

Improving urban accessibility for inclusive cities

edited by
Viviana Pappalardo
Daniele La Rosa
Luca Barbarossa



FRANCOANGELI/Urbanistica



OPEN ACCESS FrancoAngeli solution

This volume is published in open access format, i.e. the file of the entire work can be freely downloaded from the FrancoAngeli Open Access platform (<http://bit.ly/francoangeli-oa>).

On the FrancoAngeli Open Access platform, it is possible to publish articles and monographs, according to ethical and quality standards while ensuring open access to the content itself. It guarantees the preservation in the major international OA archives and repositories. Through the integration with its entire catalog of publications and series, FrancoAngeli also maximizes visibility, user accessibility and impact for the author.

Read more: [Publish with us \(francoangeli.it\)](https://www.francoangeli.it)

Readers who wish to find out about the books and periodicals published by us can visit our website www.francoangeli.it and subscribe to “[Keep me informed](#)” service to receive e-mail notifications.

Improving urban accessibility for inclusive cities

edited by
Viviana Pappalardo
Daniele La Rosa
Luca Barbarossa

FrancoAngeli 

Map4Accessibility is funded by the European Commission within its Erasmus+ Programme, under KA-2 Cooperation for innovation and the exchange of good practices, Cooperation Partnership for Higher Education. Project Number: 2021-1-IT02-KA220-HED-000030320.

Views and opinions expressed are however those of the author(s) only and do not necessarily reflect those of the European Union or the European Education and Culture Executive Agency (EACEA). Neither the European Union nor EACEA can be held responsible for them.



**Co-funded by
the European Union**



Map4Accessibility

Isbn e-book: 9788835169192

Cover image: *Observing urban accessibility and barriers*

Copyright © 2024 by FrancoAngeli s.r.l., Milano, Italy.

This work, and each part thereof, is protected by copyright law and is published in this digital version under the license *Creative Commons Attribution-NonCommercial-NoDerivatives 4.0 International (CC BY-NC-ND 4.0)*

By downloading this work, the User accepts all the conditions of the license agreement for the work as stated and set out on the website

<https://creativecommons.org/licenses/by-nc-nd/4.0/>

List of contents

Preface, by *Viviana Pappalardo, Daniele La Rosa and Luca Barbarossa* pag. 7

Part One

Accessibility for all: projects and best practices

1. Service-Learning and accessibility: the Map4Accessibility experience, by *Mariela Filipova, Miglena Tsvetkova-Gaberska and Raffaele Pelorosso* » 13

2. A geography of inclusion: the project “accessible-to-all cities” of the Italian National Institute of Spatial Planning (INU), by *Francesco Alberti* » 28

3. Promoting accessibility and inclusion: a “bottom-up” project for Catania, by *Gaetano Giovanni Daniele Manuele* » 40

Part Two

Declining accessibility: from the normative dimension to the urban landscape

1. Accessibility standards in Germany: insights and observations, by *Luca Laule and Markus Bick* » 55

2. Evolution and application of Bulgarian normative base for urban accessibility in parallel to changing social attitudes, by *Hristian Georgiev* » 66

3. Tactical urbanism. A game changer for enhancing accessibility in urban environments, by <i>Natali Dimitrova and Polina Hitova</i>	pag 72
4. Accessibility to cultural heritage. Urban planning as a regulating principle in the definition of tools and strategies, by <i>Maurizio Francesco Errigo</i>	» 86
5. The architecture of public toilets: a measure of accessibility, by <i>Sebastiano D'Urso</i>	» 101

Part Three
Accessibility and novel research paths

1. A methodological proposal for the evaluation of urban spaces' accessibility, by <i>Viviana Pappalardo, Erika Russo, Daniele La Rosa and Luca Barbarossa</i>	» 125
2. Dynamic route generation for people with disabilities in the city of Córdoba based on Artificial Intelligence, by <i>José Manuel Alcalde Llergo and Enrique Yeguas-Bolivar</i>	» 141
3. A crowdsourcing user-centered approach to design a navigation system for people with impairment, by <i>Sediola Ruko, Raffaele Pelorosso and Andrea Zingoni</i>	» 151
About the authors	» 163

Preface

by Viviana Pappalardo, Daniele La Rosa and Luca Barbarossa

This book aims at exploring and conveying new insights into the state of the art of urban accessibility by presenting and discussing the most relevant issues about urban accessibility, to drive cities and institutions to a more inclusive and sustainable future.

The United Nations 2030 Agenda for Sustainable Development urgently calls for action towards accessibility-related targets. To make cities and human settlements inclusive, safe, resilient, and sustainable, for instance, it is important to ensure that all men and women, especially the vulnerable and impoverished, have equal rights to access basic services, sustainable transportation systems, affordable housing and other properties, inheritance, green and public spaces, and other natural resources. At the same time, sound policy frameworks at the national, regional, and international levels based on pro-impaired and vulnerable-sensitive development strategies are invoked to end poverty in all forms and everywhere. Furthermore, it is advocated that to achieve the goals of promoting equitable quality education, lifelong learning opportunities, and well-being for all, it is necessary to guarantee that individuals lead healthy lives and, in addition, that all students obtain the knowledge and skills required to advance sustainable development, including through education for sustainable development and sustainable lifestyles, human rights, and equality.

The Book is divided into three Topical Parts covering three domains related to urban accessibility. The contributions thus provide a heterogeneous collection of perspectives on the topic to reach a much broader audience than scientific academia, particularly by opening its contents to NGOs, practitioners, associations, researchers, and scholars.

Part One «Accessibility for all: projects and best practices» gathers lessons learned under the frameworks of national and international research and innovation projects, based on the outputs from case studies and the related supporting methodological approaches (digital accessibility, community mapping, service-learning, urban walking). Case studies dealing with different aspects of accessibility include urban policies, plans, design and implementation experiences, and other activities related to urban accessibility improvement and awareness.

The chapter «Service-Learning and accessibility: the Map4Accessibility experience» by Mariela Filipova, Miglena Tsvetkova and Raffaele Pelorosso, delves into the multifaceted realm of Service-Learning, examining its conceptual foundations and reveals the diverse ways in which the two essential concepts of Accessibility and Service-Learning might converge to enrich educational experiences within the landscape of Higher Educational Institutes. Keeping focused on the «right to the city» and the «right to urban life», the second chapter «A geography of inclusion: the project ‘accessible-to-all cities’ of the Italian National Institute of spatial planning (INU)», by Francesco Alberti, is dedicated to the «Accessible-to-all city» project and community, an initiative launched in 2016 by the Italian National Institute of Urban Planning. The last chapter of the section «Promoting accessibility and inclusion: a ‘bottom-up’ project for Catania», by Gaetano Giovanni Daniele Manuele, builds upon the principles of universal and inclusive design its narrative about a bottom-up initiative aimed at raising awareness of urban communities on architectural barriers and issues encountered by impaired in urban contexts.

In Part Two «Declining accessibility: from the normative dimension to the urban landscape», special focus is put on urban planning and urban and architectural design insights, as well as legal and policy frameworks across different geographical contexts.

The legal foundations for accessibility in Germany and Bulgaria are discussed respectively in the chapters «Accessibility standards in Germany: insights and observations», by Luca Laule and Markus Bick, and «Evolution and application of Bulgarian normative base for urban accessibility in parallel to changing social attitudes», by Hristian Georgiev. Both contributions provide a critical overview of efforts made towards creating a fully accessible urban environment and the remaining challenges regarding accessibility in the two European regions, alongside practical insights into the implementation of accessibility-related laws and regulations. Principles, methodologies, and strategies for enhancing urban accessibility via tactical urbanism are explored in the chapter «Tactical urbanism. A game changer for enhanc-

ing accessibility in urban environments», by Natali Dimitrova and Polina Hitova, which develops a step-by-step guide on implementing tactical urbanism based on successful case studies' experiences.

The chapter «Accessibility to cultural heritage. Urban planning as a regulating principle in the definition of tools and strategies», by Maurizio Francesco Errigo, acknowledges to urban planning and its relation with urban design and mobility the pivotal role in driving key urban transformations for an improved accessibility of places of cultural interest, particularly focusing on Viterbo as case study. The paradigm of public toilets as a measure of one of the most topical factors concerning the level of civilization and inclusion of any society is highlighted in the chapter «The architecture of public toilets: a measure of accessibility», by Sebastiano D'Urso, where the case study of the Tokyo toilets serves as an exemplary reference of architecture that breaks the barriers, eliminates obstacles and is at the service of society.

Theoretical backgrounds and novel research approaches on outstanding topics related to urban accessibility are collected in Part Three «Accessibility and novel research paths». The digital mapping and its potential utilizations is addressed in all chapters of the section although approaching the tools for different research and applications purposes.

The chapter «A methodological proposal for the evaluation of urban spaces' accessibility», by Viviana Pappalardo, Erika Russo, Daniele La Rosa and Luca Barbarossa, investigates the characterization of the urban environment based on its potential accessibility by different vulnerable groups. It combines field survey research with GIS-based analysis to measure accessibility and inform the identification of proper planning and design solutions for addressing common accessibility physical issues. The other two chapters «Dynamic route generation for people with disabilities in the city of Córdoba based on Artificial Intelligence», by José Manuel Alcalde Llergo and Enrique Yeguas Bolívar, and «Crowdsourcing user-centered approach to design a navigation system for people with impairment», by Sediola Ruko, Raffaele Pelorosso, Andrea Zingoni, share a deeper focus on digital technology solutions that facilitate greater accessibility in urban environments. The first contribution focuses on automatic route generation using artificial intelligence, based on the behavior of people with disabilities and the adaptation of navigation routes to meet the various individual needs taking into account physical, sensory, communicative, and social barriers. The second paper describes the web application designed under the Map4Accessibility Project to help impaired persons move around a city independently by identifying the accessibility of a chosen destination through a specific rating system and navigating toward it. This application leverages a combination of user-generated ratings and

real-time data, allowing individuals to make informed decisions and navigate their surroundings with confidence.

This book has been developed within the Map4Accessibility Project, funded by the European Union under the Erasmus+ Program. The project fostered the civic engagement of students of Higher Education institutions about urban accessibility through service-learning approaches, and to involve stakeholders in the co-creation of a pan-European Web App to identify and map basic information on the accessibility of public spaces in different European cities.

The contributions of this book represent one of the most relevant results of the project, to support and sustain its long-term durability while highlighting the fundamental role of a joint research and educational network of institutions, associations, NGOs, and research centers committed to promoting social inclusion and sustainability of development and community. To this aim, most of the authors of contributions have been selected among the members of the Map4Accessibility Project and other scholars who contributed to its implementation.

The goal of the book is to valuably enrich the knowledge and awareness of scholars, public administrations, and other stakeholders interested in the management of accessibility-related issues, which are going to emerge as increasingly urgent challenges in daily urban functioning. Urban communities can no longer postpone taking on the responsibility of adapting cities and institutions to the needs of all residents and urban users and ensuring the complete fulfillment of human rights.

Part One

Accessibility for all: projects and best practices

1. Service-Learning and accessibility: the Map4Accessibility experience

by Mariela Filipova, Miglena Tsvetkova-Gaberska and Raffaele Pelorosso

1. Introduction

Achieving effective sustainable transformation in urban systems requires a conscious and responsible network of citizens, fostering collaboration (in addition to competition), and nurturing a connection to places and the environment as a whole (Leone, Gobattoni, and Pelorosso, 2018; Pelorosso, Gobattoni, and Leone, 2017). Therefore, we need to consider all people and living beings as part of a unicum, promoting inclusion processes as much as possible. But what does inclusion mean? From a broadened perspective, it means recognizing the immense and enduring value of every single living being, including ourselves. By acknowledging this value, we understand that within this network of social relationships we are part of, there is space for each of us. However, real inclusion is only possible if there is empathy, not just as emotional sensitivity, but as a cognitive experience that shapes our thoughts about common assets and our relationship with them.

Inclusion also means accessibility, and vice versa. Pelorosso et al. (2022) provided this definition of accessibility:

Accessibility refers to the possibility to access a place, an urban area for all and in all its aspects: places, buildings, shopping areas, public transports. Accessibility refers to how a place is inclusive, allowing people to reach every place they want without the necessity to be assisted by a caregiver. Achieving urban accessibility equals to having accessible paths, roads, allays, parks etc. (e.g., ramps, pathways for the blind people with tactile markings, traffic lights with soundmarking, special equipment to light during the night on roads with STOP signposts). In general, to define something as accessible in the city it must be easy-to-use or possible-to-use from all the citizens of the community without excluding anyone – regardless of disability, age, sex, ethnicity etc.

Ensuring accessibility for everyone is essential for building sustainable and equitable cities. The extent to which institutions provide accessibility also reflects the level of inclusiveness.

Service-Learning (SL) is a pedagogical approach that effectively develops both hard and soft skills. Since its formalization in 1979, SL has been defined and applied in various ways (Felten and Clayton, 2011) and has taken root differently around the world (Lozano, 2022). SL involves educational projects and community service programs designed to address real needs within a community, often in collaboration with that community (Pelorosso et al., 2024). Students play a central role in SL, participating from the planning stages through to final evaluation, and integrating their learning experiences, including curricula, reflections, and skills development. The SL approach is complex and challenging, requiring the institution to be seen as a civic space open to community engagement. It reimagines the university as a 'community' of students, citizens, and employees, emphasizing connections with the economic, social, and cultural contexts in which the institution operates.

The European Observatory of Service-Learning in Higher Education (EOSLHE)¹, supported by the European Association of Service-Learning in Higher Education (EASLHE), was established in January 2019. It serves as a permanent space for cooperation and exchange among members of the European network Europe Engage. EOSLHE collects data, evidence, and promotes the use and institutionalization of this learning methodology. Its aim is to enhance and disseminate knowledge of SL in European higher education as an ideal teaching methodology for fostering civic engagement and, consequently, inclusion. Here following the SL definition of EASLHE.

Service-learning in higher education is an experiential educational pedagogy in which students engage in community service, reflect critically on this experience, and learn from it personally, socially and academically. The activities address human, social and environmental needs from the perspective of social justice and sustainable development, and aim at enriching learning in higher education, fostering civic responsibility and strengthening communities. Service-learning is always recognized with ECTS credits.

In this chapter, we present the main findings of the Map4Accessibility Erasmus+ Project regarding SL and its application in accessibility mapping procedures in urban contexts. The general aim is to provide teachers and university personnel with an overview of possible way of SL applications in High Educational Institutions (HEIs) to foster inclusion and accessibility for

¹ <https://www.eoslhe.eu/>

citizens with disabilities. First, a literature review on SL and universities is provided. Second, an introduction to SL and disability topics is presented. The third section details the SL method employed in the Map4Accessibility Project through the so-called explorative walks. Finally, a guideline and some suggestions for SL implementation in HEIs are provided.

