

Jun 25th, 9:00 AM

Experimenting the role of UX design in the definition of gender-sensitive service design policies

Margherita Pillan
Politecnico di Milano - Dipartimento del Design

Martina Marzola
Politecnico di Milano - Dipartimento del Design

Follow this and additional works at: <https://dl.designresearchsociety.org/drs-conference-papers>



Part of the [Art and Design Commons](#)

Citation

Pillan, M., and Marzola, M. (2022) Experimenting the role of UX design in the definition of gender-sensitive service design policies, in Lockton, D., Lloyd, P., Lenzi, S. (eds.), *DRS2022: Bilbao*, 25 June - 3 July, Bilbao, Spain. <https://doi.org/10.21606/drs.2022.495>

This Research Paper is brought to you for free and open access by the DRS Conference Proceedings at DRS Digital Library. It has been accepted for inclusion in DRS Biennial Conference Series by an authorized administrator of DRS Digital Library. For more information, please contact dl@designresearchsociety.org.

Investigating the role of UX Design in the definition of gender-sensitive service design policies

Margherita Pillan*, Martina Marzola

Politecnico di Milano, Italy

*corresponding e-mail: margherita.pillan@polimi.it

doi.org/10.21606/drs.2022.495

Abstract: The environmental and social sustainability objectives indicated in the 2030 agenda require the development of services for urban contexts capable of responding to the diversified primary needs of different segments of the population. International studies on gender issues show that understanding the specific needs of women, their behaviors and their expectations can provide indications for creating more equitable and inclusive services. The article reports the significant results obtained using UX Design techniques and tools for gender-oriented service design. University researchers, students and women's associations partnered in order to carry out this activity and gather indications on the specific female points of view capable of guiding the development of better services and inspiring decision makers and service providers. The research also demonstrates the potential of applying the UX Design approach in the investigation of the gender perspective and in dialogue with non-profit associations interested in social innovation.

Keywords: service design, ux design, gender, social sustainability

1. Introduction

The role of design for service as a change agent capable of catalyzing social resources in defining visions and strategic proposals for a sustainable future has long been recognized (De Pieri, 2020; Manzini, 2011). In an overpopulated world, with a complex and dynamic social composition, design for services aims at inventing and proposing new service paradigms that are environmentally sustainable and inclusive from a social point of view, also enabling the co-creation of solutions apt to enhance and protect local resources and responding to the needs of population groups characterized by specific needs and requirements (Frölunde, 2018).

The development of services in urban contexts is a fundamental pivot for the development objectives indicated by The Sustainable Development Goals (SDGs) document adopted by the United Nations in 2015 and the Agenda 2030 (United Nations, 2015). The European Union recalls the importance of tackling all dimensions of sustainable development; find sustainable and inclusive development solutions; ensure everyone's human rights and make



sure that no one is left behind by 2030. (https://ec.europa.eu/international-partnerships/sustainable-development-goals_en).

Within this framework, the academic debate leverages on the contributions provided by scholars from different disciplines, also showing the variety of resources and approaches used for the creation of innovative solutions devised for the development of more sustainable urban scenarios and services. The key driver for the innovation of services with respect to sustainability is the availability of digital data, and cities are privileged contexts for the experimentation and implementation of innovative services apt to improve the lifestyle and wellbeing of citizens. Technological progress, including Internet of Things (IoTS), Artificial Intelligence (AI) and Machine Learning (ML), enables the creation of innovative socio-technical systems and opens the way to sustainable yet inclusive solutions in the fields of transportation and mobility, health care, education, home services. Data collection provides the means for a more efficient management of resources and the optimized provision of services (Bibri, 2020; Chiehyeon, 2018). The monitoring of the access to services increases the knowledge on behavioral patterns and supports the personalization of services and their optimization with respect to the needs and preferences of different clusters of citizens (Tiihonen, 2017; Pillan, 2017).

The availability of technological solutions is not sufficient, in itself, to produce progress, and the idea of smart cities as paradigm for development has been criticized, in particular as far as the real impact on individuals and contexts is concerned: some researchers consider smart cities framed as potential techno-utopies (Grossi, 2017) and some authors point out the limits of technology driven innovation, that can potentially divert attention from the real problems of citizens. When innovative services are not optimized considering the final experience of individuals, the benefits of technology driven service development can be tampered by the rejection or by weak adhesions by expected users (Krishna, 2017). The innovation produced by the implementation of socio-technical solutions can evolve toward sustainable progress provided that it is based on a mutually constructive relationship among digital and physical spaces, emerging urban technologies and enhanced human experiences. Leveraging the creative use of technologies requires the capability of producing meaningful and satisfactory solutions from the point of view of individual experiences (Andreani, 2018). In the specific field of service design, a rich literature provides indications on specific project methods for this field (Stickdorn 2012; Stickdorn 2018), and on the intersections and synergies between UX Design, Interaction design and service design (Roto, 2021). The theories and conceptualizations of service design provide a solid basis for education and professional practice also in relation to the specific field of public utility services and complex issues (Suohimo, 2020).

