

PRACTICES

Co-Designing the Accessibility: from Participatory Mapping to New Inclusive Itineraries Through the Cultural Heritage of Bologna

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ABSTRACT

Accessibility is one of the greatest challenges facing Cultural Heritage sites today. Yet, experiencing culture means being part of our society, as it brings people together, and it should be universally granted. Departing from a participatory process focusing on engaging local stakeholders to regenerate the University District by promoting its Cultural Heritage and public spaces, this paper analyses how the City of Bologna has been able to bring accessibility at the centre of its development programme. Starting from the living lab (U-Lab) created within an European funded project (ROCK), Bologna is working to remove any physical, sensorial and cultural barrier that could impede or discourage the access to the area. In doing so, all the institutions and actors involved relied on the co-design method to create a service with the ultimate aim to make the University area a Cultural District universally accessible.

KEYWORDS

Accessibility, Co-Design, Citizens Engagement, Cultural Heritage, Participatory Mapping

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FIG. 1 Public project release and testing - Source: Photograph by Margherita Caprilli for Fondazione Innovazione Urbana 29/09/2020, Piazza Rossini

1. Introduction

According to the experts, more than a third of the European population is represented by Persons with a Reduced Mobility (PRM) who frequently encounter physical barriers when they move around public places or they use public transports.

Moreover, if we also consider the temporary discomfort conditions, as heavy baggage transport, rehab after surgicals or diseases, or a travel experience in a foreign country, we can deduce that each of us could experience difficulties connected with a reduce mobility condition. We could hence say that barriers are something frequent in everybody's life but the way and the easiness a person have to go beyond them, makes the difference between one another.

In this context, it is fundamental to recognise the importance to involve people in co-design interventions, services and policies to concretely make the urban context, and all its elements—Cultural Heritage included—universally accessible.

This vision found a fertile ground on Bologna, as in the last 5 years it has successfully trialled an urban innovation model based on circular subsidiarity and civic collaboration: the “collaborative city”. This means Public Administration governs not only on behalf of citizens, but also with citizens, basing its policies on the two concepts of “City as commons” and citizens as a great source of energy, talent, resources, capabilities, knowledge and ideas in support in urban regeneration [Fig. 1].

Accessibility became part of this vision and a central node for the Public Administration in such a way that the City of Bologna is working “to promote the accessibility culture and to guarantee the equality and participation of persons with disabilities”. This effort finds its climax in the application for the 2021 Access City Award, with the aim to promote a worldwide recognition of Bologna as a universally accessible City thanks to the active collaboration between Public Administration, citizens, associations, and researchers through the Universal Design principles.

2. Cultural Heritage Accessibility and inclusion of persons with disabilities in the urban environment

The principles of Universal Design and the 2006 UN Convention on Disabilities Persons Rights, define an Accessible City as the one that “take appropriate measures to ensure to persons with disabilities access, on an equal basis with others, to the physical environment, to transportation, to information and communications, including information and communications technologies and systems, and to other facilities and services open or provided to the public, both in urban and in rural areas”. However, accessibility does not refer only to infrastructure but has to do also with services, facilities and goods, engaging in activities and partaking in experiences. All these are interacting and can give a decent degree of autonomy and security to the individual, always in relation to the environment (natural, built or virtual). Accessibility should also apply in all¹ fields so as to ensure its generic effectiveness, including the access to Cultural Heritage (CH).

A wider definition of the term Accessibility associated to CH includes the initial prerequisite for anyone to be able to reach and appreciate sites and activities of collective interest; culture as a good, situation and activity imbued with symbolic value; and heritage as the percolation of past cultural elements into epoch defining legacy. Accessibility to culture and heritage thus involves a physical moment of material access to infrastructures and sites, a perceptual moment involving an understanding of the symbolic meanings inherent in cultural products and activities, and a culminant appreciation moment when such meanings are appropriated, consciously accepted or re-presented and re-worked by those in contact with them.² Kawashima underlines how cultural institutions and CH should be inclusive and accessible to all people in society and how accessibility and inclusion of disabled people in CH resources and institutions can be achieved through outreach. Outreach refers to the process

1 Antonia Tzanavara, *Museum and People with Disabilities: Accessibility - Education - Social Inclusion*. (in corsivo!) Ph.D. thesis, University of Aegean, Corinth (2013). Available at: <http://thesis.ekt.gr/thesisBookReader/id/28536#page/1/mode/2up>

2 Alex Deffner et al., “Accessibility to Culture and Heritage: Designing for All”, *Proceedings of the AESOP*, 2015.

of taking³ CH resources away from their usual location to areas where the audience has limited access. Reaching out to different social groups helps to reduce social exclusion and increase accessibility for vulnerable groups in society. Museums are important agents of cultural outreach because they are able to reach out to various social groups such as deaf people through learning programs, exhibitions, and experiences.⁴ A comprehensive design of accessibility modalities to CH should hence take into account the needs of all citizens, including citizens with disabilities, enabling them to participate since the initial project phase and prosecuting with the co-design of the service/good through participatory methods.