2. SL and University

SL has been applied in different fields and classes. SL European cases are reported in fig. 1 distinguished by discipline. Here following is reported a brief review based on scientific literature.

Initial findings indicate that the information reviewed still tends to talk about issues related to SL. Cavalcanti-Bandos et al. (2021) surveyed a sample of business program curricula and interviewed its leaders and concluded that information on SL was not updated. Moreover, the finding show that the US and European HEIs surveyed have not yet developed enough activity to distinguish conceptually sustainable development, while the embedding of SL concepts in the curriculum is not fully developed. Playford D et al. (2019) reported an interesting connection between SL and the training of doctors by giving small tips for implementing effective service learning in medicine. Yoong SQ, et al. (2022) tracked the effect of synthesizing findings from published literature related to the educational effects of community-based learning involving older people in nursing education and evaluating the quality of existing training programs in service.

The SL has been employed in different HEI courses, e.g. criminal and social justice (Burke and Bush, 2013; Davis et al., 2014; Toporek and Worthington, 2014), social work (Postlethwait, 2012) and research based technical writing courses (Soria and Weiner, 2013; Stevens, 2014). In this regard, Burke and Bush (2013) have described the usefulness of SL in undergraduate students during their criminal justice course. Further, M. Salam et al. (2017, 2019) and Burke and Bush (2013) reported that their students found SL projects beneficial for them; however, there were some obstacles related to the required time and the limited resources, as well as some restrictions from students' families for participating in SL projects. Similar findings of another study by Davis et al. (2014) from criminal justice discipline support the notion of SL pedagogy and validate its positive impact on students' learning outcomes. Tracey and Kacin (2014) have proposed a design case framework for incorporating e-service learning in online courses. They have entailed a detailed description of processes involved in the devel-

opment of a virtual collaboration environment between SL participants, using modern ICT tools, e.g. email, instant messaging, Microsoft Teams, Skype, Zoom and Google applications. Moreover, Tracey and Kacin (2014) identified a set of good practices for integrating e-service learning in online courses, with the support of ICT for creating a virtual environment. Billig and Furco (2002) have highlighted that SL activities raise competence levels, school and university activities participation, the motivation to study, to improve self-esteem and that favour the acquisition of pro-social behaviours. The objective of these initiatives is to create paths that can convey the importance of responsibility and commitment to the community and to the common good: students who participate in these experiences grow in terms of the development of their sense of humanity, as they experience first-hand the values of solidarity, inclusion, civic engagement. In the same way the same students learn more easily and achieve better results than peers who do not have participated in this type of activity. According to Shelley H. Billig (2000), SL facilitates the achievement of certain objectives and the acquisition of the competence objectives envisaged by the various study paths. The academic literature highlights also positive implications for the institutionalisation of SL. Lin (2021) explores the different perspectives in the introduction of SL and the impact on students by re-examining their emotional state. Another paper tracks game-based learning and the use of SL to teach inclusive education in higher education (Rodríguez-Ferrer et al., 2023). Gonzales et al. (2020) searched for a systematic approach and conducted a literature review on the use of SL in pharmacy education. The authors concluded that SL is a useful component in all aspects of pharmacy education. Student and patient perceptions suggest that SL can enhance knowledge and improve overall health outcomes. Definitely, incorporating interprofessional education into SL offers benefits to all health care students (Gonzales et al., 2020).

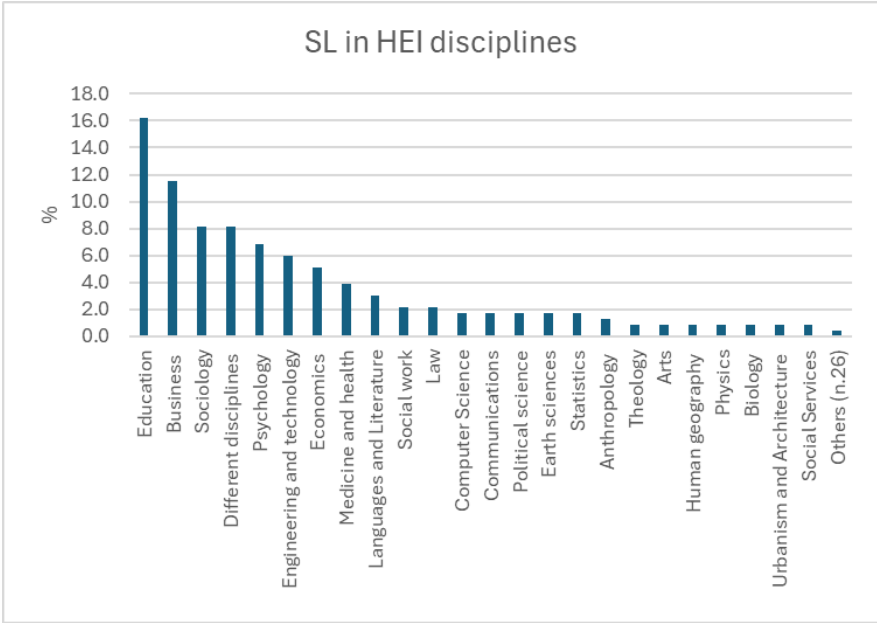


Fig. 1. SL projects distribution per HEI discipline in Europe. Education is the most represented with 38 SL project followed by business and sociology. Several SL projects across more than one discipline (8%). SL is present with only one project for 26 different disciplines (Source: EOSLHE, PR4).

Julie (2015) underlines the need for an SL framework as a way of teaching in universities by presenting the experience of embedding such a programme from the School of Nursing at the University of the Western Cape. Details from the South African Higher Education Quality Committee (HEQC) are also discussed, providing the necessary documentation to guide higher education institutions in facilitating the institutionalisation of SL in their academic programmes. The author concludes that the SL implementation framework meets the objectives of SL institutionalisation, namely to develop a common language and set of principles to guide practice and to ensure the allocation of resources to facilitate the methodology of SL teaching.

3. SL and disability

SL has been applied to promote inclusion, particularly in addressing the challenges faced by individuals with disabilities (Lozano, 2022; Winter, 2023). Gent and Gurecka (2001) noted that many SL projects can inadvert-

ently perpetuate disablism when approached stereotypically. Often, the barriers faced by people with disabilities are more related to societal attitudes than the disabilities themselves. To avoid these pitfalls, Gent and Gurecka recommend focusing on four key elements when planning and developing SL projects: training teachers in SL and disability issues, emphasizing reflection, and involving people with disabilities as equal partners in the service provision.

An example of SL in action is the PRINT3D project, which aims to improve accessibility for people with visual impairments while teaching primary and secondary school students basic engineering skills through 3D design and printing. Supported by the European Erasmus+ Programme (2017-1-ES01-KA201-038019), this project promotes empathy with visually impaired individuals, helps students understand their accessibility needs, and encourages them to collaboratively generate and prototype solutions. The students designed and printed 3D objects such as subway line plans, facility layouts, signage, and artistic objects accessible to the visually impaired. The project outcomes included increased motivation, social awareness, and technical skills, particularly among students at higher risk of dropping out of school.

SL is a transformative experience not only for students but also for teachers. It provides an opportunity for educators to challenge and overcome misconceptions about the capabilities of students with disabilities by integrating SL into an inclusive classroom setting (Ashton & Arlington, 2019).

Dymond et al. (2008) discovered that SL is increasingly being used with students with disabilities as it aligns with various curriculum and instructional standards while addressing vocational and life skill goals often included in Individual Education Programs (IEPs). SL also promotes critical thinking, allowing students with diverse abilities to participate in meaningful ways. By working alongside their non-disabled peers on community-based projects, students with disabilities can engage in inclusive environments that support both their academic and IEP goals, particularly in areas such as social communication, executive function, and emotional regulation. An inclusive SL project enables students with disabilities to participate alongside their non-disabled peers, fostering a diverse and cooperative learning environment. This model benefits all students by promoting interpersonal skills like cooperation and building character traits such as respect.

4. SL and Map4Accessibility

The literature review reveals that there are only a few SL applications

addressing accessibility issues. To bridge this gap, the 3 years Map4Accessibility Project, funded by the EU Erasmus+, was launched in December 2021. This project involves evaluating the accessibility of four cities: Catania (Italy), Berlin (Germany), Blagoevgrad (Bulgaria), and Lisbon (Portugal), with local university students participating. The students employed a SL approach based on exploratory urban walk guide to identify issues and propose solutions through surveys and mapping procedures. The SL-based guide for Explorative Walks, developed in the project's first phase, supported the students and is documented in Pelorosso et al. (2022) and Pelorosso et al. (2024). It is important to note that the guide is of a general nature and can be utilized to create Explorative Walks for various urban contexts and issues using a SL pedagogical approach. During these walks, student groups also tested the Map4Accessibility app, developed over the three-year project to offer users, with or without disabilities, a free, open, accessible, and multi-lingual tool for registering information about urban environments. While the app and its development constitute a community service and part of the SL initiative, it is not the focus of this contribution. The app can be downloaded from the Map4Accessibility.eu website. Here, we report only the main results for the study case of Blagoevgrad (Fig. 2).

On 26 and 27 September 2022, exploratory walks group were held in SWU "Neofit Rilski" Blagoevgrad. Participants were selected and invited by SWU staff. A total of 37 students of the Bachelor's of Kinesitherapy participated and were led by 2 walk leaders – assoc. prof Mariela Filipova and ch. assist. Miglena Tsvetkova-Gaberska. Several routes were covered on foot and by public transport. Five nodal routes were defined. They were consulted with the disabled person from the Multiple Sclerosis Society who pointed out the hotspots for disabled people in the city. The routes also cover the most visited places in the town. On the first day (26th Sep) 17 students took part in the EW, on the second day – 20. The students were divided into groups of 5 and were familiarized with the route and the checklist. A student with disability (multiple sclerosis, requiring walking aid) participated in the walk as well. All the groups had to focus on the accessibility of their surroundings along the chosen route and mark crisis points and locations. During the exploratory walk, different aspects of accessibility of a predefined route were documented on a standardized survey sheet by each student. The students had two ways to investigate the route, by walk first, and by bus, coming back to the start point. Features and issues of the urban spaces and routes, difficulties encountered and suggestions for improvement were also discussed during the exploratory walk.



Fig. 2. The five routes explored in Blagoevgrad.

Some topics and suggestions emerged from the conducted EW. The integration of disabled people would be most successful when the individual is considered in its entirety. Basically, students identified the needs to provide supportive measures as a package service from all institutions.

Examples are:

- The improvement of the street surface, as well as the construction of sidewalks and alleys for people with disabilities will allow them to move freely.
- Construction of ramps and elevators in places where there are stairs and limited access, as well as in public transport.
- Providing more parking spaces to prevent improper parking of cars that restrict free movement.

The applied educational approach combined formal learning sessions in the classroom on the theory and practical skills to observe and describe the surrounding urban environment. Students had the opportunity to focus on the various barriers that prevent the free movement of people with disabilities.

The students created data while they documented the accessibility on urban areas on the route described above. Those data can be implemented in the app which is being developed which can be seen as a service to the society. The students learned a lot about the topic of accessibility. On the other hand, the EW was the first step in engaging and integrating the students in the upcoming activities related to the project and the implementation of practices important for the activity in HEI.

5. SL implementation in HEI

The policy of the academic management is in line with the leading decisions, principles, ideas of national commissions and the European Commission in the field of higher education, namely: The communiqué of the conference of the ministers responsible for higher education Leuven and Louvain-la-Neuve from April 28-29 2009 “Bologna Process 2020 – The European Higher Education Area in the new decade”². It emphasizes that higher education at all levels should be based on modern scientific knowledge and scientific development, thereby pushing forward creativity and innovation in society, and that university programs should ensure high quality thematic research³. The Budapest and Vienna Declaration of 12 March 2010 on the European Higher Education Area, as well as the Bulletin of the Bologna Policy Forum (Vienna, 12 March 2010)⁴, state that we need increased cooperation between higher education systems education and research in different regions of the world⁵. Almost all European countries are members of the European network ENIC/NARIC, which was created to establish cooperation in the field of recognition of diplomas, ECTS credits and study periods between the countries of the European Economic Area and the countries that have ratified the Lisbon Convention (the Recognition Convention of qualifications relating to higher education in the European Region)⁶. The introduction and integration of SL training with a certain number of credits for university subjects would allow a better understanding of this type of training in general. It is recommended that the training courses take the form of electives or optional subjects, and it is appropriate to include them in the curriculum of a very large number of subject areas (according to the requirements of the universities where the training takes place).

² <https://ehea.info/page-ministerial-conference-Leuven-Louvain-la-Neuve-2009>.

³ https://ec.europa.eu/commission/presscorner/detail/bg/IP_09_615.

⁴ <https://www.ehea.info/cid102841/bologna-policy-forum-vienna-2010.html>.

⁵ https://www.europarl.europa.eu/ftu/pdf/bg/FTU_3.6.4.pdf.

⁶ <https://www.enic-naric.net/>.

Almost all universities are starting to look for an SL training option. On the EOSHOLE site, there is a growing trend towards project activity in this direction⁷.

An objective of Map4Accessibility is to support SL integration into HEI by a handbook of best practice and guideline. So, the best practice guide has been produced on how to implement ECTS-recognised service learning as a pedagogical methodology in educational institutions (not limited to higher education institutions). It covers ways of involving students in real-life, community-based and needs-driven projects in addition to the theoretical knowledge acquired in their academic studies. The handbook focuses on disability and inclusion SL experiences for students. These experiences are also visualised with protocols (models) to facilitate the creation of SL courses (Fig. 3).



Fig.3. Service-Learning Protocol: a framework (source Map4Accessibility SL handbook).

The objective of the SL protocol is to establish a framework for service-learning activities that integrate community service with academic instruction, fostering civic responsibility and enhancing student learning.

The benefits are:

- Promotes active citizenship and social responsibility among students.
- Enhances student learning by applying academic concepts to real-world contexts.
- Builds meaningful connections between educational institutions and local communities.

⁷ <https://www.eoslhe.eu/service-learning-resources-library/>

- Addresses community needs and fosters positive social change.

The challenges are:

- Balancing academic rigor with practical service requirements.
- Managing logistics, including transportation, scheduling, and resource allocation.
- Addressing potential power dynamics and ethical considerations in community partnerships.
- Providing adequate support and supervision for students engaged in service activities.

