Designing a Communication App for Privacy: A Scenario-Based and Participatory Approach

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Abstract. Users who share their personal information through peer-to-peer digital interactions are exposed to privacy threats driven by an opaque surveillance culture fueled by the commodification of people's data. Building upon ethical foundations of privacy for service design, which we outlined in previous steps of our research, we designed a prototype for a privacy-enhancing instant messaging app, LEGOS. In this paper, we discuss the outcome of a workshop where we tested the privacy features of the app with a group of real users through scenario-based and participatory design research methods. The results presented in the paper are based on our observation of the workshop participants, their preferred privacy settings in simulated, scenario-based interactions, and their direct feedback. Based on our previous research and experience with scenario-based and participatory workshops, we discuss the strengths and limitations of approaches that combine both methods to understand how users interact and how they choose their adequate level of informational privacy protection in peer-to-peer interactions. The empirical exercise reveals that LEGOS' standard chat privacy settings may be effective in protecting people's information and that users, however, are prone to change those settings when they trust the information recipient or when they judge the data shared by the sender valuable to them.

Keywords: App Design · Interaction · Participatory Design · Privacy · Scenario-based Design

1 Introduction

Modern people are constantly exchanging information with others through digital devices. Being connected all the time is both exciting and demanding. The technological developments of the last decades have blurred the distinction between being online and offline; what happens with our digital selves has a direct impact on our physical existence and vice versa. Most humans now live *onlife* (Floridi 2015), and that is largely due to the digital gadgets we carry in our pockets and the infrastructure that supports them.

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This situation is worthy of analysis from various angles. But one of those angles remains largely unexplored, particularly from the point of view of design, and that is *informational privacy*. Building on a landmark definition of privacy (Westin 1967), we regard informational privacy as the capacity to control how personal information is used and communicated to others.

Information that is shared digitally can be potentially accessed by the service provider and sometimes an unknown number of third parties. This access is governed by contractual agreements between the service provider and those third-party companies but can also be based on other legal reasons such as legitimate interest. In addition, government agencies may also retrieve information without the users' knowledge and consent.

Literature on the topic of privacy largely shows that the most severe collective violations of people's privacy happen through surveillance activities performed by private and government organizations. The economic and political shifts generated by massive surveillance underpin the idea that our age is that of surveillance capitalism (Foster & McChesney 2014; Zuboff 2019) and surveillance society (Capurro 2005). In surveillance capitalism and society, personal information is a commodity (Couldry & Mejias 2020) to generate more profit, wealth and, ultimately, power.

Our research recognizes that businesses and governments have a strong interest in collecting people's data. Despite the recent efforts by legislators in many jurisdictions, including the EU, China, and California, to regulate data collection and processing by service providers and to strengthen people's privacy rights, the logic of surveillance capitalism and society remains substantially unaltered (Geradin et al. 2020; Zuboff 2019).

However, most scholars' focus on privacy violations by companies and governments misses the big picture. Informational privacy is not only threatened by surveillance capitalism and society but also by a pervasive surveillance culture (Lyon 2017; Staples 1997). People both surveil each other through their gadgets and willingly accept to be constantly monitored. Surveillance has become so strongly embedded in our societies that people embrace "voluntary surveillance" (Albrechtslund 2008).

From a privacy risk perspective, a surveillance culture where users of digital services monitor (and are monitored by) others is problematic. The surveillance activities of companies and governments can be—at least in principle—regulated and controlled. Regulators can impose disclosure and transparency requirements on service providers and state agencies to inform users and citizens about how personal information is collected and processed. Moreover, regulators can determine that some types of personal information can only be collected and processed under specific circumstances. However, such safeguards and precautions do not work when individuals exchange information among themselves. This is not to say that in making that point, we are advocating that governments dictate how and when people can share their personal information, as it would be nothing short of dystopian.