3. Accessibility in Bologna

According to the Italian Institute of Statistics (ISTAT), in 2013 the City of Bologna hosted 21.200 persons with disabilities, which represents a 5.8% of the entire population with more than 6 years. Women represent 7.5% of the total while men a 3.9%. In 2018, it's been estimated an increase of 100 units bringing the total number of persons with disabilities to 2.300. Among the population group having more than 80 years, there have been 12.300 persons with disabilities, and this data would probably increase by 2033 when people with disabilities will probably be 60.000 in the entire Metropolitan area, of which 22.600 in the Municipality of Bologna.

If we refer to the cultural and socio-economic context of the City, Bologna has always been characterised by multiple elements and its success relies also on its capability to transform differences into a value.⁵

For what concerns its urban planning, it was built long before “equal access” became part of the architect’s vocabulary. But being a Medieval city it is both a value and a restraint to its effort to become a resilient and accessible city and here lies the challenge: working towards guaranteeing the universal access to its cultural heritage going beyond not just physical but communication and strategic use barriers, while not losing its peculiarities.

Therefore, making its incredibly vast CH accessible to everyone is being one of the first attempts of the ROCK project, which started from a number of experimentations on the University District to enlarge the vision to the entire city centre. The main goal was to increase the common knowledge

3 Nobuko Kawashima, “AUDIENCE DEVELOPMENT AND SOCIAL INCLUSION IN BRITAIN: Tensions, Contradictions and Paradoxes in Policy and Their Implications for Cultural Management”, *International Journal of Cultural Policy* 12, no. 1 (March 2006): 55–72, <https://doi.org/10.1080/10286630600613309>.

4 Panagiotis Kosmas et al., “Enhancing Accessibility in Cultural Heritage Environments: Considerations for Social Computing”, *Universal Access in the Information Society* 19, no. 2 (June 2020): 471–82, <https://doi.org/10.1007/s10209-019-00651-4>.

5 Leonardo Tancredi et al., “Memorie di uno spazio pubblico: Piazza Verdi a Bologna”, *CLUEB*, 2011, 7–195.

of CH while searching for new approaches to change the accessibility paradigm.

4. The ROCK project

Culture is one of the most important elements of Bologna's reputation in the world: the city's offer is multifaceted and ranges from music concerts, cinema festivals, and performative art exhibitions. The decision to position the city as one of the epicentres of contemporary culture rises from the acknowledgement that culture is both a competing market and a chance that should be given to everyone to enrich his existence.

The spearhead in experimenting innovative solutions that have a tangible impact on everyday life is the ROCK project - Regeneration and Optimisation of Cultural Heritage in Creative and Knowledge cities. Co-funded in the framework of EU R&I programme HORIZON 2020, with a budget of nearly €2 min for the city of Bologna, the main goal of the project—which is also being replicated in other European cities—is to increase the perception and to widespread the image of the city and its heritage, as a common good to which every citizen must have access, contributing to its knowledge, governance, conservation and transformation. Locally, the project is managed jointly by the Municipality of Bologna, the University of Bologna and the Foundation for Urban Innovation, through an innovative and balanced relationship between political and educational institutions. The cooperation between the city and its university also resulted in the creation of a joint ROCK office, where staff from the three entities work together.

The same collaborative approach is the pillar upon which ROCK is founded, based on the idea that historic city centres are extraordinary living laboratories where all stakeholders can share their needs, share proposals and suggestions, and co-design solutions, participating in a common effort to address and solve the challenges faced by the city. The most challenging objective pursued by the project is to transform historic city centres characterised by social conflicts and decay in unique and powerful engines of regeneration, sustainable development and economic growth for the whole city. Specifically, at the local level ROCK aims at regenerating the University Area (U-Area) of Bologna, nestled in the city center and characterised by different communities with different identities and needs that, often, caused tensions with one another and the institutions, namely the Municipality and the University.

