Learning through Action: Introducing the Innovative Simulation and Learning Environment Service Innovation Corner (SINCO)

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Abstract: This article focuses on how a service design approach can support learning through co-creation, simulations, and experience prototyping. Service design is a new practice and academic discourse; therefore, more research on connections between service design and related areas is needed. Simulations connect learning and service design research. The objective of this paper is to present the SINCO simulation and learning environment of the University of Lapland, Faculty of Art and Design. This learning environment and a service design process enable an experiential and technology-aided learning process. The methods and technologies used in SINCO help reveal development opportunities through experimentation and enable the setting-up of substantial experience prototypes for testing and communicating.

Introduction

First, the paper introduces the service design approach and process and then looks at the connection between service design and learning. Next, it discusses the possibilities for simulations and prototyping in the co-design of services. The main focus of the paper is in representing the elements and tools of the Service Innovation Corner (SINCO) service prototyping laboratory and describing how these can benefit service development, co-creation, or/and trialogic and experiential learning. In our opinion, the service design process and our laboratory concept together provide a tool for efficient co-creation. The conclusion offers brief insights and lessons learned.

Service design enables a continuing learning process through its iterative working approach whereby service solutions are developed through testing and evaluation. Further, the co-design approach used in service design fosters a strong peer-to-peer learning process. In addition, simulations in the SINCO environment enable a technology-aided learning process. As a process, service prototyping is interestingly similar to von Hippel's (2005) trial-and-error cycle in product development and Kolb's (1984) model of experiential learning.

This article is based on two action research studies (Miettinen et al. 2012; Rontti et al. 2012) conducted at the SINCO laboratory and an ongoing case study on how a service design approach, and service simulations in particular, can facilitate a technology-aided service delivery process for the social services of the city of Rovaniemi. This case study is linked with the MediPro project, which focuses on investigating technology-supported service and learning processes and technology in simulation-based learning environments. In this case, the SINCO learning environment and prototyping approach will be used for analyzing the current situation on social services, ideating new solutions, and evaluating possible future service features.

The data for the research projects were collected, documented, and analyzed using six service development cases from five organizations: Lapin Kansa (a newspaper company in northern Finland), Ranua Zoo (a wildlife park in Northern Finland), KL-Kopio (a digital printing company), Lappset Group (a Finnish global playground, sports, and park equipment manufacturer), and social services of the city of Rovaniemi. The first six service development cases were carried out between 2009 and 2011 and were part of courses for industrial design students. The data were collected from multiple sources (video documentations of simulation work at the SINCO environment, fieldwork diary notes of participatory observations, self-documented materials of the research participants) and analyzed

through descriptive content analysis (Miles & Huberman 1994), whereby the main themes that affect both service development and learning were recognized through axial coding (Charmaz 2006).

The action research approach enabled us to test ideas in practice as a means of increasing knowledge about or improving the target issue (Kemmis & McTaggart 1988), which is how service prototyping contributes to methodological development, design thinking, learning, and innovation when developing service experiences. Our research process followed the typical cyclical action research process: identifying the problem, gathering data, designing, performing the actions, analyzing the results, capturing the knowledge, and planning the next steps (Ferrance 2000). This research approach follows the iterative service design process (Miettinen 2009).

Overview of Service Design

Service design is a human centered approach to service development. It aims to ensure that service interfaces are useful, usable and desirable from the client's point of view and effective, efficient and distinctive from the supplier's point of view. Service designers visualize, observe and interpret requirements and behavioral patterns and transform them into possible future services. This process applies explorative, generative, and evaluative design approaches.

Design thinking, as an integral part of service design, has an ability to create concepts, solutions, and future service experiences that are usable and desirable for users and efficient and distinctive for service providers. Lockwood (2010) defined design thinking as a human-centered innovation process that emphasizes observation, collaboration, fast learning, visualization of ideas, rapid concept prototyping, and concurrent business analysis, which ultimately influences innovation and business strategy.