Our research focuses on instant messaging apps. As noted above, regulators in several countries set boundaries for app provider's use of the information shared between users in peer-to-peer exchanges. Technologies, such as end-to-end encryption, are powerful means to prevent service providers from accessing messages and information from users. However, users who share private information with other users have little or no

power to limit how the receiver will use—or misuse—that information. In the case of instant messaging services, recent research about some of the most used applications in Western Europe (WhatsApp, Telegram, and Signal) revealed that their design leaves little space for users to limit how their interlocutors use the information received (Parrilli & Hernández-Ramírez 2023a, b). When the data shared is particularly sensitive (e.g., intimate pictures and videos) and the sender is a vulnerable user (e.g., a minor), the results can be tragic.

In this paper, we discuss how users can be involved in the design process of a privacy-enhancing instant messaging app through participatory and scenario-based design methods. The research originates in the first author's PhD research project, which they recently concluded. The aim was to identify the ethical foundations of privacy for service design and to allow designers to incorporate privacy as a key aspect of service design practice. Other objectives included developing a new definition of service design that incorporates informational privacy. Therefore, we understand service design as the activity of creating solutions embedded in tangible or immaterial products that enhance the user experience in a specific context through interactions with the service provider, other users and stakeholders, and touchpoints.

Based on this understanding of service design, the first author designed a prototype for a service design product aimed at protecting and enhancing users' privacy: an instant messaging app called 'LEGOS'. LEGOS has been designed to prevent and minimize specific privacy threats, ranging from revenge porn to blackmail. By empowering the information sender to really control what happens with the data they share in peer-to-peer communications, LEGOS intends to create safer digital communities. The first goal of the design process involved effectively embedding the ethical foundations of privacy for service design in the app. The second goal was to validate the research findings and improve the design of the prototype. To do so, we organized a scenario-based and participatory design workshop where real users were asked to simulate chat interactions and adjust the privacy settings as desired. We proposed participants to consider speculative, but realistic, scenarios where they would share their information to different recipients (doctor, real estate agent, friend, lover, etc.) and they were required to adjust the chat privacy settings accordingly.

In the next sections we discuss on the methodology adopted along with the results, lessons learned and challenges and limitation of our research. Since the inception of the study, we anticipated that the small number of workshop participants could not lead to bullet-proof insights, and that people in real life scenarios would act differently than in simulated scenarios. However, the research showed that such challenges and limitations did not hinder the validity of our research through design.

1.1 Context of the Research

The research discussed in this contribution is about LEGOS, a communication app designed for users' privacy. The main feature of the app is that users can control what the information receivers can do with the shared data through an intuitive privacy chat interface. The sender can decide whether messages are deleted immediately after they are seen, or after 1 h, 24 h, 1 week, or never; whether the receiver can (or cannot) copy text, take screenshots of the chat, forward messages, and save, copy, and forward attachments.

Figure 1 shows the chat privacy interface presented to the workshop participants, which has been 'neutralized' in order not to influence them in freely choosing their preferred settings. In reality, messages in LEGOs are set to disappear after they have been seen by the recipient.

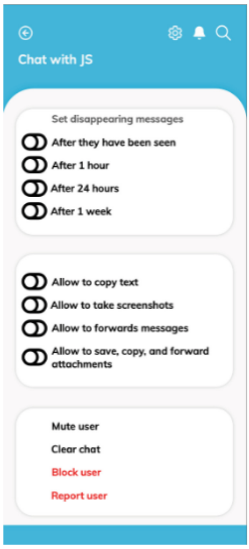

Fig. 1. Chat privacy settings interface presented to the workshop participants.

To reinforce the mechanism aimed at minimizing information abuses and misuse by the receiver, the definition of chat privacy settings relies on negotiation between the parties. By default, the most stringent privacy settings apply to both parties. But, if one chat member alters the privacy settings, the other party receives a notification. The notified user can agree with the proposed new settings or refuse them. In other words, any settings change works bidirectionally. As a result, both parties have the same powers and limitations over the information they share.

