

Reconfiguring the SINCO Lab through Empathy-Driven Service Design: A Strategic Approach to Accessibility and Collaborative Innovation

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Abstract:

This thesis investigates the reconfiguration of the SINCO Lab at the University of Lapland through an empathy-driven service design approach aimed at improving accessibility, usability and user experience. As digital technologies continue to evolve, there is a growing need to shift toward more collaborative and user-centered service design frameworks. Initial assessments revealed significant gaps between user expectations and their actual experiences within the lab, highlighting the need for a systematic redesign.

Through a mixed-methods research design, the study engages a diverse group of stakeholders, including students, faculty, and alumni, in a survey, interviews and an observational session to gather comprehensive feedback. Key concepts such as empathy, co-creation, and digital transformation are explored within the context of service design to provide a theoretical foundation for the findings. The research identifies challenges related to technology use, operational guidance, and limited support, proposing practical solutions to improved user engagement and creative collaboration. The outcomes of this research contribute to the broader field of service design by illustrating how empathy and co-creation can enhance user experiences and service delivery. This work advocates for integrating user feedback into design processes to foster more inclusive, effective, and innovation-driven spaces. Ultimately, this work serves as a call to action for integrating user feedback into the design process to create inclusive and effective service environments.

Keywords: *Service Design, Empathy, User Experience, SINCO Lab, Accessibility, Usability, User Engagement, Co-Creation and Creative Collaborations*

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Chapter 1: Introduction

1.1 Background and Context

In today's digital age, the rapid evolution and integration of technology has fundamentally altered the landscape of service design, blending creativity, strategy, and user-centered methodologies to develop innovative solutions. As digital tools and methodologies continue to evolve, they present new opportunities for enhancing service delivery, interaction, and collaboration. However, they also pose challenges related to accessibility, usability, and inclusivity. In this context, service prototyping labs play a vital role in supporting innovation by providing hands-on experiences where users can actively engage in co-creation processes.

One such pioneering space is the Service Innovation Corner—SINCO Lab at the University of Lapland, which fosters creative collaboration through an immersive service prototyping environment. It brings together students, educators, and industry professionals to co-create, test, and refine service concepts using advanced technologies like the Servicescape Simulation, the Service Stage, and the Digital Touchpoint Toolkit as presented in the figure 1. These tools facilitate a blend of physical and digital experiences, allowing users to experiment and refine their ideas in a realistic setting (Miettinen et al., 2012; Kuure et al., 2014).



Figure 1: Overview of SINCO service prototyping laboratory

Rontti Simo, Miettinen Satu, Kuure Essi, Lindström Antti: A Laboratory Concept for Service Prototyping – Service Innovation Corner (SINCO) (Rontti et al., 2012, p. 232)

Despite its sophisticated design, SINCO Lab faces accessibility and usability challenges that hinder its full potential. Technical inefficiencies, lack of structured guidance, and unclear onboarding processes have created a disconnect between the Lab's potential and the actual user experience. These limitations have affected user engagement particularly among new users, and have impacted the Lab's inclusivity and collaborative. Addressing these issues is essential to ensure that SINCO Lab evolves into a more inclusive, user-friendly, and innovative service prototyping environment.

The motivation for this research stems from my own firsthand experience during a service design lecture conducted in SINCO Lab, which I attended with my classmates. Upon entering the Lab, there was a shared sense of excitement and curiosity, largely driven by the presence of advanced equipment and digital tools. However, this enthusiasm was quickly tempered by a range of practical challenges. We encountered difficulties due to insufficient guidance, unclear instructions for using the technology, and an overall experience that did not meet our expectations. Although SINCO Lab is equipped with advanced tools and an innovative setup, these tools were not being used to their full potential. This disconnect raised questions about the accessibility of the space and its ability to serve all users, especially those unfamiliar with its tools and processes.

Service design as a discipline emphasises empathy, collaboration, and iterative development, all of which require environments that are user-friendly, emotionally engaging, and accessible to a diverse range of users. While SINCO Lab embodies many of these principles in theory, it falls short in practice. The aim of this research is to bridge this gap by exploring how empathy-driven service design principles can be applied to reconfigure the lab's physical and digital environments. By addressing the existing challenges related to usability, accessibility, and emotional engagement, SINCO Lab can evolve into a more effective and inclusive space for service innovation and collaborative learning.

1.2 Problem Statement and Research Questions

The core issue driving this research is the underutilization of the SINCO Lab and its misalignment with user expectations. The Lab, while equipped with cutting-edge technology, is not fully accessible or intuitive for all users, especially students and those unfamiliar with digital design

tools. This research aims to explore how the SINCO Lab can be reconfigured to improve its usability and accessibility, fostering a more engaging and productive environment for users.

The central question guiding this research is:

How can the SINCO Lab be reconfigured to enhance accessibility and improve user interaction while fostering creative collaboration through empathy-driven service design?

This main question is supported by the following sub-questions:

1. What usability barriers currently hinder effective engagement with SINCO Lab's tools and environment?
2. What tools, training, and layout adjustments can enhance the lab's accessibility?
3. How can the physical layout and digital infrastructure be redesigned to create a more inclusive and user-friendly experience?

1.3 Aims and Objectives

The overarching aim of this research is to transform the SINCO Lab into a more accessible, functional, and user-friendly service prototyping environment, ensuring that it remains a cutting-edge resource for service innovation. The study is driven by the need to align the lab's design and operations with the evolving needs of its users and the principles of empathy-driven service design.

The specific objectives are:

- To identify and investigate the key usability challenges currently faced by users of the SINCO Lab.
- To propose strategies for upgrading SINCO Lab's digital and physical tools, creating a hybrid environment that supports innovation.
- To develop a framework that guides the ongoing adaptation of the lab in response to user needs and technological advancements.

1.4 Significance of the Study

This study holds significance not only within the context of the SINCO Lab at the University of Lapland but also in the broader field of service design and innovation education. Service design labs such as SINCO are increasingly recognized as vital environments that support experiential learning, collaborative development, and innovation across academic, public, and industry sectors. However, a persistent gap exists between the theoretical promise of these labs and the users' experiences.

By using the SINCO Lab as a case study, the research demonstrates how user-centered improvements can be implemented in educational settings, ensuring that users can fully engage with the lab's resources. This research contributes to the evolving field of service design by offering practical insights into how service prototyping environments can be improved. It addresses the gap between the theoretical potential of these labs and the real-world experiences of users.

The findings of this research will offer actionable recommendations for academic institutions, design educators, and service design practitioners seeking to establish or refine similar prototyping environments. By emphasising empathy and inclusivity the study underscores the importance of social and emotional dynamics in collaborative innovation. Ultimately, it contributes to the broader discourse on hybrid spaces that integrate physical and digital tools to support user-centered creative and collaborative work.

1.5 Methodology Overview

The research methodology will adopt a mixed-methods approach which includes qualitative and exploratory design, complemented by quantitative data where necessary. The qualitative approach allowed for a deeper exploration of user experiences, challenges, and expectations related to SINCO Lab. The study will focus on gaining user-centered insights by engaging participants through a feedback survey, interviews, and an observational session. These methods will help gather in-depth insights from current students, faculty, alumni and other professionals who have used the Lab to comprehensively understand their needs and experiences. This approach aligns with the cyclical, participatory nature of service design, ensuring that solutions are informed by

authentic user experiences. The findings from this research will inform practical recommendations for redesigning SINCO Lab to better meet the needs of its diverse user base. By addressing both the technical and emotional aspects of the lab experience, the research aims to create an environment that fosters greater engagement, creativity, and collaboration.

The methodology was structured in three key phases:

1. Interviews with alumni, current students, and teachers/researchers to gather qualitative data on their experiences and perceptions of SINCO Lab.
2. A post-workshop survey will be conducted with current students to assess the lab's usability and its effectiveness in supporting collaborative activities.
3. An observation Session with the instructor to assess the SINCO Lab's technological setup.

1.6 Ethical Considerations

Ethical considerations will be a central component of this research. Participants will be informed about the study's objective and methods before participating. Their participation will be voluntary, and they will have the option to withdraw at any time without consequence.

Confidentiality and data protection will be prioritized throughout the study. Personal data will be stored securely and used solely for research purposes. To protect participants' privacy, responses and contributions will be coded or anonymized in a way that ensures individuals cannot be traced or personally identified. Transparent communication with participants will ensure that their contributions are respected and accurately represented. The research will adhere to ethical guidelines set by the University of Lapland and relevant research ethics standards. By embedding these ethical principles into the research framework, this study aims to foster trust, integrity, and mutual respect between the researcher and participants, while also ensuring the credibility and rigor of the research process.

1.7 Limitations of the Study

While this research aims to offer comprehensive and actionable insights into improving the usability of the SINCO Lab, there are several limitations to consider. Firstly, the study is context-specific focusing on the SINCO Lab at the University of Lapland, which means the findings may not be fully generalizable to other service design environments.

Secondly, due to time and resources constraint, the participant pool may be limited to users currently affiliated with the university who have used the Lab, which may not fully capture the perspectives of all potential users.

Finally, as a qualitative study, the findings are interpretive and are influenced by participants' personal perspectives. However, this subjectivity is also a strength, as it allows for a rich and nuanced understanding of the emotional and experiential aspects of the Lab usage. Despite these limitations, the study will provide actionable recommendations for improving the SINCO Lab and offer insights that could inform the redesign of similar spaces in other contexts.

Chapter 2: Theoretical Framework

This chapter establishes the theoretical foundation for this research by synthesizing key concepts related to service design, prototyping, empathy, co-creation, and usability. These foundational themes are crucial for understanding how the SINCO Lab functions as a service prototyping and co-creation space. The integration of these concepts within SINCO Lab's current framework is explored through case studies, which not only demonstrates its effectiveness as a service prototyping environment, but also reveal challenges concerning usability and accessibility. These insights inform the ongoing research aimed at enhancing SINCO Lab to better serve diverse users and support innovative service design.

2.1 Service Design and Prototyping

Service design is a multidisciplinary and evolving field that centres on the systematic creation and improvement of services by integrating user experience, operational efficiency, and innovation through the application of design thinking principles. Fundamentally, service design aims to develop services that are not only functional and effective but also deeply user-centered, responding precisely to the needs, expectations, and behaviors of users. This requires the application of creativity, empathy, and analytical insight to ensure that service solutions deliver value both to the end users and the service providers themselves, fostering satisfaction and sustainable engagement (Stickdorn & Schneider, 2011).

In the context of digital ecosystems, Ryttilahti et al (2016) highlight the evolving role of service design, noting that participatory methods such as stakeholder and value network mapping enhance communication among diverse actors including users and businesses. This approach ensures that socio-cultural values are integrated into service development processes, addressing the growing complexity of digital ecosystems. Building on this foundation, Wetter-Edman (2014) describes service design as a critical tool for value creation, particularly through fostering co-creation and collaboration among stakeholders. He portrays service design not only as a process of developing services but as a way to shape meaningful interactions between users, designers, and products, thereby bridging user needs with organizational goals. Further expanding the scope, Sangiorgi and Prendiville argue that service design plays a crucial role in driving social innovation by employing co-design and participatory approaches, service design facilitates collective action and empowers

communities to address wider societal challenges. This perspective aligns with the notion that service design transcends business applications to create shared value across communities (Sangiorgi & Prendiville, 2017).

The key aspect of service design is service prototyping which involves creating testable models of service ideas to refine and validate concepts before full-scale implementation (Stickdorn & Schneider, 2011). At SINCO Lab, this strategy is put into practice by combining physical and digital tools that enable the simulation and prototyping of service scenarios. Digital tools, such as interactive displays, tablets, and digital touchpoint toolkits, complement physical tools like service staging props and mock-up crafting materials, allowing users to experiment with and develop service prototypes that simulate real-world interactions (Miettinen et al., 2012). This hybrid methodology exemplifies multimodal service design, where various touchpoints are designed to interact seamlessly and enhance user engagement.

According to Kuure, Miettinen, and Alhonsuo (2014) service design is a learning and transformation process, highlighting the crucial role of service prototyping. They also claim that the essential tool in this process is service prototyping, as it allows designers to get insights through real-time experimentation and iterative improvement. According to their framework, prototyping not only assesses the feasibility of service concepts, but also fosters collaborative learning, encouraging all stakeholders to actively engage in service development. From this perspective, service design is closely tied to organizational transformation, with insights derived from prototyping shaping not only the service but also the operational practices which support it. However, from Schaaf's perspective, service design is undergoing a digital transformation, marked by a shift from analog thinking (traditional manual design processes) to digital tools that facilitate rapid prototyping and iterative testing. He underlines that service design is the process of integrating digital tools to enhance traditional co-creation and prototyping techniques, allowing for more efficient, agile, and collaborative service development. This transformation from analog thinking to digital doing, service design leverages technological advancements to develop scalable and user-centered solutions (Schaaf, 2021). In this way, SINCO Lab exemplifies the integration of traditional and digital service design tools, enabling real-time feedback and collaboration in a co-creative space (Rontti et al., 2013).

2.2 Empathy and Emotional Engagement

Empathy is a cornerstone of service design, allowing designers to connect deeply with users' needs and fostering innovation in creating user-centric services. It is often described as "walking in someone else's shoes," comprises cognitive (perspective-taking) and affective (emotional resonance) components (Davis, 1983; Batson et al., 2002). These authors advocate balancing empathy with lived experiences, suggesting that incorporating users' firsthand insights enhances reciprocal co-creation and mitigates risks inherent in empathy-led processes. Wright and McCarthy (2008) have elaborated empathy's role in perceiving emotions and articulating others' contexts within one's frame of reference. Similarly, Leonard and Rayport (1997) describe observational methods as a means to elicit empathy, allowing designers to uncover users' latent needs through close interaction with their environments.