While the protocol can serve as a blueprint for SL implementation, making the SL approach promptly understandable to all teachers can be challenging in a context of complexity and bureaucracy. To assist teachers in structuring their courses, AI tools such as ChatGPT can be utilized (Mollick and Mollick 2023). Below, we propose a prompt for ChatGPT to help build SL courses. It is important to note that the results should be carefully adapted and modified to meet individual needs, and the SL literature (most of which is cited in Map4Accessibility reports) should be consulted to ensure effective student involvement, learning outcomes, and measurable services.

Let's explore how you can integrate Service-Learning into your teaching course. Please, copy and paste the following string text into ChatGPT and answer a few questions.

ChatGPT, you're an expert teacher who provides assistance with the concept of Service-Learning. You'll ask me to describe the current topic I'm teaching and the name of the course where I would like to include Service-Learning. You'll also ask about the audience or class level. Then, you'll suggest four ideas on how to incorporate the current topic into my course using the Service-Learning approach. Finally, provide two questions I can ask the class to refresh their memory on the topic.

Here we reported an example of response for Urban Planning Course at University; topic: inclusion and accessibility.

[...] Given that you're teaching urban planning and focusing on inclusion and accessibility, here are four ideas on how to incorporate Service-Learning into your course:

1. **Community Accessibility Audit:** Organize a project where students conduct accessibility audits of public spaces in the local community. This could involve assessing sidewalks, public transportation, parks, and buildings for compliance with accessibility standards. Students can collaborate with local disability advocacy groups to identify areas for improvement and propose solutions for enhancing accessibility.

2. **Design Charrettes for Inclusive Spaces:** Host design charrettes where students work in teams to develop inclusive design proposals for urban spaces. Invite members of the community, including individuals with disabilities, to participate in the charrettes and provide feedback on the proposed designs. Students can then refine their proposals based on the input received, incorporating principles of universal design and accessibility.

3. **Community Engagement Workshops:** Organize workshops or seminars on accessibility and inclusion for community members, policymakers, and urban planners. Students can research best practices in inclusive urban planning and lead discussions on topics such as accessible transportation, housing, and public spaces. This provides an opportunity for students to share their knowledge with the community while also learning from diverse perspectives.

4. **Policy Analysis and Advocacy:** Assign students to research local policies and regulations related to accessibility and inclusion in urban planning. They can analyse the effectiveness of existing policies, identify gaps or areas for improvement, and develop advocacy strategies for promoting more inclusive policies. Students can then present their findings to local government officials or community organizations, advocating for changes to improve accessibility in the built environment.

Now, to refresh your class's memory on the topic, here are two questions you can ask:

1. What are some key principles of universal design, and how can they be applied to enhance accessibility in urban planning?

2. Can you provide examples of urban planning initiatives or projects that have successfully promoted inclusion and accessibility in diverse communities?

[...] Feel free to tailor these ideas and questions to suit your specific teaching objectives and the needs of your students. Let me know if you need further assistance or have any other questions!

6. Conclusions

Service learning (SL) provides a profound opportunity for students to transcend the boundaries of the classroom and engage with communities in meaningful ways. By applying critical analysis to real-world issues, students not only deepen their understanding of High Educational Institution (HEI) disciplines, but also cultivate empathy, social awareness, and civic responsibility. SL serves as a bridge between academic study and community engagement, encouraging students to reflect on the complexity of the human

experience and the challenges faced by diverse communities. By integrating service activities into the HEI courses, educators empower students to become agents of positive change and advocates for social justice and equity. The impact of SL in HEI extends far beyond the classroom, enriching students and communities alike. Indeed, through collaborative partnerships with local organisations, students have the opportunity to contribute their time, skills and knowledge to address pressing social issues, from inclusion and education to environmental sustainability and cultural preservation. Research indicates that the advantages of SL for students with disabilities significantly outweigh the drawbacks.

Within this context the Map4Accessibility Project is born. Map4Accessibility Project engaged students with narratives and urban walks that reflect diverse perspectives and experiences, and the students gained insight into the complexity of accessibility issues also providing suggestions for the development of an innovative citizen science app to map urban accessibility. In conclusion, the results of Map4Accessibility project, first of all the handbook for SL implementation in HEI, aim to foster effective SL introduction in academic courses and to inspire a new generation of compassionate leaders committed to building a more just and equitable world.

References

- Ashton, J., & Arlington, H. (2019), "My Fears Were Irrational: Transforming Conceptions of Disability in Teacher Education through Service Learning", *International Journal of Whole Schooling*, 15(1), 50-81.
- Billig, S., & Furco, A., (2002), "Service-Learning: Through a Multidisciplinary Lens. Advances", in *Service Learning Research Series*, ISBN-1-931576-80-.
- Burke, A. S., & Bush, M. D. (2013), "Service learning and criminal justice: An exploratory study of student perceptions", *Educational Review*, 65(1), 56-69. <https://doi.org/10.1080/00131911.2011.638138>.
- Cavalcanti-Bandos, M.F., Quispe-Prieto, S., Paucar-Caceres, A., Burrowes-Cromwel, T. and Rojas-Jiménez, H.H. (2021), "Provision of education for sustainability development and sustainability literacy in business programs in three higher education institutions in Brazil, Colombia and Peru", *International Journal of Sustainability in Higher Education*, Vol. 22 No. 5, 1055-1086. <https://doi.org/10.1108/IJSHE-07-2020-0247>.
- Davis, J., Cronley, C., Madden, E. E., & Kim, Y. K. (2014), "Service-learning use in criminal justice education", *Journal of Criminal Justice Education*, 25(2), 157-174. <https://doi.org/10.1080/10511253.2014.882367>.
- Dymond, S. K., Renzaglia, A., & Chun, E. J. (2008), "Inclusive high school service learning programs: Methods for and barriers to including students with disabilities", *Education and Training in Developmental Disabilities*, 43(1), 20-36.

- Felten, P., & Clayton, P. (2011), "Service-Learning", *New Directions for Teaching and Learning*, 75-84.
- Gent, Pamela & Gurecka, L. (2001), "Service-Learning : A Disservice to People with Disabilities?", *Michigan Journal of Community Service Learning*, 36-43.
- Gonzales, AD., Harmon, KS., & Fenn, NE., (2020), 3rd. "Perceptions of service learning in pharmacy education: A systematic review", *Curr Pharm Teach Learn*, Sep., 12(9), 1150-1161.
- Julie, H., (2015), "The development of an implementation framework for service-learning during the undergraduate nursing programme in the Western Cape Province", *Curationis*, 38(2), 1563.
- Leone, A., Gobattoni F., & Pelorosso R. (2018), *Pianificazione e Incertezza. Una Bussola e Alcune Mappe per Navigare Nel Mondo Liquido*, FrancoAngeli, Milano.
- Lin, TH. (2021), "Revelations of service-learning project: Multiple perspectives of college students' reflection", *PLoS One*, Sep 23, 16 (9). <https://doi.org/10.1371/journal.pone.0257754>. PMID: 34555105; PMCID: PMC8459965.
- Lozano, O. (2022), "PRINT3D, a Service-Learning Project for Improving Visually Impaired Accessibility Through Educational 3D Printing", *Journal of Pre-College Engineering Education Research*, 12(1), 60-80.
- Mollick, E., & Mollick, L. (2023), "Using AI to Implement Effective Teaching Strategies in Classrooms: Five Strategies, Including Prompts", *SSRN Electronic Journal*, <https://ssrn.com/abstract=4391243> or <https://doi.org/10.2139/ssrn.4391243>.
- Pelorosso, R., Carbone, L., Zingoni, A., Camporese, F., Ruko, S., Urbani T., Lucchetti, L., Noto, M., & Calabrò, G. (2022), *Project Result 1 Map4accessibility Service-Learning and Community Mapping Methodology*, Technical Report. <https://doi.org/10.13140/RG.2.2.13016.98567>.
- Pelorosso, R., Gobattoni F., & Leone, A. (2017), "The Low-Entropy City: A Thermodynamic Approach to Reconnect Urban Systems with Nature", *Landscape and Urban Planning*, 168, 22-30.
- Pelorosso, R., Zingoni A., Ruko S., & Calabrò G. (2024), "Map4Accessibility Project, An Inclusive and Participated Planning of Accessible Cities: Overview and First Results", *Innovation in Urban and Regional Planning*. INPUT 2023. Vol. 463, 266-77, edited by A. Marucci, F. Zullo, L. Fiorini, and L. Saganeiti, Springer, Cham.
- Playford D, Bailey S, Fisher C, Stasinska A, Marshall L, Gawlinski M, Young S. (2019), "Twelve tips for implementing effective service learning", *Med Teach.*, Jan, 41(1), 24-27. <https://doi.org/10.1080/0142159X.2017.1401217>. PMID: 29171333.
- Postlethwait, A. (2012), "Service learning in an undergraduate social work research course. *Journal of Teaching*", *Social Work*, 32(3), 243-256. <https://doi.org/10.1080/08841233.2012.68734>.
- Rodríguez-Ferrer, J.M., Manzano-León, A. & Aguilar-Parra J.M. (2023), "Game-Based Learning and Service-Learning to Teach Inclusive Education in Higher Education", *Int J Environ Res Public Health*, Feb, 13, 20(4), 3-285.
- Salam, M., Iskandar, D. N. F. A., & Ibrahim, D. H. A. (2017), "Service learning

- support for academic learning and skills development”, *Journal of Telecommunication, Electronic and Computer Engineering (JTEC)*, 9(2-10), 111-117.
- Salam, M., Awang Iskandar, D. N., Ibrahim, D. H. A., & Farooq, M. S. (2019), “Technology integration in service-learning pedagogy: A holistic framework”, *Telematics and Informatics*, 0(0), 10-45.
- Shelley, H., (2000), *The Effects of Service Learning*, Service Learning, General. 42. <https://digitalcommons.unomaha.edu/slceslgen/42>.
- Soria, K. M., & Weiner, B. (2013), “A ‘virtual fieldtrip’: Service learning in distance education technical writing courses”, *Journal of Technical Writing and Communication*, 43(2), 181-200. <https://doi.org/10.2190/TW.43.2.e>.
- Stevens, C. (2014), “The community grant writing project: A flexible service-learning model for writing-intensive courses”, *Journal of Higher Education Outreach and Engagement*, 18(2), 261-280.
- Toporek, R. L., & Worthington, R. L. (2014), “Integrating service learning and difficult dialogues pedagogy to advance social justice training”, *The Counseling Psychologist*, 42(7), 919-945.
- Tracey, M., & Kacin, S. (2014), “Graduate students in a service learning design case: the development of a parenting program”, *Journal of Computing in Higher Education*, 26(3), 227-237.
- Yoong SQ, Liao AWX, Goh SH, Zhang H. (2022), “Educational effects of community service-learning involving older adults in nursing education: An integrative review”, *Nurse Educ Today*, Jun, 113, 105376. <https://doi.org/10.1016/j.nedt.2022.105376>. Epub 2022 Apr 20. PMID: 35489329.
- Winter, Ch. (2023), “Promoting Inclusion for Students Through Service-Learning.” Master’s Thesis, Bethel University. Spark Repository. Available at: <https://spark.bethel.edu/etd/964>.

2. *A geography of inclusion: the project “accessible-to-all cities” of the Italian National Institute of Spatial Planning (INU)*

by Francesco Alberti

1. Introduction

In a famous *lectio magistralis* delivered to the American Planning Association in 2005, the prominent British urban planner Peter Hall (1932-2014) questioned whether the sustainable city was a “mythical beast”, concluding that while there is still no such thing as a fully sustainable city (and this is still true today, almost two decades later), a large number of best practices related to partial aspects demonstrate that it is an achievable goal, at least a “possible utopia”, through the dissemination, adaptation and systematization of virtuous solutions successfully tested in various parts of the world in response to globally widespread problems. Therefore, “What we need to do, above all is learn from best practice, to learn from each other.”¹.

Shifting the focus from the general theme of the sustainable city to the more specific theme of the city “accessible to all” (which, as is evident, has a large overlap with the former with regards to the social dimension of sustainability), it is legitimate to ask the same question, getting a similar answer.

As in the case of urban sustainability, universal accessibility calls into question first and foremost the public sector and its capacity to develop integrated policies and play the role of “director” in urban transformation processes. The aim is to ensure that every single intervention planned, regardless of its size or the expenditure chapter to which it relates (e.g. a new infrastructure, the rehabilitation of a brownfield site, the resurfacing of a pavement), or every initiative promoted or supported, aimed at citizens or city users, is functional to achieve an improvement in the initial conditions. In both cases, the basis for measuring the effectiveness of such policies is the public domain in all its components: spaces, equipment and collective services. With

¹ The lecture was later edited and published in (Hall, 2009).

a fundamental distinction: if sustainability is indeed an “added value” – albeit an indispensable one – for the functioning of the city, accessibility is a precondition for the use of any space or service, and thus ultimately for the exercise of the “right to the city” itself – that is, quoting Lefebvre’s seminal book on the topic «the right to urban life» (Lefebvre, 1968). Accessibility is the zero degree of social inclusion that the city as such should guarantee, however and wherever it may be.

According to the *Charter of Public Space*, adopted by the Italian National Institute of Urban Planning (Istituto Nazionale di Urbanistica – INU) on the occasion of the first Public Space Biennale, held in Rome in 2013, and which has become one of the most important documents on the subject in the UN Habitat Program, «Eliminating and/or overcoming the physical barriers that impede or limit access to certain categories of users is [...] a priority goal to pursue both in the design of new public spaces and in the adaptation of existing ones» (Garau, 2015: 118). This confirms that this right is in fact often denied to many people (especially those with permanent or temporary motor, sensory and intellectual disabilities), whose numbers are increasing on the European continent due to the ageing of the population.

In Italy, such a limitation of individual rights – which is, moreover, enshrined in the Constitution of the Republic itself² – does not depend so much on deficiencies in the regulatory and instrumental apparatus. In fact, since the end of the 1970s, technical standards have been in place to make buildings accessible to disabled users, followed in the mid-1980s by a national law that made them mandatory for new public buildings or buildings open to the public, and required all institutions to adapt existing buildings. In 1992 the same principle was extended to public space and services, such as public transport or, for example, bathing facilities at the seaside. Since then, all Municipalities must draw up Plans for the Elimination of Architectural Barriers (Piani per l’Eliminazione delle Barriere Architettoniche) – the so-called PEBA. More recently, Italy has ratified the UN Convention on the Rights of Persons with Disabilities adopted in 2006, with a law which establishes the National Observatory on the conditions of Persons with Disabilities. The problem is that existing regulations are often ignored, only formally applied, or otherwise rendered ineffective by fragmented and uncoordinated interventions.