1.2 Methodology and Research Question

The research presented in this paper discusses a largely unexplored area of service design. We focus on how scenario-based and participatory design workshops with a group of real potential users can be meaningfully implemented to design a privacy-enhancing product and evaluate its features. Along the paper, we will attempt to answer the following research question: *Are scenario-based and participatory design workshops effective qualitative research methods to assess the privacy features of a digital service design product?*

The methodology adopted for this research is based on a critical assessment of the scenario-based and participatory design workshop where users were requested to role-play with the prototype of our instant messaging app. In particular, the research material for this paper comes from the following sources:

1. Video and audio recordings of the workshop.
2. Direct observation of the workshop participants.
3. Participants' output—users were asked to record the adjusted privacy settings in their simulated interactions in printouts of the chat privacy settings interface.
4. Participants' feedback.

Based on this material, our analysis intends to understand and present the potentialities and limitations of scenario-based and participatory design workshops within a design process and in the context of an assessment of the privacy features of a digital service design product. In Sect. 2, we comment on the literature about the chances and shortcomings of scenario-based and participatory design methods in (service) design research projects. Then, we describe the workshop and the methods adopted to collect and analyze data (Sect. 3). Further, in Sect. 4, we discuss the merits and limitations of scenario-based and participatory design workshops in the context of our research. Finally, we conclude the paper with a short presentation of our future work, which extends the research discussed here (Sect. 5).

2 Theoretical Background

Participatory design vision stems from the Scandinavian region and, as a research methodology, has gained traction among researchers and designers globally (Spinuzzi 2005). Northern European scholars (Bødker et al. 2004) outline 4 core elements of participatory design: workshops, cooperative prototyping and prototypes, iterative development, and mock-ups. The research presented in this paper builds upon previous contributions to participatory and scenario-based design workshops.[1]

Participatory workshops can help elicit helpful insights towards creating an intervention and trigger collective thinking among participants from diverse units (Poulsen et al. 2015)—or diverse backgrounds, like in our workshop. Stakeholders can incorporate various forms of knowledge, viewpoints, and principles to enhance the development of target intervention (Ernst et al. 2018). Other authors also argue that involving stakeholders can empower them, resulting in more coherent and resilient strategies that facilitate better preparedness for future outcomes (Reed et al. 2013). Local knowledge can complement contextual data, delivering diverse insights across various explored dimensions (Knapp et al. 2011). Nevertheless, the degree of involvement varies significantly across different research endeavors (Reed et al. 2013).

While participatory workshops offer numerous benefits, scholars have also highlighted their limitations, underscoring the need for meticulous planning and consideration. Some scholars share their experience with the OurCity project (Salgado & Galanakis 2014), a participatory workshop aimed at making design processes more accessible and empowering residents to contribute to the reconstruction of their area. However, due to the underestimated scope of the participatory workshop, the team could not achieve the impact of the alternative plan as much as expected because it did not adequately factor the participatory process towards the alternative master plan conceived for the

[1] Further in the text, we use the expressions 'scenario-based workshops' and 'participatory workshops' for concision.

area. The authors call for making the participatory design process more visible in the envisioned outcomes, emphasizing the importance of strategic thinking in participatory design—which is a particularly useful lesson learned also in our research. The contribution about OurCity project invites to critically assess the role of designers in nudging participants towards preferred outcomes. We advocate that designers in participatory workshops should play a neutral role and enable the outcome of bottom-up solutions by participants.