Soto (2021) narrates the importance of empathy in understanding the emotional and functional needs of the user by viewing the world from their perspective. He has pointed out an interesting argument about the role of emotional intelligence in facilitating co-creation practices and establishing inclusive collaboration, where diverse stakeholders feel appreciated and their ideas are meaningfully integrated into the design process. This aligns with the collaborative nature of service design, where empathy promotes a deeper understanding of user experiences and guides the development of emotionally resonant services. Stickdorn and Schneider (2011) presents a similar argument related to empathy as a foundational principle of design thinking, underscoring its critical role in enabling designers to observe, engage and immerse themselves in the user's environment. This comprehensive engagement provides a more nuanced understanding of user behaviours, challenges, and aspirations, forming the basis for the development of innovative and impactful service solutions.

Moreover, collaborative prototyping in service design heavily relies on empathy to create solutions that are not only effective but also emotionally resonant. In the context of the SINCO Lab, empathy is fostered through immersive tools such as Servicescape Simulation, which enables users to step into and experience service interactions from diverse perspectives (Kuure et al., 2014). Vink and Oertzen (2018) acknowledged the importance of empathy in enabling reciprocal co-creation, where users and designers collaboratively generate solutions. They claim that co-creation often relies on designers immersing themselves in users' perspectives to ensure inclusivity and

relevance. Further expanding on the role of empathy, Mokhberi (2019) presented a compelling argument regarding the use of empathy-driven co-design methods, showcasing how emotional engagement with older adults during participatory workshops enhanced the relevance and usability of health-smart home designs. On a similar note, Mattelmäki (2006) elaborates on empathy tools, such as design probes, which engage users in exploring their emotional and functional needs over time. Vink and Oertzen (2018) further argue that these empathy-driven methods, when paired with lived experiences, create a richer and more inclusive design process.

2.3 Co-Creation and Collaboration

Co-creation is a collaborative process which brings together diverse stakeholders, users and designers to co-develop effective, innovative and user-centered solutions. Prahalad and Ramaswamy (2004) assert that co-creation represents a shift from a traditional model of the designer as the sole creator to a collaborative framework that integrates the insights and experiences of all participants into the design process. Through active involvement of the users, in all phases of service development, from ideation and prototyping to testing, co-creation ensures that services are continuously refined and improved in response to real-time user input. They further justify this shift by suggesting that businesses should engage customers as co-creators of value, recognizing that customers have distinctive insights and needs that can significantly contribute to the development of products and services. Through this collaborative process, both companies and customers derive mutual benefit as it not only enhances the quality of the solution but also empowers users, making them active contributors to the service development process.

Expanding on this view, Ramaswamy and Ozcan (2018), describe co-creation as a dynamic and interactive process. They elaborate on the importance of participatory platforms in fostering dialogue and enabling shared value creation in service ecosystems. They also point out an interesting argument about how co-creation transcends traditional customer-service provider relationships, embedding itself in broader socio-economic interactions. They elaborate on the concept of co-creation through their interactional creation framework, integrating insights from service-dominant logic. A similar argument is presented by Lusch and Nambisan (2015), who narrate the critical role of platforms and ecosystems in fostering service innovation, highlighting the need for networked solutions in co-creation practices. Additionally, other aspirations of these

frameworks focus on leveraging technology to expand access and reduce participation barriers, reinforcing the inclusive and transformative potential of co-creative service design.

In the context of service design, co-creation involves multiple stakeholders working together through different creative workshops, brainstorming sessions, and iterative prototyping to enhance services. As noted by Schaaf (2021), digital tools play a crucial role in supporting real-time collaboration across distances and enabling hybrid workflows that integrate both in-person and virtual modes of working. Moreover, through iterative cycles of testing, feedback, and refinement, co-creation ensures that services remain adaptable and reflective of both the users' and the organization's objectives. This hybrid approach, integrating both physical and digital modes of collaboration is also evident in the SINCO Lab, where immersive experiences are created, and immediate feedback is gathered from participants (Rontti et al., 2012). The significance of inclusive design in co-creation workshops is emphasised by Kuure et al. (2014), who stress the importance of ensuring all voices are heard and promoting a collaborative process rather than hierarchical. This need for effective facilitation is particularly crucial in SINCO Lab, as its effectiveness as a co-creation environment depends on the facilitator's ability to engage participants and manage the vigorous interactions between diverse stakeholders (Soto, 2021).

2.4 Usability and Accessibility in Design Labs

It is essential to ensure that all participants, regardless of their physical, cognitive, or technological abilities, can fully access and engage with the lab's resources. This inclusivity is crucial for fostering collaborative innovation and enhancing the service design process. Usability ensures that the tools and resources within the lab are user-friendly, efficient, and promote seamless interaction. As suggested by Rontti et al. (2012), a design lab should prioritize intuitive interfaces, clear instructions, and seamless transitions between physical and digital tools to ensure that users of varying technical proficiency can engage without difficulty. They argue that environments like the SINCO represent this concept by providing a space where users can transition seamlessly between hands-on prototyping and real-time feedback, ensuring optimal efficiency and engagement during the service design process.

Meanwhile, accessibility refers to the ease with which all participants, regardless of their abilities or limitations, can access and utilize the tools and resources within the design lab. These factors

are essential in promoting a collaborative, user-centered design process. Schaaf (2021) highlights the role of digital accessibility, particularly in the context of technological advancements. He explains how the integration of digital tools in design labs must adapt to users with varying technical abilities while ensuring compatibility with assistive devices. He also presents a compelling argument that the inclusion of training and support systems enhance accessibility by empowering all users to engage with the technology effectively, thereby reducing any potential barriers to collaboration.

Kuure et al. (2014) present a similar argument regarding accessibility and extend the discussion by addressing how processes and activities are carried out in design labs. They argue that accessibility involves not only the technologies but also the facilitation of collaborative dynamics. The authors state that users are better prepared to handle both the creative and technical aspects of service prototyping when labs are designed with clear instructions, flexible processes, and adaptive interfaces as top priorities. Their work has shown that accessible environments promote equitable participation, making collaboration more inclusive and productive. Soto (2021) introduces the concept of emotional accessibility, stressing its crucial role in co-creation practices within design labs. He also questioned the adequacy of purely functional accessibility, arguing that true inclusivity requires addressing the emotional and psychological comfort of participants to foster a more open and creative collaboration process.

2.5 Review of Frameworks Developed in the SINCO Lab

This section presents an overview of key frameworks developed in the SINCO Lab, illustrating practical applications of these frameworks in enhancing collaboration and service innovation. While these frameworks demonstrate effective integration of digital and physical tools and reflect best practices in collaborative design, the review also highlights challenges encountered during their application. These include issues related to inclusivity, facilitation, and technological accessibility. By acknowledging both the strengths and existing gaps, the review aims to inform ongoing improvements in user-centred service design.

Case Study 1: Prototyping for the Lapin Kansa

The Lapin Kansa case study, a student led project for a Finnish newspaper, sought to develop new strategies for marketing subscriptions as tangible products in grocery stores. It demonstrated how SINCO Lab's tools and environment can simulate real-life service experiences and prototype user interactions in an immersive controlled setting. To begin the project, students studied the actual customer journey in a grocery store by capturing photographic material on-site. This imagery was then used to recreate a grocery store environment within the SINCO Lab through servicescape simulation using rear projection screens, ambient sound effects, and lighting to create the look and feel of a retail space. This immersive setup served as a foundational platform for experience prototyping. Students employed the service stage to role-play different customer interactions, testing design aspects such as the optimal placement of a subscription sales stand, customer registration procedures, and onboarding techniques for new users. Iterative prototyping enabled the rapid development and evaluation of ideas, with a key component being the "thinking aloud" method where test users verbalized their thoughts and reactions to the service concept as they engaged with it. This method was particularly useful in capturing subconscious user insights that might otherwise go unnoticed during static interviews.

An essential aspect of this case was the active participation of the client. During a prototyping session, the company representative was invited to role-play the service interaction scenario, which enhanced their engagement with the service concept. This example demonstrated the shift of client perspectives from product-oriented thinking to a holistic focus on the user experience. In this way, Lapin Kansa project shows the successful application of co-creation principles within SINCO Lab. However, challenges related to usability and stakeholder engagement were identified, particularly aligning the expertise of different stakeholders with the available technology. One key issue was the difficulty of fully simulating large-scale environments like a grocery store within the confined lab setting. As noted in the paper, "*it was a challenge to perceive the layout of the entire store*" using the servicescape simulation tools available (p. 237). While this limitation did not hinder the overall success of the case, it did lead the authors to consider enhancements to the lab's prototyping capabilities in future development cycles (Rontti et al., 2012).

Case Study 2: Service Innovation for LAPPSET

The LAPPSET case study was carried out within the SINCO Lab to develop an innovative service concept for the LAPPSET Group, a leading manufacturer of playground and fitness equipment. The project aimed to explore the potential of a virtual trainer service to offer guided workout programs in outdoor settings. The process involved simulating physical interaction and digital touchpoints in a hybrid service experience. The team began with concept exploration using toy building blocks and sticky notes to plan the physical arrangement of equipment and interactive screens. This was followed by bodystorming sessions on the SINCO Service Stage, where students acted out exercise routines to better understand user posture, physical flow, and interface engagement. These scenarios were enhanced by servicescape simulations that projected outdoor park imagery and soundscapes to mimic real-world fitness environments. To explore motion-tracking functionality, students used different devices and Internet resources like the Sony EyeToy™ game, and tested a prototype for remote-guided training using a camera setup connected to live feedback displays. In this way with the help of available prototyping tools, they simulated the park setting with touchscreen displays strategically positioned in parks, providing users with access to a variety of fitness activities and enhancing their overall outdoor workout experience.

The project team gained a deeper understanding of the technological and experiential aspects of remote fitness services through hands-on prototyping services. The SINCO Lab's immersive and iterative environment enabled LAPPSET to assess the feasibility and acceptance of the concept by potential users. This case underscores the prominence of SINCO Lab's integrated approach in supporting creative exploration and informed decision-making in service design (Simo et al., 2012). However, a notable challenge emerged regarding the technical capabilities of the SINCO Lab in supporting rapid interaction design. The authors state that *“the student team with an industrial design background wanted more easy-to-use tools for making rapid user interface mock-ups, as well as more versatile tools for creating different physical interactions, for instance with the aid of simple motion detectors”* (Rontti et al., 2012, p. 238). The current tools in the lab at the time were not fully sufficient to create a highly functional or responsive UI, which limited the fidelity of the digital prototype. This issue reflected a broader challenge in balancing conceptual creativity with technical execution when prototyping hybrid physical-digital services (Rontti et al., 2012).

Case Study 3: KL-Kopio – Redesigning Digital Printing Services

The third case study involved a service redesign project for KL-Kopio, a digital printing company. The objective was to evaluate and enhance the customer experience of a digital printing service by rethinking the spatial and procedural design of the company in-store service environment. This project used the SINCO Lab as a setting for prototyping various service interactions through iterative role-playing and physical modeling. The student team began with field research, reviewing the company's existing service flow and identifying pain points from a customer perspective. Using the SINCO Service Stage and a variety of rough mock-ups, students replicated the printing shop environment to test alternative service flows and spatial configurations. Through iterative cycles, students built physical representations of the service environment, which were used for experiential role-play and evaluation. These prototypes allowed stakeholders to interact with a tangible representation of the redesigned service path. One powerful output was the ability to explain and visualize the service concept to the client using a high-fidelity mock-up that represented both the digital and physical components of the service experience. As the authors describe, this method provided an “*explaining*” function, which is essential in achieving shared understanding between design teams and stakeholders. The authors write, “*the refined service prototype was then used to communicate ideas to the company representative,*” and that the prototype helped him “*better understand the service from the customer’s point of view*” (Rontti et al., 2012, p. 238). The visualization and embodiment of the user journey enabled shared understanding among the project team and the client, making it easier to evaluate and finalize the proposed changes.

However, one of the recurring challenges in this case and across many SINCO projects was the hesitation of participants in engaging with role-play and improvisational methods. The study notes, “*Experience prototyping, role-play and unprompted experimentation are also often difficult for new students and partners, who require training to throw themselves freely into the creative mode*” (Rontti et al., 2012, p. 239). This hesitation among participants affected the authenticity and depth of user engagement in scenario testing, often requiring substantial facilitation or pre-structuring of activities. This is a critical observation from both an instructional and user-experience standpoint. The authors suggest that the effectiveness of such methods depends heavily on the presence of a skilled facilitator capable of guiding participants through the process. It reaffirmed that while the

tools and environment of SINCO enable rich interaction design, the human dynamics of role-playing and improvisation must be carefully managed to achieve meaningful insights (Rontti et al., 2012).

Key Challenges and Feedback

Despite these considerations, the SINCO Lab faces practical challenges related to usability and accessibility. The key feedback and challenges identified through these case studies are summarised in Table 1. Moreover, the following section offers a detailed discussion of each challenge, supported by direct evidence from the case studies and reflections from the student’s perspective.