The involvement of users and end-users as well as service providers or people working in customer services is essential to the design process. The roles of users may vary from proactive participation, where users contribute to solving and framing design challenges, to an inactive role, where designers interpret user data without direct engagement with the user community (Keinonen 2009). When the customer and the end-user participate in the design process, new ideas, service needs, and different ways of utilizing technology are encountered. The service design process and methods can help in innovating customer-orientated service concepts (Miettinen 2011).

The service design process includes the implicit idea of innovation and can use several methods for concretizing new offerings or innovations, even in the same development process. Design thinking uses the designer's sensibility and methods to match people's needs with what is usable and technologically feasible and can be converted into customer value and market opportunity (Brown 2008). Designers' tools and the service design process emphasize empathy for the users, creativity, visual thinking, and co-design.

The service design process starts with exploratory or immersive research to lead to finding the opportunities for innovations in strategy rather than starting from defining strategy (Holmlid & Evenson 2008). Van Oosterom (2009) proposes a five-phase service design process that consists of discovering, conceptualizing, designing, building, and implementing. This is similar to both Engine's (2009) three phases—identify, build, and measure—and Mager's (2009) four-phase process—discovery, creation, reality check, and implementation.

The different process models vary according to the number of steps or the accuracy and the aspect emphasized in the phases. The identification and discovery phase is about understanding the service context and the users, as well as the business environment of the client. The building, conceptualizing, and creation phase is about visualizing, co-creation, participatory design and prototyping. The main aim in comparing service concepts is to find out what the profitability of the service would be and if the created services are valuable to customers. The implementation phase, incorporating the IT process, development, and training, is also often included in the process.

Processes and methods should be selected or applied according to each case or project. Nevertheless, the important factors that must be considered when developing and applying the service design process can be identified as follows: understanding the service design challenge—the users, business environment, and applicable technologies; observing, profiling, and creating empathy for and cooperating with the users; including the clients, other stakeholders and the users in the process; creating ideas; prototyping, evaluating, improving, and visualizing during the whole process; implementing the services; and also maintaining and developing the services after implementation.

Co-development, co-planning, co-designing, and value co-creation are key concepts in service design. These refer to the different backgrounds represented by the people—users, developers, planners, and service providers (e.g., in different levels of management)—that are brought together to develop and ideate. It might be challenging to see things in a new light, especially if one has worked with them for a long time. The emphasis on the

user's perspective, creating better service to the customer, contributes to a common understanding and the creation of something new.

Service Design and Learning

Future-oriented solutions to learning and producing knowhow can be generated using the principles of service design. In today's society, the conditions and sources of learning, knowing, and competencies are in a state of constant change. The paradigm for learning and knowing is shifting from one that emphasizes cognition forming and individual learning to one that accentuates the ideas of contextualism. This same idea of contextualism is well utilized in service design where the core of service development lies in the contextual understanding. Different service design tools enable contextual learning. The emphasis of research is moving toward the study and development of processes that produce learning and competencies in and between the contexts of education and work (Poikela 2010).

The service design approach can be used to redesign pedagogical and mediation processes in cooperation with researchers and participants in various settings (Kuzmina et al. 2013). This research gap between pedagogy and service design research was recognized in the University of Lapland, and cooperation between Faculty of Education and Faculty of Art and Design started in the MediPro: simulation-based pedagogy in education and services for first aid project in 2012. This research project is investigating technology-supported service processes and developing a pedagogical model to support teaching, studying, and learning processes and technology in the simulation-based learning environment. The research will focus on the simulation pedagogy and service design perspectives through different cases.

The first case in which the relationship between simulation pedagogy and service design will be studied is already ongoing. The case is being done in cooperation with the social services of Rovaniemi. The aim is to see how a service design approach and prototyping facilitates the development of a technology-aided service delivery process and how learning happens in these circumstances through training, simulations, and prototyping. Co-development is done with the professionals of social services, because they have the most topical and practical knowledge of the services.