Project actions reflect the way Bologna has been working for years in defining public policies and in realising interventions involving citizens as key actors in public policies. Therefore, the entire University zone was transformed into an open-air Living Laboratory—the U-Lab—encouraging participatory practices to co-design actions of cultural regeneration, such as the greening of city squares, the mapping of urban areas to improve their

accessibility or the re-design of public lighting. Project strategy reflects the main pillars of development policies of the city in the field of sustainability and inclusion, considering Culture and Cultural Heritage as moving engines fostering welfare and economic growth. In the meantime, it also acknowledges the goals fixed by both the Agenda 2030 and the Urban Agenda as pillars and fundamental source for citizens enrichment, due to their key contribution to the achievement of sustainable development and accessibility.

In fact, the objectives pursued by the ROCK project, and U-Lab in particular, could be related to the 17 SDGs in several manners. First of all, by supporting accessibility with different tools, such as sign language or tools for visually impaired people, mapping of physical accessibility to CH places, and opening places which are usually closed or not accessible. Secondly, the ROCK project aims at reducing inequalities and considers cultural participation as a key factor for promoting the inclusion of all people. To this end, it provides tools to foster participation to cultural life and capacity building activities, opening of hidden treasures, promoting alternative/public use of private spaces, foster innovation through culture and tools linked to CH as analysis of people flows, tracking of accessibility barriers and threats, virtual/augmented reality applied to CH, educational interactive video games for schools and young people especially dedicated to discover hidden treasures of the city, and sensors monitoring indoor and outdoor environmental parameters. The project works to build inclusive institutions where citizens are concretely enabled to participate in the design, implementation and evaluation of actions testing practices which could feed the definition of cultural policies and programmes, through the Living Lab approach. Finally, it widely contributes to make cities inclusive, safe, resilient and sustainable by working on tangible and intangible CH and fostering local sustainable development.

4.1 U-Lab

The presence of the University has always been a key factor for the city of Bologna, fostering culture, creativity, new ideas and social, intellectual and economic growth. The life of citizens and students has always been closely intertwined, since the main University district is located in the very heart of the city centre creating a hybrid place where different communities (students, residents, tourists, business owners) coexist and try to face the respective needs and challenges. The area has a very high concentration of heritage sites (porticoes, libraries, the main Theatre, several important museums, including 11 University Museums and 5 Civic Museums plus 2 Cultural production systems, the Academy of Fine Arts, the Conservatory of Music, a network of squares, courtyards and historical

6 Urban Agenda for the EU. Pact of Amsterdam, 2016, available at https://ec.europa.eu/futurium/en/system/files/ged/pact-of-amsterdam_en.pdf

roads and several historic buildings) providing many opportunities, but it is also challenging as different communities are passing through the same public realm without actually engaging in any interaction or even producing conflictual situations.

Even though University and city life have always been influencing each other, students and citizens still represent two separate populations coexisting in the same space and creating a city in the city, often considered a no-entry zone characterised by conflicts and decay. Thanks to its innovative approach, and the declared aim to involve a large ecosystem of stakeholders, ROCK gave the City the opportunity to recognize and strengthen the specific identity of the U-area as a cultural, creative and sustainable district by improving safety, turning social conflicts into new opportunities, increasing the accessibility of the area for all, attracting visitors and tourists, entrepreneurs and private investments. The main local goal, in fact, was to develop co-designed cultural and sustainable initiatives in this area, to create ownership over the Zamboni District, empowering both students and residents to regenerate the area through culture, and to test a wide set of technologies to increase the potential of the area. The approach was systemic and aimed to not overlap but to synergically intertwine with cultural initiatives in the Zamboni district and other initiatives previously developed by the city or by formal and informal institutions. By combining conservation of cultural heritage, innovation and environmental protection, ROCK in Bologna developed shared actions between those who live, those who attend and those who animate the U-area, mixing visions, knowledge and skills. To face the challenge, FIU together with the Municipality of Bologna, the University of Bologna, and Fondazione Rusconi, provided the basis for the creation of a Living Lab, U-lab. The main reason behind the development of LL methodology was a perceived necessity to involve a variety of stakeholders in filling gaps between technology ideation and development on the one hand, and market entry and fulfillment on the other.