Table 1: Analysis of Key Prototyping Challenges in SINCO Lab Case Studies

Identified Challenge	Description	Documented Evidence	Case Study Context(s)
Technology alignment and stakeholder unfamiliarity with tools	Stakeholders and some participants required facilitation to effectively engage with SINCO tools and methods.	<i>“We found it important to take the client company members along with the experience prototypes...”</i> (Miettinen et al., 2012, p. 1210); <i>“Experience prototyping... are often difficult for new students and partners...”</i> (Rontti et al., 2012, p. 239)	Lapin Kansa, KL-Kopio
Limited spatial fidelity in simulation	Difficulty simulating large or complex service environments in full scale within SINCO Lab’s physical constraints.	<i>“It was a challenge to perceive the layout of the entire store.”</i> (Miettinen et al., 2012, p. 1210)	Lapin Kansa
Lack of intuitive tools for UI and motion-based prototyping	Prototyping dynamic interactions (like UI navigation and motion tracking) was limited by a lack of user-friendly tools.	<i>“The student team... wanted more easy-to-use tools for making rapid user interface mock-ups, as well as more versatile tools for creating different physical interactions...”</i> (Rontti et al., 2012, p. 238)	LAPPSET

Performance limitations and reliability of equipment	Tool responsiveness issues (e.g., motion detection, projectors, or touchscreen interaction) created frustration and testing delays.	<i>“...shortcomings in motion detection and mock-up interaction tools...”</i> (Rontti et al., 2012, p. 239)	LAPPSET, KL-Kopio, Lapin Kansa
High technical skill demand for toolkit use	SINCO tools required trained facilitators or digitally skilled users, limiting ease of access and slowing collaboration.	<i>“The use of the Toolkit also requires sufficient technical skills.”</i> (Rontti et al., 2012, p. 239)	LAPPSET, KL-Kopio
Slowed iteration and feedback loops	Tool complexity, setup time, or user onboarding slowed iterative design cycles and limited immediate feedback.	Implied through emphasises on facilitation needs and technical setup, e.g., <i>“The effectiveness of such methods depends heavily on the presence of a skilled facilitator...”</i> (Rontti et al., 2012, p. 239)	LAPPSET, KL-Kopio

A major issue observed in both Lapin Kansa and KL-Kopio was the unfamiliarity with prototyping tools among participants, especially stakeholders unfamiliar with service design methods. Even with enthusiasm, participants often needed facilitation and guided explanation to interact effectively with simulated environments and digital tools. From my experience, this not only slows the co-creation process but also places significant pressure on the team to lead, to act as a translator between concept and interface. The paper implies that warm-up exercises, visual tutorials, or short onboarding sessions could help stakeholders engage more confidently and contribute more meaningfully to co-design.

Another major issue emerged during the Lapin Kansa case, where students attempted to simulate a full grocery store experience within SINCO Lab, which indicate the spatial limitations of the physical space and toolkit. As a result, the team could not realistically test customer navigation, an essential component for assessing impulse decisions and spatial flow. From my own experience as a student using the SINCO Lab, these constraints often force teams to simplify or verbally supplement the setting, which risks reducing the accuracy of the user feedback. The authors

suggest further development of the toolkit to improve spatial simulation flexibility (p. 1212), or modularizing the projection system to allow more flexible environment simulation.

The LAPPSET project revealed a more tool-centered challenge: the absence of rapid and user-friendly prototyping solutions for interactive and motion-based experiences. As reported, the student team “*wanted more easy-to-use tools for making rapid user interface mock-ups... with the aid of simple motion detectors*” (Rontti et al., 2012, p. 238), highlighting a gap between the sophistication of design ideas and the practical tools available. From my perspective, this is especially problematic in multidisciplinary teams where not everyone has technical or programming skills. Without quick and flexible tools, some of the most promising service concepts can be underdeveloped or inadequately tested.

A more technical yet widely shared issue was the inconsistent performance of lab equipment. Across the cases, students and clients dealt with unresponsive motion sensors, out-of-sync projectors, or delays in mock-up interactions. On page 239, the authors acknowledge “*shortcomings in motion detection and mock-up interaction tools,*” which reflects the technical unpredictability many users face during prototyping. In practice, such disruptions can be frustrating, especially when trying to maintain momentum during a workshop or design sprint. While SINCO provides robust simulation capabilities, technical limitations such as unresponsive touchscreens or out-of-sync audio, can disrupt the testing experience. I have personally encountered these issues during the session with my instructor in SINCO Lab where time was lost troubleshooting rather than iterating ideas, reducing the fluidity of the process. Regular hardware maintenance, streamlined integration, and user-guided setup protocols could address many of these concerns.

Another significant limitation present in both LAPPSET and KL-Kopio was the technical skill threshold needed to operate SINCO’s toolkit. As the author states, “*the use of the Toolkit also requires sufficient technical skills*” (Rontti et al., 2012, p. 239). In team settings, this dynamic can unintentionally create hierarchies between those who are “tech fluent” and those who are not. The most technically proficient member often takes control of the tools, leaving others in passive roles. This imbalance can hinder collaboration and limit overall participation. From a student’s viewpoint, learning the platform’s capabilities is rewarding but time-intensive. Without prior

experience or dedicated technical support, users often struggle with setup, coordination and integrating layered simulations which hinders rapid iteration and creative momentum. Simplifying the user interface and offering template-based tools for common prototyping tasks could democratize tool access and empower more team members.

Finally, these combined issues contributed to slowed iteration and feedback loops. Iterative testing, which should feel dynamic and experimental, instead felt linear and sometimes rigid. While not explicitly labeled, the cases show how tool setup, participant unfamiliarity, and equipment constraints, often disrupt the pace of prototyping. The LAPPSET case, for instance, required technical reconfigurations between tests, and in KL-Kopio, onboarding stakeholders demanded significant facilitation. The authors imply that iteration effectiveness “*depends heavily on the presence of a skilled facilitator*” (Rontti et al., 2012, p. 239). This aligns with my own observations, without skilled guidance, prototyping often shifts from refining ideas to merely navigating tools. Improvements here would include real-time preview tools, rapid scenario editing, and live annotation support during role-play. Altogether, while SINCO Lab offers an exceptional environment for simulating services, these recurring barriers, technical, spatial and experiential can impact its usability and accessibility. Enhancing the lab’s value means focusing not just on the quality of the tools, but also on how inclusive, intuitive, and versatile the overall experience is for all types of users.

In conclusion, this literature review has explored the essential concepts that underpin the research focus on service design, empathy, co-creation, and the role of digital transformation in service prototyping. Through the synthesis of diverse scholarly insights and case studies, the chapter demonstrated how these concepts intersect and contribute to the evolving practices of service design in the context of SINCO. Moreover, the review explored the usability and accessibility of design labs, emphasising that for effective co-creation to occur, the tools and spaces used must be accessible and easy to navigate for all participants. The Case studies conducted within SINCO reveal key challenges such as technological limitations, the need for better alignment of tools with users’ needs, and inadequate facilitation, providing valuable insights into how design labs can enhance their usability and accessibility to ensure effective co-creation.

Chapter 3: Methodology

This chapter explains the research methodology, data collection methods, and analysis techniques employed to assess the SINCO Lab’s usability, accessibility, and collaborative potential. By integrating qualitative and quantitative research approaches, the study aimed to provide a holistic understanding of user experiences and identify areas for improvement. Survey, interviews, and detailed observational session were employed to evaluate the Lab’s technological framework and its ability to support collaborative activities. Furthermore, this chapter draws on insights from previous studies, incorporating theoretical perspectives to justify the chosen methodology and establish a solid academic foundation for the research approach.

3.1 Methodological Approach

To evaluate the SINCO Lab’s potential as a user-centered innovation environment, this study adopted a rigorous mixed-methods approach aligned with its core research aim: assessing usability, accessibility, and collaborative potential. This methodological strategy combined qualitative and quantitative approaches, offering a comprehensive understanding of user experiences and informing practical improvements.

Mixed-methods research enhances both depth and breadth, enabling the collection of nuanced qualitative insights and measurable quantitative data (Greene et al., 1989). In this study, qualitative methods such as interviews and observational session were chosen for their ability to explore complex, context-specific phenomena in user-centered environments. As Creswell (2014) highlights, qualitative research is particularly effective for gaining rich, detailed insights into individual experiences, making it well-suited for the interactive, experimental nature of SINCO Lab.

The quantitative aspect of the study, consisting of survey, complemented the qualitative approach by gathering standardized data on usability and functionality. According to Fowler (2013), surveys are invaluable for identifying recurring patterns across a diverse group of participants, contributing to empirical generalizability. To ensure the credibility and trustworthiness of the qualitative findings, a triangulation strategy was adopted. This strategy involved cross-verifying data from multiple sources—interviews, survey, and observational notes to validate interpretations. As

Shenton (2004) claims that triangulation enhances the dependability of qualitative research by minimizing interpretive bias and ensuring findings are well-supported by evidence. This process ensured that participants' experiences were accurately and comprehensively represented.

3.2 Research Design

Building on this integrated methodological foundation, the research design implemented these methodological choices using structured models and frameworks. The following section outlines how the Research Onion model and case study strategy shaped data collection and analysis.

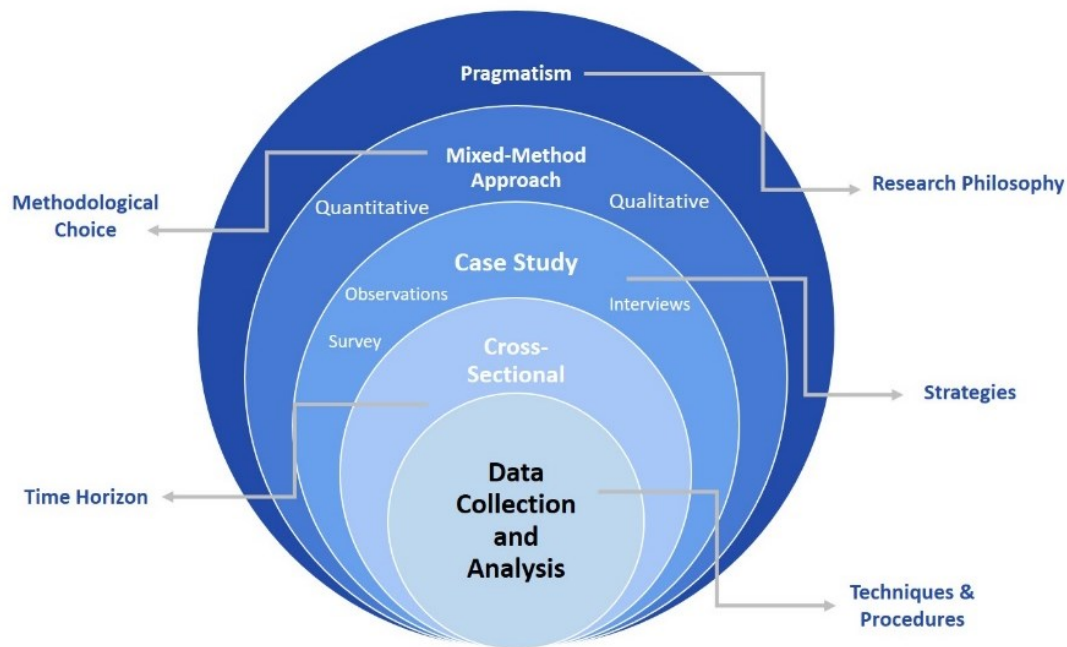


Figure 2: The Research Onion Model for this Study

Adapted from "The Layers of Research Design" by Saunders and Tosey (2013)

The Research Onion model (Saunders & Tosey, 2013) guided the study's methodological decisions by illustrating how philosophical stances, methodological strategies, and data collection techniques are interconnected. Figure 2 presents an adapted version of the Research Onion, tailored to this project's structure. This layered visualization helps contextualize the rationale behind combining qualitative and quantitative approaches, employing a case study strategy, and using both cross-sectional and mixed-methods techniques for data collection and analysis.

A key element of the research design was the use of a case study framework, which enabled a focused exploration of SINCO Lab as a bounded system where service design principles are applied. Yin (2018) asserts that case studies are particularly well-suited for investigating contemporary phenomena within real-life settings, offering an in-depth understanding of specific subjects. In this study, the framework facilitated a detailed investigation of how users' interact with the Lab, shedding light on its collaborative strengths and operational challenges.

To capture these interactions effectively, a cross-sectional design was applied, allowing data collection at specific moments in time. This approach focused on critical touchpoints such as workshops and observational sessions, providing a contextual snapshot of user experiences during live interactions. The cross-sectional design facilitated the evaluation of the Lab's technological infrastructure and its role in fostering co-creation and innovation.

The exploratory nature of the research made qualitative methods particularly suitable, as they allowed for the collection of rich, context-specific data from participants. As Stebbins (2001) suggests, exploratory research is valuable for generating insights into new or complex phenomena such as the SINCO Lab's function in facilitating service prototyping.

Participation Recruitment and Challenges

Recruiting participants who possessed sufficient hands-on experience with the SINCO Lab's technologies proved to be a significant challenge for this study. My objective was to include both current students and alumni who had engaged in collaborative or prototyping activities within the lab, ensuring a balance of recent and retrospective insights.

As Bryman (2016) stated that participant recruitment in qualitative research is often requires careful planning to ensure diverse perspectives. Outreach efforts included emails to alumni and direct communication with faculty to identify eligible participants particularly those who had prior experience with the lab. However, some alumni were unavailable due to time constraints, and many current students had limited familiarity with the lab's advanced features which restricted their ability to provide detailed feedback. These challenges underscore the importance of continuous training and engagement to ensure more comprehensive participation in future evaluations.

Although alumni were considered ideal participants due to their prior experience with the lab, contacting them was challenging, as many were unavailable due to their academic or professional commitments. This challenge aligns with findings by Robinson (2014), who notes that attrition and reduced accessibility are common issues when attempting to engage past participants in follow-up research.