Service design can help in the recognition, understanding, and development of the immaterial processes and resources related to learning and producing knowhow. Service design can also be used effectively in organizational learning and development processes. Service thinking is an ongoing consideration of how our collective needs are met without overstretching the human and natural resources (Reason et al. 2009). This approach is used in experience design, which is an approach to creating emotional connection with guests or customers through careful planning of tangible and intangible service elements (Pullman & Gross 2004).

In recent decades, participatory and collaborative design approaches have gained increasing support and interest in many areas and fields. Different methods of co-development can be used to convert tacit knowledge to explicit knowledge and in that way foster creative learning (Nonaka & Takeuchi 1995). The goal of participants is to form a common information sharing and creation space, where information is shared, and a new understanding of the participants is created based on their experiences and knowledge (Pöyry-Lassila & Teräväinen 2010).

The aim of co-development is always the conscious construction of new knowledge. Transferring the existing knowledge to the participants or mere participation in the development activities is not enough. Collaborative knowledge construction aims at creating new knowledge and the development of common objects (e.g., services or concepts). This is trialogical learning, in which learning is viewed as knowledge creation. The goal is a collaborative and systematic effort to develop conceptual or concrete products, services, or practices (Pöyry-Lassila & Teräväinen 2010).

In the research of learning, co-development methods and a participatory design approach are becoming more common. This is particularly true in the research of new learning environments (see Brown 1992; Barab & Squire 2004; Barab 2006). This is called design-based research (Brown 1992), in which the idea is to explore and develop the processes, activities, and environments all at the same time. In service design, learning and development happen through innovative working principles and process. Design thinking principles, like "quick and dirty" prototyping, "thinking with hands," "failing often and early," and "serious play" (Kelley 2001; Brown 2008), and "try thinking verbs not nouns" (Kelley 2001) guide the work. According to Brown (2008), thinking like a designer can transform the way services, processes, or even strategies are developed. The characteristics of a good design thinker are empathy, integrative thinking, optimism, experimentalism, and collaboration.

Simulations and Prototyping in Design

Simulations are an effective way to cooperate, make processes and practices visible, and also learn new skills. To simulate means to present, imitate, or pretend about some situation, system, or model. Simulation-based learning has been studied more in the field of healthcare and medical training (see Gaba 2004; Alinier 2006), and it has opened new possibilities for learning professional skills. The notion of simulation is implicit in the service design activity as simulations are needed to test and evaluate service concepts. The iterative activity of creating ideas and concepts, testing and evaluation is a practice based learning process.

In service design, simulations are often called service prototypes. The goal of a prototype is not to complete the design but to learn about the strengths and weaknesses of the idea and to identify new directions (Brown 2008). Service designers find service prototyping central to their work because it is collaborative, makes services visible, and helps to communicate service concept suggestions (Blomkvist 2011). Prototyping enables collaborative work with stakeholders when designing product service systems and multi-channel services. Already at the concept design phase, stakeholders' participation helps facilitate the realization of ideas.

Prototyping is one of the core methods in service design. The main purpose of prototyping is to concretize an idea (Fulton Suri 2008). Prototypes should represent product and technological and social interactions (Kurvinen 2007). They can quickly and cost-effectively communicate a service proposition and prompt questions on the technical feasibility, consumer desirability, and business viability (Samalionis 2009). Service design methods also allow designers and users to enact or perform service experiences before they have been established in an organization (Holmlid & Evenson 2007). According to Coughlan et al. (2007), prototyping is a powerful means to facilitate organizational development and change.

Lockwood (2010) emphasizes the role of visualization and hands-on experimentation and creating quick prototypes, which are made simple enough to get usable feedback as an integral part of design thinking. Prototyping can provide a way for a dialogue to take place. These same elements are the core of the service design process. Service prototyping has the same focus as the purpose of prototypes in the design thinking process: "to make the intangible become tangible".