It is important to underline that, even in the case of services intended for large segments of the population, the identification of the factors that characterize specific groups and sub-groups of users is a fundamental task in the design process, in order to maximize the acceptance of the service and optimize its performance according to the real needs and con-

straints of different user profiles. Notably, numerous researches point out that, with respect to the design of services with a strong impact on environmental and social sustainability, the analysis of needs, attitudes and preferences depending on gender diversity leads to the identification of numerous issues that affect the appreciation and acceptance of services by women and gives important insights on opportunities for the improvement of services to the advantage of the entire population to which the services are addressed (Swedish Government, 2007)

In this context, it is very important that the designer of services is equipped with effective tools suitable to investigate the peculiar needs of the different segments of the population, even when the purposes and nature of the services that are the subject of the design do not lend to co-design with the final users. This happens, for example, when design develops services that operate on a very large catchment area and over a vast territory, such as mobility and transport services. (Trischler, 2021; Vink, 2021)

This document reports a design experience that took place in the fall semester of 2020 and was aimed at identifying the main needs of women of different generations in relation to the development of services in urban areas, with a focus on both the improvement of existing services and the creation of new types of services. The research was conducted within a UX Design course and involved students of the MSc in Digital and Interaction Design.

The project was carried out in collaboration with the Interassociational Women's Council of Milan and a local club of Soroptimist International, Milano alla Scala. Activities included desk research, primary research on users (surveys, ethnography, digital ethnography, interviews), concept generation of innovative services and tests with users. The results of the research were shared with the partners and fostered the dialogue between local women organizations and the local administration on the strategies for the next generation of services in urban environments. This experiment produced interesting results from several perspectives, which are summarized in the rest of this paper. The outcomes demonstrate the effectiveness of the UX Design approach to conduct preliminary research on users aimed at investigating gender issues in urban environment. The results of the design research conducted by the students, in fact, intercept many different themes and points of attention that are important for the quality of life of women and families. The research was carried out during a lockdown period for the Covid-19 pandemic, and thanks to cross-research techniques, including digital ethnography, it was possible to identify specific needs related to the moment and to produce proposals for innovative solutions. The international composition of the class of students who conducted the research facilitated the detection of local and international needs that can be satisfied through the creation or improvement of services. The overall results outline strategic guidelines for the development of personalized services, for well-being and social sustainability in urban contexts. These strategic pointers, combined with the collection of best practices, represent a contribution to the conversation on the sustainable development of cities and give women's associations useful information to start a discussion about women's needs and expectations aimed at inspiring urban management policies for

gender equality. Lastly, the experiment shows the suitability of UX Design tools for the envisioning of design insights and hints (such as User Journey Maps, Mental Model Diagrams, system maps and more) in order to facilitate the understanding of innovative solutions by partners not accustomed to design tools that simplify the co-design of the non-material factors involved in the creation of socio-technical systems.

2. Embracing human diversity in service design

The different goals for sustainable development listed in the Agenda 2030 are tightly intertwined, and the policies oriented toward sustainability incorporate human rights, good governance and social inclusion (Chang, 2021). In order to produce progress and social justice, the evolution of technologies should be accompanied by design approaches capable to take into consideration the complexity of contemporary urban environments and to respond to differentiated needs and behaviors. To this respect, several authors have pointed out the importance of adopting a gender-responsive approach in the management of urban facilities and services (Asteria, 2020). Asteria and all. claim that “With respect the existence of social change actors, women have a strategic role to play in making changes and shaping innovations... Smart cities must develop gender sensitivity and awareness about the needs of women by using inclusion mechanisms”. On the other hand, the number of studies focusing on the specific women perspective with respect to services and service design for sustainability is still limited, and very often the available data do not provide gender-based insights on behaviors, preferences and decision patterns.

The inclusive development of smart cities requires a social dialog among the different stakeholders about development strategies, involving all agents contributing to the deployment and management of services, communities of peers, government and public administration, private companies and parties. The analysis of the literature shows that the point of view of women is rarely taken into consideration. Beebeejaun (Beebeejaun, 2017) reports that gender issues remain out of the focus in the academic debate on service design for sustainability and on shaping cities. The author points out that “Firstly, gender remains a pivotal concern for a critically engaged planning that does not rely solely on the language of diversity and difference and, secondly, although significant contributions have been made to our understanding of the role and significance of gender in the urban space, there remain important questions that have only been partially addressed”. Beebeejaun refers to the importance of investigating the everyday life so as to analyze the tensions created by unequal opportunities and experiences. Chang, Choi et al. (Chang, 2021) argue that “Ideally, women’s voices need to be taken into consideration at the planning stage as well as at the implementation stage. It doesn’t make much sense for women to participate at the very last POE stage when the most important decisions have already been made”. The analysis of the gender-based point of view should be extended to all aspects of urban life. As an example, the perception of spaces and of the affordances and risks related to the use of environments is gender dependent. Condon et al. report the result of a research based on qualitative and quantitative data which focused on women’s fears in public spaces and their impact on women’s behav-

iors with respect to mobility. The authors claim that “Smart city development requires not only data orchestration but also interaction with other resources and collaboration among stakeholders.” Furthermore “Violence in the public sphere is not attributable to a specific environment or an exceptional context; on the contrary, it is part of women’s everyday lives and surges up in places where they pursue their ordinary activities”. The violence taking place in public spaces is physical as well as psychological and has also a symbolic impact. (Condon, 2007)