While current students were more accessible, many had only limited or surface-level interaction with the lab's advanced features. Although several had attended workshops or demonstrations, only a few had engaged in deeper, hands-on service prototyping. This limited their ability to provide detailed, experience-based feedback, particularly on technical usability and collaborative capacity. As Morse (2007) suggests, ensuring that participants have sufficient experience with the phenomenon under study is critical to collecting meaningful qualitative data. These recruitment challenges highlighted the broader issue of user engagement with the SINCO Lab.

3.4 Data Collection Methods

Understanding the multifaceted nature of user interaction within SINCO Lab required a flexible and layered approach to data collection. I adopted a multi-method data collection strategy that included a survey, interviews, and a guided observational session. Each method was selected for its specific strengths in capturing user experiences and generating insights into the usability, accessibility, and collaborative potential of the SINCO Lab. Below, I describe each method in detail and explain how it was applied in the context of this study.

Survey

To gather data on user experiences in the SINCO Lab, I designed a survey (see Appendix 1) using Google Forms. This survey was distributed to 17 students who had participated in collaborative workshops held in the SINCO. I chose this method for its effectiveness in capturing timely and actionable feedback—an approach supported by Dillman et al. (2014), who emphasise the importance of prompt data collection in user experience research. The survey aimed to collect structured data on usability, accessibility, and the effectiveness of the lab's tools and technologies.

The survey included both multiple-choice questions, to enable quantitative analysis, and open-ended questions, to gather qualitative insights. Specifically, it sought to:

1. Identify the most frequently used devices in the SINCO Lab.
2. Document technological challenges encountered by participants.
3. Collect suggestions for improving usability and accessibility.

To maintain ethical standards, participants' anonymity was ensured throughout the process. This helped foster an environment where students felt comfortable sharing honest and constructive feedback.

By analyzing responses using descriptive statistics, I was able to identify common usability issues, recurring challenges, and specific areas in need of improvement, insights that directly informed the evaluation of the SINCO Lab's performance guided recommendations for future development.

Interviews

Initially, the study aimed to conduct semi-structured interviews in person, with all interviews recorded with the participants' consent. The goal was to explore individual experiences with SINCO Lab's technology and assess its usability, accessibility, and potential for collaborative work. These interviews were intended to gather in-depth insights from participants. This method aligns with the recommendations of Kvale and Brinkmann (2009), who suggest that semi-structured interviews are effective for exploring individual perspectives while allowing flexibility to address emergent themes.

However, scheduling conflicts led to the unavailability of some participants for in-person interviews. Additionally, several current students, who had limited experience with the lab's more advanced features, found it challenging to provide comprehensive feedback. As a result, the approach to conducting interviews was adjusted. Given the availability constraints of participants, the interviews were instead conducted via email, using Outlook to send interview questions and receive written responses. This adjustment allowed participants to respond at their convenience, though it limited the ability to ask follow-up questions in real-time. Despite these limitations, the email format still enabled a thorough exploration of participant experiences and suggestions.

In total, seven participants were interviewed, and they were divided into three groups:

Alumni: To gather insights into their past experiences with SINCO Lab and its role in their learning.

Current Students: To explore their firsthand experiences with the lab during workshops and other activities.

Faculty Members: To evaluate how SINCO Lab supports academic objectives and teaching practices.

The interview questions focused on the usability of SINCO Lab's technology, challenges encountered during service prototyping, and ideas for improving accessibility and collaboration. These questions, along with the participant responses, are included in Appendix 2 for further reference.

Since the interview was conducted via email, transcription was not necessary. The responses were directly analysed to identify recurring themes and insights. Thematic analysis was employed to categorize the data into key themes, such as usability barriers, accessibility challenges, and recommendations for improvement. This approach the study to go beyond surface-level patterns and identify deeper, more nuanced themes in the responses.

Observational Session

As part of the data collection process, an observational session was conducted in collaboration with an instructor to better understand the technological infrastructure and usability of the SINCO Lab. Observational research, as described by Angrosino (2007), allows for firsthand insights into how users interact with their environments and tools.

During the session, I actively explored various elements of the SINCO Lab alongside the instructor. We focused on key components such as access protocols, interactive touchscreen displays, sound systems, projection settings, and the Service Stage—an immersive platform for service simulation. By both observing and participating, I experienced the Lab through the dual lens of a researcher and a user.

Throughout the process, I made detailed observations regarding the ease of access to the lab, the intuitiveness of its digital tools, the clarity of setup instructions, and the overall user-friendliness of the technology. I carefully documented the process using detailed field notes, capturing each stage, including the steps taken, the challenges encountered, and the instructor's explanations. This collaborative exploration allowed me to ask questions in real time and compare expert perspectives

with my own experiences navigating the system as a user unfamiliar with some of the system's configurations.

The insights gathered from this observational session not only helped me contextualize the SINCO Lab's technological landscape but also played a critical role in shaping the findings presented in the next chapter. These findings highlight specific usability barriers and suggest improvements to support more seamless user engagement in service design activities.

3.5 Methods of Analysis

The data collected through survey, interviews, and observational session was analysed using a mixed-methods analytical approach, integrating both qualitative and quantitative techniques to ensure a comprehensive understanding of user experiences. This approach enabled the study to identify measurable trends while also exploring the underlying factors influencing user behaviour and perceptions.

Qualitative data from the interviews, open-ended survey responses, and observational session notes were evaluated using Thematic Analysis, following Braun and Clarke's (2006) six-phase framework: familiarization with the data, generation of initial codes, searching for themes, reviewing themes, defining and naming themes, and producing the report. This process facilitated the identification of recurring patterns, particularly around usability barriers, accessibility issues, and opportunities to enhance collaborative practices. To ensure the credibility and validity of the qualitative findings, methodological triangulation was employed. By comparing data across interviews, survey, and observational insights, the study was able to cross-verify emerging themes. This strategy strengthened the trustworthiness of the interpretations and minimized potential biases associated with single-source data.

In the quantitative component, descriptive statistics were applied to closed-ended survey responses to identify trends in user feedback. This included calculating frequencies and percentages to recognize common patterns in technology usage, challenges encountered, and suggestions for improvement. These statistical summaries provided a structured overview of user feedback, complementing the richer, context-specific insights obtained through qualitative methods.

The observational session contributed additional contextual depth. This session documented how users interacted with the lab environment, navigated the space, and engaged with technological tools during collaborative tasks. These real-time observations uncovered practical issues such as equipment usability limitations and spatial constraints that were not always apparent in self-reported data.

By combining these analytical methods, the study delivered a robust and nuanced interpretation of the data, capturing both the scope and depth of user experiences within the SINCO Lab. The illustrated trends in device usage, types of challenges reported, and thematic groupings, offered readers an intuitive overview of the findings. This comprehensive approach ensured that findings are not only grounded in empirical evidence but also reflected the complexity of real-world user interactions.

3.6 Justification for Methodological Choices

The methodological choices made for this study were aligned with the research objectives and the theoretical framework. As Yin (2018) notes, case study research is particularly suited to exploring contemporary phenomena in their real-world context, making it the ideal choice for evaluating SINCO Lab. The case study approach enabled the researcher to capture detailed, context-specific data about the lab's usability and its potential for collaborative activities.

The mixed-methods approach combined quantitative survey with qualitative interviews and observations, offering complementary insights into user experiences. The Interviews provided rich, qualitative data to explore individual experiences, aligning with Kvale and Brinkmann's (2009) view of semi-structured interviews as a flexible and effective tool for data collection. Surveys offered a broader understanding of recurring issues and preferences, complementing the qualitative findings which align with Fowler's (2013) argument for their effectiveness in capturing large-scale feedback. Finally, the observational session allowed for a firsthand exploration of SINCO Lab's technological framework, providing rich, context-specific data that supplemented the survey and interviews findings. These methods ensured a comprehensive evaluation of SINCO Lab's framework, balancing qualitative depth with quantitative breadth.

Chapter 4: Findings

This chapter presents the findings of the research conducted to assess SINCO Lab’s usability, accessibility, and collaborative potential. Data were collected from three complementary sources: a survey, interviews, and an observational session. The survey provided quantitative data on technology usage and user preferences, the interviews offered detailed personal insights and suggestions from a diverse group of SINCO Lab users, and the observational session allowed for direct examination of practical challenges within the lab’s technological environment. Together, these methods provide a comprehensive understanding of user experiences and inform potential improvements to the SINCO Lab.

The findings are organized thematically, reflecting the core areas of investigation: usability, accessibility, and collaboration. Each section delves into specific aspects identified through data analysis, highlighting both strengths and areas for improvement. To facilitate clarity and comprehension, the results are presented alongside relevant figures and tables, which visually represent key data points. The implications and analysis of these findings will be discussed in chapter 5.

4.1 Survey Results

The survey was designed to capture diverse user experiences and perceptions regarding the technology and service environment of the SINCO Lab. While participants provided a wide range of responses (see Appendix 2 for the full survey form), with the focus on three core themes that emerged as the most relevant and actionable: technology usage, usability challenges, and user-driven suggestions for improvement. These themes were selected because they most directly reflect the research objectives, particularly concerning how SINCO Lab can be made more accessible, user-friendly, and supportive of creative collaboration.

Usage of SINCO Lab’s Technology

One of the key areas of focus in the survey was to examine how frequently and in what ways participants engage with the Lab’s available technologies. Respondents identified the devices they used most often during their activities. The results, summarized in Table 2, reveal that the

Interactive Screens, Microsoft Surface Hub, and Service Stage were among the most frequently utilized technologies.

Table 2: Usage of SINCO Lab’s Technology

Technology	Usage Percentage (%)	Primary Function
Interactive Screens	78%	Digital prototyping, interactive presentations
Microsoft Surface Hub	65%	Collaborative exercises, brainstorming
Service Stage	60%	Immersive service prototyping
Loudspeakers	45%	Enhancing multimedia elements
Ceiling Projector	40%	Displaying service design prototypes

The Interactive Screens are essential to the Lab’s digital prototyping process with 78% of respondents reporting frequent use. The Microsoft Surface Hub, at 65%, was the second most widely used device, primarily supporting collaborative exercises and brainstorming. The Service Stage, used by 60% of respondents, was identified as crucial for immersive service prototyping, offering users an engaging, interactive experience. Other technologies, such as the Loudspeakers (45%) and the Ceiling Projector (40%), were also reported as integral to enhancing the multimedia and interactive components of the service design process.

While the frequency of technology use provides valuable insights into the Lab’s functionality, it is important to note that higher usage does not necessarily correlate with ease of use. The following sections will address the accessibility and usability challenges that participants encountered while interacting with these technologies, which are critical factors in evaluating their overall effectiveness.

Challenges in Using SINCO Lab Technology

Survey responses indicate that, although technology plays a crucial role in SINCO Lab’s operations, several obstacles hinder its usability and accessibility. As shown in Figure 3, the most frequently reported issue was the lack of clear instructions, reported by 76.5% of respondents.

Many users had difficulty in understanding how to operate the devices, particularly when dealing with multi-screen configurations and connectivity settings which often led to delays during workshops.

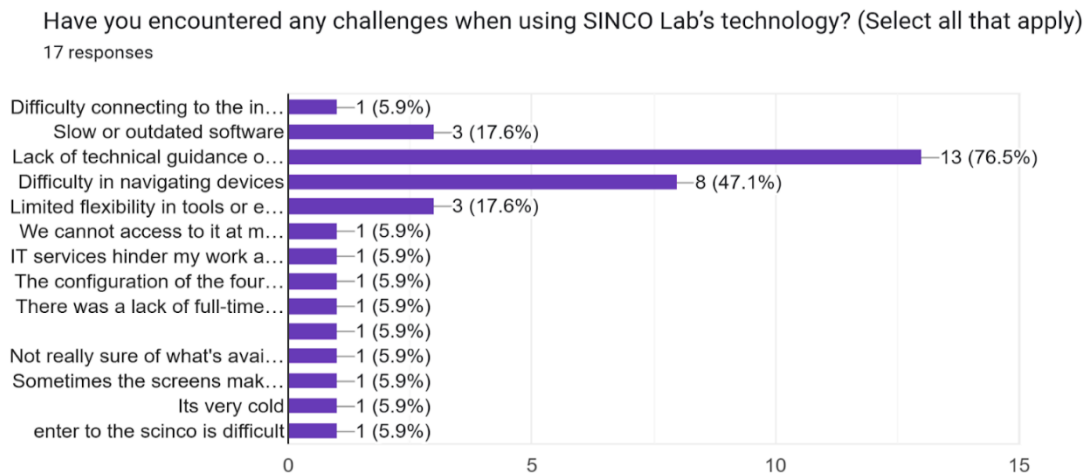


Figure 3: Reported challenges in using SINCO technologies

Another most common challenge was difficulty navigating devices, reported by 47.1% of participants. This indicates that despite the advanced technological tools available in the lab, their non-intuitive design and limited user guidance reduce operational efficiency. 17.6% of respondents reported experiencing slow or outdated software, which further affected the smooth functioning of the lab's digital resources.

Several participants also expressed frustration with the absence of a systematic troubleshooting mechanism. In such cases, users often relied on trial-and-error methods, peer support, or spent excessive time setting up devices before beginning actual design activities. These findings underscore the need for clear onboarding materials, technical support, and regular system updates to enhance the usability of SINCO Lab's digital infrastructure.

Accessibility and Usability Feedback

For broader exploration of potential enhancements, the study sought user-driven insights into the accessibility and usability of the SINCO Lab. These contributions highlighted areas for improvement and opportunities to better support diverse users. Figure 4 shows that the most preferred forms of instructional support were printed instructions or posters and digital onboarding

videos, each selected by 64.7% of respondents. Participants recommended that short, categorized video tutorials demonstrating how to use specific devices (e.g., connecting to projectors, using interactive screens) would provide quick and accessible learning support.