The term Living Lab (LL) usually refers to a variety of local experimental projects of a participatory nature. They are user-centered, open innovation ecosystems based on a systematic user co-creation approach in public-private-people partnerships, integrating research and innovation processes in real life communities and settings. They focus on a multiplicity of ingredients:⁷ they relate to the subject they focus on, which has to be placed in a real-world setting in which multiple stakeholders from multiple organizations and expertise interact. They can provide a “demand-driven innovation” approach by engaging all the stakeholders involved in a specific process and across multiple phases, generating a flexible ecosystem. Users also play an active role as co-innovators in order to

7 Ana Garcia Robles et al., “Introducing ENOLL and Its Living Lab Community”, *European Network of Living Labs*, Brussels, 2015.

create, prototype, validate and test products, services, systems and technologies in a real-life setting. Finally, the research setting is fundamental in facilitating the multidisciplinary dimension to achieve the LL's goals and a key characteristic is the collaboration within physical and virtual spaces of interaction in order to create the desired outcomes.⁸

Hence, following the above prescription, U-Lab was born in 2017 as a hub for collaborative practices targeting the University district of Bologna. Its main goal was to link different expertise and sectors to work together on the regeneration of the entire area, developing new ideas and experimenting new methods to use public spaces and services. Through U-Lab, Bologna launched a season of observation, conception and co-production involving the direct protagonists: students, residents and stakeholders active in the area. Co-design represented the core method on which the whole process was based, from the analysis of the spaces to the validation of the solutions co-designed with the stakeholders. Participants have hence been invited to actively participate to explore the area with the aim to highlight criticalities and characteristics of the physical space. They also collaborated in underlining the main themes to be faced and the different approaches to rely on with the final goal to give everyone a voice and to respond to all the different visions characterising the area.

U-Lab actions started with a mapping of the local stakeholders. Then, to experiment direct actions and events in the area, but also to create new uses, U-Lab launched an open call for proposals targeting associations, collective of citizens, informal groups to propose activities, initiatives and events. The call received 47 proposals. The 16 winners animated the cultural and public spaces of the Zamboni District during the spring 2018 with 60 experimental events.

In the first months of 2018, a series of public meetings and workshops with stakeholders were held to ease the dialogue between different communities and to highlight their necessities and perception on the area. The meetings focused on specific themes of analysis and on the places where implementing the actions, and were aimed to make people focus on their needs [Fig. 2].

The process included a series of thematic meetings, held from January to February 2018 and open to invited participants. They focused on accessibility—considered as physical, cultural, and relational accessibility, and as a necessary element to ensure inclusiveness and personal security—sustainability—with particular attention to climate change and resilience issues—and collaboration for new productions - as a mean to increase the

8 Steen K., van Bueren E., *Urban Living Labs: A Living Lab Way of Working*, AMS, Delft University of Technology, (June 2017)



FIG. 2 Workshop by MUVet in partnership with Unione Italiana dei Ciechi e Ipovedenti
 - Source: Photograph by Margherita Caprilli for Fondazione Innovazione Urbana
 17/04/2018, Teatro Comunale

activation of new partnership (being those PPP, including associations, formal and informal groups...), and specific areas, namely Scaravilli Square, Rossini Square, the area surrounding the Municipal Theater, and Via delle Moline.

A number of workshops have been held in the area to further analyse the potential benefit deriving from the use of technologies applied to the urban environment (lights, sounds, greening interventions, innovative devices to be installed in the area...).

This phase promoted dialogue between some of the most important local stakeholders having specific skills or competencies on the topics discussed, and citizens with disabilities whose participation was sought from the beginning of the process. They mainly pertained to the following categories:

- Institutions;
- University and Research;
- Associations and Third sector;
- Communities (formal and informal) of citizens and students;
- Enterprises and connected associations.

U-Lab has eventually constituted a first step to define a process of mutual learning to highlight objectives and prioritise strategic lines of adaptive actions and political orientation.⁹ It enabled the participation of stakeholders with the aim to connect the traditional cultural functions of the U-Area,

9 Gamze Dane et al., "Participatory Mapping of Citizens' Experiences at Public Open Spaces: A Case Study at Bologna Living Lab", in *REAL CORP 2020: Shaping Urban Change. Livable City Regions for the 21st Century: Proceedings of 25th International Conference on Urban Planning, Regional Development and Information Society, Wien, CORP-Competence Center of Urban and Regional Planning*, 2020, 645–54.

with spaces for interaction, collaboration and co-design of new products and services. The overall objective was not to provide an exhaustive solution for regenerating the entire U-Area, but to outline some discussion points, carry out experiments and construct a medium-long term vision oriented to guide the implementation of transformative actions in the historical centre.