Different means for simulation are used and developed in the context of service design. Makino et al. (2009) have noticed that an interactive process whereby visualized simulation results are shown to the field experts repetitively enhances rapid prototyping and the obtaining of valuable feedbacks from them, though these simulations were computer based. Their findings and overall increasing interest in co-creation supports the use of simulation in the case of SINCO.

Innovative Simulation and Learning Environment SINCO

In the service design process, prototyping most clearly represents an activity stemming from (industrial) design. The immaterial nature of services—for example, their simultaneous production and consumption and heterogeneous production quality—has called for new ways to concretize and illustrate new service concepts (Winhall 2011). The starting point of the development of SINCO was the analogy of a product mock-up crafting and workshop culture in industrial design. We wanted to put the emphasis on that aspect so design students would feel that the SINCO laboratory, with all its technological tools and equipment, was made for their use. As an environment, SINCO also needed to support the experiential learning of design thinking principles and service design methods through doing. Moreover, we wanted it to be a space for co-creation, a place where you are "allowed" and enabled to do whatever is needed to concretize and test service ideas collaboratively.

The SINCO laboratory concept is an attempt to facilitate experience prototyping with technologies as well as innovative working principles (Fig. 1). SINCO consists of the environment and a set of tools, which aim at co-creational service development. SINCO uses technological equipment and digital material such as photos, videos, and sounds to create the atmosphere of actual service moments for prototyping and re-enactment. This helps to concretize different aspects of service concepts and ideas for participating users by giving them a better idea of what the service experience might contain and feel like. In SINCO, it is possible to simulate all kind of services, processes, and practices.