3. The worth of investigating gender issues in service design

The investigation of gender-based perspectives with respect to services and urban development is far from being confined to the issues of safety and violence. The worth of considering gender specific issues is amply demonstrated, among others, by researches on mobility and transportation. Transportation services are among the fundamental basic systems for social organization. While these facilities are obviously devoted to all citizens regardless of their age gender or other factors of differentiation, gender studies on women and services for mobility reveal a large spectrum of factors that characterize the specific needs and requests of women when it comes to transport. The World Development Report 12 on Gender and Mobility in the developing world includes an ample document reporting the heavy consequences of performance failures in transportation that are specifically referred to gender issues (Uteng, 2011). Notably, the research points out factors such as very complex mobility schedules for women compared to men due to their multiple roles in families (care of children and aging relatives, provision of basic goods,...), different access to resources for mobility (access to money, ownership of vehicles, technology, skills) and security issues (women are the main target of assaults and violence) that limit the actual access to transportation or influence the time of access, not to mention the different impacts on women and men produced by the built environments for the facilities of transportation (bus design, bus shelters, stations, ...). Hidayati et. all. have investigated the complex impacts of the limits of the existing solutions on women and the overall impact on mobility in Asia (Hidayati, 2020). Reduced access to transportation services and to solutions for mobility has an impact on work opportunities, education, health care, culture, social networking.

The recent state of crisis also affected women in different ways; as reported by URBACT (<https://urbact.eu/>; Kneeshaw, 2020), “Gender, racial and economic disparities are being amplified by the pandemic in a way that really exposes fault lines”. The report points out the impact on ageing women and on mothers, as individuals most affected by the situation.

In some countries, governments created initiatives aimed at improving services for the specific requirements of women. For instance, the organization Women Mobilize Women, supported by the German Federal Ministry for Economic Cooperation and Development, womenmobilize.org, aims at collecting knowledge, creating networking and initiatives to foster innovation in transportation services oriented towards environmental sustainability developed by women for women.

The optimization of services to align them with women's issues requires in fact:

- the ability to develop research on users with a special focus on gender for the specific context, including the collection and processing of data reporting women's experience
- the collection of good practices providing examples of solutions
- the dialogue between the stakeholders, including private and public entities, with a specific focus on gender issues
- the development of experimental solutions and their validation before the implementation

The case study on transportation demonstrates the worth of collecting data and assessing services from the point of view of women; furthermore, it provides guidelines for action that are suitable not only for transportation and mobility, but also for services of all kind. Few local administrations invest in the analysis of gender-based improvement opportunities and many services are still designed in a way that will not allow the collection of data in the future to implement improvements in a logic of personalization of services.

Therefore, gender associations can play a very important role in the collection and reporting of women's expectations and inspire policy makers, city managers and service providers by devising indications for improvement from a gender perspective. In this context, designers can play an important role by providing design-oriented knowledge on user needs, preferences, patterns of action and proposing innovative scenarios and solutions, as well as act as catalysts of progress.

4. UX Design methods for Service Design

The optimal experience of users is the main focus of UX Design (Garrete, J., 2011; Hartson, 2012). This approach includes tools and techniques for the preliminary research on users aimed at identifying people's needs, mental models and behavioral patterns as a reference orienting all development phases (Buxton, 2010). UX Design is presently mainstream for the physical design of digital interfaces and digital functions, and it focuses on usability and accessibility, on the coherence between the architecture of the digital features and the logical operational flows of actions and decisions of users. (Evans, 2017; Roto, 2021).

The main scope of application of UX Design is the development of digital and interactive solutions (Benion, 2019), but design approaches focused on experience are a main trend in branding and product design as well (Newbery, 2013). As far as the authors of this document are aware, UX Design is not used in the context of design for social innovation and for the definition of urban development policies sensitive to gender issues.

When it comes to complex projects involving several project partners and stakeholders, UX Design provides the means for effective sharing of insights on users and contexts and helps to orient the development of products and services so as to maximize customer and user

satisfaction. In UX Design, the design research on users is part of a design strategy aimed at reducing the friction of innovation as well as the risks of failures by focusing on the alignment of value proposition and needs. According to Kalbach, (Kalbach, 2016), “Insights about users are not a nuisance, they are a strategic opportunity” and part of a design philosophy developed to create shared value based on the dialog between service providers and customers, beyond social responsibility. In this framework, the visualization ability of designers plays a fundamental role in the dialogue between the stakeholders of innovation (Buxton, 20010; Kalbach, 2016). The creation of innovative solutions requires the collaboration of experts across disciplines and professional roles; it is necessary to create means for sharing project goals, conceptual models and evaluation metrics (Erwin, 2014). In UX Design, designers are in charge of creating a common language, of producing representations of complexity, of providing the common ground for co-design oriented towards the maximum satisfaction of users. Furthermore, UX Design employs knowledge from cognitive and behavioral psychology to avoid the bottlenecks of human experience that can preclude the success of innovative solutions (Evans, 2017).

UX Design appears as a promising approach for the investigation of women’s needs, expectations, feelings and behaviors, aimed at the identification of pointers for the action of policy makers, service providers and no-profit organizations representing women’s issues. Notably, some performance appear as relevant: the ability to identify differences and specific issues in the target users; the capability of creating optimal interfaces and touchpoints of services so as to optimize user experience; the production of visual maps and diagrams containing the synthesis of research on users and capable of supporting the dialogue between different actors; the visual representation of innovative services and systems scenarios presented both from the point of view of the personal and subjective experience and of the organizational and socio-technical system that enables the service (including tools such as User Journey Maps and mental Model Diagrams); the construction of prototypes and demonstrators that allow the testing of innovative solutions with final users. The case study reported in the following chapter of this document validates this assumption.