4.1.1 A roundtable focused on accessibility

The thematic meeting on Accessibility has been organised following a specific methodology and a shared work, and saw the participation of about 50 people. During the plenary phase that opened each of the thematic meetings, participants have been instructed on the contents of a specific dossier focused on the U-Area. Through maps and data analysis, the dossier gives an overview of the projects implemented in the area as a source of inspiration for the

participants and it specifies the demographic characteristics of the U-Area declining each of the three themes according to different visions.

As for almost all the events organised within U-Lab, the meeting focused on accessibility has been planned to be accessible also to person with disabilities, by providing:

- accessible location with no architectural barriers;
- LIS translations (the Italian Sign Language for the deaf);
- real time subtitles (respeaking);
- previous transmission of all the materials on a format compatible with the software used by blind and visually impaired persons.

First of all, participants have been requested to enrich the definition of Accessibility described within the ROCK project as “the chance and level of access to different urban areas – namely public spaces, cultural institutions and contents, university buildings and learning events, transports, services, community life, technologies, and commercial places – and strictly connected to the security issue as a place which is not considered safe is logically not an accessible place.”

In particular, accessibility has been analysed according to different perspectives: physical accessibility, cultural, interrelational, and as an element capable of increasing personal security and inclusiveness. During the meeting, speakers having a specific knowledge on the accessibility theme, or the area, shared their view and contributed to the discussion. The second phase of the meeting has been characterised by a 1 hour working group session made up of 10-15 people, under the coordination of a facilitator. Participants analysed the U-area context with respect to accessibility, trying to create a unique definition of it, and to highlight criticalities and opportunities deriving from discussing the topic. One of the

output of the whole discussion was the creation of specific guidelines to strategically manage the future transformation of the area.

The results of the process entailed the definition of guidelines and proposals to overcome the criticalities highlighted by the participants to the process, mainly:

- personal safety to be guaranteed both in public and private spaces;
- autonomy to move and self orientate;
- the chance to take advantage of culture as an instrument to communicate, to increase personal knowledge and to enjoy cultural heritage at the large;
- a way to foster dialogue, and as a tool to access, and participate, to decision making and participatory and democratic processes.

4.2 U-area for all: improving accessibility through collaborative design methods

As a result of the roundtable discussion on accessibility, the second phase of U-Lab focused on the implementation of specific activities and foresaw a deep and concrete contribution by technological partners. To this end, in March 2019 FIU promoted U-Area for all, a call for proposals to prototype and experiment concrete solutions to increase accessibility to the area and, on a wider basis, to the whole historic centre. The call resulted in a medium-term process to experiment a guided tours service which should be inclusive and easily accessible to both tourists and people who live the area on a daily basis.

The winning team gather together project managers having a specific expertise on physical, cognitive and hearing disabilities, visually impaired necessities, simplified languages, accessibility to museums and cultural heritage, the relation between dance and artistic language, and come from local associations, namely Accaparlante CDH, Gualandi Foundation, Cavazza Institute for blind people, La Girobussola Onlus and MUVet. The co-design phase of U-Area for all focused on both citizens and users of the area and involved them since the very beginning of the process following the guidelines dictated by the co-design methodology: "One way to help design thinking diffuse throughout an organization is for designers to make their clients part of the experience [...] We find that we invariably get much better results when the client is on board and actively participating."¹⁰ [Fig. 3]

To this end, the process started with a research that concretised in two different co-design meetings to define as precisely as possible the needs of the final users. To this end, FIU proposed "personas" as a co-design tool.

¹⁰ Tim Brown and Barry Katz, *Change by Design: How Design Thinking Transforms Organizations and Inspires Innovation*, vol. 20091 (HarperBusiness New York, NY, 2019).



FIG. 3 Urban exploration "Carotaggi" - Source: Photograph by Margherita Caprilli for Fondazione Innovazione Urbana 18/06/2019, Piazza Re Enzo

A "persona" is a fictitious user described with basis in data. It requests to use everyday experiences of the users and their needs as a starting point when developing new products. The method includes representations of the users and it leads to the inclusion of the users' perspective in all aspects of the co-design process. The method has been adapted to the specific case and it resulted in the creation of 6 personas working with cultural heritage, 11 visitors and 6 operators who have been synthesized in 6 reference figures.