Participatory workshops also do not enable opportunities for assessing change in relationships directly, highlighting the importance of ongoing discussions and post-intervention assessments. Part of the literature (Evers et al. 2017) reveals that participatory workshops solely focus on alterations in relational perspectives. The authors argue that although it is reasonable to presume that shifts in thinking occasionally impact behaviors, affecting performance, the interplay between these dynamics is intricate and complex. Indeed, in our workshop we realized that participants were influenced by their pre-existing thinking and that interactions with other participants do not necessarily and automatically lead to shifts in thinking. The authors suggest that subsequent workshop stages, including ongoing discussions post-intervention, are essential to gauge the occurrence of such shifts and whether researchers or participants can assume the cause. Although participatory workshops enable stakeholders to share their knowledge and perspectives, they are limited because the results often depend on what the participants share rather than careful scientific examination (Geels et al. 2016). Also, power dynamics management among the participants limits the transferability of the study's outcomes (Reed et al. 2013). The results of participatory workshops could be biased if nonparticipants possessed superior ideas and perspectives compared to the actual participants had they been involved (Knapp et al. 2011)—which, however, is extremely hard to measure and establish.

The mixed situations above raise questions about human involvement in participatory workshops, especially concerning decision-making roles. Moreover, participatory design and workshops envision human involvement as actors and not factors (Bødker et al. 2004). To this end, scholars have also applied top-down and bottom-up approaches to participatory workshops. Some authors propose a combined top-down and bottom-up approach to co-produce knowledge in local workshops (Nilsson et al. 2017). One of the positive aspects of this method is that it enables a fair and accurate comparison between various case studies (Ebi et al. 2014). Domain experts usually create these methods within the academic community. In contrast, bottom-up approaches start from a localized perspective by focusing on specific domains, such as regional locales or societal sectors.

This method commonly involves stakeholders as integral constituents of the approach, thereby incorporating localized or sector-specific insights. Bottom-down methods are tailored to decision-making at local levels, community involvement and grassroots mobilization (Panda 2007). Experts and locals must be involved and work together to mitigate failure often associated with decision-making by experts who lack contextual knowledge and enhance the success of participatory workshops (Fraser et al. 2006). Scholars seem to agree that participation in participatory workshops depends on the project's nature and goals. When the design can be applied globally, as with LEGOS,

the local backgrounds of workshop participants become less significant. However, it is still important that participants represent a diverse spectrum of potential users.

Scenario-based workshops are still largely unexplored in the (service) design literature. Some scholars have used scenario methods in participatory workshops when decision-making roles are unnecessary: for instance, scenario-based workshops are suitable for the "'upstream', preparatory, capacity-building tasks of a planning process" (Hatzilacou et al. 2007).

Researchers' contributions so far address mainly scenario-based design, from which we can draw useful lessons for scenario-based workshops. Scenario-based design stems from scenarios, a human-computer interaction technique for understanding and developing computer systems that serve as instruments for human activities and communication mediums (Carroll 2000a). Typical scenarios in design-based projects comprise three elements: actor/agent, action/event, and situation (Wu et al. 2009).

In total 5 benefits of scenario-based design have been outlined to overcome the technical challenges of information technology creation (Carroll 2000a):

1. Scenarios enable designers to reflect on their work, facilitating the coordination of design actions and reflective processes.
2. Scenarios possess concrete and flexible characteristics, making them ideal tools for managing constantly evolving design situations. They provide a sense of adaptability that enables developers to navigate such situations efficiently.
3. Different perspectives of an interaction are made possible through the use of scenarios. These scenarios can provide various levels of detail and assist developers in managing the many outcomes that can result from a single design decision.
4. Abstracting and categorizing scenarios can benefit designers. This can help them identify, document, and reuse patterns and address the issue of technical design needs outpacing technical knowledge.
5. Using scenarios can facilitate stakeholders' communication, making design work more inclusive and accessible to a diverse range of experts offering contributions to the design process. Scenarios can also help address the common issue where external factors and limitations may divert attention from the demands and concerns of the technology's end-users.