5. Case study: Gender-sensitive service design for orienting policy makers

We report here the results of an educational activity performed at the School of Design at Politecnico di Milano with the participation of the students of the MSc in Digital and Interaction Design, in collaboration with the Consulta Femminile Interassociativa di Milano (Consfim, <https://www.consultafemminilemi.com>) and the local club Soroptimist International Milano alla Scala.

Consfim is a group of women's associations based on the collaboration of clubs representing national and international organizations, including professional women's networks. Consfim promotes cultural and social initiatives with a specific gender focus, manages projects in collaboration with local associations and discusses with local administrations about specific and

general issues. SI is a 100 years old organization, with offices and clubs distributed all over the world and made up of professionally committed women. SI organizes cultural initiatives, charity projects, training, mentoring and numerous global and local initiatives in which it promotes the empowerment of women.

The project reported in this document was conducted in a continuous dialog between the teachers and the organizations, providing the brief and the reference context for the student's activities. The experiment involved ten groups of students; the project brief instructed to identify specific female needs with regard to services of various kinds and generate innovative concepts. The first task assigned to students was a preliminary research to identify their main research topic within the reference context. This first exploration brought to light four different macro topics (Table 1): the struggle of families during the pandemic, the support for maternity, gender issues on transportation and the loneliness of elderly women.

After the definition of the area of investigation, students performed a deeper investigation applying UX design techniques for desk research including literature and benchmarking of available solutions so as to map the state of the art of existing services and identify best practices. The following phases involved field research (interviews, surveys and context observations) and digital ethnography, (Kozinets, 2015) aimed at gaining a deeper understanding of issues and needs, at identifying clusters of users characterized by specific attitudes and at leveraging the power of available data on behaviors. Students employed UX Design tools for the visual representation and synthesis of research outcomes, as well as for tracking and comparing the information from different sources and pointing out design opportunities, from insights to hints.

As summarized in Table 1, the research conducted by students reports the specific needs of women living the urban areas, mainly related to family duties, professional or educational life, and their personal perception of themselves considered the feminine image within society. Another aspect that stands out is that most available services are not optimized in consideration of feminine needs, therefore women's daily access to public facilities is hindered. Gender issues brought to light by student research were considered as valuable by external partners in a middle term review meeting, and apt to inspire policy makers in urban areas to develop more satisfactory services (Table 2). The research outcomes underline the need to create more inclusive services to improve the wellbeing of women and citizens in general.

Among the ten groups of students, three focused on the topic "struggles of families during the pandemic", pointing out the main challenges that families faced during lock-down and quarantine. Several families felt abandoned by government and were confused by official communications. People complained about the quality of information and the difficulties to get clear and complete guidelines on official institutional websites. Field research and digital ethnography revealed that people trusted and felt better supported by influencers on social network during the quarantine. Influencer promoted crowdfunding campaigns, organized games and challenges and helped with children entertainment.

For families, staying at home all together permitted to rediscover the pleasure of sharing family time; on the other hand, quarantine was a suffocating experience, especially for women, burdened by childcare duties, and impacted on their work performances and state of mind as well. The unequal distribution of tasks within families has widened the disparity between men and women when it comes to job position and salaries. In order to safeguard their psychological health, mothers expressed the will to create communities with other families with the same habits and preferences, sharing common spaces and knowledge about children education and childcare. Women appeared more likely to leave children with friends, instead of a babysitter or dedicated services, to reduce health risks and to give the responsibility to trusted peers. The municipality should take into account that people are prone to create a shared network between similar families and families from different cultures, in order to face the difficulties caused by the pandemic (Figure 1). Local services should facilitate the connection within the neighborhood, leveraging local resources in order to meet the needs of families.