Afterwards, the co-design team developed a research on the cultural heritage located in the pilot area, focusing on mapping activities, including crowdmapping, of the accessibility level of the main cultural buildings located in the U-Area, and the viability of public places. Further explorative and mapping activities have been conducted using non conventional methods to study the perception of people of the surrounding environment: dance and performative arts became exploring tools and a support to traditional technologies, allowing people having different levels and types of disabilities to connect to the public places [Fig. 4].

Data collected on the perception of people participating in the mapping and exploration activities, allowed the team to design a preliminary tour proposal focused on avoiding architectural barriers and locations reported by the participants for causing discomfort. In contrast, places providing positive sensations have been highlighted.

The project development benefited from a divergence and convergence



FIG. 4 Urban exploration "Carotaggi" - Source: Photograph by Margherita Caprilli for Fondazione Innovazione Urbana 18/06/2019, Piazza di Porta Ravegnana

phase: if the first corresponds to problem solving and represents what drives the researcher toward solutions, the objective of divergent thinking is to multiply options to create choices.¹¹ A number of explorations were conducted later, together with detailed mapping activities involving persons having different types and levels of disabilities, after a preliminary selection of the contents mapped in the research phase. This allowed researchers and technicians to collect more and more data useful to effectively finalise the co-design of inclusive and universally accessible paths. The process did not result in the direct removal of architectural barriers but it included the design of a service made by two guided tours: one focusing on the main historical and artistic attractions, and the other centered on the academic and scientific heritage. Both the tours include:

- a route with no architectural barriers specifically designed for people having physical disabilities or forced in a wheelchair. The itinerary description highlights points that could be critical for blind people and useful indications for move around autonomously;
- points of interest and the level of accessibility for the three main disability categories identified, namely visual, auditory and physical;
- a description of the itinerary and the cultural heritage contents encountered during the tour translated using a simplified and accessible language.

11 *ibid.*



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FIG. 5 Paper guide - Source: Photograph by Margherita Caprilli for Fondazione Innovazione Urbana 29/09/2020

GIS cartography as a tool to improve the knowledge and to allow the construction of a cognitive framework useful as a starting point for activities concerning cultural heritage, is not new and it has already been used with success¹². To be efficient, it must be flexible enough to meet the needs of the different social actors in heritage studies such as urban planners, policy makers, schools, universities, researchers, commercial actors, and citizens. As an example, a territory map with a complete¹³ catalogue of cultural heritage could easily be incorporated in the work of protection and management, such as urban and territorial planning instruments and civil protection programs. The issue is timely because several factors threaten the conservation of the cultural and rural landscape in the Italian countryside.¹⁴

The last phase of the Bologna U-Area for all process, involved Bologna Welcome, the official tourist agency of Bologna, and a group of touristic guides who provide their expertise for defining the tours. They also took part in a series of pilot tests with three groups of disabled and non-disabled persons. Two leaflets have been produced to support the promotion of the guided tours. They both include an embossed map of the suggested itinerary and will be available on a digital and printed version. The leaflets

12 as in the case of Cancellara (Basilicata, Italy)

13 Marilisa Biscione, Maria Danese, and Nicola Masini, "A Framework for Cultural Heritage Management and Research: The Cancellara Case Study", *Journal of Maps* 14, no. 2 (13 November 2018): 576–82, <https://doi.org/10.1080/17445647.2018.1517699>.

14 Maria Danese, Giuseppe Las Casas, Beniamino Murgante, "The Periurban City: Geo-Statistical Methods for Its Definition", *Urban and Regional Data Management*, 2007, 473–85.

have been designed to be accessible autonomously by people with disabilities and contain descriptions and focuses on the cultural heritage that could be accessed by Qr Codes.

4.2.1 Using technologies as a tool to ameliorate urban accessibility

Technologies have been a consistent part of the ROCK project and have been specifically fundamental to map the U-Area. On April 2019, the Foundation for Urban Innovation, in collaboration with the Eindhoven University of Technology (TU/e), organised a participatory mapping finalised to make up most of the spatial local knowledge, paving the participatory part in planning and policy-making, where citizens can take an active role in the discussion of their environments.¹⁵ This represented a first general exploration of the area to highlight the main barriers impeding a universal accessibility of the District and its cultural heritage while valorising artistic and historical elements and the emotional perception of public spaces. To this end, TU/e made available a GPS device to track people flows and to register and geocalise participants' feedback on specific points of the area, with the support of a questionnaire.