To exemplify the benefits noted above, some researchers suggest an early scenario-based project to assess requirements and foreseeable situations, aiming to identify and analyze potential design actions (Carroll 1998). The project employed claim analysis to evaluate the inherent design compromises within the examined scenarios, thoroughly documenting both the advantages and disadvantages of fulfilling the requirements. Other authors created a bridge for scenario-based evaluation using claim analysis (Haynes et al. 2009). This approach involved providing clear introspections on system-use scenarios and analyzing their consequences. Formative and summative evaluation approaches are widely used to evaluate interactive system design and use.

Formative evaluation is ideal for identifying aspects to improve in the redesign of interactive tools and systems (Carroll 2000b). It is possible to conduct this evaluation through a pay-off or intrinsic approach. Formative intrinsic evaluation leads to critical assessments of a product's features and rationale, whereas summative intrinsic evaluation produces a comprehensive analysis of the features (Carroll 2000b). Intrinsic evaluation,

a complex process, seeks to unravel implicit issues emerging from the product's use. It is challenging for intrinsic evaluation to distinguish between the intended but unachieved designer's goals and the implicit goals the design portends (Carroll 2000b). In many cases, it is cumbersome to interpret things not easily testable by a pay-off approach.

To this end, decades ago it emerged the idea to focus on explicit goals during the design's early phase, intrinsic evaluation and goal modification throughout the design phases and to embody the goal analysis through pay-off evaluation (Scriven 1967). More recently, researchers also reveal that in many cases, users' life needs seem like a black box, and the designer's limited knowledge about users' needs is incapable of understanding these needs (Wu et al. 2009). In particular, the authors user needs modelling and scenario building to identify user needs. For example, the scenario might be about how people want to live, and the modelling tries to depict what people need to live. When informational privacy is a concern, designers should carefully consider what information people want and need to share with others, as well as what they need to ensure safe and meaningful interactions.

3 Research Design

The prototype of the communication app went through a qualitative assessment aimed at understanding how people would interact using the app. We performed research through design with a qualitative study supported by an empirical exercise, with no ambition to do investigation in an experimental setting. On 14 June 2023 the authors held a workshop at the School of Digital Technologies of Tallinn University, Estonia. During the 3-h workshop, a group of 8 people, with no prior knowledge of the research and the product, were invited to perform a role-playing simulation in pairs. The mixed-gender group comprised individuals from academia and design, ranging in age from 25 to 45, and hailing from diverse countries and cultural backgrounds. For ethical and legal reasons, all participants signed a consent form agreeing to the processing of their data until the end of the research. Participants were not asked to mark or put their names on the material they worked on, but the session was recorded for research purposes.

Each pair received a list of 10 scenarios, each one involving a digital interaction between the users and 20 prints of the app interface where users could adjust the chat privacy settings. All settings were neutralized—that is, all settings were turned off to nudge participants to actively choose their desired settings—as shown in Fig. 1. For each scenario, participants have been asked to play in turn both roles—thus simulating in real life an interaction that normally would happen remotely through the app—and to select with a pen the preferred privacy settings for each interaction. Each participant was requested to indicate their preferences by marking 20 printed interfaces in total.

In the upper section of the interface, users can establish the timeframe for disappearing messages. They can choose from the following options: messages vanish after being viewed, after 1 h, after 24 h, after 1 week, or never (if users prefer messages to never disappear, it is important to toggle off all options). In the middle block, users can select multiple choices.

Although participants were invited to talk to each other and to comment on their decisions, the selection of the settings was personal. Indeed, most participants did not

extensively talk with their peers about their preferred privacy settings. One participant, in particular, claimed that it was a personal decision and that he did not see the need to share it with their peers (Table 1).