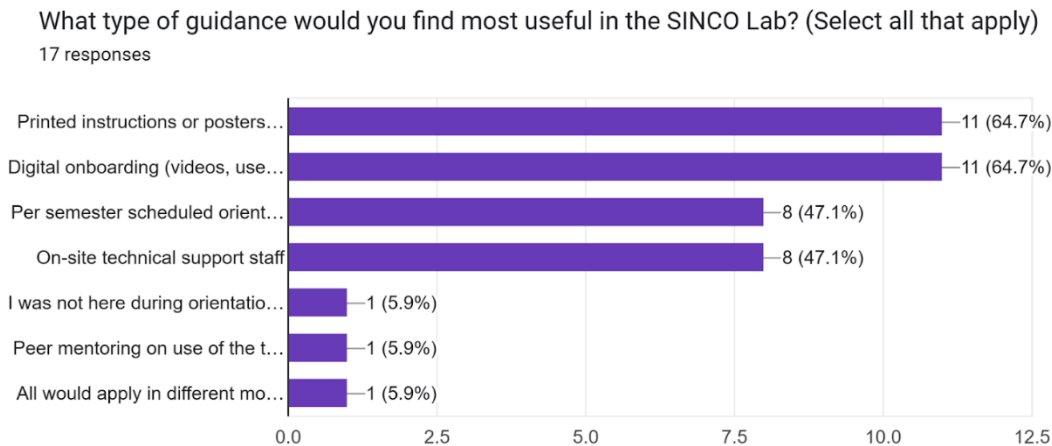


Figure 4: Training Resources Preferred by SINCO Users

These materials were seen as especially useful for first-time or infrequent users who might not remember all instructions from initial orientations. An equal percentage of respondents (47.1%) also expressed a preference for having on-site technical support, emphasising the need for real-time assistance during practical use of the lab’s technology.

A smaller subset of respondents highlighted the importance of peer mentoring and multi-format support options, acknowledging diverse learning preferences and varying levels of familiarity with the Lab’s tools. These findings underscore the need for a comprehensive and flexible support system, combining self-directed learning tools with accessible human support.

4.2 Interviews Findings

The findings derived from the interviews conducted with a diverse group of SINCO Lab users, including students, faculty members, and technical staff. Due to scheduling constraints and to facilitate convenience, the interviews were conducted remotely via Microsoft Outlook, where interview questions were shared with participants electronically and responses were received

asynchronously. This approach allowed participants ample time to provide thoughtful and detailed reflections on their experiences.

The interviews aimed to gain an in-depth understanding of several key areas such as which technologies and devices were used most frequently, the challenges encountered during usage, specific instances of confusion or uncertainty, and participants' suggestions for improving the Lab's overall accessibility and usability. These qualitative findings provide a nuanced understanding of user needs and inform potential directions for enhancing the lab's infrastructure and support systems.

SINCO Technology Usage

The interviews revealed a broad spectrum of technology engagement across different user groups, illustrating the SINCO Lab's multifunctional role as a hub for service prototyping. Participants' experiences varied ranging from deep, technical interaction with almost every device to selective use of specific tools that fit their needs. This diversity reflects the Lab's capacity to accommodate varied project needs but also underscores the varying levels of user expertise.

For instance, Interviewee 1, who self-identified as highly proficient due to prior technical experience, described comprehensive use of the Lab's resources.

“I have used almost everything in the SINCO Lab — all the screens, remote connection for presenting my computer screen, Bluetooth speakers for music, computers for presentations, and lighting systems to create immersive workshop environments.”(Interviewee 1)

This statement showcases the wide range of technologies available in the SINCO Lab and highlights how users with technical confidence can fully utilize multiple tools at once combining audiovisual and lighting controls to create rich, immersive workshop experiences. Interviewee 1's experience demonstrates how familiarity with the lab's resources enables deeper engagement and can enhance the outcomes of service prototyping projects.

In contrast, other participants focused their usage on particular devices suited to their immediate needs. Interviewee 2 emphasised:

“The dual projector screens were the most used especially for body storming and service prototyping, while iPads were important during the final stages of creating videos.” (Interviewee 2)

This focused engagement reflects a practical adaptation of technology, where tools are employed selectively across different stages of the design process — from ideation through to presentation. It suggests that seamless functionality across these devices is crucial to maintaining workflow continuity.

Similarly, Interviewee 5 discussed reliance on specific technologies for instructional purposes:

“I use the Microsoft Surface Hub most often, along with the BenQ touchscreens and the Service Stage. The loudspeakers also play a vital role during sessions.” (Interviewee 5)

This underscores the centrality of certain key devices in supporting collaborative learning and interactive sessions, positioning them as core infrastructure for the Lab. Together, these perspectives illustrate the Lab’s technological diversity and its importance as an adaptable space, while also suggesting the need for different types of user support to address varying skill levels.

Usability Challenges and Confusions

Despite the broad technology use, a recurrent theme across interviews was the significant usability challenges that impaired user confidence and efficiency. A major issue identified was the absence of clearly structured and user-friendly instructional materials. Interviewee 1 commented:

“There are instructions, but they are scattered and not detailed enough for basic users. For example, I had to figure out how to play music through the speakers myself because the devices weren’t connected properly.” (Interviewee 1)

This comment reflects a common frustration: without clear and user-friendly guidance, even simple tasks can become time-consuming, especially for users who are not familiar with complex audiovisual setups. The absence of clear instructions led to inefficiencies and increased reliance on peer support or trial and error, disrupting workflow and potentially discouraging use.

The technical problems made the usability challenges even worse. For example, Interviewee 5 pointed out ongoing issues with hardware not working properly and problems with connecting devices, which added to the difficulties users faced when trying to use the Lab's technology.

“The Microsoft Surface Hub often fails to connect via HDMI, forcing us to use Bluetooth connections instead. Cables are old and sometimes devices don't function because they are not properly installed. IT support is slow since these devices aren't their responsibility.” (Interviewee 5)

These technical issues not only cause frustration among users but also reduce their confidence in the Lab's technology. When devices appear unstable, users might avoid using them or plan extra time for troubleshooting, reducing the Lab's overall efficiency and effectiveness.

Further, setup complexity introduced emotional and logistical challenges. Interviewee 3 noted:

“I usually arrive early to make sure everything works before workshops. Otherwise, it's a process of trial and error.” (Interviewee 3)

This statement illustrates how users bear the burden of ensuring operational readiness, often feeling anxious and uncertain. Preparing the equipment is time-consuming and diverts focus from creativity and collaboration. Such experiences point to a critical need for improved support mechanisms and smoother setup processes to improve user confidence and reduce stress.

Suggestions for Improvement

In response to the recurring challenges they encountered, interview participants proposed a series of user-driven, actionable suggestions aimed at improving the accessibility, usability, and overall functionality of the SINCO Lab.

Several interviewees pointed out the need for regular training sessions and efforts to raise awareness. For example, Interviewee 2 recommended organizing activities that encourage user engagement.

“SINCO Lab should have monthly open-door events where students and staff can explore the technology and learn how to use it effectively.” (Interviewee 2)

Such informal events would not only reduce pressure on technical staff but also foster a more collaborative and inclusive learning environment, especially for students hesitant to seek help. These open-door sessions would allow users to explore tools at their own pace, build confidence through experimentation, and demystify unfamiliar equipment.

The need for responsive technical support was also a recurring theme. Interviewee 5 noted the limitations of existing support structures and suggested a targeted intervention:

“There should be a help desk specifically for SINCO Lab users, ensuring that technical issues can be resolved quickly.” (Interviewee 5)

This dedicated point of contact would bridge the current gap between users and general IT services, who are often unavailable or unfamiliar with Lab-specific technologies. A responsive, trained support role would ensure smoother operations, reduce downtime, and provide peace of mind during workshops or classroom sessions.

Beyond instructional and technical improvements, participants recommended better spatial organisation. Interviewee 1 highlighted this through a call for clearer physical infrastructure:

“Implementing a lean 5S system, where every item has a clearly labelled place, along with cleaning supplies and a floor plan showing the desired setup, would improve usability and upkeep.” (Interviewee 1)

This level of spatial clarity would help users easily locate and return items, reduce setup time, and maintain the professionalism of the space. This is especially important when hosting presentations or meetings with external professionals, where a tidy and well-organized environment creates a better impression.

Finally, simplifying access procedures was seen as essential for increasing engagement. Interviewee 7 articulated this sentiment clearly:

“Booking the Lab currently feels complicated, requiring teacher permissions and approvals. It would be more effective if the space could be booked as easily as a library room, encouraging spontaneous and flexible use.” (Interviewee 7)

Lowering the administrative barriers to access would not only foster more frequent use but also support innovation by encouraging spontaneous, self-directed experimentation particularly valuable in a creative learning environment.

4.3 Observational Session Findings

During my observational session with an instructor at the SINCO Lab, I identified several challenges related to its technological configuration. While the SINCO Lab offers an impressive range of digital and physical tools to support immersive service prototyping, I encountered several barriers that could hinder smooth operation—particularly for users unfamiliar with the lab’s systems.

The session began with an unexpected obstacle: accessing the lab’s digital systems. I had difficulty locating the login credentials, which led to delays and a somewhat frustrating start. This experience highlighted a broader issue—the absence of clear access protocols or visible instructions. For new users, this lack of clarity may lead to confusion or discouragement.

Once we gained access, the instructor guided me through the use of the interactive touchscreen displays. Our goal was to adjust settings for advanced features like 3D visualization. Even with the instructor’s support, the process felt unintuitive, largely due to the absence of user manuals or clear on-screen prompts. I realized that without prior experience or expert help, many users might not be able to fully utilize these screens.

Next, we moved on to configure the sound system, including loudspeakers and background music, key elements for creating an engaging workshop atmosphere. I found this part especially time-consuming, as the process involved manual trial-and-error due to a lack of clear setup instructions. This same challenge reappeared when adjusting projection lighting and using the wireless HDMI connection. Without a lab technician or guide, I found myself unsure how to achieve the desired immersive environment.

Finally, I evaluated the Service Stage. This platform is central to SINCO’s immersive service simulations, but its setup process was surprisingly complex. Configuring it involved multiple

interconnected systems, and it became apparent that a standard user like myself would likely struggle without specific training or technical guidance.

I summarized the key observations from this session in the following Table 3, which outlines the issues I encountered and suggests practical improvements.

Table 3: Observational Session Findings – SINCO Lab Technology

Observation Area	Key Observations	Challenges / User Impact	Suggestions for Improvement
Access and Setup	I had difficulty accessing the SINCO Lab system, particularly in locating login credentials and starting up the setup.	Inconsistent access protocols; no visible instructions for login. This caused delays and made me rely on the instructor to proceed.	Introduce clear login procedures and display credentials or access instructions near relevant equipment.
Interactive Screens (Large touchscreen displays)	I explored the settings of the large touchscreen displays for 3D view optimization with guidance from the instructor.	Interface was unintuitive; no setup prompts or user manuals. This slowed down the progress and made the tool feel inaccessible for independent use.	Provide user-friendly setup guides or short video tutorials to support screen customization and 3D features.
Sound Setup	Configured the sound system, loudspeakers, and background music settings to enhance the workshop atmosphere.	With no guidance available, I had to rely on trial and error. This led to time loss and confusion during configuration.	Offer quick-start audio setup guides or visual instructions for setting up sound systems and configurations.
Lighting and Projection	I adjusted the projector lights (color, warmth) and experimented with ceiling projector and HDMI connections.	The setup was technically complex and lacked any troubleshooting support or documentation. This made the process frustrating and slowed the session's momentum.	Provide visual setup instructions or assign a support contact for projection and lighting configuration.
Service Stage Setup	I examined the Service Stage for simulating real-	The setup process was complicated and required technical knowledge.	Provide user training sessions and simplified documentation

	world service environments.	Without clear instructions, I found it difficult to operate independently	for setting up and operating the Service Stage.
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This session allowed me to directly observe and experience how powerful yet difficult SINCO’s tools can be to use effectively without structured support. It became clear that even though the technology has strong potential to support advanced service prototyping, its usability is hindered by issues like lack of documentation, access friction, and complexity in setup.

To ensure broader accessibility and smoother experiences particularly for students, visiting researchers, or first-time facilitators, I recommend improvements such as user-focused documentation, regular orientation sessions, and designated technical support. These steps would make SINCO’s infrastructure more inclusive and better aligned with its mission of supporting creative, collaborative service design.

Overall, this chapter has provided a comprehensive overview of the user experiences, challenges, and suggested improvements based on multi-method data collection. While SINCO Lab offers valuable capabilities for service prototyping, addressing these usability, training, and support-related gaps is essential. The next chapter will analyse these findings in relation to existing research and propose actionable recommendations for enhancing SINCO Lab’s accessibility and efficiency.

Chapter 5: Discussion

This chapter interprets the findings presented in Chapter 4, linking them to the research questions and existing literature. The discussion explores the implications of the results, how they align with or diverge from previous studies, and their broader significance in service design and usability. Additionally, this chapter acknowledges the study's limitations and recommendations for future research directions. The findings contribute to the ongoing discussion on usability, accessibility, and collaborative innovation in service prototyping labs, particularly within the context of SINCO Lab.

5.1 Linking Findings to Research Questions

The study aimed to address key research questions concerning SINCO Lab's usability, accessibility, and collaborative potential. The key findings provide critical insights into the challenges faced by users and propose solutions to enhance the lab's efficiency. The following Table 4 summarizes how the findings relate to the research objectives.