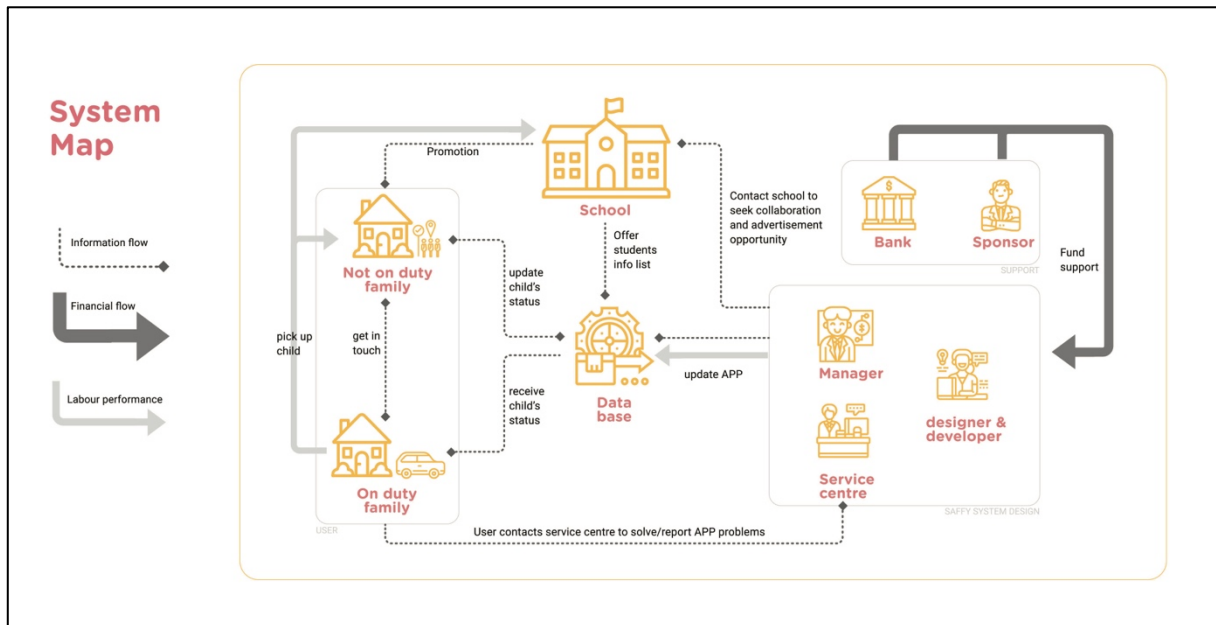


Figure 1. An example of the documents produced by students. Group 4. Miao Yang, Baorui Zhang, Sara Saccoccio, Lidia Marquez Sanz, Lorenzo Sidoni – Children care solutions

The use of local resources emerged to be important also for elderly women living alone. Loneliness is a big problem of contemporaneity that has been increasing since the pandemic begun. Local institutions offer numerous activities through which the loneliness of older women can be addressed, and they could benefit from projects aimed at improving the quality of life and the urban area thanks to the active participation of people. A better communication of these opportunities and, in some cases, a rethinking of performances and conditions of access based on a deeper understanding of needs and expectations, could considerably improve their effectiveness.

According to field research, ageing women expressed their willingness of being involved in new experiences. It found out that the elderly want to feel part of the community and cultivate new interests while remaining in contact with the local area. The difficulty to find information about available activities and initiatives in their neighborhood has been identified as the major problem. It is therefore important for local institutions to diversify communication channels and strategies to involve older people. The use of purely digital channels, in fact, excludes citizens and prevents the collection of data about a part of the city's inhabitants.

Another topic recognized as important and of high impact by the students was "gender issues in transportation and mobility". It was chosen by 5 groups. Students focused on different aspects related to this macro-theme and, despite the differences, their research was focused on the detection of women's specific needs for mobility within the urban area, with a specific impact on safety, timing, comfort and self-confidence. It came to light that women are held back by the perception of danger which strongly affects their daily life. They often don't feel safe while they are alone and have to take public transport or walk on roads with poor lighting and a structure that prevents wide-angle vision. Last-mile mobility issues are perceived as very important by women.

After designing concepts, students performed some assessment and test activities with representatives of the final users. The solutions designed during the design course allowed to collect data on the desirability of the solutions and provided hints for the partner women organizations upon which to create tailored services and solutions for users.

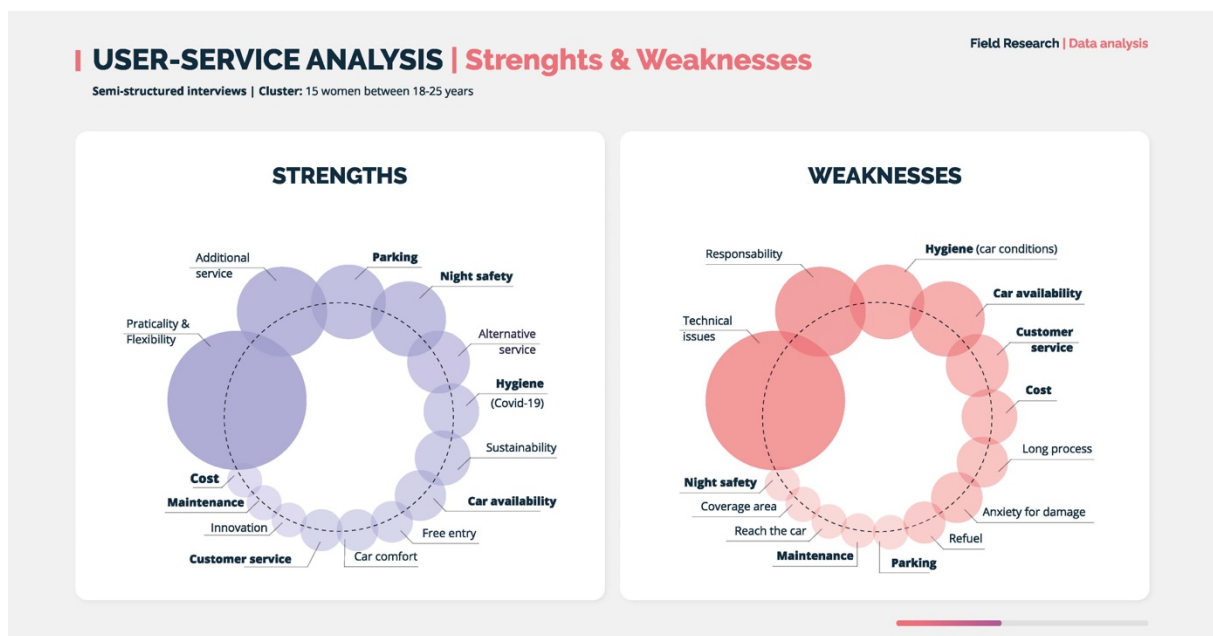


Figure 2. An example of the documents produced by students. Group 9. Emanuele Ceccherini, Si Cheng, Silvia Guarnieri, Martina Mondonico, Eleonora Nava – Gender issues in public transportation.