Table 1. Workshop scenarios and roles

Scenario	Content	Role 1	Role 2
1	You are in the process of buying a house. The real estate agent asks you to send a picture or digital copy of your ID or passport because the notary/attorney needs your data	Real estate agent	Potential buyer
2	Some unusual marks appeared on your face. You contact your doctor, who asks you to send a picture for a quick remote examination	Doctor	Patient
3	You are going through a difficult period in your life. Because you have an appointment with your partner's lawyer to discuss the divorce, you ask one of your colleagues to cover for you at work. You want to explain the reason for your replacement to your colleague	Worker who needs replacement	Worker who replaces the other worker
4	You date someone virtually without knowing them in person. Your virtual date starts sending pictures and videos that are increasingly intimate and asks for similarly personal photographs or videos from you. You agree with their request	Virtual date who asks for pictures	Sender of pictures

(*continued*)

Table 1. (*continued*)

Scenario	Content	Role 1	Role 2
5	You date someone that you know in person. Your date starts sending pictures and videos that are increasingly intimate and asks for similarly personal photographs or videos from you. You agree with their request	Date who asks for pictures	Sender of pictures
6	You go to a party at a friend's house. That night your partner does not feel well and could not join. You drink too much and enjoy yourself, and flirt with other people at the party. You take selfies with someone you flirt with and send these pictures to your best friend	Sender of pictures	Best friend
7	You go to a party at a friend's house. That night your partner does not feel well and could not join. You drink too much and enjoy yourself, and flirt with other people at the party. You take selfies with a person you flirt with and send these pictures to some of your colleagues with whom you hang out	Sender of pictures	Colleague
8	It is your child's 6^{th} birthday, and you organize a party for them and their friends in the garden of your house. You take many pictures of the children playing and eating cake and share them with the other children's parents	Party organizer	Other child's parent

(*continued*)

Table 1. (*continued*)

Scenario	Content	Role 1	Role 2
9	You are writing your first book. A friend of yours gave you the contact of an editor who is willing to have a look at your manuscript. He asks for a copy when you chat with the editor. You agree to share the manuscript through a messaging app	Writer	Editor
10	You have an argument with your boss. You are disappointed by their attitude, and when you leave your workplace, you send a voice message to a close colleague. In the message, you explain to your colleague, using colorful language, what you think of your boss and the company you work for	Angry worker	Colleague

After the participants finished their scenario-based interactions, they received previously unknown information about the app design. They learned that when a user alters the chat privacy settings, the other user receives a notification about the change and that the modification of privacy settings works bilaterally by design. The logic behind this design decision is that if one user can use the other user's information, the latter should have the same power over the former's information. Participants were tasked with discussing with their peers whether having knowledge of this design feature would have influenced their decision regarding the privacy settings. At the end of the workshop, participants engaged in a collective discussion about their experience. They were also required to share their feedback and comments about the app.

We collected the printouts with the selected chat privacy settings for qualitative analysis. For each scenario and for each role, we reported the preferred settings in an Excel file and then in column charts for data visualization. We did not have a specific hypothesis or expected outcome to validate. Instead, we anticipated that the insights from the research could help confirm that predefined stringent privacy settings are beneficial for users to better protect their information.

4 Discussion

The workshop gave useful clues about how people interact when the exchange of personal data is involved. The scenario-based workshop revealed that users have a tendency to facilitate the use and sharing of information in business contexts where trust is usually and necessarily involved (e.g., in scenario 1, 5 out of 8 buyers allowed the real estate agent to save etc. attachments). Indeed, trust plays a role and influences users' decisions in several scenarios, although sometimes (e.g., in scenario 2), patients showed a preference for slightly more stringent settings despite the confidence relationship between patients and doctors. It may be striking that users trust real estate agents more than doctors, but we acknowledge that this may be caused by the limited sample in our exercise.

The interests at stake are also, perhaps unsurprisingly, important. In some cases, when a party has more to lose with the disclosure or misuse of personal information, their attitude tends to be more cautious (e.g., in scenarios 3, 5, 6, 7, and 10). In scenario 7, in particular, information receivers show an interest in keeping information, arguably for future use. A participant commented: "I might keep the chat to make fun of this person at work, to tease." Perhaps for this reason, it emerged a clear trend for information senders (7 out of 8) to have messages immediately deleted after they have been seen by the recipient.