² Actually, according to the article 3 of the Constitution of the Italian Republic (1947) «It is the duty of the Republic to remove the economic and social obstacles which, by limiting the freedom and equality of citizens, prevent the full development of the human person and the effective participation of all workers to the political, economic and social organization of the country».

2. The “Accessible-to-all city” project and community

This is the backdrop to the initiative launched in 2016 by the aforementioned National Institute of Urban Planning, to which this article is dedicated.

The INU is a non-profit association, member of the European Council of Town Planners. Founded in 1931, it has been recognized by the Italian State since 1949 as a “high cultural and technical coordination body” and since 1997 as an association for the protection of the environment. Its members are urban planners, architects, engineers working as professionals, academics or civil servants, other experts concerned with urban and territorial issues – such as economists, sociologists and lawyers – as well as collective subjects and groups, such as public institutions, universities, professional orders, other associations, etc.

INU is present in every Italian region with a local division, but it is also organized in thematic groups or “communities”, open to external contributions, focused on different planning issues, such as transport and infrastructure, climate adaptation and mitigation, urban regeneration, etc. A specific INU community is dedicated to urban and territorial accessibility and oversees the “Accessible-to-All Cities” project³. Its mission is to share and network the good practices, spread all over Italy but often isolated and little known, aimed at improving the way cities and territories respond to the needs of all citizens and city users – that is, the functioning of the city – considering the diversity of people as an enrichment and the possibility of accessing the urban places and services as an inalienable right of everyone, regardless of his/her state of health, disability, gender, age, economic conditions, culture, religion, etc.

Since its establishment, a network of public and private stakeholders – regions, municipalities, universities, citizens' and professional associations, representatives of people with disabilities, freelancers, scholars, etc. – has been formed and continues to grow, sharing experiences, problems and possible solutions.

Through the organization of dozens of meetings, seminars, workshops, conference sessions and webinars, more than 200 experiences have been gathered in the three planning cycles of the Community's activities (2016-2018, 2019-2022, 2023-2025), including studies and research, public policies and both tangible and intangible actions. Some of these occasions took place within the framework of national events promoted by INU, such as the

³ The project was initiated at the 29th INU Congress in April 2016 from a proposal by Luigi Bandini Buti, architect and ergonomist, Giorgio Raffaelli, president of the Foligno based “Festival delle Città Accessibili” Association, and architects Iginio Rossi and Fabrizio Vescovo. The INU Community is now coordinated by Iginio Rossi and Alessandro Bruni.

Biennale of Public Space in Rome, the Urbanpromo and Urbanpromo Green conferences in Venice, Milan and Florence, the INU Study Days in Naples and the Institute's National Congresses. On other occasions, the INU has collaborated with its partners in the organization of events related to the world of accessibility – as in the case of the workshop held in Florence on the “World Accessibility Day” (May 16, 2024), aimed at defining, through discussion on thematic tables of public and private stakeholders, the guidelines for the policies of the Region of Tuscany on universal accessibility. Since 2021 the INU Community “Accessible-to-all Cities” also promotes an annual award for theses and research-studies that, from different disciplinary perspectives, propose innovative approaches to issues of spatial justice and social inclusion.

The set of experiences discussed in the eight years of the Community's activity, if on the one hand it returns the variety of more or less structured and consolidated contributions from the world of institutions and civil society to the overcoming of barriers that affect the right of self-determination of many citizens, on the other hand it highlights how the phenomenology of such barriers is broad and articulated, including:

- physical, sensory and cognitive barriers that affect the independence and quality of life of individuals and communities, as well as access to mobility, urban amenities and public spaces;
- cultural barriers that limit access to cultural heritage, museums and natural areas;
- social barriers, which relate to the relationships between people and the degree of inclusiveness of living and working environments;
- health and safety barriers, which relate to access to health care and the right to live in a safe environment;
- economic barriers related to working conditions and access to housing, consumer goods, recreation and tourism.

3. The mapping and indexing of good practices

One of the objectives pursued since the inception of the Community has been to create a dynamic map of initiatives and activities carried out by the actors involved in the various initiatives, as a tool for the sharing of good practices, with the aim of spreading a culture of accessibility and inclusion that goes beyond the mere application of current regulations to overcome architectural barriers, and encouraging the exchange and emulation of the most effective experiences.

On the occasion of the 30th INU Congress (2019), the “Accessible City

for All” project and community website was finally launched. In a section of the site entitled “Practices and Places”, a web GIS map of the collected good practices is offered for consultation, indexed in a database and easily searchable⁴. By clicking on the map, the user is directed to a downloadable sheet containing the full description of the selected project, chronology and state of the art, costs, a description of the process followed by the initiative, the list of proposers and stakeholders involved, and one or more contact addresses.

The mapped elements are searchable by spatial keys, classification, and tags related to their specific field of application (e.g., tourism, public space, health, etc.)

Spatial keys distinguish practices at the local or regional level.

Moreover, projects are classified into four categories:

- Projects, related to the use of space, time and services in the city and the territory. The most recurring fields of application are sustainable mobility, public space, tourism for all; all projects are intended to contribute to urban well-being and to promote the autonomy of each citizen in urban life;
- Tools, related to spatial planning and organization. The aim is to integrate 360-degree accessibility in urban and regional planning, as well as in the programming of public works, from the level of ordinary maintenance to the construction of new urban infrastructure;
- Processes, related to the construction of integrated, inclusive and interactive policies. The collected practices are examples of how to establish a stable and constant dialogue between stakeholders to share, discuss and monitor accessibility projects. The promotion of participatory co-design is considered as one of the main objectives to be pursued in order to achieve 360 degree accessibility;
- Training, related to all practices aimed at increasing either social awareness or the know-how of professionals, communities, public officials, etc., in the design of accessibility projects and initiatives, taking into account their actual feasibility, management over time, fundraising, etc.

⁴ <http://atlantecittaccessibili.inu.it/> See also: Alberti & Chiarelli, 2022.



Fig. 1. Screenshots from the Atlas of best practices (Alberti & Chiarelli, 2022).

Among the initiatives surveyed, some involve mapping systems, either of barriers in the urban environment or of accessible places, such as the following:

- “Kimap. Digital ecosystem to support the mobility of disabled persons”. Kimap is a smartphone app developed by a Florence-based startup that offers an automatic mapping and navigation system fed with real-time information provided by the community of wheelchair or mobility scooter users who, with the app running on their smartphones, travel the streets every day, automatically generating and sharing data about the obstacles they encounter along the way, the state of the ground, road works, etc.
- “Accessible beaches” (“Spiagge accessibili”), supported by the private foundation Cesare Serono with Legambiente, one of the most important associations for the protection of Environment in Italy. The project is aimed at providing a multimedia mapping of beaches on the Italian coasts accessible to disabled users.

The upgrade and further development of the Atlas, created by a working group at the University of Triest, which, like other academic institutions, has joined the Accessible-to-all Cities project, is one of the actions planned by the Community for the three-year activity period 2023-2025.

4. The “Guidelines for Integrated Policies” and the “Network of Knowledge”

From the numerous public meetings held in person and remotely during the lockdown periods in 2020 and 2021 following the spread of the Covid-19 pandemic, and especially from those held using the roundtable methodology,⁵ clear frameworks of analysis and perspective have emerged over time. These have made it possible to identify a set of experiences which, unfortunately, are hardly considered by urban and territorial policies and are scarcely present in the knowledge and expertise to which urban and territorial planning and programming usually refer.

During the discussion tables, coordinated by facilitators from INU or other partner associations such as CERPA⁶, participants were invited each time to present their cases highlighting some key elements in order to make the different experiences more easily comparable and to facilitate, where possible, scalability and replicability in similar contexts. Namely:

- the contextual conditions;
- the strengths and weaknesses;
- any mistakes made and obstacles encountered.

The results of the discussions, in the form of summaries and reports, have been collected in a special section of the Community website entitled “Network of Knowledge” and have also been the main source for the drafting of the “Guidelines for Integrated Policies”: another tool made available on the website to disseminate and consolidate the lessons learned from the experiences discussed at the tables.

The guidelines, like the interactive map described above, have been developed by a working group of the INU Community led by the Faculty of Engineering and Architecture of the University of Trieste, partner of the Accessible-to-All Cities project, as well as other academic institutions, and are divided into four chapters corresponding to the classification adopted in the “Practices and Places” section of the website: projects, tools, processes and training.

⁵ In the online meetings, the methodology of the discussion tables was simulated through the organization of “virtual rooms” run in parallel by the videoconferencing platform and the use of “virtual whiteboards” for the annotation and clustering of issues that emerged in the debate.

⁶ The European Centre for Research and Promotion of Accessibility (Centro Europeo di Ricerca e Promozione dell'Accessibilità - CERPA Italia), The European Center for Research and Promotion of Accessibility is a non-profit association, established in 1993, whose main purpose is to contribute to the promotion of a culture of social inclusion and to promote experiences, knowledge and information on the topic of accessibility, seen as an evolving concept.

The integration of knowledge between practitioners and the world of research constitutes one of the essential pillars of the INU Community's approach to the promotion of a new culture of accessibility/social inclusion and one of the key messages of the Guidelines for Integrated Policies with regard to training. Hence also the need to reconstruct, with the collaboration of the local divisions of the Institute, an overview of the training, scientific research, and third mission activities (which imply collaboration with public administrations and/or civic groups in the implementation of research-actions, plans and projects), carried out by Italian universities in the various regional contexts, referring to the extended notion of 360-degree accessibility.

In 2022, two special sections in as many issues (No. 303 and No. 305) of INU's journal *Urbanistica Informazioni* edited by the Accessible-to-All Cities Community (Community Città accessibili a tutti, 2022a, 2022b), were devoted to "mapping" such initiatives, most of which are also little known outside the territories directly concerned, involving departments, laboratories and research units of the Universities of Udine, Venice (IUAV), Trieste, Genoa, Florence, Rome (La Sapienza), Catania and the Polytechnics of Turin and Milan. In many cases, these are methodological contributions related to the urban analysis of areas within historical or contemporary fabrics, as a premise for the development of place-based strategies of reconfiguration of physical space according to the principles of "Universal Design". One example is the GAP-REDUCE project developed by the Polytechnic University of Turin, aimed at creating an inclusive urban environment for people with autism (Talu & Tola, 2022).



Fig.2. An example of the mapping and filing of "facilitating elements" and urban obstacles in GAP-REDUCE research (Talu & Tola, 2022).

But the range also includes experiments aimed at improving well-being in the universities themselves – such as the desk office UNIFI include – guidance and listening for inclusion”, promoted by the University of Florence to support students with disabilities and those with specific learning disorders in their studies, as well as to counter discrimination related to gender or sexual orientation (Alberti & Manzi, 2022).

5. From surveying projects to the Pact for Urbanism

The geography of inclusion, resulting from the explorations carried out by the INU Community on the Italian territory, presents some hotspots made up of the pilot municipalities, associated with INU and already members of the Community, that have participated in the initiative “Pact for Urbanism – Accessible-to-All Cities”, launched in 2021 and still ongoing. These are eight municipalities in total, distributed from North to South Italy: Udine, Mantua, Genoa, Reggio Emilia, Ancona, Leghorn, Spello and Taranto.⁷ The outcomes of the first phase of the experiment were published in a special issue of *Urbanistica Informazioni* (Rossi, 2023).

The “Pact for Urbanism” mentioned in the title of the initiative is not to be understood as a negotiation between different actors prior to the drafting of planning instruments, nor as a technical protocol to be followed in the planning and implementation of interventions, but as an imperative commitment, a political and cultural choice to overcome the fragmentation and sectoral approach that still dominate public action and hinders the implementation of integrated policies, that are essential to achieve both the environmental sustainability and social inclusion goals.

Even the experiences explored and documented in the Atlas, while positive in themselves, testify to a widespread inability to integrate them into a broader strategy. This is due to the lack of public guidance capable of systematizing and optimizing the efforts of the various actors, who thus find themselves acting in isolation to respond to specific needs, with little impact on the collective well-being. By joining the Pact, the municipalities have made themselves available to discuss ongoing projects, and rethink them in terms of possible integration between different inputs and know-how as a key to managing fragmentation.

⁷ The City of Taranto had to abandon the ongoing experiment due to the commissioning of the municipal administration.

- “A pact for accessible-to-all cities” piloted in 8 Italian Cities.



Fig. 3. The map and objectives of the “Pact for accessible-to-all cities” initiative.

The range of projects selected by the cities for this experiment is wide: it includes general urban master plans as well as mobility and accessibility plans, urban regeneration projects, and projects for the revitalization of historic centers. The diversity of territorial and social contexts, infrastructural endowments, spatial configurations and characteristics of the built environment also gives the experiment a certain degree of representativeness of the different conditions in which medium-sized Italian cities operate.

To facilitate contacts between the INU Community and the municipalities without creating bureaucratic burdens, a contact person was identified in each city, such as the Disability Manager, the President or a member of the regional division of the INU, or a member of the “Accessible to All Cities” community itself. In addition, regional bodies were involved, as well as other institutions and universities in the area.

Phase 1 consisted of four workshops that brought together policy makers and technical and scientific referees from the eight cities to discuss their respective projects through the lenses of accessibility, active mobility, environmental sustainability, social inclusion, services for the autonomy of people with disabilities, the fragility and marginality of some population groups to be overcome, the role of urban and regional planning, and the impact of the pandemic on the social fabric, which was still ongoing in the first months of the initiative. Common themes and differences emerged from the discussion, both of which were useful in defining, on a case-by-case basis, the most effective ways to combine planning choices and the

design of urban spaces with intangible policies and measures aimed at responding to the needs of even the most vulnerable, with the aim of achieving 360-degree accessibility.



Fig. 4. Inclusive playground within Nora Park in the municipality of Reggio Emilia (Nobili, 2023).

By 2025, a second phase of evaluation of the results of both the projects and the processes developed in phase 1 will be carried out, which will lead to an update and improvement of the Guidelines for Integrated Policies and hopefully also enrich the Atlas of Good Practices with examples of coordinated multi-sectoral interventions capable of triggering virtuous processes projected in the long term.

Although the horizon of a city that is fully inclusive and accessible to all, throughout its whole connective system and in its functional and identity hotspots, is still far away, the ferment of initiatives all over the country, even if still insufficient to reach a critical mass, strengthens the initial assumption that it is not a chimera, but a possible utopia.