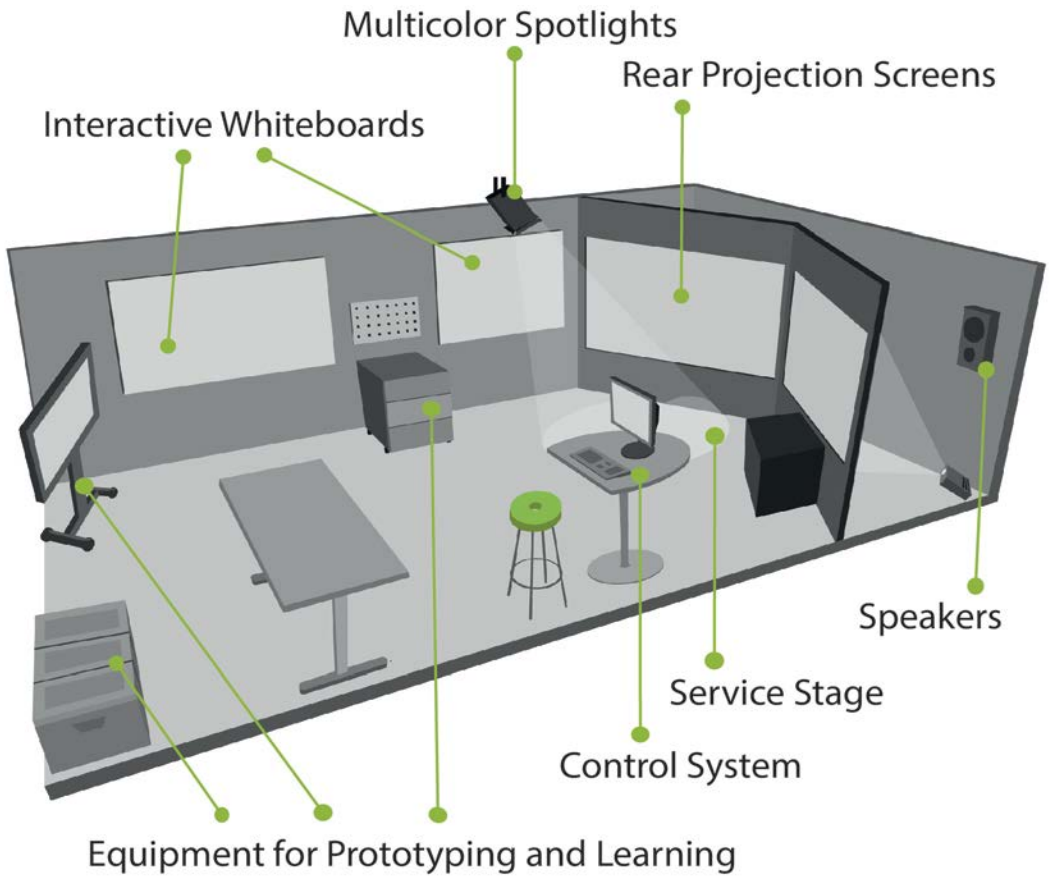

Figure 1: Overview of the SINCO learning environment.

Functionally, the SINCO laboratory can be conceptualized under the following five terms: Servicescape Simulation; Service Stage; Digital Touchpoint Toolkit; Rough Mock-up Crafting; and Teamwork & Documentation Tools (Rontti et al. 2012). Servicescape Simulation refers to the digitally created service scenes used in experience prototyping. By changing the imagery view and the lighting and sounds of the service scenes, the desired location of service can be brought to life inside the laboratory. As the set-up for Servicescape Simulation, SINCO has two 117" background projection screens perpendicular to each other, to provide the background scenery and enable partial, yet immersive, spatiality. One loudspeaker behind each screen provides sounds that seem to emanate from the landscape, while multi-color spotlights help create the desired ambience. PowerPoint™, with a dual display adaptor, is used to control background images, videos, sounds, and transitions, which, at the same time, build an entire storyline for the service and work as a platform for generating ideas.

The Service Stage is the place dedicated to acting out scenarios and experiencing the Servicescape Simulation. The stage itself has a strong analogy to a theater stage, which allows acting, whether you are able to empathize with a situation presented through Servicescape Simulation or take the role of another user. We found Service Stage with role accessories and props to be an encouraging area, even for persons with no prior experience of service design and role-playing. Rough and unfinished tangible mock-up elements, used case by case, support the idea of the Service Stage as an informal place, where playing out wild ideas as incomplete experimentation is encouraged. This is important especially in the early phases of the design process. During later iterations, or when exploring specific technological opportunities and experiences, the digital prototyping accessories and content become more relevant.

The Digital Touchpoint Toolkit is a set of handheld devices used to prototype ideas with digital content. The Toolkit includes differently sized mini video projectors, small speakers, mobile devices and tablets, cameras, a large touchscreen, and a variety of accessories to mix and use the equipment in a versatile way. The aim of prototyping with these technologies varies depending on the case and design process phase. In the front end of the

process, a typical use is to explore technological opportunities or to reach the realistic “taste” and feeling of a new idea. In many cases, the “taste” is also achieved with an analogous exemplar (see Blomkvist 2011).

Mock-ups are images, models, or dummies that illustrate or explain an idea (Moritz 2005). The idea of using mock-ups in service prototypes is to concretize features of elements from real service situations. They don’t need to be exact copies of the elements they represent; mock-ups are meant to help evaluate hidden limitations, as well as the possibilities of a service’s physical elements. Depending on the role of the mock-up, its representation level can be visual, behavioral, functional, or any combination of these (Buchenau & Fulton Suri 2000). Teamwork and documentation tools support communication between the prototyping team and the client, but also between the members of the interdisciplinary project team.

The elements together compose an inclusive laboratory concept supporting design thinking, experiential learning and development through action. Being strongly based on digital prototyping material, such as photos, videos, and recorded sounds, the SINCO prototypes are rapid and easy to develop and vary. This is ideal for hands-on service development, whereby new ideas are generated while testing existing prototypes. This also supports the co-creational culture and group learning, where anyone can build on the ideas of others.