It emerged that services collecting real time data about different travel patterns, about unsafe situations and about damaged streets and facilities could permit the optimization of transportation services so as to encourage the use of these systems and provide citizens proper services and a livable city.

Another interesting result concerning women and urban mobility refers to the use of sharing mobility services (Figure 2). The interviews and the digital ethnography showed that women are very insecure in using these means of transport because they are afraid of taking responsibility or having to deal with technical problems that they think they are unable to solve.

In addition, it has to be taken into account that women are often accompanied by children, an aspect that highlights the issue of transport safety even more. Users in fact tend to be mindful of the length of journeys, waiting times and crowding.

The fourth topic investigated by students focuses on maternity support, which is a key aspect of ensuring inclusiveness and an equal quality of life to all citizens. One of the topics addressed in the research and the project was postpartum depression, which occurs quite frequently in new mothers. Research reported that young mums are oppressed by the societal pressure of being a good mother and they can feel guilty if they don't like maternity. Decision makers together with health services should facilitate the connection between mothers to enable them to share their experience and most importantly they should involve partners to make mothers feel more confident in asking for help. This topic is of great importance in countries such as Italy, which for many years has had a negative population growth rate. Students who have worked on this theme have highlighted strong similarities at a country level as far as this issue is concerned.

Altogether, the ten teams of students produced a great amount of data describing women's needs and issues, mapping a wide range of design opportunities to produce innovative services and to improve the existing facilities. The main results are summarized in tables 1 and 2.

Table 1. Table of topics and UX research main insights.

Macro topic	Focus	Desk research	Benchmarking	UX research
Struggle of families during pandemic	Find official information from the government on institutional websites.	Technical issues Educational issues Economical issues Physical issues	Online services for childcare and game (virtual baby-sitter club services).	People don't trust the government: unclear communication and instructions on where to find information. People trust influencers on social network instead. People expressed the need for support from similar families, also by sharing common spaces. People would like to share experiences with foreign families in order to have intercultural exchange.
	Childcare during working time.	Lack of local institutions support especially for women.	Self-learning applications (Codeacademy)	
		Suffocating experience especially for children and women.	Psychological support services (Home. Mental Health Foundation)	
		Rediscover the pleasure to stay with other family members.		
Loneliness of elderly women living alone	The use of local resources to involve elderly people	Loneliness of elderly people is increasing. Staying alone is harmful for personal health and it is a big cost for the community.	Applications for connecting young and elderly people (Get a student in your home);	Elderly willing to participate in several activities in order to have a role. They are attached to their familiar place, and they would like to be part of a local community. Elderly need to have a private space where they can be and feel independent. They need to feel part of the contemporaneity and familiarize with technology.
		Problems in reaching elderly people with communication about local activities.	Local activities for elderly (Oma's pop-up restaurant)	
Gender issues on transportation	Women safety and perception of safety.	Women use mostly public transportation. Women choose based on timing and safety.	Safe transportation for women only (Taxy rosa).	Women travel patterns are influenced by family duties and work duties. Presence of children influences the choice of the transport. Women don't feel safe also due to the streets state (light, low visibility...) Tendency to not feel confident in using the car-sharing service when they are alone (sense of responsibility). Need to be beautiful even while paying attention to safety during the moments of the day that are the worst for being alone on means of transport.
	last mile mobility during the night and when alone.	Women have a stricter timetable than men due to childcare and professional duties.	Safety app for sharing locations and messages.	
	travelling patterns and behaviors		Sharing services.	
Support for maternity	Postpartum depression and care during pregnancy progress	Postpartum depression is more and more common and remains largely undiagnosed. It has been worsening during and after pandemic.	Applications and services for mums, for healthcare staff or for both (Better beginnings; Lifeline4mums)	Mums are oppressed by the societal pressure of being a good mother and they feel guilty if they don't like maternity. Mums prefer the support of family and friends instead of doctors. Acknowledging the need for professional mental support is difficult. Several mothers would like to share the reality of

being a neo-mother with other mums.

