many definitions of design. For example, the goal of service design is to ensure that service interfaces are useful, usable and desirable for the user, and that they are effective, efficient and distinctive for client (Mager, 2007). Many of those factors could be interpreted as valuable to the stakeholders. The key elements of service experience are the customer journey, service moments and touch points (Koivisto, 2009), all of which are connected to the time and place factors – and the concept of value-in-context.

An aspect of the mutual trust between the network members can be studied with a group of service design tools (Tassi, 2010) in order to obtain a better understanding. The motivation matrix has been introduced above. The moodboard effectively exposes values related to the service. Role playing puts users, actors or designers in their dedicated roles in order to play through some of the key functionalities of a service as it would exist. In this case, we would propose the latter: as a co-design tool, role playing can simulate interdependent tasks, build knowledge about service interfaces and create empathy and understanding about the users' motivation and trust. This tool can be useful in all phases of the design process, especially when conceptualising a new service.

Shared expertise increases motivation for common value co-creation

Sharing of expertise is an essential foundation for value co-creation, as every member brings their own knowledge to support the network as a whole. The opportunity to use the know-how of the other members may be a motivation to join in to the network, especially for the small specialist organisations involved. In turn, one missing party may cause problems for the others in the accomplishment process of the common target within the network.

These arguments were supported by the research data: with a trauma team, there was an external evaluator assessing the interaction within the team:

We had an (external) interaction consultant in our training (in the ENVI), and it was very useful, because we got evaluation about our group's interaction immediately --- and he said 'you gave instructions like this' [group 2: interviewee 5]

The members of a trauma team do not know each other, since they are usually working in various departments of the LCH and some members come from different organisations, e.g. the paramedics who operate in the patient transportation units. The members of a trauma team are rarely the same. Therefore, this kind of consultancy about the team's interaction skills and work processes had added value to the organisations and is an example of shared knowledge.

Temporal changes may also have influence on shared expertise, both internal and external, even in a well-planned education session. In another trauma team rehearsal at ENVI, the team leader (surgeon) was absent, and the group had to practice without one key member.

"--- it (the absence of the surgeon) just makes the training situation so incomplete." [group 2: interviewee 5]

"(trauma care) training is simulation (of real work), and if one have to play another role in it, it is a failure." [group 2: interviewee 2]

In the situation mentioned above, the rehearsal was led by another team physician. Some members of the trauma team felt as though the practice was a partial failure, even though many other aspects of the process were learned. These temporal factors may influence the success of the co-operation, and also highlight the sensitivity of the networks of shared expertise: a session may include 5 to 15 professionals and one missing person, which affects the training results. However, an active and strong network can also tolerate such problems without significant loss of the mutual trust. After a failure, new activities and successes should normalize the relations within a network of shared expertise.

Shared expertise can only happen in a co-operative context. It thereby supports the SDL concept of value-in-context and can also be seen as related to the service design focus, where various visualisation techniques are used to develop temporal and intangible aspects that occur in time and place, such as service touch points (Edman, 2009). To study the notion of shared expertise between the network participants more closely, we suggest a couple of service design tools, which are role playing, a motivational matrix and system maps. In this case, we would especially propose a motivation matrix, which is a tool for understanding the connections between the parties by showing their expected motivations, benefits and possible interactions, and presents the reasons for shared expertise (Tassi, 2010). This tool should be useful in the pre-design phase of an educational service.

Conclusions

This paper has focused on value co-creation in service-dominant logic and service design frameworks. The research method was content analysis for the case of a supplementary healthcare education service. The goal for the focus group interviews has been to study which characteristics support networked value co-creation in the design of education services.

Based on the research data, we have found features that increase understanding in regards to value-creation processes of education organisations. The following characteristics support networked value co-creation in design for an education service:

- » Result #1: Transparency between design parties of a service enables an internally strong network
- » Result #2: Trust between parties is based on rich co-operation
- » Result #3: Shared expertise increases motivation for common value co-creation.

A focal concept in service design domain is the customer journey, which can be seen as a path through the service by way of offering multiple touch-points provided by the service network. When designing this service journey, it is essential to understand the characteristics of a common value co-creation process between the participants to be able to meet the motivations of the stakeholders. In order to be solid and cumulative in knowledge, the service network has to be open and transparent for the members; meaning it also allows new participants to join and others to leave.

The internal strength of the expertise network is related to mutual trust, which allows constant changes, a multitude of activities and shared expertise. A customer journey is possible to design if the parties rely on each other and share their knowledge.

The more a network of expertise fulfils these conditions, the more robust it is in terms of preventing various disturbing factors (e.g. missing parties or resources). Symbolically, a firm service network may be able to repair itself in a way similar to how living organisms fix their shortcomings.

We have suggested some service design tools for the development of the three characteristics mentioned above. The service design tools were an ecology/actors map, a customer journey map, a motivation matrix, a system map, a moodboard and role playing.

We believe that with better understanding of value co-creation characteristics and with the help of service design techniques, an education service could be more customer-centred, student service experiences could be improved, and operations could be rendered more functional for all the members of the network. This could be a potential subject for future research activities. We hope that this work provides possibilities for more research on implementing service design tools for the education services to better design and increase knowledge about the subject.

Acknowledgments

We would like to thank the MediPeda III project (1.11.2008-31.10.2010), which was administered by the Centre for Media Pedagogy of the University of Lapland. It has been funded by the Finnish Funding Agency for Technology and Innovation (TEKES) and the European Regional Development Fund (ERDF), together with Rovaniemi University of Applied Sciences, the City of Rovaniemi, the Lapland Hospital District and the companies Medieco, Heat-It and Nordic Simulators.