Table 4: Linking Findings to Research Questions

Research Question	Key Findings	Proposed Solutions
How can SINCO Lab's usability and accessibility be improved?	Lack of structured onboarding, unclear user instructions, and complex booking procedures.	Introduce structured training programs, create instructional videos and user manuals, improve onboarding procedures, and simplify the booking system.
What strategies can enhance collaboration and co-creation?	Technical issues with devices, lack of IT support, and insufficient guidance during workshops.	Ensure dedicated technical support, develop facilitation guidelines for workshops.
How can SINCO Lab better	Poor device integration, outdated software, and inconsistent	Regular software updates, ensure interoperability between tools, and

integrate its physical and digital tools?	connectivity prevent smooth prototyping.	provide comprehensive troubleshooting resources.
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These findings indicate that improving user support, streamlining access, and enhancing technological infrastructure are essential steps in optimizing SINCO Lab’s usability and collaboration potential.

5.2 Comparison with Existing Literature

The findings of this study provide nuanced insights into the usability, accessibility, and collaborative potential of the SINCO Lab, contributing to the broader discourse on service prototyping environments. By comparing these findings with existing literature (see Table 5), we can identify areas of convergence, divergence, and extension, thereby situating this research within the academic landscape.

Table 5: Comparison with Existing Literature

Key Finding	Alignment with Existing Literature	Extension or Divergence
Need for Structured Training and Onboarding	Supports Miettinen et al. (2012), who emphasised the importance of structured learning frameworks in service prototyping environments. Also aligns with Kuure et al. (2014), highlighting the role of structured processes in facilitating design thinking.	Extends prior research by identifying specific challenges in user onboarding within SINCO Lab, such as the absence of formal training sessions and reliance on peer-to-peer knowledge transfer, which were not extensively documented in earlier studies.
Integration of Digital and Physical Tools	Aligns with Kuure et al. (2014), who discussed the necessity of seamless technology integration in service design	Highlights specific issues in SINCO Lab, such as outdated software and poor device

	labs to support experiential learning and co-creation.	interoperability, providing concrete examples of integration challenges that extend the general observations made in previous literature.
Importance of Dedicated IT Support	Partially aligns with Miettinen et al. (2012), who acknowledged the role of facilitation in service prototyping but did not delve deeply into the necessity of dedicated IT support. Reinforced by Soto (2021), who highlights the need for proper facilitation and technological support in service prototyping labs.	Diverges by emphasising the critical need for dedicated IT personnel to assist with technical issues during prototyping sessions, a factor not thoroughly explored in earlier studies.
Challenges with Booking Systems and Accessibility	Limited discussion in existing literature regarding administrative and logistical aspects of service prototyping labs.	Introduces new insights into how complex booking procedures and limited accessibility hinder user engagement, suggesting areas for operational improvements not previously addressed in the literature.
Effectiveness of Guided Workshops for Collaboration	Supports the findings of Kuure et al. (2014), who noted that structured workshops enhance collaborative learning and stakeholder engagement in service design processes.	Extends the literature by providing detailed accounts of how guided workshops within SINCO Lab specifically address issues of ineffective facilitation, offering practical solutions to enhance co-creation efforts.

Emphasis on Digital Co-Creation	Aligns with Schaaf (2021), who emphasised the growing role of digital co-creation in modern service design.	Extends the literature by highlighting the necessity for seamless digital-physical integration in technology-driven prototyping labs like SINCO to maximize collaboration and innovation.
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These findings align with Miettinen et al. (2012), who emphasised that service prototyping environments require structured learning frameworks to support effective user engagement. Similarly, Kuure et al. (2014) argue that seamless technology integration is essential for maintaining efficient workflow in service design labs. However, this research expands on previous studies by identifying specific usability challenges related to IT support and the integration of digital and physical tools, which were not extensively covered in prior studies. Soto (2021) highlights that service prototyping labs function best when users receive proper facilitation and technological support, a finding that is strongly supported by this study. The findings in this study reinforce these conclusions, showing that users struggle with self-navigation due to the absence of structured onboarding and clear technical guidelines.

Additionally, this study aligns with Schaaf (2021), who emphasises the growing role of digital co-creation in modern service design. The findings indicate that technology-driven prototyping labs like SINCO must ensure seamless digital-physical integration to maximize collaboration and innovation. While existing literature has broadly discussed the importance of usability in service design labs, this research contributes by providing empirical evidence on the particular challenges related to usability and accessibility in SINCO Lab, thus bridging gaps in the literature.

5.4 Implications of the Findings

The research's findings have significant practical and theoretical implications for service design labs and collaborative prototyping environments:

User-Centered Training Models: The study emphasises the need of structured onboarding and ongoing support to improve usability. Users who lacked prior experience with SINCO Lab's tools faced technical difficulties that limited their engagement. Implementing training programs, availability of user manual and video tutorials could bridge this gap and enhance user confidence.

Hybrid Service Prototyping: Findings reveal that seamless integration between physical and digital tools is essential for effective service prototyping. Enhancing technological compatibility between interactive screens, projection tools, and collaboration software will allow for more dynamic prototyping.

Technical Support as a Service Component: The study highlights the importance of dedicated IT support in service design labs. Participants frequently encountered technical difficulties, including device malfunctions and software limitations, which disrupted workflow. This underscores the need for permanent on-site technical assistance to enhance user experience.

Accessibility Optimization: SINCO Lab's complex booking system posed barriers to access, making it difficult for students and faculty to reserve the space effectively. Simplifying the reservation process, implementing automated scheduling, and ensuring greater transparency in availability would improve accessibility for all users.

The study's findings suggest that service design labs must adopt a more user-centric approach, prioritizing usability enhancements, accessibility improvements, and technological advancements to foster innovation and collaboration.

5.5 Limitations and Future Research

Despite its contributions, this research has certain limitations that must be acknowledged. Firstly, the limited sample size, primarily consisting of university-affiliated users, its findings may not be fully applicable to design labs with different user demographics. To strengthen the findings, future

studies could involve a more diverse participant group, including industry professionals from outside the university and comparing multiple institutions.

Secondly, the research findings are primarily relevant to SINCO Lab's infrastructure and may not fully apply to other service design labs with different technological setups. Future research could investigate usability challenges across multiple prototyping labs to identify common trends and solutions.

Finally, while qualitative data provide profound insights, they are fundamentally subjective and may be influenced by individual participant experiences. Employing longitudinal studies or objective usability testing could enhance the validity of findings in future research.

Future Research Directions:

- Comparative analysis of SINCO Lab with other service prototyping spaces to identify best practices.
- Investigation of the long-term impact of implemented solutions, such as training programs and IT support enhancements.
- Exploring the potential of AI-driven user assistance systems to improve usability and accessibility in design labs.

Addressing these limitations will further strengthen the practical applications and theoretical contributions of research in service prototyping environments.

The study provides valuable insights into SINCO Lab's usability, accessibility, and collaborative potential. The findings highlight key challenges, such as limited technical guidance, ineffective IT support, and difficulties in integrating digital and physical tools. By implementing structured training programs, improving booking systems, and enhancing IT support, SINCO Lab can be transformed into a more efficient service prototyping and innovation hub.

Furthermore, the study contributes to existing literature by identifying specific usability barriers and offering practical solutions for optimizing service design labs. These findings serve as a foundation for future research aimed at improving collaborative prototyping environments, ultimately fostering more effective and user-friendly service design practices.

Chapter 7: Conclusion and Recommendations

This research aimed to explore how the usability, accessibility, and collaborative potential of the SINCO Lab could be improved through empathy-driven service design approaches. Rooted in a multidisciplinary framework that integrates service design, co-creation, and digital transformation, this study responded to identified user needs by proposing targeted enhancements to the lab's operation and user experience.

The study employed a mixed-methods research design, comprising qualitative interviews, a post-workshop survey, and observational data gathered during an interactive session within the SINCO Lab. These methodologies provided valuable insights into how students, alumni, and faculty members interact with the lab's technological and spatial elements. The research findings identified key issues, including a lack of instructional support, challenges in technology integration, inefficient booking systems, and underutilized collaborative tools. Despite these limitations, participants acknowledged the lab's value as an experimental and innovative environment that fosters service development.

The assessment revealed that improvements to onboarding, technical documentation, and system usability could significantly enhance the lab's effectiveness. The research proposed actionable strategies, including the implementation of structured user training, simplified booking processes, better integration of physical and digital tools, and clearer interface designs. These proposals were informed by user feedback and aligned with service design literature that emphasises human-centered, participatory innovation.

Academically, this study contributes to the field of service design by highlighting the importance of integrating empathy and co-creation within institutional infrastructure. It expands on previous studies by providing a nuanced understanding of how service prototyping labs can serve as democratic platforms for collaborative innovation. Practically, the research presents a series of tangible solutions that can inform the management and development of similar design environments across higher education institutions. While the research offers important insights, it also acknowledges certain limitations. The study was constrained by a relatively small sample size, with data collected primarily from university-affiliated users. Additionally, time limitations restricted the capacity to test and validate all proposed improvements. These constraints suggest

the need for broader, more longitudinal studies to further evaluate the impact of service design interventions in lab-based environments.

In conclusion, this research affirms the critical role that empathy, user-centeredness, and collaborative design play in shaping the usability and inclusiveness of service innovation environments like SINCO Lab. By synthesizing theoretical perspectives with empirical data, the study not only addresses current challenges but also provides a forward-looking roadmap for enhancing participatory design labs. The findings underscore the potential of service design to facilitate democratic engagement, knowledge co-creation, and innovation through well-structured, accessible, and inclusive design infrastructures.

Furthermore, this study opens avenues for future research, including the comparative analysis of SINCO Lab with other service prototyping spaces to identify best practices and contextual differences. Such research could illuminate cross-institutional design strategies and broaden the applicability of findings. Another critical direction involves evaluating the long-term impact of implemented solutions, such as structured training programs and dedicated IT support enhancements, to determine their sustainability and effectiveness over time. In addition, as digital transformation continues to redefine interaction paradigms in learning environments, future investigations could explore the integration of AI-driven user assistance systems. These could offer real-time guidance, improve usability, and enhance accessibility, particularly for novice users or those with varying levels of technical expertise. Ultimately, this research serves as a foundational effort to rethink how service design principles can be embedded into the spatial, digital, and human dimensions of academic prototyping labs, with implications that extend to broader discourses in participatory design and democratic innovation.

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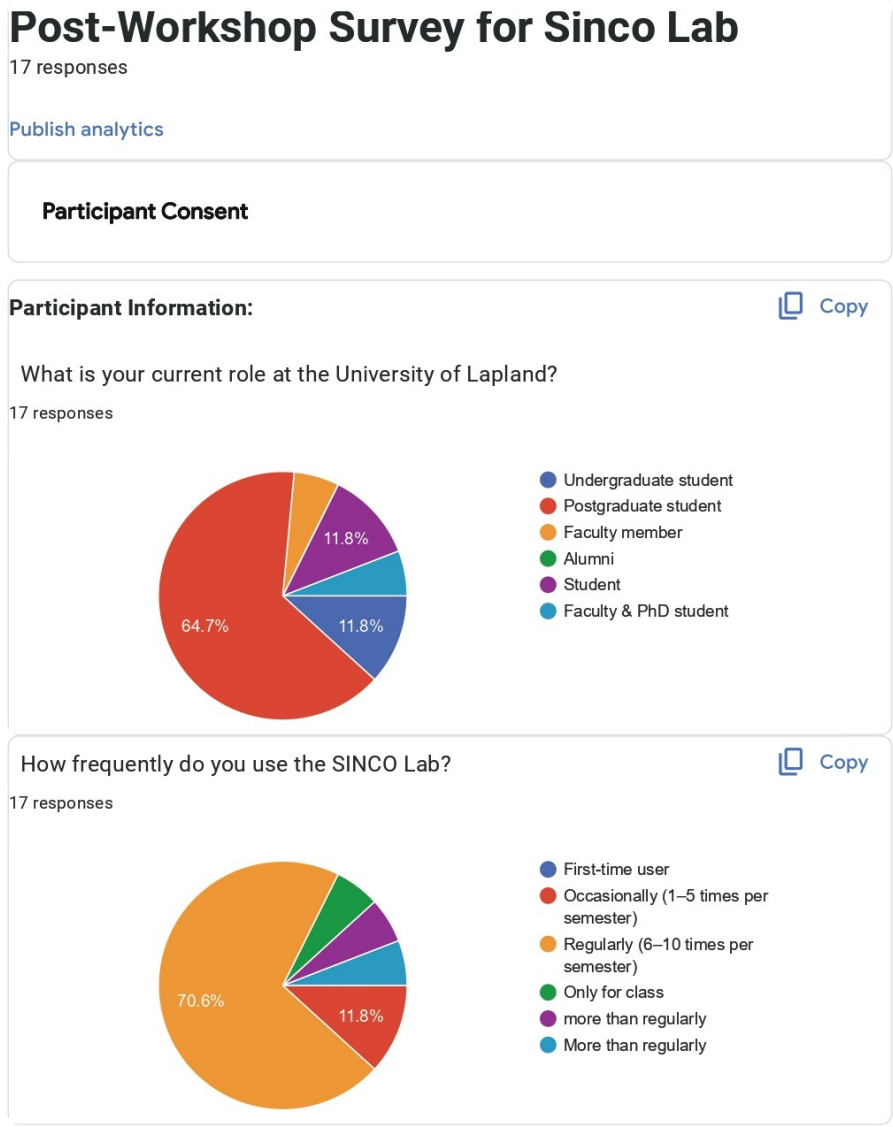
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Appendices

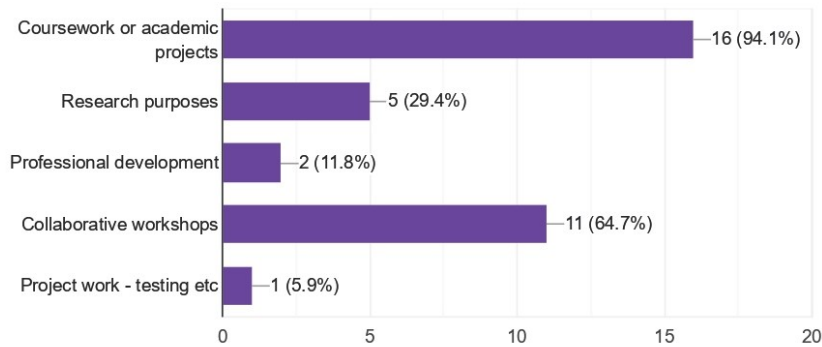
Appendix 1 Survey Results



In which capacity have you used the SINCO Lab? (Select all that apply)



17 responses



Which technologies or devices in the SINCO Lab have you found most helpful?