References

Alberti, F. and Chiarelli, B. (2022), “Accessible-to-All Cities. A Project of Networking Italian Experiences to Raise Awareness and Promote Universal Design”. In Garofolo, I., Bencini, G., Arengi, A. (eds.), *Transforming our World through Universal Design for Human Development, Proceedings of the Sixth Interna-*

- tional Conference on Universal Design, Brescia, 7-9 Sept. 2022*, IOS Press, Amsterdam, 111-119.
- Alberti, F. and Marzi, L. (2022), “L’accessibilità ‘a 360°’ nelle attività di ricerca e terza missione del Dipartimento di Architettura di Firenze”, *Urbanistica Informazioni*, 305, 77-79.
- Community Città accessibili a tutti (ed.) (2022a), “Accessibilità e inclusione sociale: il contributo delle università”, *Urbanistica Informazioni*, 303, 93-104.
- Community Città accessibili a tutti (ed.) (2022b), “Il contributo delle università per costruire maggiore consapevolezza su accessibilità e inclusione sociale”, *Urbanistica Informazioni*, 305, 75-87.
- Garau, P. (ed.) (2015), *Global Public Space Toolkit. From Global Principles to Local Policies and Practice*, UN Habitat – INU.
- Hall, P. (2009), “The Sustainable City: A Mythical Beast?”, in Piedmont-Palladino, S., Mennel, T. (eds.), *Green Community*, Routledge, New York, 2-11.
- Lefebvre, H. (1968), *Le droit à la ville*, Anthropos, Paris.
- Nobili, P. (2023), “Comunità e città, vivere inclusivo ed equo”, *Urbanistica Informazioni*, 308 s.i., 21-22.
- Rossi, I. (ed.) (2023), *Patto per l’Urbanistica. Città accessibili a tutti*, *Urbanistica Informazioni*, 308 special issue.
- Talu, V. and Tola, G. (2022), “Autismo e ambiente urbano. Il progetto di ricerca GAP-REDUCE”, *Urbanistica Informazioni*, 303, 100-102.

3. Promoting accessibility and inclusion: a “bottom-up” project for Catania

by Gaetano Giovanni Daniele Manuele

1. Disability and context

In Italy, the legislative decree approved on 15 April 2024 defines how the condition of disability is determined by «physical, mental, intellectual or sensorial impairments which, in interaction with barriers of different nature, can hinder full and effective participation in different contexts of life».

Unlike the definition formulated for law 104 of 1992 – in which disability was seen as a «physical, mental or sensorial minority, stabilized or progressive» – it considers the environmental aspects and the difficulties that a condition of disability can cause in carrying out of daily activities for an individual.

This new definition comes close to the criteria proposed by the International Classification of Functioning (ICF) disability classification, in which not only biomedical and pathological elements are considered but also social interaction.

The ICF was introduced by the World Health Organization to measure the health and disability of individuals (World Health Organization, 2018).

In cataloguing the different forms of disability, it also includes a list of different environmental factors, because it considers how each disability develops in a context.

The ICF integrates the International Classification of Diseases (ICD) of the World Health Organization, which is a health classification system that provides diagnostic codes to classify diseases. The eleventh version of the ICD (ICD-11) is currently in force, which was released in 2018 and was ratified by WHO countries in 2019. An implementation of the contents and translation of the text into a further 25 languages, including Italian (World Health Organization, 2024).

The ICF, unlike the ICD, evaluates an individual not only for his illness

or disability, but also for his functional status in relation to the environment in which he lives. The ICF is in fact based on functioning, i.e. on what an individual is able to do. It evaluates the person according to their functionality in the personal, social and biological spheres.

The United Nations Convention on the Rights of Persons with Disabilities (CRPD) defines individuals with disabilities as «those who have long-term physical, mental, intellectual or sensory impairments which in interaction with various barriers may hinder their full and effective participation in society on an equal basis with others» (United Nations, 2006).

The importance of the context in defining a disability is therefore reiterated. Moreover, one thing that the WHO underlines in the “Global report on health equity for persons with disabilities” – recalling the ICF – is that disability cannot be treated as an illness. If it is true that sometimes an illness may be the basis of a disability, it is important to understand how in the presence of a disability we must intervene on the surrounding environment to reduce an individual’s limitations.

Blindness can prevent a child from attending school if it is not equipped with adequate supports to help them learn; a woman in a wheelchair will not be able to attend a meeting in person if the building in which it will take place is not accessible; a man with intellectual disabilities will not be able to find a job if he is not adequately supported.

From these examples reported, it is clear how disability directly affects the quality of life of individuals (World Health Organization, 2022).

If we consider that, according to the World Health Organization (2022), in 2021 there were 1.3 billion individuals with disabilities in the world – equal to 16% of the world population – we understand how it is a global priority to intervene to make life better of those with a disability.

It therefore seems essential to act on the context by creating the conditions so that a disability causes as few difficulties as possible for those who experience it.

It is also necessary to intervene on the environment, as Luigi D’Alonzo also underlines in his text “Integration of the disabled. Roots and educational perspectives”. He argues that a social approach must be applied that analyzes the individual’s daily life to understand what obstacles he experiences due to his pathology. Once these obstacles have been identified, work must be done to remove them (D’Alonzo, 2018).

The World Health Organization recognizes the benefits of this social approach, but indicates how it should be applied together with the medical approach (Imbriani, 2018).

The social approach therefore involves an intervention on the environment aimed at creating spaces that can be accessible to all. Design therefore

takes on an important role in the creation of environments suitable for individuals with one – or more – disabilities.

In this regard, different answers are provided by design approaches defined as universal design and inclusive design. The terminology universal design was introduced by architect Ronald L. Mace of North Carolina State University. Universal design requires that each project be accessible and usable by everyone, including those with any form of disability.

Mace – with the collaboration of his university's research center – has developed seven principles underlying universal design, in this case:

Principle 1: Fair use. The project is usable and marketable for people with different abilities.

Principle 2: Flexible use. The project adapts to a wide range of individual preferences and abilities.

Principle 3: Simple and intuitive use. The use of the project is easy to understand regardless of the user's needs, knowledge, language, or current level of concentration.

Principle 4: Perceptibility of information. The project communicates the necessary and effective information to the user, regardless of the environmental conditions or the user's sensory capabilities.

Principle 5: Tolerance for error. The project minimizes risks and negative or accidental consequences or unintended actions.

Principle 6: Limitation of physical effort. The design can be used effectively and conveniently with minimal effort.

Principle 7: Measurements and spaces for approach and use. Appropriate dimensions and spaces are provided for approach, accessibility, manoeuvrability and safe use regardless of the height, posture and mobility of the user. (Baroni, Lazzari, 2013, p. 86)

Universal design indicates the principles, the ideals, to which each new designed element should aim, while inclusive design designates a series of operational rules that should be followed so that individuals with difficulties have their needs satisfied.

The rules of this latter approach, deduced from the theorization of Professor David Benyon – one of the main proponents of inclusive design – can be summarized in these four:

1. Include people with special needs in analyses, design requirements and use tests.
2. Evaluate whether the user experience of users with special needs is changed by the inclusion of new features and options.
3. Take into account guidelines and assessments that go against them.
4. Include users with special needs in usability evaluations and tests» (Imbriani, 2018, p. 21).

Both approaches therefore focus on the need to create spaces accessible to all. The use of a place for those with any physical disability must take place independently and without the support of other individuals. Anyone with a motor disability – for example – can also get over a staircase using a stair lift. This, however, will require the presence of an employee or companion who starts it and helps the disabled person to use it. This situation will not make a disabled person who travels in a wheelchair independent. On the other hand, the presence of an elevator will allow the person in a wheelchair to overcome the obstacle represented by the staircase without any need for help.

2. Disability and prejudice

According to a study published in *The Lancet Child & Adolescent Health* – conducted by researchers from the University of Oxford, in Great Britain, and Beijing Normal University, in China – 38% of children with disabilities suffer bullying or cyberbullying from their peers.

The study involved over 16.8 million young people aged between 0 and 18 and highlighted that those most affected are children with mental disorders (34%) and cognitive difficulties (33%) (Fang et al. 2022).

The European Union Agency for Fundamental Rights (FRA) instead carried out a study on violence against minors with disabilities, trying to understand the causes and the context in which they occur. For this activity, the commission analyzed the legislation of the European Union countries on the subject, and carried out interviews with the bodies indicated – at national level – for the implementation of the Convention on the Rights of Persons with Disabilities (CRPD).

From these interviews it emerged how violence towards minors with disabilities – according to the interviewees – is favored by their exclusion and social isolation. Furthermore, the interviewees highlighted how there is – in general – a certain prejudice among individuals towards those with a disability and above all how many of them are not aware of what a disability is (Agenzia dell'Unione europea per i diritti fondamentali, 2015).

To confirm these alarming data, the United Nations report *Keeping the Promise: Ending Violence Against Children by 2030* indicates that a child with a disability in the world is four times more likely to suffer violence than a child of the same age who does not have a disability (United Nations, 2019).

The Observatory for Security against Discriminatory Acts (OSCAD) carried out a study which identified how in Italy, between 2020 and 2022, 230

crimes were committed against women with disabilities. The study highlighted how they have a greater possibility of suffering violence (36%) compared to women who do not have a disability (30%) (Osservatorio per la sicurezza contro gli atti discriminatori, 2023).

Therefore, the fragility caused by a disability unfortunately contributes to increasing the risk of violence or abuse against minors and women. As described by the European Union Agency for Fundamental Rights, an important role in this would be determined by the isolation of those with a disability, but also by the lack of awareness of what it is and what it implies.

In Italy, the first survey carried out by the SWG Citizens and Disability Observatory in 2021 highlighted how 63% Italians consider disclosure on disability to be insufficient and 79% maintain that the media does not give space to the issue.

In general, therefore, Italians perceive the lack of a debate on disability and a difficulty in accessing information on the topic, not surprisingly – in the same survey – they declare that they turn to different channels – such as the local health authority (20%), internet (18%) and the general practitioner (14%) – to obtain information on disability.

The interviewees also think that an attitude of indifference (62%) and prejudice (66%) towards those with a disability prevails among Italians (Moccia, 2021).

The survey demonstrates how there is a lack of information on disability among ordinary people and how a certain prejudice towards it prevails.

This situation also facilitates – in the opinion of the writer – a general inaction on the part of municipal administrations on the issue of removing architectural barriers.

It is no coincidence that in Italy, although municipalities have the obligation to draw up the plan for the elimination of architectural barriers (PEBA) – established by law 41 of 1986 –, it unfortunately does not appear to be widely adopted.

Although there is no national register of municipalities with PEBA, an example in this regard is the questionnaire on the state of implementation of Peba in Lombardy municipalities – carried out by Anci Lombardia – which shows that 94.2% of the 911 Lombardy municipalities – who responded to the question – they do not have a Peba (Anci, 2018).

Local administrations, given the general inertia of citizens on the issue of accessibility of buildings and public spaces, in fact decide not to act, not considering – in general – PEBA a priority. It therefore seems essential to raise people's awareness of the need for accessibility in cities to create a critical mass that stimulates local administrations to intervene.

This work to raise public awareness would also be important to break down prejudice and discrimination related to disability.

The first survey carried out by the SWG Citizens and Disability Observatory in 2021 reported how a third of those interviewed had witnessed episodes of discrimination towards those with a disability (Moccia, 2021).

But to understand that the situation in Italy on this aspect is difficult – without the need to produce further findings – it would be enough to observe what has happened recently at a legislative level on the subject of disability. The legislative decree of 15 April 2024, in fact – among the various provisions – also provides that – in current legislation – the word “handicap” is everywhere replaced by the words “condition of disability” and that the words “handicapped person”, “bearer of handicap”, “person with a disability”, “disabled” and “differently abled”, wherever they occur, are replaced by “person with a disability”.

This measure was necessary due to the negative meaning that these terms – over time – have taken on in common language.

Often, unfortunately, terms such as "handicapped" and "disabled" are used in a derogatory manner to offend another individual.

This bad habit can only be stopped by making individuals aware of what a disability is and making them understand the importance of treating those who experience it on a daily basis with respect.

3. Raising awareness among local communities about accessibility: “inSUPERabile Catania”

“inSUPERabile” is a “bottom-up” research project conceived – by the writer – in response to a call from the “Cities Accessible to All2 community of the National Institute of Urban Planning (INU), entitled “Country project for cities accessible to all. Good practices of cities accessible to all”, which invited researchers and designers to describe solutions that could improve the accessibility of cities. The “inSUPERabile” project has two important objectives, which recall what was argued previously:

- raise awareness among local communities of the need to remove architectural barriers;
- improve, in an urban context, the quality of life of a person with disabilities through the creation of spaces accessible to all.

“inSUPERabile” is a container project that brings together various initiatives – sometimes unrelated to each other – designed to be able to be applied to any city.

Since 2017, the project has been experimentally contextualized in the city of Catania.

The first initiative carried out by “inSUPERabile Catania” saw the creation of a Facebook group in which it was possible to report the architectural barriers present in the Etna capital.

To raise awareness even among those who were not interested in the topic, a points game was introduced into the group which allowed people to win small prizes.

The positive, even competitive, comparison that was created between users – thanks to the possibility of increasing their score and winning some symbolic prize – had the aim of promoting participation even among subjects less attentive to the topics addressed.

In fact, in the Facebook group “inSUPERabile Catania”¹ anyone could report problems related to urban accessibility for those with a disability and obtain points depending on the type of critical issue highlighted.

Facebook users had to report architectural barriers by creating a specific post in the group. They had to follow five simple rules:

1. Take a photo of an architectural barrier or a dangerous situation for a person with a disability;
2. Describe the public place where the barrier was present and the type of problem encountered;
3. Tag local administrators in the post so that they are made aware of the problem;
4. Enter the score relating to the report made;
5. Publish the post inviting friends to share it or like it to give it greater visibility.

As mentioned, users received points depending on the different type of problem or barrier reported, in detail they obtained:

5 Points. Reporting a public building that is inaccessible for an individual in a wheelchair.

5 Points. Reporting a square or public space that is inaccessible for an individual in a wheelchair.

3 Points. Reporting a pedestrian crossing with a pedestrian crossing that is inaccessible for an individual in a wheelchair.

3 Points. Reporting a dangerous situation for an individual in a wheelchair (hole in a pedestrian path; grate on the ground with bars that are too wide; etc.).

1 Point. Reporting an element that creates a barrier in a pedestrian path (planter that narrows a sidewalk; road sign pole that prevents passage; etc.).

¹ <https://www.facebook.com/groups/214176195710637>

1 Point. Reporting a temporary obstacle that prevents the passage of an individual in a wheelchair (car parked in front of a slide; scooter on the sidewalk; etc.).

Naturally, as can be seen from the list of scores, the aim of the report was to make individuals more aware of the difficulties of those with a motor disability, postponing the in-depth analysis of the specific problems of those with a sensory or intellectual disability to subsequent initiatives.