We would also like to thank the students and personnel of Rovaniemi University of Applied Sciences and especially the ENVI – Virtual Center of Wellness Campus™, the Lapland Central Hospital, The Finnish Border Guards, the Oulu University of Applied Sciences and the University of Lapland.

References

- Alasuutari, P., Koskinen, I., & Peltonen, T. (2005). *Laadulliset menetelmät kauppatieteissä*. [Translation: Qualitative methods in economics]. Jyväskylä: Vastapaino.
- Bessant, J., & Maher, L. (2009). Developing radical service innovations in healthcare - the role of design methods. *International Journal of Innovation Management*. Vol. 13 (4), 555-568.
- Bradwell, P. & Marr, S. (2008). *Making the Most of Collaboration: an International Survey of Public Service Co-Design*. Demos Report 23. Retrieved Nov 6, 2010, from Demos: <http://www.demos.co.uk/files/CollabWeb.pdf>
- Edman, K. (2009). *Exploring overlaps and differences in service dominant logic and design thinking*. First Nordic Conference on Service Design and Service Innovation. Retrieved June 13, 2010, from First Nordic Conference on Service Design and Service Innovation: http://www.designforskning.no/PageFiles/6819/New/Wetter%20Edman_Exploring%20overlaps%20DT_SDL.pdf

- ENVI. (2010). *Centre of excellence in education for 2008–2009*. Retrieved May 24, 2010, from ENVI: <http://www.envi.fi/?m=26>
- Gaba, D. (2004). The future vision of simulation in health care. *Quality and Safety in Health Care*, 13(1), 2–10.
- Graneheim U., & Lundman B. (2004). Qualitative content analysis in nursing research: concepts, procedures and measures to achieve trustworthiness. *Nurse Education Today*, 24, 105–112.
- Haukkamaa, J. (2010). Virtual learning environment design: A study of service design and service-dominant logic frameworks. [Research plan]. In J. Viteli & A. Östman. (eds.). *Tuovi 8: interaktiivinen tekniikka koulutuksessa 2010 -konferenssin tutkijatapaamisen artikkelit*. [Translation: Proceedings of the research conference of the Interactive technology in education 2010]. Tampere: University of Tampere, Department of Information Studies and Interactive Media.
- Johnson, D., & Grayson, K. (2005). Cognitive and affective trust in service relationships *Journal of Business Research*, 58(4), 500-507.
- Keskitalo, T. (2010). Teachers' Conceptions and Their Approaches to Teaching in Virtual Reality and Simulation-based Learning Environments. *Teachers and Teaching: Theory and Practise*. In print.
- Koivisto, M. (2009). Framework for structuring services and customer experiences, 136-149. In S. Miettinen & M. Koivisto (eds.): *Designing Services with Innovative Methods*. Keuruu: Otava.
- Kuula, A 2006. *Tutkimusetiikka*. [Translation: Research ethics]. Tampere: Vastapaino.
- Mager, B. (2007). Service design. In M. Erlhoff & T. Marshalle (Eds.), *Design dictionary: Perspectives on design terminology* (pp. 354–357). Basel: Birkhäuser.
- MediPeda III. (2010). New Models for Pedagogy, User-Centred Media Design and Value Creation in the Physical, Virtual and Social Space of Health Care. Retrieved Nov 7, 2010, from University of Lapland: http://www.ulapland.fi/InEnglish/Units/Centre_for_Media_Pedagogy/Research/MediPeda_III_%282008-2010%29.iw3
- Ordanini, A., & Pasini, P. (2008). Service co-production and value co-creation: The case for a service-oriented architecture (SOA). *European Management Journal*, 26, 289–297.
- Parker, S., & Heapy, J. (2006). *The journey to the interface. How public service design can connect users to reform*. Demos. Retrieved Nov 6, 2010, from Demos: <http://www.demos.co.uk/publications/thejourneytotheinterface>
- Prahalad, C., & Ramaswamy, V. (2004). Co-creating unique value with customers. *Strategy & Leadership*, 32(3), 4–9.
- Ruusuvuori, J., & Tiittula, L.(2005). *Haastattelu. Tutkimus, tilanteet ja vuorovaikutus*. [Translation: Interview method. Research, situations and interaction]. Vastapaino: Tampere.
- Tassi, R. (2010). *Service design tools. Communication methods supporting design processes*. Retrieved Nov 7, 2010, from Service Design Tools: <http://www.servicedesigntools.org/>
- Yliniemi, P. (2009). Nursing and Healthcare Students' Experiences of Training in Simulation-based Learning Environment – ENVI. In T. Bastiaens et al. (Eds.) *Proceedings of the World Conference on E-Learning in Corporate, Government, Healthcare, and Higher Education 2009* (3275–3279), Chesapeake, VA: AACE.
- Yliniemi, P. (2010). *Nursing and health care students' experiences of training in "ENVI", a virtual and simulation-based learning environment*. The Annual Meeting of the Society in Europe for Simulation Applied to Medicine (SESAM), June 16 – 18, 2010, Groningen, The Netherlands.
- Yliräsänen-Seppänen, P., & Timonen, E. (2010). A design model as a tool for developing a virtual learning environment. In *Proceedings of World Conference on Educational Multimedia, Hypermedia and Telecommunications 2010*, 725-731. Chesapeake, VA: AACE.

- University of Lapland. 2010. *Good scientific practice. Guidelines on Research Ethics at the University of Lapland*. Retrieved Nov 6, 2010 from University of Lapland:
http://arcticcentre.ulapland.fi/docs/Guidelines_on_Research_Ethics.pdf
- Vargo, L., & Lusch, F. (2004). Evolving to a new dominant logic of marketing. *Journal of Marketing*, 68 (January), 1–17.
- Vargo, S., Maglio, P., & Akaka, M. (2008). On value and value co-creation: A service systems and service logic perspective. *European Management Journal*, 28, 145–152.