Table 2. Solutions and guidelines for decision makers

Macro topic	Innovative solutions	Point of attention	Guidelines for decision makers
Struggle of families during pandemic	<p>System composed by a chatbot and a buddy that can help the user looking for information.</p> <p>Service for connecting families creating a network for education and mental support.</p>	<p>Better communication with personalized and clear information. All news in one place. More trust in information.</p> <p>Accessible education and entertainment for families.</p>	<p>Listen to people to know topics of interests, needs, thoughts, so as to improve information and services provided. Institutions can regain the trust.</p>
Loneliness of elderly women living alone.	<p>Applications and services that leverage on local resources and already existing solutions in order to improve the communication between people and municipality.</p>	<p>Elderly people are willing to be involved in activities in order to have a personal role within the community. It is important to maintain the link with the hometown.</p> <p>It is difficult to know which activities are offered by the municipality, mainly due to the digital gap.</p>	<p>Customized path on the digital platform, improvement of the service offered based on the feeds chosen by users.</p> <p>Notice about interesting services for the users based on their interests and/or position; How often is the service used and how to improve the services. Use data to understand how new projects (such as greening the city) could meet elderly women's needs and make them thrive as well as optimize local resources.</p>
Gender issues on transportation	<p>Applications that allow exchange of information between users, municipality and decision makers in order to improve the urban areas. Application for sharing the routes with others to not being alone and feeling safe. Application to be updated on the state of crowding in transportation</p>	<p>Transport is not designed for different women's needs and the urban space often affects freedom of choice for women.</p>	<p>Build women-friendly cities improving lighting systems and street visibility. Connection with citizens to fix reported problems in the city. Understand travel patterns by gender in order to facilitate women's daily life. Improve security systems during the night. Women are worried about pollution, but they don't choose greener solution because they are not safe or convenient, or because they don't feel confident using them.</p>
Support for maternity	<p>Application to share personal experiences during pregnancy and to find support from other mothers;</p> <p>Application to help mothers to fight false beliefs normalizing the externalization of needs with family, partners and doctors.</p>	<p>Lack of public services for maternity support.</p> <p>The need to fight false beliefs diffused in the society that prevent mothers from expressing their needs.</p> <p>The will of sharing experiences about being a neo mum.</p>	<p>Data for public health institutions about post-partum depression and problems with maternity.</p> <p>Build a network to facilitate sharing of experiences between mothers.</p>

6. Conclusions and future activities

The research and education activity reported in this document was carried on during the Covid-19 pandemic, when social restrictions heavily affected the daily lives of all citizens. Students embraced the proposed brief with passion, recognizing the importance of collaborating with female associations and producing information and case studies to inspire gender-oriented policies. The complex situation created by the pandemic, with unprecedented restrictions on mobility and social life, inevitably influenced the results of the research conducted by the students. However, many of the results are general and non-contingent.

In particular, we believe that this experiment produced significant results regarding both the gender issues that constituted the object of the research and the theoretical reflection on the potential of design methodologies and tools.

The outcomes of the research activities performed by students confirmed that the investigation on women's needs and expectations is fertile and capable to produce useful hints for the innovation of public services and facilities. Indeed, the cross-over between Service Design and gender studies is worth further investigations and experimentations. The ability to identify different perspectives related to human diversity and deal with them in service design represents a meaningful challenge for the contemporaneity and a meaningful area of application for design.

From the educational point of view, gender-oriented service design was highly motivating for students, that recognized the social importance of the topic, and put UX Design research tools (knowledge of which is an important professional skill) to the test to investigate in depth the specific experience of clusters of users.

The use of UX Design tools for the visual representation of data, complex systems user experience in accessing a service was very effective in fostering the dialogue with the female associations that partnered in the experiment. Consfim and some delegates of the SI participated in the project by attending the main presentations of the results in various moments of the semester and by expressing questions and comments. Despite the very high cultural level of the members of Consfim and Soroptimist, most delegates were not familiar with Service Design and UX Design, nor were accustomed to the visual representation tools normally employed to describe scenarios, such as maps of user journeys, mental model diagrams, system maps. Many members of non-profit associations were not familiar with design language and methods: UX Design proved to be a suitable tool to facilitate the understanding of the potential of this approach. The presentation of research outcomes and concepts was quite effective, and the experiment can also be considered as a case study for disclosing the potential of design.

The research outcomes were rated as very significant and full of previously unknown contents. The service concepts developed by the student groups were considered interesting and promising.

Acknowledgements: The authors wish to thank the representatives of women's associations who collaborated in the experiment reported in the article. In particular, we thank Giovanna Guercio, national president of the Soroptimist International d'Italia; the Soroptimist Milano alla Scala club; Laura Caradonna, president of the Women's Association Council of Milan – Consfim, and the whole Council. A special thanks goes to all the students of the course, that were very committed to the brief, and to Dr. Laura Varisco, acting as teaching assistant.