During the data collection 42 people used the GPS loggers which enabled gathering their objective experiences. However, only the data of 36 respondents were available via geo-survey which enabled gathering their subjective experiences and background information. According to the geo-survey, 47% of the respondents were female while 53% were male. 56% of the participants were between 18 and 30 years old, 17% of them were between 31 and 50 years old and 37% of them were 50 years and older. Regarding their occupation, 44% of participants were students, 33% were employed and 23% were retired.¹⁶ The number of participants allowed to track a sufficient quantity of itineraries and places within the pilot area, while furnishing a wide variety of reactions in line with the different characteristics of the participants. According to a report elaborated by TU/e and the City of Bologna "42 people used the GPS loggers. On average, their visits lasted 76 minutes. On average 11.2 minutes were spent at Piazza Scaravilli, where the experiment started¹⁷. This was followed by Giardino del Guasto, Piazza Verdi and Piazzetta Molinari pradelli. On these public open spaces (POS), participants spent on average 6 minutes. In addition to this, the most visited POS was Piazza Scaravilli as all participants started the experiment at that location. This is followed by Piazza Verdi,

15 Cali Warner, "Participatory Mapping: A Literature Review of Community-Based Research and Participatory Planning", *Social Hub for Community Housing, Faculty of Architecture and Town Planning Technion, Cambridge, Massachusetts: Massachusetts Institute of Technology*, 2015.

16 Dane, G. Z., Derakhshan, S., Etefagh, T., Massari, M., Gianfrate, V., & Bigi, M. Participatory mapping of citizens' experiences at public open spaces: a case study at Bologna living lab. In *Proceedings of 25th International Conference on Urban Planning and Regional Development in the Information Society GeoMultimedia*, 2020 (pp. 645-654)

17 *ibid.*

Piazza Puntoni, Piazza Rossini, Giardino del Guasto, Piazzetta Molinari Pradelli and Piazza di Porta Ravegnana. The thicker lines represent the higher frequency of visitation. According to Figure 4, Via Zamboni, Via delle Belle Arti, Via S. Giacomo, Via Marsala, Largo Respighi and Via del Guasto were the routes that have been taken the most by the participants.

In total 273 subjective experiences were registered. Looking at the feelings of participants at point of interests (POI), 80% of subjective experiences were positive (interesting, fun, joy, inspired, relaxing, surprising) while 20% of them were negative (confusing, disgusting, irritating, boring, fear). Most feelings were registered at Via Zamboni, Piazza Verdi and Piazza Scaravilli. These places can be considered as the most feeling triggering places for participants. At these feeling triggering locations, people were also asked to report the issues relating to accessibility, dirt, smell, neglect and safety. Each participant could report more than one issue at the location. In total 106 accessibility, 53 dirt, 21 smell, 75 neglect and 28 safety problems were registered. These problems were mostly registered at Piazza Verdi and Piazza Scaravilli. One interesting finding is that although participants had positive feelings at a certain location, they still reported problems/issues.

The combined use of technologies, participatory methods targeting the final users and a real-life scenery, have been fundamental to co-design a service balanced in such a way to meet real needs and to increase a universal accessibility of the U-area. At the end of the process, technologies have been specifically considered also as a tool to boost the autonomous access to contents by city users. These contents are now available also in the form of an App, BOforAll, just developed by the Municipality of Bologna, which aims to illustrate the accessible itineraries of the U-area and the center of Bologna [Figs. 6-7].

To complete the system of technologies, in autumn 2020 tactile maps were installed in Piazza della Mercanzia with the aim of providing blind citizens and city users with information about the urban shape of the historic center and its characteristic elements (such as towers and historic arcades).

5. Conclusions: the gains of accessibility

The U-Lab experience set the basis for a permanent urban laboratory, able to define adequate spaces for listening, narration, representation and production of new urbanity for the university area and consequently for the historical centre. It allowed local stakeholders to shed light on their necessities and the criticalities of the area, with particular reference to Cultural Heritage. Then, the U-Area for all allowed to make accessibility at the centre of the process while mitigating the challenges faced by institutions and decision-makers in the development of future action plans for the accessibility of the area's heritage.