Each user therefore published the barriers and obtained points. During the initiative, two contests were launched, in which – at a given deadline – whoever had the highest score obtained two pizzas and two drinks offered by two pizzerias in Catania.

A small prize which nevertheless encouraged group members to make reports. The group was opened to the public on 01/27/2017, and on June 20th – after the closing of the last contest –, they were:

- 5,032 members of the group;
- 192 reports were made (equal to 682 points);
- 261 posts published;
- 207 comments written.

The group also encouraged members – through posts and comments – to see the elimination of a barrier as an asset not only for those with a disability, but for the entire local community.

It was noted that the presence of a slide is also essential for those traveling with a stroller or trolley; reduces trip hazards; facilitates the passage of elderly people and children; indicates crossing points, reducing risks associated with vehicular traffic; etc.

The group also highlighted how creating places that can be used by everyone is important not only to break down “physical” barriers but above all to eliminate “social” ones. A popular place determines sociability, increases the vitality of a neighborhood, facilitates interpersonal relationships and reduces phenomena such as marginalization and isolation.

The barriers reported by the group’s users were geolocated in a multimedia map created by the engineer, Nadia Giuffrida – thanks to a collaboration with the Dicar department of the University of Catania –.

The project, in its development, also saw the creation of two neighborhood walks to highlight the architectural barriers of some sites of historical and archaeological interest and the paths that connect them. They were created thanks to the collaboration of several important local associations.

During the walks, live broadcasts were created and visible on the Facebook group to give anyone the opportunity to observe what was found in the different places.

Experts and representatives of the associations have highlighted various

critical issues present in the structures of historical interest of the Roman amphitheatre, the Roman theatre, the Benedictine monastery and the Ursino castle, but also in the routes that connect them.



Fig. 1. A moment from the neighborhood walk on 18/05/2017. (Photo Gaetano G. D. Manuele).

As part of the project, a “call for papers” was subsequently launched in which designers and researchers were invited to propose solutions that could improve the quality of life, in an urban context, of people with disabilities in Catania.

This initiative was supported by the Dicar department of the University of Catania and saw twenty-five proposals submitted.

A scientific conference held on 23 June 2017 – at the Benedictine monastery in Catania – reported the results of the project and saw the presentation of the best contributions received for the “call”. During the conference, a round table was held with sector experts and representatives of the municipal administration in which visions were presented for creating an “Accessible Catania”.

In fact, the following were present at the round table: the traffic councilor of the municipality of Catania Salvo Di Salvo; the professors Giuseppe Inturri, Paolo La Greca and Francesco Martinico of the University of Catania; the engineer Salvo Marano representing the order of engineers of Catania; and the creator of the project.



Fig. 2. Scientific conference at the Benedictine monastery in Catania. (Photo Daniela Leonardi).

inSUPERabile continued with a design workshop aimed at students and professionals entitled “Catania, a city accessible to all. inSUPERabile Catania: the workshop” which took place on 2, 3, 4 May 2019.

The workshop was preceded by a scientific conference in which good practices for accessibility were discussed and was closed by another scientific conference in which the projects developed during the workshop were presented and discussed – in a round table – with authoritative experts on the future of Catania.

The workshop was organized by: the Department of Civil Engineering and Architecture (DICAR) of the University of Catania; the Order of Architects, Landscape Planners and Conservationists of the Province of Catania; the Order of Engineers of the Province of Catania; the Foundation of Architects, Landscape Planners and Conservators of the Province of Catania; the Foundation of the Order of Engineers of the Province of Catania; the National Center for Urban Studies (CEnSU). Partner of the initiative was the National Institute of Urban Planning INU SICILIA, and the event was sponsored by: Municipality of Catania; Biennial of Public Space; Association for Industrial Design (ADI) – Sicily Delegation. The following

associations also supported the workshop: Controvento; Catania Tourist Guides; Legambiente Catania; Mobilità Sostenibile Catania; Mobilita Catania; Officine Culturali.

The workshop saw thirty participants between professionals and students – divided into five groups – carry out urban regeneration projects in various squares of the city of Catania to guarantee total accessibility and encourage attendance by those with disabilities.

Each group was supported by a tutor from the professional or academic world, and by a co-tutor indicated by the associations that joined the initiative. The five groups applied – for a vast territory of the municipality of Catania – what the writer theorized in the freelance research "Minimum Accessible Network (R.A.M.)".

It proposes an accessible, protected and safe route that connects the main attraction poles of a city (Manuele, 2019).

The "inSUPERabile Catania" project cannot be considered concluded given that various initiatives are planned which will be developed between 2024 and 2025. Some associations operating in the Catania area, representatives of the academic and institutional world, institutions, and free citizens have collaborated and continue to collaborate in the various initiatives of the project – in various capacities and with different tasks –.

References

- Agenzia dell'Unione europea per i diritti fondamentali (FRA) (2015), *Violenza contro minori con disabilità: legislazione, politiche e programmi nell'Unione europea. Sintesi*, Vienna.
https://fra.europa.eu/sites/default/files/fra_uploads/fra-2015-violence-against-children-with-disabilities-summary_it.pdf
- Anci Lombardia (2018), *Stato di attuazione dei Piani per l'Eliminazione delle Barriere Architettoniche (PEBA), LR Lombardia 20/02/1989, N 6, indagine sui comuni lombardi*, April.
- Baroni, F., Lazzari, M. (2013), "Tecnologie informatiche e diritti umani per un nuovo approccio all'accessibilità", *Italian Journal of Disability Studies*, Vol. 1, N. 1, Sept, p. 79-92, from p. 86.
- D'Alonzo, L. (2008), *Integrazione del disabile. Radici e prospettive educative*, Editrice La Scuola, Brescia.
- Fang, Z., Cerna-Turoff, I., Zhang, C., Lu, M. M., Lachman, J. M., Jane Barlow, J. (2022), "Global estimates of violence against children with disabilities: an updated systematic review and meta-analysis", *The Lancet Child & Adolescent Health*, Vol. 6, ISSUE 5, p. 313-323, May. [https://doi.org/10.1016/S2352-4642\(22\)00033-5](https://doi.org/10.1016/S2352-4642(22)00033-5).

- Imbriani, L., *Luogo comune L'utilizzo del gioco per il cambiamento sociale per coadiuvare l'integrazione di ciechi e ipovedenti*, Thesis, Politecnico di Milano, a.a. 2017/2018.
- Manuele, G. (2019), “*Catania, città accessibile a tutti*”. in *SUPERabile Catania: il workshop*, official blog of the initiative.
<https://cataniaaccessibile.blogspot.com/>
- Moccia, E. (2021), “*Osservatorio Cittadini e disabilità*” SWG con il Premio Bompreszi: *la pandemia ha peggiorato la vita delle persone disabili*, Corriere.it, 03/12/2021.
<https://invisibili.corriere.it/2021/12/03/osservatorio-cittadini-e-disabilita-swg-con-il-premio-bompreszi-la-pandemia-ha-peggiolato-la-vita-delle-persone-disabili/>
- Osservatorio per la sicurezza contro gli atti discriminatori (OSCAD) (2023), *La violenza contro le donne con disabilità*, p. 27.
https://www.interno.gov.it/sites/default/files/2022-12/la_violenza_contro_le_donne_con_disabilita.pdf
- United Nations (2006), *Convention on the Rights of Persons with Disabilities (CRPD)*, p. 37
<https://www.un.org/disabilities/documents/convention/convoptprot-e.pdf>
- United Nations (2019), *Keeping the Promise: Ending Violence Against Children by 2030*, United Nations Publications, New York, p. 106.
- World Health Organization (2018), *International Classification of Functioning, Disability and Health (ICF)*.
<https://www.who.int/standards/classifications/international-classification-of-functioning-disability-and-health#:~:text=The%20International%20Classification%20of%20Functioning,a%20list%20of%20environmental%20factors.>
- World Health Organization (2022), *Global report on health equity for persons with disabilities*, Geneva.
<https://www.quotidianosanita.it/allegati/allegato1670255154.pdf>
- World Health Organization (2024), *International Statistical Classification of Diseases and Related Health Problems (ICD)*.
<https://www.who.int/standards/classifications/classification-of-diseases>

Part Two

*Declining accessibility:
from the normative dimension
to the urban landscape*

1. Accessibility standards in Germany: insights and observations

by Luca Laule and Markus Bick

1. Introduction

Worldwide, around 1.3 billion people have a disability, which is about 16% of the global population (World Health Organization 2022). The older people are, the more likely they are to be affected by disabilities, which are not necessarily congenital but can develop over time for a variety of reasons (National Academy on an Aging Society 1999). People with disabilities have specific needs that must be considered to ensure inclusive participation in public life. Accessibility is crucial in this context, as the built environment determines whether public spaces are accessible to everyone, regardless of disability, or if barriers exist that prevent or hinder participation in certain activities (Imrie and Kumar 1998). Despite the adoption of the United Nations Convention on the Rights of Persons with Disabilities (United Nations 2006) years ago, significant renovations are still needed to make public places, infrastructure, and administrative buildings accessible (Jackson 2018). It is important to highlight that the condition and accessibility of streets, public paths and facilities significantly impact people with disabilities. Clarke et al. (2008) found that individuals with disabilities, particularly those with advanced mobility impairments, are four times less likely to leave their homes if street conditions are poor and not accessible. An accessible environment can slow down or even reverse the progression of disabilities (Clarke et al. 2008).

In Germany, there are several laws regulating accessibility in public spaces. These laws are based on European Union regulations and the German Grundgesetz (transl.: constitution/basic law). Building on this foundation, Germany has laws specifically addressing accessibility (e.g., *Law on Equal Opportunities for People with Disabilities 2022*, *Accessibility Reinforcement Law 2021*), along with many others that contain sections with accessibility

regulations, such as in building codes (e.g., *Restaurant Regulation Berlin 2020*).

As part of the transnational EU project Map4Accessibility¹, which has the main goal of developing an app to document the accessibility of urban spaces, an evaluation of accessibility in Berlin was conducted. This comprised one exploratory walk and two so-called urban walks. In collaboration with students from the Berlin campus of the ESCP Business School, a designated route from the Brandenburg Gate to the TV Tower in Berlin was walked, with the objective of identifying any potential impediments to accessibility. The exploratory walk was conducted with 15 participants with the objective of gaining initial insights into the accessibility of the built environment, while simultaneously gathering data that the app should later be able to capture. In this initial phase, data was collected manually on pre-developed worksheets. The urban walks were conducted with a total of 53 participants with the aim of gathering further data regarding accessibility, this time using a beta version of the app, which all students installed on their smartphones. The results of the walks were mixed. On the one hand, the route was generally well-developed, but on the other hand, many temporary construction sites significantly restricted accessibility. Additionally, many older buildings along the route, housing restaurants and other establishments, cannot be easily made accessible and are therefore exempt from mandatory accessibility laws.

The aim of this paper is to first provide an overview of the German legal landscape regarding accessibility. This will help to understand how the law structure in Germany is organized. Additionally, it will outline some practical implications for various sectors such as public buildings or restaurants. This lays the foundation for the second objective of this report, the documentation of the findings from the exploratory and urban walks and ultimately the comparison what is legally required with what is actually implemented. Our results show different discrepancies, leading to reduced accessibility of the places we discovered.

The following section provides a definition of the term accessibility to establish the terminology. Subsequently, the legal regulations in Germany will be detailed to compare them with the findings from the Berlin examination in the following chapter, thus conducting a target state and actual state analysis. Finally, concluding remarks are given.

¹ For more information, visit <https://map4accessibility.eu/>

2. A brief definition of Accessibility

To address the issues of accessibility identified during the exploratory walk and urban walks in the further course of this article, it is first necessary to define the term accessibility because it is particularly relevant in our context regarding people with disabilities. However, it is important to mention beforehand that defining disability is not trivial. This is because the definition and the resulting grouping of certain individuals can already create the potential for exclusion of this group (Drexel et al., 1991). Johnstone (2004) also emphasizes that the construct of disability is merely a collection of definitions and practices that exclude people who deviate from the socially established norms of the “healthy”. Thus, it is not the actual nature of disability that is considered, but the classification process, which is categorized based on the structures and values of society (Johnstone, 2004). Nevertheless, particularly at the political level, a classification and definition of the term disability are necessary to create a public environment as free from disadvantages as possible for people with impairments through political guidelines. The definition primarily used in the German legal system is described, among other places, in Section 1, §3 of the *Law on Equal Opportunities for People with Disabilities* and reads: “People with disabilities within the meaning of this law are people who have long-term physical, mental, intellectual, or sensory impairments which, in interaction with attitudinal and environmental barriers, may hinder their full and effective participation in society on an equal basis with others. Long-term is considered to be a period that is likely to last longer than six months.” (*Law on Equal Opportunities for People with Disabilities*, 2022).

Building on this, the legislature defines the term accessibility in such a way that it must be possible for everyone to use buildings, means of transport, or digital services in the same manner: “Structures and other facilities, means of transport, technical consumer goods, information processing systems, acoustic and visual sources of information and communication facilities, as well as other designed living areas are considered accessible if they are locatable, accessible, and usable for people with disabilities in the usual way, without special difficulty and generally without external assistance. The use of disability-related necessary aids is permissible”. (Section 1, §4, *Law on Equal Opportunities for People with Disabilities* 2002). The absence of special difficulty and the general absence of external assistance indicate that for example a building should not be considered accessible if there is an additional accessible entry at the rear of the building. Accessibility

should be understood in a manner that allows any individual to use the primary pathways in an equal manner, regardless of their eventually reduced abilities.

3. The legal basis in Germany

In Germany, there are various laws that together form the legal basis regarding accessibility for people with disabilities. The aim is to equally include all types of disabilities. Different areas, such as digital or public spaces, are regulated in such a way that they are as equal and easy to access as possible for everyone. The following two sections will first provide an overview of the German legal system, outlining its structure and key characteristics. This will be followed by an examination of the practical implications of these laws.

3.1. *The law structure in Germany*

The foundation of all laws in Germany is the German Grundgesetz. It contains the most important rules for living together in the state. The Grundgesetz is superior to all other laws. No other law may violate it. Article 3, §3, Sentence 2 states: “No one may be disadvantaged because of their disability” (*German Grundgesetz*, 2022). Several other laws, which implement this principle in detail, are based on this.

At the international level, the UN Convention on the Rights of Persons with Disabilities has existed since 2006. Since its adoption and its entry into force in 2008, it has uniformly defined what member states should understand by the term accessibility. This convention more precisely defines human rights in the context of people with disabilities, not by speaking of special rights, but rather by creating an environment that includes all people. This focuses on access to transport, information, and communication, as well as other public facilities. Moreover, it especially aims to create the greatest possible independence for people with disabilities (United Nations, 2006).