17 responses

I haven't used many of them

Most of them but specifically stationary for group activities, the screens for group interaction where we can brainstorm.

Whiteboard and big screen

Interactive screens

Corner screens, collaborative whiteboards, top down projector on table

The screens

Four screens, overhead projection on marker board, overall spaciousness

Whiteboards

Usually for hybrid classes and workshops. Unfortunately did not get the full use of the technology resources.

Digital boards

Interactive Screens

The interactive boards

The screens and the materials (legos, post-its etc)

The screen it helps in working as a group

Big screens, white boards, workshop materials, prototyping walk

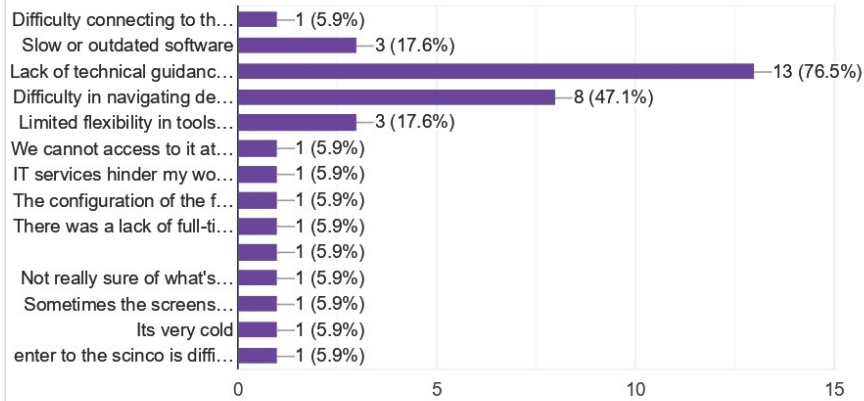
digital white board

Interactive boards

Have you encountered any challenges when using SINCO Lab's technology? (Select all that apply)

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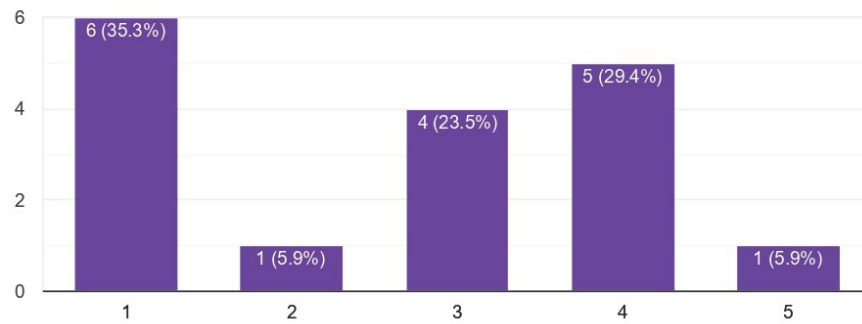
17 responses



How would you rate the accessibility of SINCO Lab resources (physical space, equipment availability, etc.)?

 Copy

17 responses



What additional support or guidance do you think could enhance your experience in the SINCO Lab?

13 responses

The introduction video or an information sheet which should explain all the facilities in the lab. Because I still have no much idea what facilities are available in lab. I explore some of them during group activities. This guidance should be available some where all the time and students can easily access that.

For now only necessary change is definitely the accessibility

IT services should react quicker and do something. They want to control the labs but don't want to help.

More comfortable seats by the table

Maybe a on side technician/person working in the lab.

More practice in using the tech

Having a booking system that doesnt go through the professor

Reservations - should be done like any other classroom in Outlook

I am very poor using technology, so it would help that there is someone I can ask help from when I want to use a specific device. I cant remember all of the instructions I have given in the beginning.

More proper working space

Smooth booking process

Show what is inside, I use to open everything to look what are the tools

Showing us the capabilities of the tech. Tools in the lab and how can we utilize it best.



Any additional comments or suggestions for improving future workshops?

10 responses

Major issue is limited tables and chairs in lab during lectures.

Thanks for hosting this, we really need that

even more cozy sitting areas

add more tables and chairs

This room is not accessible at all! No central booking possible, bottleneck Professor who then has to write an email to another person and come down from his office to open the room. This is very contradictory to the general way of booking and using rooms in this Uni.

SINCO should be open for more use of the technology as a lab environment for production of visual media. Requires in depth training and knowledge of the technology so it's quite exclusive and for the most serious users. Safety to prevent misuse and abuse of the technology eg a group used the lab and unplugged the monitors and left the place in a mess with food and drinks near the tech. There should be more control and guidance of the resources.

Quick ones and iterative - note down questions of people, having an FAQ page somewhere for example. Also the history of SINCO, the connection with EU projects

It would be nice that the space is clean and it has a specific place for all the materials. Now the drawers are messy and you can't find the materials very easily. The door is not working properly for the students to come in on their own.

Is impossible for student to enter. Only I can use if a teacher reserve and open for us. Other problem is how use all the space like screens, lights and more. I only use white board and digital board.

Other problem is the table, have a shape that don't help in organize the room.

The kitchen now is a work room but is not clear this information. I never use it like this I think people don't use for that.

The energy plug in the air is difficult to connect all the computer. Likewise, this interfere the vision for classmate and slide. Also in not all location is possible to connect a computer.

I would love to have a nap space jaja if you running a long session could be interesting to take a nap

Having may be simplified videos to show what, how to use the tools, rules and regulations, etc..

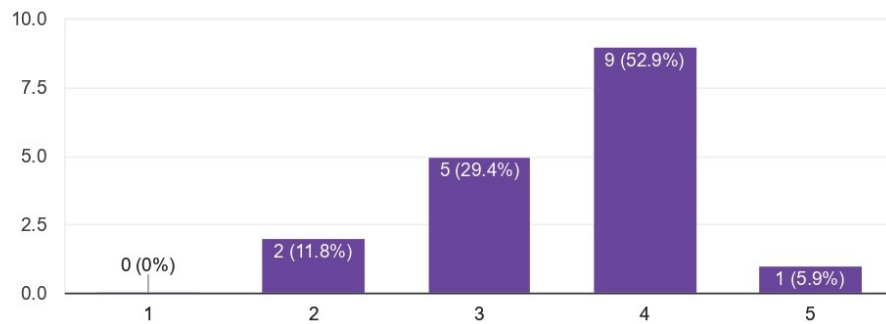
Co-Creation and Collaboration



How well did SINCO Lab's space and setup support group collaboration and co-creation?

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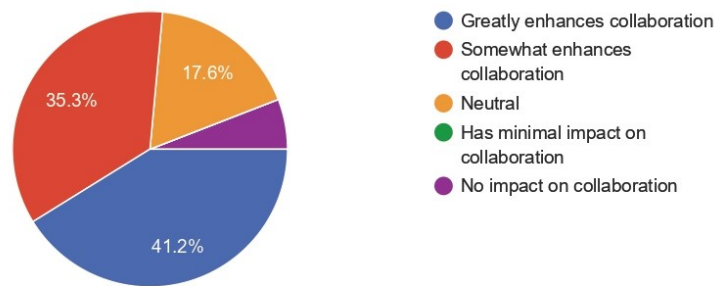
17 responses



To what extent has SINCO Lab contributed to a collaborative learning experience in workshops?

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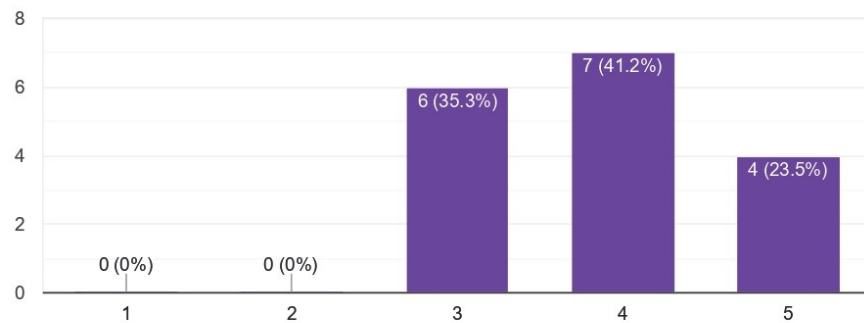
17 responses



How effective are the available tools in supporting teamwork during your collaborative sessions?

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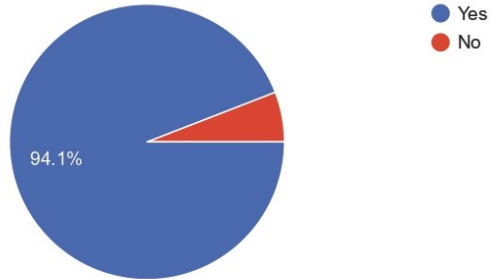
17 responses



Did you feel empowered to share and contribute ideas during the workshop?

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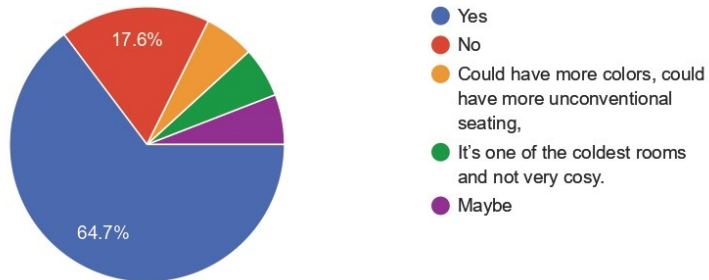
17 responses



Did you feel that the lab environment encouraged creativity and innovation?

 Copy

17 responses



What challenges, if any, have you faced while trying to collaborate or prototype with others in the lab? (e.g., lack of instructions, limited space, technology barriers, etc.)

13 responses

Lack of understanding about how to use interactive screens.

Lack of instructions about digital devices

technology barrier

technology not working, IT services not helping

Cannot enter the room itself to do such things.

Did not utilize the full potential of the technology.

Booking the room

Technology Barrier

The pens are working weird on the boards. They need to be updated.

Limited space. People/groups work very closely together and it makes me distracted. And the fact that some of the materials are quite hard to find.

Lack of instructions for using electronic devices

limited space

We have never tried to prototype in SINCO and we don't know how.. so again showing the utilities and the capabilities is very crucial.. lack of instructions is a big thing. Also of course technological barrier , as not everyone is as good in that things!



How could the SINCO Lab environment better support group collaboration?

8 responses

I think for now is okay

Let groups in.

Have an online digital platform to showcase case studies and offerings. The SINCO.fi website needs a redesign and new ideas to promote the full range of potential of the space e.g for events and productions.

I feel like for me personally, the lighting in the room could be changed. After a long time in the room my eyes start to hurt

To be as open as possible - so much space so little flexibility from whoever manages it

It would be great to have a corner where you can block others for a bit to concentrate.

more accessible (now we can't enter if we don't have a class)

Allow the use of supporting technology and keep it open for the use of students. It's very weird that we have such a facility and we are not allowed to use it unless we have class!

Improvements for SINCO Lab



Based on your experience, what improvements would you suggest for SINCO Lab?

11 responses

Better guidance about using equipment.

Utilise more the space in the back

IT collaboration. Easier time to connect to the projectors

More colors, make it more like a jungle

Light adjustments to warmer light. Access to students STid who are in a project related to sinco.

redesign of SINCO.fi website and have a full time technician to maintain the space.

Better booking system, better light setting

Possibility to book it like any other room

What I mentioned before.

Warmer and space utilisation

For now, I only see what I mentioned before. Instructions and availability.

What additional resources, instructions, or technologies would make the SINCO Lab more effective for workshops?

6 responses

A live studio for filming for content creators.

Instructions on what is possible to do in the room and how

Sessions on workshops from A-Z

I would like to have more materials for analog prototyping, boards etc.

Digital device usage instructions

Nothing in mind for now.



Do you have any suggestions for making SINCO Lab more accessible and user-friendly for first-time users?

8 responses

tutorials

Guidebook, printed instructions. Videos are cool, but i think printed is still the friendliest option for users

Online ressources with QR codes next to the devices. Tutorials. Instruction next to device.

SINCO is more for advanced users. First time users can learn from advanced users.

Booking system

Explanations on the Orientation weeks, guide inside the screens to be iterated as much as possible

If not having a person to help, atleast have paper instructions

Have friendly guided tours and onsite support for the first time.

Any additional comments on how SINCO Lab could better meet your needs?