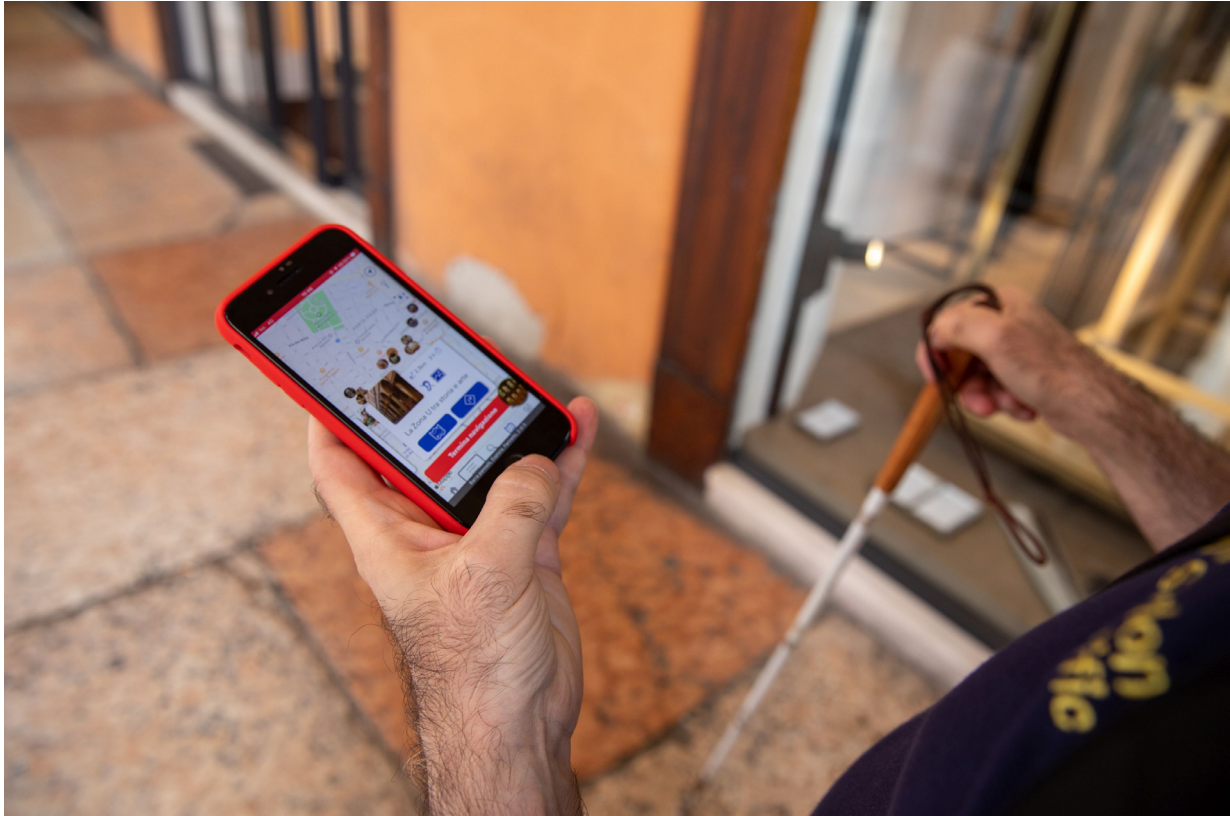


FIG. 6 BoforAll app's first test - Source: Photograph by Margherita Caprilli for Fondazione Innovazione Urbana 15/07/2020



Margherita Caprilli

FIG. 7 Tactile map installed in Piazza della Mercanzia - Source: Photograph by Margherita Caprilli for Fondazione Innovazione Urbana 14/12/2020

If the initial goal of the process was to engage citizens in better understanding their needs and the importance to promote and improve the accessibility to the area, the final result has been an increase in the overall awareness of the importance to ease the universal access to cultural heritage. This led to the co-design of a service that goes beyond the definition of accessibility as something related to physical barriers but also to communication tools, language, and instruments and which has been co-designed to allow a universal access to cultural heritage. This immaterial tool does not break physical barriers but highlights all the existing points of access, being those material or immaterial, while establishing new ones. The service creates a storytelling of how the area could be accessed and enjoyed according to the different sensorialities which a person would or could evaluate.

The active involvement of the final users has been fundamental for have a clear imagine of the area and to understand it in the most effective way: co-designing the service together with both able bodied and people with different levels and types of disabilities led to the creation of service studied to be concretely based on real needs. This first pilot process, involving just a limited area, led to the awareness that accessibility should be extended to the entire City, making it one of the main thematic routes towards which Bologna is driving its efforts.

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