The national implementation of accessibility regulations in public institutions in Germany is governed by the *Equal Opportunities for Persons with Disabilities Law*. This law was enacted to minimize the disadvantages for people with disabilities as much as possible and to enable them to lead a self-determined life. The law is mainly directed at public administrations and their areas of responsibility. Various measures are intended to implement the prohibition of discrimination, such as ensuring accessibility for people with

disabilities in construction projects. Additionally, measures like creating accessible public transportation options should be implemented so that people with mobility impairments can move as freely as those without such impairments. There is also a right to use sign language, the application of easy language when dealing with authorities, and the right to be accompanied by assistance dogs (*Law on Equal Opportunities for People with Disabilities*, 2022).

Another noteworthy legal basis in connection with people with disabilities is the *Law on Measures to Promote the German Film Industry*. In addition to fundamental regulations for promoting German film productions, it also addresses accessibility. It is legally stipulated that only film productions equipped with accessibility measures are eligible for promotion. Furthermore, only cinemas that have implemented structural measures for physical accessibility and created the technical foundations to screen accessible versions of films are eligible for state funding (*Law on Measures to Promote the German Film Industry*, 2016).

Starting in June 2025, the *Accessibility Reinforcement Law* will implement Directive (EU) 2019/882 (European Accessibility Act) of the European Parliament and the Council. This will not only affect public institutions as the *Law on Equal Opportunities for People with Disabilities* (2022) before but will also require private companies to comply for the first time. Additionally, the scope of application will no longer be limited to areas such as communication, information technology, or construction regulations, but will extend to the products and services offered by private companies (Horcher, 2024). Section 1, §2 defines the products that will be affected by the *Accessibility Reinforcement Law*. These include, for example, computers, payment terminals, ATMs, ticket machines, smartphones, and e-book readers. Section 1, §3 defines the services that must be made accessible in the future. These include websites, mobile applications, electronic tickets, travel information, e-books, and services in electronic commerce. If companies do not comply with the regulations of the law after the respective transition period, they will face fines of up to €100,000 or restrictions including sales bans or product recalls (*Accessibility Reinforcement Law*, 2021).

3.2. Practical implications of the legal basis in Germany

The application of these laws has several implications for accessibility, which will be detailed below. This involves not only the aforementioned laws that deal exclusively with accessibility or the equality of people with

disabilities, but also, for example, the *German Civil Code* (2024), where accessibility is mentioned only in passages.

New public buildings, including administrative offices, must generally be designed to be accessible. This includes, for example, installing wheelchair ramps to ensure accessibility for wheelchair users. Additionally, these buildings must have separate, accessible restrooms and clearly understandable signage. Streets, public squares, and parks must also be planned and constructed to be accessible (Kock, 2004; *Law on Equal Opportunities for People with Disabilities*, 2022).

In private housing, tenants can request permission from their landlord to make the rented apartment accessible (§554 *German Civil Code*, 2024). This involves structural modifications to make the bathroom accessible, widen doors, or install ramps at steps so that the premises can be navigated with a wheelchair. The tenant must bear the costs for these modifications and is also obligated to restore the original condition upon moving out, bearing the costs for this as well (Kock, 2004). Depending on the level of care needed, support for such measures can be requested from the German social system.

Restaurants and eateries are subject to several laws that include accessibility requirements. On one hand, there is the *German Restaurant Code*, which deals with the permission to operate a restaurant business. Operators are denied permission if the building was constructed after 2002 and certain parts of the building cannot be used by people with disabilities. This also applies to buildings renovated since 2002 that could be made accessible with reasonable effort (*German Restaurant Code*, 1998). On the other hand, state-specific regulations apply, which sometimes include additional provisions. For example, the state of Berlin has mandated that in dining areas with a floor space of 50 m² or more, there must be at least one accessible restroom for guests with mobility impairments (*Restaurant Regulation Berlin*, 2020).

The Law on Equal Opportunities for People with Disabilities also stipulates that public transportation as well as public paths, squares, and streets must generally be designed to be accessible (Section 2, §8 *Law on Equal Opportunities for People with Disabilities*, 2022). However, the renovation of existing infrastructure, especially in public transportation, is delayed because municipalities, communities, and public transport operators often lack the necessary resources to promptly implement the construction measures. The legislative body had set a deadline of 2022 for the establishment of fully accessible facilities, including those pertaining to transportation by bus, train, and airplane.

4. Accessibility in Berlin

To evaluate the situation regarding accessibility in public spaces in Berlin, we, the authors, who constitute the research team from the Berlin campus of ESCP Business School, conducted one exploratory and two urban walks with a total of 63 students. This was part of our participation in the Map4Accessibility Project, which was funded by Erasmus+² and involved a project team of seven partners from five different European countries. One of the project's goals was to develop an app that allows for the assessment of public spaces in terms of accessibility. To support the app's development, one task was to walk a predetermined route with students and document all obstacles that may decrease the accessibility. The chosen route led from the Brandenburg Gate to the TV Tower. Along the route, there is a major street including a walkable median strip.

During the first walk, the exploratory walk, barriers were recorded manually on a previously developed worksheet. For each obstacle documented by the students, a point was marked on a map to indicate its exact location. Subsequently, a description of the obstacle was created based on the criteria on the worksheet. For the two urban walks, a beta version of the app was used to document the obstacles. With this digital support, documentation of accessibility was much faster and more accurate. Besides obstacles, places like cafes or restaurants could also be rated regarding their accessibility. Since the app is based on Google Maps, all the locations listed there could be selected and given an individual rating. Additionally, new places or obstacles can be added. Furthermore, the urban walks were conducted to test the beta versions of the app and provide feedback on its usability.

In the analysis of the results from the three walks, three main categories of public places or obstacles were identified, which will be further described in the following three subchapters.

4.1. Restaurants, Cafés, and Shops

Along the street “Unter den Linden” which was the focus of the exploratory and urban walks, there are many restaurants and other establishments that were assessed by the students in terms of accessibility. A total of nine questions had to be answered, such as whether there is an accessible restroom, whether there are disabled parking spaces in front of the establishment, and whether the entrance is accessible.

² Grant agreement No. 2021-1-IT02-KA220-HED-00003032.

The results in this regard were mixed. Measures to ensure accessibility were implemented in many locations. Particularly in restaurants, attention was paid to simple and secure facilities that allow people with disabilities to move freely within the premises. It was documented that tables and other furnishings were spaced far enough apart to ensure sufficient room for wheelchair maneuverability. However, it was also observed that some places had a step at the entrance door. Unless a ramp was installed, this could be a barrier for people reliant on wheelchairs, as they may not be able to manage the step alone. Considering the legal frameworks presented in the previous chapter, it is likely that the structural conditions do not allow for creating an accessible environment without unreasonable effort.

Overall, a positive conclusion can be drawn regarding restaurants and shops. The vast majority of places were freely accessible and can therefore be classified as accessible.

4.2. Streets and sidewalks

The sidewalks on the left and right sides, as well as the central median along the route taken, are very wide compared to other streets in Berlin. This generally makes it easy for pedestrians to move, especially benefiting individuals with disabilities who gain the most from the extra space. Multiple people can pass each other without difficulty, even accommodating strollers, wheelchair users, or other devices needing to navigate past each other. Additionally, there are markings on the ground to assist visually impaired individuals in finding their way. These markings notably highlight intersections and traffic lights by altering the patterns on the ground. Traffic lights are typically designed to provide both visual and auditory signals, ensuring safe street crossings for blind and visually impaired people.

However, during exploratory and urban walks, it was noted that the central median is not entirely barrier-free. While there are no high steps obstructing wheelchair or walker access, the surface is largely gravel, gravelly soil, or paved, which significantly complicates maneuvering. Additionally, it was documented that large puddles form on the central median during rain, further highlighting the uneven surface.

Overall, regarding the streets and sidewalks along the route explored, it can be noted that the sidewalks on the right and left sides of the street are exceptionally wide and accessible. However, the central median, also designed for pedestrians, is less accessible due to its poor surface conditions.

4.3. Temporary reductions of accessibility

In addition to the previously described conditions for restaurants, cafés, and the basic characteristics of streets and sidewalks, there are temporary restrictions on accessibility. During the three walks with the students, numerous obstacles were noted. The most significant hindrance on the sidewalks along the street “Unter den Linden” was the barrier in front of the Russian embassy. Due to the war in Ukraine, the Russian embassy was extensively cordoned off, preventing pedestrians from using the sidewalk along the embassy. While this measure provides security for the people inside the embassy, it creates uncertainties for pedestrians. Since passage was no longer possible, all pedestrians had to cross to the other side of the street, crossing four stripes for cars in total.

Temporary obstacles were repeatedly found on the sidewalks. The construction of the surrounding buildings necessitated the closure of the sidewalk, which led to the redirection of sidewalks onto the street. This often involved the use of steep ramps that had to be overcome. Sometimes the sidewalks themselves were under construction, which also led to temporary construction sites and the closure or redirection of the sidewalks. The students also documented that traffic lights, which were not permanent but installed temporarily due to the construction sites, usually did not provide auditory signals for visually impaired individuals. This resulted in limited accessibility in those areas.

It can be summarized that whenever there were construction sites on sidewalks, a significant restriction of accessibility in these sections was observed. Nevertheless, efforts were always made to find an adequate solution to ensure accessibility could still be maintained. Despite these efforts, insurmountable obstacles for certain types of disabilities were identified.

5. Conclusion

It can be noted that various regulations exist in Germany to facilitate and ensure the participation of people with disabilities in everyday life. Significant efforts are made by lawmakers to create specific laws, such as the *Law on Equal Opportunities for People with Disabilities* (2022), which details the measures the state must take. Additionally, many sections in other laws address the needs of people with disabilities, such as in the *German Restaurant Code* (1998), which includes a paragraph specifying when accessible toilets must be installed in restaurants.

However, during the exploratory and urban walks conducted as part of

the Map4Accessibility Project, it became evident that the practical implementation of these laws does not always fully achieve accessibility. Often, the given structural conditions, especially in older buildings and public places and streets, are such that achieving accessibility is not possible without significant effort. Additionally, construction sites often have such a substantial impact on accessibility in public spaces that passing through these areas becomes impossible for people who rely on mobility aids. Furthermore, the needs of people with visual impairments are frequently overlooked, especially at temporary construction sites and during other measures.

We want to emphasize that the assessment of accessibility was conducted in only a very small part of Berlin. Although “Unter den Linden” is a very busy street, it is not very representative, as it is significantly larger and better developed than most other streets in Berlin. Nevertheless, our results are highly valuable. They can be used by the public administration to implement measures to improve the accessibility of that area. Furthermore, the main goal of the urban walks was to test the beta versions of the app, which was successfully achieved. Mapping a larger area can ultimately only be accomplished by a large community. Future actions should thus focus on promoting the app to a wide audience, highlighting the significant benefits it can provide to people with reduced abilities.

References

- Accessibility Reinforcement Law (2021), available from https://www.bgbl.de/xaver/bgbl/start.xav?startbk=Bundesanzeiger_BGBI&jumpTo=bgbl121s2970.pdf#__bgbl__%2F%2F*%5B%40attr_id%3D%27bgbl121s2970.pdf%27%5D__1719403977960.
- Clarke, P., Ailshire, J.A., Bader, M., Morenoff, J.D., and House, J.S. (2008) “Mobility Disability and the Urban Built Environment”, *American Journal of Epidemiology*, 168 (5), 506-513.
- Drexel, A., Feurstein, B., Licka, L., and Proksch, T. (1991), *Behindertengerechte Städtische Freiräume*, Wien.
- German Civil Code (2024), available from <https://www.gesetze-im-internet.de/bgb/BJNR001950896.html#BJNR001950896BJNG000202377>.
- German Grundgesetz (2022), available from <https://www.gesetze-im-internet.de/gg/BJNR000010949.html>.
- German Restaurant Code (1998), available from <https://www.gesetze-im-internet.de/gastg/index.html#BJNR004650970BJNE000503377>.
- Horcher, G. (2024), “Barrierefrei Kommunizieren Für Unternehmen”, *Wiesbaden: Springer Fachmedien Wiesbaden*.
- Imrie, R. and Kumar, M. (1998), “Focusing on Disability and Access in the Built Environment”, *Disability & Society*, 13 (3), 357-374.

- Jackson, M.A. (2018), “Models of Disability and Human Rights: Informing the Improvement of Built Environment Accessibility for People with Disability at Neighborhood Scale?”, *Laws*, 7 (1), 10.
- Johnstone, D. (2004), *Interventionstheorien Und Sozialer Wandel in Bezug Auf Behinderung*, ed. by Bloemers, W. and Wisch, F.-H.
- Kock, M. (2004), “Disability Law in Germany: An Overview of Employment, Education and Access Rights”, *German Law Journal*, 5 (11), 1373-1392.
- Law on Equal Opportunities for People with Disabilities (2022), available from <https://www.gesetze-im-internet.de/bgg/BJNR146800002.html#BJNR146800002BJNG000100000>
- Law on Measures to Promote the German Film Industry (2016), available from https://www.gesetze-im-internet.de/ffg_2017/BJNR341300016.html#BJNR341300016BJNG000100000.
- National Academy on an Aging Society (1999), *Chronic Conditions: A Challenge for the 21st Century. Data Profile Series*, 1, No. 1. Washington, DC.
- Restaurant Regulation Berlin (2020) available from <https://gesetze.berlin.de/bsbe/document/jlr-GastVBErahmen>.
- United Nations (2006), “Convention on the Rights of Persons with Disabilities”, Treaty Series 2515, 3.
- World Health Organization (2022), *Global Report on Health Equity for Persons with Disabilities*.

2. Evolution and application of Bulgarian normative base for urban accessibility in parallel to changing social attitudes

by Hristian Georgiev

1. Accessible environment through the prism of social acceptance...

I am writing in my capacity of an architect and a municipal employee in the administration of the Republic of Bulgaria.

The issue of providing an accessible environment in the built environment and urban spaces has been relatively recently introduced in the country's legislation. We have all been outraged by the "bizarre" solutions of staircases in blocks of flats, where you have to walk through a split-level of several stairs to get to the lift, and the "even more exotic" lift designs, with stops located on intermediate platforms to the floors. We have been indignant about the difficulty when a stroller or furniture needs to be moved within, and we have not even thought about how that should be possible for persons with different abilities.

"Once upon a time there were no invalids"... have you heard it?! Sure you have... and you really haven't seen people with different abilities much... well, yes you have not, because they couldn't leave their homes – at least not alone, very often they used to be carried by their relatives, loved ones or medical personnel... so they chose not to be among us – those two-legged ones... and the kids who couldn't get around – they didn't go to school either, simply because they couldn't walk. The ones with visual disability needed a companion everywhere...just the missing sense was the only thing that could orient them, the city couldn't tell them where they were, what color the traffic light was... and we rarely saw them... but there they were... and there they are now.