However, in scenario 4—which involves the exchange of sensitive personal images between strangers—both parties reveal a strong preference to protect personal data. The strong majority of senders and receivers (7 out of 8) prefer that messages are delected immediately after they have been seen. In real life, this would be achieved by simply not altering the default chat privacy settings. Speculatively, we suggest that the fact that users are forced to adjust the chat privacy settings if they do not accept the default settings is effective in protecting users' sensitive information. Our workshop preliminary confirms the assumption that default settings are efficient means to nudge people to make their best interests (Thaler & Sunstein 2021). However, we plan to expand our research into this area in the next future.

It also emerged that privacy should be balanced with other rights and interests, including the right to cherish memories and share pictures with other trusted users (e.g., in scenario 8, where the majority of users showed a fairly liberal attitude towards shared information). In general, thanks to scenario-based simulated interactions, we learned from participants' feedback that users understood how LEGOS works and did not feel pressured to maintain the most restrictive chat privacy settings. However, some (still unsolved) issues became evident. In particular, the input provided by workshop participants brings attention to an important concern regarding how users perceive the granting of permission to save, copy, and forward attachments by the other party in an interaction. This raises questions about whether such permissions can be interpreted as a form of consent to utilize the received data at the receiver's discretion. Further research is necessary to delve deeper into this matter and gain a better understanding of users' perspectives and interpretations in relation to the permissions granted within the LEGOS app. From an ethical standpoint, it is important to note that simply changing privacy settings does not equate to explicit consent. However, it is possible that misunderstandings can arise in practice, where users may have different interpretations or expectations regarding the implications of privacy settings.

The participatory design character of the workshop allowed collective thinking and discussion at the end of the seminar. During the workshop, we observed that participants (working in pairs) were more focused on adjusting the chat privacy settings for each scenario than discussing their preferences. This should not necessarily be seen as a negative aspect because the same would happen in real-life interactions. At the same time, it reveals a tension between scenario-based and participatory design: participants were more focused on playing the assigned roles in all scenarios than on discussing and exchanging ideas about the reasons for their choices.

We observed some of the limitations of participatory workshops introduced in Sect. 2. In particular, the workshop had a limited impact on the overall design process of LEGOS. Participants gave specific feedback about some aspects related to the use of the app, but they did not really contribute ideas about how to better design LEGOS. We must admit, however, that the workshop was not designed as a participatory co-design session. We infer that participatory workshops where users are required to test a product do not necessarily produce insights for its design process unless users are required or nudged to bring their own ideas about how to design or improve the solution at hand. In this sense, we are confident that such limitation did not have negative implications in our exercise and overarching research through design.

Further, we noticed no perceivable shifting in users' thinking. We detected that participants did not change their attitude about privacy, but they altered the chat privacy settings to reflect their pre-existing privacy preferences. This emerged clearly from our observation of the (few) interactions between users in pairs and of the speed with which participants adjusted the chat privacy settings in each scenario. Again, this aspect did not negatively impacted on our research because its scope was not to stimulate shifting in users' thinking over their informational privacy.

Despite these challenges, through a scenario-based and participatory workshop, we have been able to collect useful insights about how people perceive privacy in their peer-to-peer interactions and adjust the chat privacy settings accordingly. It emerged from our experience that scenario-based research methods in a workshop are effective means to stimulate engagement among participants and to nudge them to act like in real life. However, we admit that simulated scenarios may have a major shortcoming: would people show the same level of care for their personal information in real-life scenarios? The workshop did not provide an unequivocal answer to that question. More research is needed in this field.

In designing the workshop, we were moved by the assumption that scenarios are appropriate tools to nudge users to interact as closely as possible as they would do in real life. We observed, indeed, that participants acted naturally during the workshop and revealed a high level of engagement. The comments received by the participants at the end of the workshop confirm this idea. The participatory nature of the workshop allowed us also to collect feedback about the app itself. This will let us improve LEGOS with the further development of the research, although its main design features will not be altered to assure adherence to the ethical foundations of privacy for service design.