SINCO is not only focused on designers, but also on the real users and providers of services. Service prototyping is a new competence area for a designer that locates him or her in the center of a business development case working as a facilitator and using concretizing tools that connect the stakeholders and make visible the service offerings in the case. SINCO offers a multi-sensory environment to experience and present new, abstract service ideas to others. Ideas that can be hard to communicate through images and traditional presentations come to life through experience prototyping in the SINCO laboratory.

In SINCO, it is possible to study and analyze existing service journeys, visualize ideas and develop them quickly, and evaluate concepts collaboratively with companies, design students, teachers, researchers, and end-users. For SINCO projects, we have simplified the service design process to the main steps needed to cooperate with the client company. The steps are called as follows: Find; Create; Concretize; and Make It Happen. In an academic context, the last phase is often reduced to guidelines and instructions about how you should make it happen. Throughout the SINCO process, prototyping is used as a central platform for the agile development of novel or existing services.

Service designing and prototyping in SINCO is iterative, concrete, agile, and co-creative. SINCO is a learning environment, where students work alongside the project team, researchers, and companies. Knowledge transfer from the service design team (researchers and students) to knowledge recipients (partner companies) occurs in the context of co-creation. Students have hands-on involvement in the cases, thereby learning to use both different prototyping methods and technology that facilitates prototyping.

Learning through Technology-aided Agile Service Simulations

The aim of the SINCO environment is to support experiential learning. Kolb (1984) defines experiential learning as “the process whereby knowledge is created through the transformation of experience. Knowledge results from the combination of grasping and transforming experience.” In Kolb's experiential learning model, learning is seen as a set of circumferential cycles; the learning event is constantly evolving and deepening the process. This coincides with the iterative service design process.

According to Kolb (1984), experiential learning occurs through four phases: concrete experience (feeling), reflective observation (watching), abstract conceptualization (thinking), and active experimentation (doing). In SINCO, the design team goes through the same phases in prototyping. First, they study the current state of the service. During this phase, the project group will do research into the current service environment, competitors, and the company's operational environment, as well as get to know the service process from the customer’s point of view. After that, designers or users go through the service or service prototype if they are developing a novel service or it is otherwise challenging to test the service on the company’s premises. During testing and prototyping, at least one group member is doing reflective observation. Service design methods, like thinking aloud, the 5 whys, or mystery shopping (Moritz 2005), allow the designer to understand the thoughts, wants, and underlying needs of the users. The simple tasks of creating empathy and looking at the user’s service journey are core elements of the work of the SINCO laboratory.

Abstract conceptualization happens after observation and gives the team the opportunity to consider what is working or failing and also think about ways to improve the service. Ideas for new service processes, situations, or details are represented firstly through visualizations, small-scale mock-ups, and rough prototypes, which are

developed in cycles. In prototyping, reflection and active doing follow each other until the refined service concept is ready.

The purpose of prototyping is to see, hear, and feel the future service situations as realistically and tangibly as it is possible to do. By testing and acting out a prototype of a service, the project group can come up with new solutions, test new interactions, and make ad hoc innovations. The design group develops service by active experimentation. Based on the experiences of prototyping in SINCO, the most promising service prototype will be refined and further developed into a finalized holistic service concept that can then be experienced concretely once again.

Kayes et al. (2005) define that in an idealized experiential learning cycle or spiral, the team and its members "touch all the bases"—experiencing, reflecting, thinking, and acting—in a recursive process that is responsive to the learning situation. SINCO's equipment and tools were chosen to support all these phases. Experiencing can happen in real service surroundings when different cameras and recorders help to preserve a situation as it happens. After that, the behavioral patterns of users are analyzed and visualized, because it is important to understand what is working or failing and why. For example, interactive whiteboards, serious play done with dollhouse accessories, and rough mock-ups help in this. In the thinking phase, the tools for ideation are emphasized. Simulation is for the acting phase but it can work in all the phases as a unifying platform for ideas. The aim was to equip SINCO with the appropriate technical tools, to enable the co-creative team to switch between the experience-based context, creative building, and analytical thinking.