5. References

- Andreani, S., Kalchschmidt, M., Pinto, R., Sayegh, A. (2018). Reframing technologically enhanced urban scenarios: A design research model towards human centered smart cities, *Technological Forecasting and Social Change*, Article in Press. DOI: 10.1016/j.techfore.2018.09.028.
- Asteria, D.; Jap, J. J. K.; and Utari, D. (2020). A Gender-Responsive Approach: Social Innovation for the Sustainable Smart City in Indonesia and Beyond. *Journal of International Women's Studies*, 21(6), 193-207.
- Beebeejaun, J., (2017) Gender, urban space, and the right to everyday life. *Journal of Urban Affairs*, 39:3, 323-334, DOI: 10.1080/07352166.2016.1255526.
- Benion, D., (2019). Designing User Experience. Pearson Education Limited.
- Bibri, S.E., Krogstie, J. (2020). The emerging data-driven Smart City and its innovative applied solutions for sustainability: the cases of London and Barcelona. *Energy Inform* 3, 5 <https://doi.org/10.1186/s42162-020-00108-6>.
- Buxton, B., (2010). Sketching the user experience.
- Chang, J., Choi, J., An, H., Chung, H., (2021). Gendering the smart city: A case study of Sejong City, Korea, *Cities*. <https://doi.org/10.1016/j.cities.2021.103422>.
- Chiehyeon Lim, Kwang-Jae Kim, Paul P. Maglio, (2018). Smart cities with big data: Reference models, challenges, and considerations. *Cities*, Volume 82, Pages 86-99. <https://doi.org/10.1016/j.cities.2018.04.011>.
- Condon, S., Lieber, M., Maillochon, F., (2007). Feeling unsafe in public places: understanding women's fears. *R. franç. sociol.*, 48, Supplement, 2007, 101-128.
- De Pieri, B., & Teasdale, S. (2020). Radical futures? Exploring the policy relevance of social innovation. *Social Enterprise Journal*. Vol. 17 No. 1, 2021 pp. 94-110. Emerald Publishing Limited 1750-8614. DOI 10.1108/SEJ-11-2020-0111.
- Erwin, K., (2014). Communicating the New. Methods to shape and accelerate innovation. Wiley.
- Evans, D.C., (2017). Bottlenecks. Aligning UX Design with user psychology. Apress.
- Frølund, L., Pillan, M., & Piredda, F. (2018). New paradigms related to community building and identity in service design: Exploring global and local design initiatives. *Cross-Cultural Design: 10th International Conference, CCD 2018: Held as Part of HCI International 2018, Las Vegas, NV, USA, July 15-20, 2018: Proceedings. Part 1: Methods, Tools, and Users*, 885–895. Cham: Springer.
- Garrett, J. J., (2011). The Elements of User Experience: User-Centered Design for the Web and Beyond, Second Edition. New Riders for Pearson Education.
- General Assembly of United Nations (2015). Resolution adopted by the General Assembly on 25 September 2015. Transforming our world: the 2030 Agenda for Sustainable Development.
- Grossi, G. & Pianezzi, D. (2017). Smart cities: Utopia or neoliberal ideology? *Cities*. Volume 69, Pages 79-85, <https://doi.org/10.1016/j.cities.2017.07.012>.
- Hartson, R. & Pyla, P., (2012). The UX Book. Process and guidelines for ensuring a quality user experience. Morgan Kaufman, Elsevier.

- Hidayati, I., Tan, W., Yamu, C., (2020). How gender differences and perceptions of safety shape urban mobility in Southeast Asia. *Transportation Research Part F: Traffic Psychology and Behaviour*, Volume 73, Pages 155-173.
- Kalbach, J., (2016). *Mapping Experiences: A Guide to Creating Value Through Journeys, Blueprints, and Diagrams*. O'Reilly.
- Kneeshaw, S. & Just, J., (2020). Policy, Exploring the gendered impacts of Covid-19 | URBACT.
- Krishna, R., Kummitha, R., Crutzen, N., (2017). How do we understand smart cities? An evolutionary perspective. *Cities*, Volume 67. Pages 43-52, <https://doi.org/10.1016/j.cities.2017.04.010>.
- Kozinets, R., (2015). *Netnography Redefined*. Sage Editions.
- Manzini, E. (2015). *Design, When Everybody Designs. An Introduction to Design for Social Innovation*. The MIT Press. Cambridge, Massachusetts.
- Newbery, P. & Farhnam, K., (2013). *Experience Design. A Framework for Integrating Brand, Experience, and Value*. Wiley.
- Pillan, M., & Colombo, S. (2017). Will smart homes improve our lives? A design perspective towards effective wellbeing at home. *The Design Journal*, 20(sup1), S2580–S2591.
- Roto, V., Lee, J.J, Law, E., Zimmerman, J, (2021). The overlaps and boundaries between Service Design and User Experience Design. *DIS'21: Designing Interactive Systems Conferences 2021*. Pag. 1915-1926.
- Stickdorn, M., & Schneider, J. (2011). *This is service design thinking*. John Wiley & Sons.
- Stickdorn, M., Hormess, M.E., Lawrence, A., Schneider, J. (2018). *This is service design doing*. O'Reilly.
- Suoheimo, M., Vasques, R., Ryttilahti, P. (2021). *Deep Diving into Service Design Problems: Visualizing the Iceberg Model of Design Problems through a Literature Review on the Relation and Role of Service Design with Wicked Problems*, *The Design Journal*, 24:2, 231-251.
- Swedish Government Official Reports (2007). *Gender Equality in Public Services. A book of ideas for managers and strategists from the Swedish Gender*. Mainstreaming Support Committee. Stockholm.
- Tiihonen, J., Felfernig, A. An introduction to personalization and mass customization. *J Intell Inf Syst* 49, 1–7 (2017). <https://doi.org/10.1007/s10844-017-0465-4>.
- Trischler, J. & Trischler, J.W, (2021). Design for experience – a public service design approach in the age of digitalization. *In the Journ. of Public Management Review*. Routledge. Vol 23.
- Uteng, T. P., (2011). Gendered Bargains of Daily Mobility. Citing cases from both Urban and Rural settings. *World Development Report 12 on Gender and Mobility*.
- Vink, J., Kskel-Huotari, K., Tronvoll, B., Edvardsson, B., Wetter-Edman, K., (2021). Service Ecosystem Design: Propositions, Process Model, and Future Research Agenda. *Journal of Service Research*. Vol. 24(2) 168-186. DOI: 10.1177/1094670520952537.

About the Authors:

Margherita Pillan, PhD, Associated Professor at the Design Dep., program board director of the MSc in Digital and Interaction Design at the School of Design at Politecnico di Milano. She is the scientific coordinator of the research lab IEX- Interaction and Experience Design Lab at Politecnico.

Martina Marzola is a research fellow at Politecnico di Milano, where she graduated in Communication Design with the final thesis "*The menstrual taboo. From the spots of the '70s to social media: menstrunormativity or normalization?*"