Consistently with the literature and practice about participatory design methods in service design (Morelli et al. 2021; Stickdorn & Schneider 2011), it emerged that participatory research methods are more useful at the beginning of the design process to

influence its outcome and allow the designers to co-design the product with users. In the situation commented in this paper, the participatory design workshop took place at the end of the design process to validate the findings of our research and to test the designed product. The validity of users' participation has been useful, although limited in scope.

An additional challenge to the research relates to the 'law of small numbers', according to which it is a mistake to believe that a sample randomly drawn from a large population is highly representative of that population (Kahneman 2012; Tversky & Kahneman 1971). We are indeed aware that the small number of users involved is not sufficiently representative to gather definitive insights into users' attitudes and behaviors. However, the nature of the research and the means at our disposal did not allow a full-scale investigation with a representative sample of users. The scope of the workshop was to gather qualitative input that could shed light on how people could possibly interact with other users through LEGOS.

Finally, the workshop left us with an unanswered question: would users dynamically adjust the chat privacy settings based on the privacy risks of each specific interaction? Because in the workshop participants were required to select the desired privacy settings with no possibility for them to accept any pre-defined setting, we were not able to reach an unequivocable answer to that question. However, although more research is needed, we doubt that this would happen for most users. Previous research shows that people tend to stick to existing settings (Thaler & Sunstein 2021). In practice, this would either mean that users would keep the most privacy-protecting default settings or those that have been 'negotiated' between the parties based on the level of trust between them. If that were to happen in real life, we could confidently claim that LEGOS achieves its mission to enhance users' privacy based on freedom, autonomy, and trust.

5 Conclusions

The workshop allowed us to perform a preliminary assessment of LEGOS' privacy features with a sample of real, potential users through both scenario-based and participatory design research methods. They both reveal strengths and shortcomings. To the end of our research objectives, they have been useful in obtaining insights about how real users potentially could interact with and through the app, thanks to direct observation of participants, their output, and their direct feedback.

The most important result of the workshop is the confirmation of the relevance of our research: privacy does matter for people, and more privacy in peer-to-peer interactions can be achieved through privacy-enhancing design. We inferred, in particular, that LEGOS' standard chat privacy settings may be effective in protecting users against malicious and unwanted use of their personal information. More quantitative research would shed light on this issue, focusing on real people in unsimulated situations. However, an important step in our investigation is missing: an assessment of how users reach an agreement about the best privacy settings for all parties in the chat. We plan to explore this aspect of the app in the near future by applying the same research methods with some adjustments, limiting the quantity of scenarios and focusing our research instead on how users interact until they finally reach an agreement (or not). Scenarios are easy to understand for users and stimulate participants' engagement. However, to further

expand our investigation in multiple directions, we should extend the sample and add a co-design element to the participatory design research method. Specifically, we intend to invite users to share feedback about how to improve the app design.

Further, we plan to organize a more ambitious participatory workshop where participants are asked to co-design an instant messaging app starting from the ethical foundations of privacy for service design. The result can potentially be very different from LEGOS' design, and it will likely offer several clues about how to improve its design. To maximize the quality of the outcome of the workshop, however, it is important that participants are aware of the ethical foundations of privacy for service design and, more importantly, of their reason. Otherwise, we expect that users could stick to the current paradigms of privacy in (service) design: surveillance and commodification of personal information.

Our overarching research has the ambition to firmly put informational privacy on the map of service design. LEGOS and the workshop discussed in this paper are stepping-stones in that direction. More work is necessary to achieve more results and start a real conversation about privacy in the service design practice. However, we firmly believe that users should play an active role in the discussion. From the experience commented on in this paper, we inferred that scenario-based and participatory workshops are a means worth exploring to reach our ambitious goals.

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