Working and learning in SINCO is very active and agile. The aim is to be as concrete as possible. Traditional design approaches emphasize the importance of good background research, planning, and understanding before moving the process further. In the agile development process, which has its roots in software development, this is considered to be a "bad thing," as remarked by Beyer et al. (2004). However, in service design, the prototyping methods aim to compare, combine, and enhance ideas in iterative cycles in collaboration with the stakeholders. Due to several similarities with the agile approach, the term has also been adopted in service prototyping to better describe its rapid methods.

With the help of technology, it is possible to re-create the service setting in the laboratory. Technical equipment can replace missing service elements, such as servicescapes, user interfaces, processes, and even people. Technology-aided representations stimulate prototyping and help in the understanding of situational factors, emotional aspects, and the viability of new service ideas. The technical equipment available at SINCO makes the immaterial elements of services visible and allows the user to experience these aspects without advanced engineering knowledge.

The agile service approach emphasizes the concretization of ideas iteratively. This makes the ideas easier to understand using the same effort and time that it would take to define the ideas on paper or through discussion. This principle coincides with the learning-by-doing education philosophy and innovative working principles like "thinking with hands" and "failing often and early to succeed sooner." Well-facilitated technology-aided prototyping not only increases the fidelity of experience prototypes, but also supports co-designing in practice. For non-designers in particular, simulated contexts assist in role-playing and stimulate ideation. They also help to communicate service development challenges, opportunities, and novelty concepts in a concrete way.

Service prototyping is very context related and our goal was to equip SINCO with tools and materials that can be used in various ways. In every company case, students used their imagination and came up with original ideas how service ideas could be concretized. In the case of Ranua Zoo, the aim was to create a new Christmas-based experience for foreign tourists. One part of this was to develop the dining experience; accordingly, a dinner table was augmented with various optional tablecloth designs projected with a mini video projector on the table's surface. In the case of the Lappset Group, different user interface modalities for a public virtual trainer concept were tested using digital devices and an agile development process. For instance, motion-controlled games were used to understand the development opportunity for motion tracking-based user experiences on a large outdoor screen.

By going through the experiential cycle supported by the real-life case and learning environment, design students learn not only the phases of the creative process but also the mindset required from the designer. They learn to think solutions, not challenges; they learn to tolerate uncertainty and also to concretize even the most abstract things like communication or networks. During prototyping, students learn about action, process, context, roles, and purpose.

Conclusions

An agile prototype-based development approach can provide a variety of benefits in learning. For companies, prototypes can be used as a tool for concretizing the future vision and for using design skills and methods in their processes. Prototyping can also reveal innovative solutions for business areas where testing ideas in practice is difficult or even impossible. More refined SINCO prototypes also work as communication and training tools for companies.

In SINCO, experience prototyping is used throughout the design process to understand the context, compose new ideas, and test the final concepts and communicate them to the company. Working alongside of companies and users, students get valuable firsthand knowledge about cooperation and the needs of users and companies. The design team can then turn these insights into experiential design solutions through prototyping and eventually to service features that can be implemented with a lessened danger of failing. Entrepreneurs found simulation to be a concrete communication aid as well as a powerful tool to uncover the problems experienced on their premises and services.

Education is now perceived as a learning process but it could be seen as a service that could be developed by using service design. Overall, service design tools and methods as well as innovative working principles can be useful in learning processes as those put the emphasis on co-creation, iterative cycles, and concretization. Especially in simulations, service design and prototyping methods have many implications related to learning. With agile technology-aided service simulations, future possibilities—services, processes, and practices that do not exist yet—can be visualized, tested, developed, and evaluated based on subjective experience. Service design process is all about doing, not talking, so it supports active learning related to the case in hand but also on technologies and service design methods and how to use them in service development.

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