5 responses

more resources

Redesign sinco.fi website

Just make it more visible and open to the community, the door should be open with the stid access

I like that there is possibility to use the devices and big screens

Wishing the best of luck

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Appendix 2 Interview Questions and answers

1. Which devices or technology did you use the most in the Sinco lab?
2. What challenges, if any, did you encounter while using the lab's technology?
3. Were there any instances where you felt confused or unsure about how to use certain devices or features?
4. Any Suggestions/thoughts to make the lab more accessible for students.

Interviewee 1:

Hi!

Thank you for your patience, here are my answers.

And before continuing to the answers: As background information, I would like to point out that my baseline level of proficiency in using Sinco's equipment is already high due to my previous occupations, education, and enthusiasm for technology. Essentially, I have acted as a support person for other students regarding Sinco-related technical matters, but this is because I quickly adapt to using new equipment due to my background. For example, I hadn't previously connected a computer to the large screen in Sinco via remote access, but because I understand the technology behind it, I was able to quickly figure it out on my own and subsequently teach others, such as lecturers, to do the same.

1. Which devices or technology did you use the most in the Sinco lab?

I have used almost everything in the Sinco lab which includes for example:

- **All the screens**
 - In the main area: 4 screens which are in a row and the big screen
 - in the small area: corner screens
- **Remote connection**
 - for presenting my computer screen to the main area's big screen
 - for playing music from the big speakers (bluetooth connection)
- **Computers**
 - for presenting the PowerPoint, showing YouTube-videos with music etc.
 - for creating the immersive experience in the workshop, for example using the Powerpoint-slide to create the service environment

- **Existing light systems in the Sinco**
 - for adjusting the color lights via lighting control console
 - for background lights I have used light switches which are next to the door
- **Movable light equipment which are located at the Sinco's storage**
 - Movable LED panel lights with legs for floor placement
 - Small light which uses portable charger for energy
- I haven't used the projector because I haven't needed it for my own projects

2. *What challenges, if any, did you encounter while using the lab's technology?*

- **Lack of clear instructions**
 - There are instructions available, but their locations are not very systematic, and the instructions themselves are also not detailed enough for basic user.
- **Not all devices were always ready for immediate use, causing delays in adhering to schedules.**
 - For example, during my previous use of Sinco, the speakers were not connected to the main computer, requiring me to figure out how to play music through them on my own.
 - One time the display settings for the main computer in the main area may have changed since the last visit, necessitating manual adjustment. This is something a basic user may not know how to do independently, thus requiring precise and clear instructions, especially for adjusting display settings.
- **The storage locations for items were sometimes unclear.**
 - Previous users may have misplaced items, resulting in more time spent searching for them than originally anticipated.

3. *Suggestions for making the lab more accessible:*

- **User instructions for Sinco**
 - It would be very helpful if all the user instructions were, for example, in one folder, categorized according to their purpose.

- The instructions should also be as clear and concise as possible, and in addition to written instructions, they could also include pictures/videos depending on the content.
 - If the instructions are in a cloud service, it would make the maintenance of the instructions much easier to do. Also, through the links provided in the instructions, users could be directed to watch instructional videos alongside written instructions if they need further support. Instructional videos could either be sourced directly from the manufacturer's website or created independently.
 - Computers can also be accessed through individual user accounts, so to ensure access to instructions stored in the cloud service, a link to the cloud service should be included as a default setting on the computer's desktop. To draw users' attention to the link to the instructions, there should be a notification near the computer indicating where the instructions can be found and how to access them. This could include, for example, a QR code that would direct users straight to the cloud service if needed.
 - The user instructions for Sinco could include tips for utilizing the space effectively, along with instructions on how to implement them. New users may not immediately grasp the full potential of the space without examples.
 - For common problems, including a FAQ section could allow users to attempt to resolve issues independently first.
 - The user instructions should also include a help desk phone number for any potential issues.
- **Implementation of Cleanliness Protocols**
- To maintain cleanliness and orderliness at Sinco, I would suggest implementing the lean 5S system, ensuring that everything has a designated place clearly marked with signs or labels.
 - I would recommend creating a floor plan for the space, indicating the expected cleanliness and organization standards upon departure. Including

photographs of the desired state would help users easily visualize where items such as desks or screens should be positioned, ensuring a consistent starting point for all users.

- Sinco should also provide its own cleaning supplies for tasks such as removing coffee stains. This could include items like buckets, disposable cleaning cloths, paper towels, spray cleaners which are suitable for the surfaces, and a dustpan and brush. These supplies should have designated storage locations which is clearly explained in Sinco's user instructions.
- **Mandatory Equipment Training and Facility Orientation Session**
 - I suggest arranging a mandatory Sinco usage training for students who are studying service design, as well as other potential space users, to be conducted once per semester (once in September, once in January). During this training, participants will be introduced to the space, its available solutions, and a few suggestions for its utilization.
 - The onboarding guidance should also include practical exercises so that students can learn to use the equipment themselves effectively. This could be achieved through a small task, where students adjust lighting settings, establish connections to the main display and speakers, and manage audio systems.
 - After the training sessions students are able to book Sinco independently for their studies.
 - Students who are studying remotely and therefore will never physically come to Sinco in Rovaniemi could participate in the usage training via remote connection, eliminating the need for them to engage in the practical portion. This way, they could still gain insights into the technological solutions that could be utilized in the service design workshop.
 - Each student should attend the onboarding guidance session either in September or January before being allowed to use the space independently. Afterward, they can choose to attend the session again if they feel they need additional support with using the space.

- There should be a list of those who have received onboarding guidance to ensure that only individuals with the necessary training are using the space. If someone wants to use the space but hasn't undergone training, a brief training session would be arranged for them before they can access the space.
- I would recommend that only those who have completed the space usage training be allowed to use Sinco, as there is a lot of delicate and expensive technology in the space.

I hope this helps you! And good luck with your research!

Interviewee 2:

I based my answers on the old SINCO lab since I haven't been working in the updated SINCO lab since spring 2024.

Which devices or technology did you use the most in the Sinco lab?

The most used devices in the former SINCO lab were dual projector screens for proper body storming/service prototyping and a top-down projector for desktop walkthroughs. I also used a smart TV/whiteboard for documentation when it worked. I also used mini speakers a lot with my own smartphone if I wanted to add some background noises to the service prototyping. The iPads I used for the final stages of service prototyping, when, e.g., students created a video out of their concept. However, this was a different use when I could prepare the devices for video making (updating software and charging the batteries).

What challenges, if any, did you encounter while using the lab's technology?

The lab consisted of many technologies and devices. Unfortunately, software updates, low batteries, user interfaces, or other technical problems challenged usage. It was often quicker to take a pen and paper than wait for the iPad to open or charge. Many people were using the lab, and some didn't quite know how to use the technologies. Thus, sometimes, devices were not working as they should because of the wrong usage.

IT support services were often useless because the technology didn't belong to their area. Technical help was provided by one person (the lab master), who was also quite busy but truly did his best.

Were there any instances where you felt confused or unsure about how to use certain devices or features?

The lab consisted of many small devices that I never tried. A former colleague bought them with project money to investigate prototyping. I just felt that the technology wasn't that flexible or fast for 'quick and dirty' service prototyping, which is the field I prefer to do. So, many times, small white boards (A4-A2 sizes), cardboard, and sticky notes worked the best.

Also, learning to use different devices or features takes some time. The best practices come through different case studies, and that might take some time, too. You need to practice and test them so that you feel comfortable using them and can use the devices/features for different purposes/service scenarios.

Any Suggestions/thoughts to make the lab more accessible for students.

Instructions in visual paper format and videos. Videos should be categorized as "How to use background projectors," "How to use smart TV," etc.

One idea I had was a monthly "open doors event" where students and staff could come and see how the lab works. This could minimize the working hours from individual help.

The students should also be asked this question. They know better how to answer what they need to make the lab more accessible.

Interviewee 3:

Here are my answers:

Which devices or technology did you use the most in the Sinco lab?

- I use mostly the main projector for presenting. I also use the new interactive screens (360°), which are good in the workshops and for group work. Sometimes I also use legos for playing different scenarios or service journeys (not technology though), and the ceiling projector to project something on the table, where you can draw e.g. customer journeys etc.

What challenges, if any, did you encounter while using the lab's technology?

- It was hard to connect to the internet with the new interactive screens. There should be clear instructions on how to do that. Also, sometimes projecting the picture from the computer to the new screens has not worked efficiently either. And the same with the ceiling projector. Clear instructions on how to use the different projectors would be also important.

Were there any instances where you felt confused or unsure about how to use certain devices or features?

- In the beginning of workshops. I have to go there early to make sure everything works before facilitating a workshop there.

Any Suggestions/thoughts to make the lab more accessible for students and teachers.

- Good instructions to every device. Instructive videos behind QR code may be effective (not too long though).

Interviewee 4:

Which devices or technology did you use the most in the Sinco lab?

In old Sinco (before the renovation in 2023) I used the screen that is now in f-hub, legos to prototype and tables to adjust the room. Also the service corner screens were often used. In the new sinco I don't know how to get the service corner but I've used the multiple screen to take multiple situations in workshop. I continue to use the other screen too.

What challenges, if any, did you encounter while using the lab's technology?

With old sinco I had a lot of problems with the technology being too slow. The new one is again a bit of a mystery still, there are no guides. I've had a few workshops there and learn by doing.

Were there any instances where you felt confused or unsure about how to use certain devices or features?

Yes often, It's always trial and error. I often rely on colleagues for information.

Any Suggestions/thoughts to make the lab more accessible for students and teachers.

Video guides, wholesome intuitive hierarchy of usability. not 20 random things that use different systems. Also the borrowing stuff is a pain.

Interviewee 5:

Which devices or technology did you use the most in the Sinco lab?

Due to teaching purposes, I use most Microsoft Surface Hub. This is the big black screen/Microsoft computer. I also use the BenQ screens (touch screens) and service stage. Also, the JBL loudspeakers behind the BenQ screens are in use.

What challenges, if any, did you encounter while using the lab's technology?

There are a lot of challenges. Sometimes the black Microsoft Surface Hub doesn't connect to the PC with the HDMI cable. The wireless Bluetooth connection must be used to connect the PC to the Surface Hub. The device should be updated to a normal big flat-screen TV. Then BenQ screens' 360 do not always work properly. Especially, the 360-configuration from the main PC to the screens goes broken often. This is due to people unplugging HDMI cables from the main PC to the BenQ screens. Also, the ceiling projector is broken at the moment. This is the projector that reflects the screen view on the white table. Also, the service stage projector views should be fixed. The devices should be fixed by the IT department, but the process with them is very slow. This is why the devices do not get fixed on time. Also, we have a lack of cables to be able to use the screens at full capacity. The existing cables are old and that's why the quality of the screen views is not good. In addition, some of the technology and devices have not been properly installed. This causes a lack of using the devices. In addition, people who use Sinco, do not know the rules of how to use it, or they do not know how each equipment works. This is why personnel and student training should be in place. Also, videos should be made to guide on how to use each equipment. In addition, posters should be placed in the lab here and there to guide people's behaviour.

Were there any instances where you felt confused or unsure about how to use certain devices or features?

I have noticed that Sinco is not familiar to many. Those people who don't know Sinco, don't feel psychologically safe in the space since they feel unsure about the technology and how to use it.

BenQ screens are new for us. This is why all of the features are still not familiar to the users. Also, we are not sure how to get 360 views of our 360 cameras on the screens. We can watch 360 videos from YouTube, but we don't know if a special program must be used (or what else is required) to reflect the views of our own 360 cameras to the screens. Then, Sinco is full of old cables that go in the ceiling from PCs to all sorts of devices. I am the responsible person for Sinco, but I should get an expert to go through the cables and reinstall new cables so that the cable issue can be fixed. However, we still haven't gotten new cables. This requires money, which is also something we have issues with.

Any Suggestions/thoughts to make the lab more accessible for students and teachers.

Also, the videos and posters that I discussed above would help the users a lot. In addition, how to get the rights to access Sinco must be discussed and agreed upon with the industrial design department's personnel. Now this seems to be a bit of a 'wild wild west'.

The issue from my side is that my working time goes in teaching, so I have a lack of time to deal with Sinco Lab. We would need a lab expert whose responsibility Sinco would be among other labs. As a university lecturer, my time is dedicated to teaching and guiding students. This means that I don't have enough time to dedicate to Sinco Lab. In addition, I'm not a technical expert in terms of the equipment in Sinco. It would be great to get a person with strong technical know-how to take responsibility for our labs at the University of Lapland, not just the Sinco Lab.

I hope these answers help you

Interview 6:

Here are the few things that I observed.

Seats are not that comfortable. The layout seems a bit scattered. If startups were to use sinco lab and if they want to bring prospective clients there, I guess they would want a place which is slightly tidy.

The table layout seems bad. There should be a dedicated presentation space where around 10-15 people could sit and watch or discuss something.

There is a lot of equipment there which should be kept in an organized storage space. The screens in Sinco lab could somehow become more immersive. Perhaps if there are more of them, or probably floor panels, which could be turned into screens as well.

Interviewee 7:

Sinco lab is nice. I never have this kind of thing in my school.

But it's complicated to get an access to it

I agree that we need to book a place. But when it needs to have permission from the teacher etc, it feels complicated for me. It's a bit demotivating for us to use this place.

And every room and lab in this university also has the same rule. I think we should be able to use it like a library. Because it will help us to do the task, brainstorming etc. I mean, why not make it simpler like when we're booking a laundry in a DAS apartment.

For security purposes I don't know the solution, but that is how I feel so far. It needs more instructions for sure & more accessibility like I said previously

they didn't provide us enough information about the usage of the Sinco lab. Yes, and also accessibility that is not so flexible.