It may have been a peculiarity of the political system, since it is a well-known tendency of socialism, similar to all types of authoritarian regimes, to

promote the image of the perfect person – hard-working, physically strong and resilient, advanced in science, or further images of ideal human... Still, there are people who due to versatile reasons do not fit within this framework. How were these challenges addressed back then – they were not! Although there were a number of norms which deal with them in the previous political system, some of which still provide efficient solution today, what is needed are clear and definite laws and regulations covering multiple aspects, including providing guidelines in the design of buildings, urban environments, making them resilient to the needs they are addressing.

In this way, even in the modern regulatory framework of the architecture in Bulgaria there are no elementary design principles to make the urban environment relatively uniform or to regulate it, depending on the specificity of the building. It is a weird, ridiculous, but at the same time commendable fact that even today – 2024 – the first normative document that somehow treated an accessible environment is still in force. Its date of issue is in the relatively distant 1986... ironically, shortly before the collapse of socialism.

This is the first norm that deals with the accessible environment in Bulgaria.... although it does not mention people with disabilities in any way. The norm, in this case, the BDS – Bulgarian State Standard, outlines guidelines for the design of staircases – the main communication in a building, which to this day has no better alternative – elevators of sizes depending on the type of building, floor plan and others, corresponding stair landings and arms and much more. Although in no way did this norm declare that it creates conditions for an accessible environment, it is indisputable for all architects and designers of accessible facilities that a building designed according to BDS 8267-86 is extremely easy to adapt, has space for hoists, the lifts are wide, there is space for a wheelchair and more.

What was the main aim of the regulation – convenient use for every-one and everything, including moving in furniture. Today's furniture comes mostly in boxes, sized to fit as much as a person can carry, assembled on the spot, but the ones back then were not like that: whole hulls that weighed a lot, non-assemblable, often neck-sized, with a “depth” parameter. They bring up the issue that the regulation solves – how to deal with portability, naturally relative to the building type. Namely, if the building is relatively low, it is enough to provide a wide staircase and with the help of neighbors and friends, the new wardrobe is in the bed-room.

Well, if we lived on the 19th floor in one of the typical blocks of flats of that time, our child was a pianist and we had given them the pleasure to have a real piano for their birthday – it might had turned out that we didn't have enough neighbours and friends, the solution is here to help – transport eleva-

tors mandatory for this type of building in which a ward-robe, piano, a bicycle, a baby carriage, even a stretcher or coffin, can easily fit. So is the case with a wheelchair, but it is not mentioned in the regulation.

A few years later, planners and administrators “forgot” about this regulation. The 90s was a period in which all values were replaced with a supreme one – “profit”. In particular, the desired effect in the buildings was large apartments – few staircases, where possible no elevators. Constructing and selling apartments was profitable, whereas adding convenient communication areas was costly.

We have all entered buildings from those years, inevitably resenting the awkward staircase, the trapezoidal steps, the small or missing elevator and so on.

Not until recent years did the discomfort of these solutions start to be discussed. Maybe this has given the impetus of the regulatory framework that also came into force due to the aspirations of Bulgaria to join the European Union.

Directive No. 6 of 26.11.2003

This is the first norm in Bulgaria, directly addressing accessible environment – not only in buildings but also in their adjacent environment – urban areas. Its content is mainly graphic – schemes, drawings, diagrams, and dimensions, accompanied by scarce explanatory text.

For the designers it was at the same time a difficulty, given the developed routine in design, characterized by a rudimentary, minimal development of the communication zones, often reduced to their mere existence, but also an exciting challenge. The situation was similar to the one of a kid who has received a constructing game to build elements together for a desired effect – a building with sustainable communication and an accessible environment.

Naturally, thoughts and considerations such as “I have no room for this”, “Who needs this?”, “This bathroom is definitely suitable for evening balls and conferences!”, “Are we going to enter through this door with the car?”, “Well, it’s ugly, and I’m making a masterpiece”, “Who’s going to buy it when half the area is a toilet?”, “We’re going to skateboard on this ramp and nothing else”, accompanied the design process.

This made it a bit harder to in its implementation, but in the end the trend was established.

Construction has moved towards accessibility slowly, with attempts to circumvent the norm, but it is being happening. Inspection bodies whose main task is to monitor the compliance of the built environment with the standards from the regulation, have played a considerable role in it. They also found new norms challenging. Thus, depending on the attitudes and the

experience of the inspection officials, new practices, some good, others vicious were established.

Again in parallel and maybe due to the accession of Bulgaria to the European Union on 01.01.2007, the effective today regulation entered into force to comply with the requirements of the relevant European norms.

Ordinance No 4 of 1 July 2009

This was a new “shock” in the design and administration fields. There were relatively slight, nuanced differences in the two regulations. The graphic material was the same, and even the structure was not changed, there were slight enhancements in one aspect or another, where certain requirements were softened or given more weight.

In the end, the trend remained unchanged and after a short period of adaptation – continued moving towards making an accessible built environment for everyone.

The results were there soon – the streets and establishments were filled with trolleys, and innovative vehicles that even people without disability wanted to try. We started seeing smiles and acceptance, but not pity, disgust or an attempt to turn away.

In a month I witnessed two scenes of the new normal of acceptance: some teenage children looked on with admiration, talking animatedly to a peer of theirs about the “cool” wheels of his wheelchair, with images of MINE-CRAFT; a two-meter-tall tattooed motorcyclist took off his helmet and chatted with an elderly lady about technical aspects of her four-wheeled vehicle.

And all this – brought up by the norm... norm, which even with its name carries a clear message – normality.

Nearly 12 years after this routine was established, a new shift has been made, a natural step towards achieving universality and integration.

Ordinance No RD-02-20-2 of 26.01.2021

I quote on purpose the amendments of the regulation, in addition to their names, publisher, and dates of issuance – it illustrates that the above normative act has been amended three times in two years.

Why is that so – it advocates for “universality”, promoting “universal design” – it is a necessary step to ensuring the possibility of people with different abilities to move freely in their daily life.

Despite the relatively high level of social acceptance of novel concepts the norm still faces confusion. While up until then resistance was typical for planners, investors, and administrators, the users now joined the group. The challenge was the equal adaptation of built space for all tenants. For example, the ordinance aims to make all rooms in a dwelling accessible. This implies that a balcony and the bathroom should be at least 150 cm wide each, the doors 100 cm wide. Yet, this is not always an optimal solution in the case

of smaller dwellings. The ordinance further contradicts to other effective norms in terms of structure and installation. This leads to some challenges in the design phase, e.g. balconies have to be large to be accessible, but at the same time with Bulgaria being a region of often earthquakes, it is to be managed in terms of structure. Similarly, the necessity for even floors in a dwelling to impose the obligation to lower in a structural way the floor in the ‘wet’ areas, as they are based on pipe installations which make them ticker.

All of the above leads to a more expensive design and construction, which is an issue for most of the population, contributing to the predominant dissatisfaction. The psychological barrier posed by the apparent, indirect “uniformity” of all users of the environment – “We are not all disabled” – is also a relatively small factor.

As a planner, I can say that the product – buildings, and environment created on the basis of this ordinance – are fundamentally different from what has been implemented so far, and my personal opinion is that it is for the better. The balconies provide the necessary space for people with physical disability to move freely with a wheelchair, but they are also micro-courtyards – you can often see barbecues, bicycles being repaired, and elegant seating areas. Communal spaces are wide, bright, comfortable, and presentable.

Basically, the higher standard has its own cost, but it brings benefits and self-esteem for all who use it and who design it, for those who manage to implement it – it offers decent living for people with physical disabilities and spacious dwellings for all.

In conclusion, the normalization of an accessible environment is a high priority, even if we look at the etymology of the word – NORMA. With the unification of standards, high social efficiency is also achieved. A decent living lays the foundations for excelling in other domains of life, hence contributing to social health and progress.

An interesting fact is that there have always been norms towards accessible environments even if it was not directly targeted. Due to their non-mandatory nature, they were applied only in specific cases or requests. For example, back at the beginning of World War II, Germany published “Neufert. Bauentwurfslehre” (German: Bauentwurfslehre), an architectural handbook originally developed by Ernst Neufert. First published in 1936, it has since undergone 38 improved and expanded editions in German language but also translated in almost 20 others. The first edition in Bulgarian is from 2007. There is an evident link between this document and the Bulgarian legislation acts.

Human evolution goes hand in hand with the evolution of accessible public spaces facilitating the free movement of all individuals. The world will evolve, but we must never forget how different we are. The world is different

in everyone's mind, so we cannot and should not want it to be the same for all of us. Still, we all should certainly be able to feel comfortable in it.

References

- BDS 8267:1986 - Stairs and Stairways for Residential and Public Buildings. (1986).
<https://fhart.wordpress.com/wp-content/uploads/2009/10/bds-8267-86.pdf>
- Directive No. 6 of 26.11.2003 on the construction of accessible environment in urbanized areas (amended). Issued by Minister of Regional Development and Public Works, the Minister of Agriculture and Forestry, the Minister of Labour and Social Policy and the Minister of Health. Promulgated by SG 109 of 16.12.2003. Amended by SG 54 of 14.07.2009.
Available at: <https://dv.parliament.bg/DVWeb/index.faces>.
- Neufert, E. (1936). Bauentwurfslehre. Bauverlag.
- Ordinance No. 4 of 1 July 2009 on the design, execution and maintenance of buildings in compliance with the requirements for an accessible environment for the population, including people with disabilities. In force since 14.07.2009. Issued by the Minister of Regional Development and Public Works, Official Gazette of the Republic of Bulgaria, No. SG 54 of 14 July 2009, amend. SG 54 of 15 July 2011, amend. SG 12 of 12 February 2021.
Available at: <https://dv.parliament.bg/DVWeb/index.faces>.
- Ordinance No. RD-02-20-2 of 26.01.2021 on determining the requirements for accessibility and universal design of the elements of the accessible environment in the urban territory and of the buildings and facilities. Issued by the Minister of Regional Development and Public Works Ann. SG12 of 12 February 2021, suppl. SG 18 of 2 March 2021, suppl. SG 42 of 18 May 2021.
Available at: <https://dv.parliament.bg/DVWeb/index.faces>.

3. Tactical urbanism. A game changer for enhancing accessibility in urban environments

by Natali Dimitrova and Polina Hitova

1. Tactical urbanism: defining what it is and what it isn't

Tactical urbanism is an innovative approach to urban planning and design that emphasises short-term, low-cost, and scalable interventions aimed at catalyzing long-term change in communities. This method, often referred to as guerrilla urbanism, DIY urbanism, or planning-by-doing, involves both formal and informal actions that range from pop-up parks and bike lanes to street art and temporary plazas (Lydon and Garcia, 2015).

Tactical urbanism shows how with a little imagination and the resources at hand, cities can unlock the full potential of their streets (Janette Sadik-Khan).

The core principles of tactical urbanism include a phased approach to change, addressing local planning challenges, making short-term commitments with long-term potential, fostering community engagement and capacity-building among stakeholders. This methodology is exemplified in various interventions, such as the transformation of parking spaces into park-like areas during the annual PARK(ing) Day¹, the creation of pop up bike lanes during the COVID-19 pandemic (Olmos et al.,2021), and community-led efforts like guerrilla gardening and pop-up cafes.

In the context of inclusivity and accessibility, tactical urbanism plays a pivotal role in creating more inclusive public spaces that cater to diverse populations. Tactical urbanism initiatives often involve reclaiming underutilized urban spaces and transforming them into accessible and inclusive areas. For

¹ Park(ing) Day is a global, public, participatory project where people across the world temporarily repurpose curbside parking spaces and convert them into public parks and social spaces to advocate for safer, greener, and more equitable streets for people. Available at: <https://www.myparkingday.org/>. Accessed July 1, 2024.

example, pop-up parks and pedestrian plazas not only provide green spaces and social hubs but also ensure these areas are accessible to people of all abilities. This approach can also include installing temporary ramps, creating sensory gardens, and ensuring clear signage for better navigation (Lydon et al., 2016).

Best practices in tactical urbanism emphasise *community involvement* and the *iterative nature of urban design*. Engaging residents in the planning and execution of projects ensures that the interventions meet the actual needs and preferences of the community. This participatory process helps build social capital and fosters a sense of ownership among residents, which is crucial for the sustainability of the projects. Tactical urbanism's flexibility allows for rapid prototyping and experimentation, which is particularly beneficial for testing accessibility features. For instance, temporary installations can be used to evaluate the effectiveness of different design elements before making permanent changes. This approach reduces the risk of costly mistakes and allows for adjustments based on real-world feedback (Tuna, 2022).

And what tactical urbanism isn't? Tactical urbanism is not about chaos or unregulated activities. While some projects might seem unstructured initially, they are strategically designed to address broader community goals. It is not a form of revolt; instead of aiming to upend existing power structures, tactical urbanism seeks to engage with them creatively and collaboratively. This approach is not about making changes for the sake of change; it involves thoughtful, strategic interventions that serve larger community objectives. For example, in Paris, temporary bike lanes created during the COVID-19 pandemic addressed immediate transportation needs. These bike lanes, initially temporary, became permanent, demonstrating how small-scale, incremental projects can inspire long-term change without disrupting the status quo.

In essence, this is precisely what tactical urbanism entails – it focuses on small-scale, low-cost, and low-risk projects that aim to inspire long-term improvements through practical, actionable steps (Munro, 2017; Green, 2015).

2. Principles, methodologies, and tactics for enhancing urban accessibility via tactical urbanism

Tactical urbanism has emerged as a powerful approach to enhance urban accessibility by implementing low-cost, temporary changes that have long-term impacts on the urban environment. This strategy focuses on community-based initiatives that aim to improve public spaces, promote active transportation, and foster social interaction.

Yet, what are the principles underpinning it?

Tactical urbanism has several core principles that guide its implementation. As a core principle it emphasises *incremental change*. Instead of grand, sweeping projects, tactical urbanism promotes small-scale interventions that can be quickly implemented and tested. This allows for flexibility and adaptability, responding to the evolving needs of the community. The framework proposed by Müller et al. (2023) for deploying small-scale urban design interventions emphasises the importance of using cities as resources for mental health and literacy. Their research suggests that even minor changes, like improved signage and seating, can significantly enhance accessibility and quality of life.

Effective tactical urbanism also champions *community engagement* – projects are often driven by residents and stakeholders who have intimate knowledge of the area's needs and dynamics. This bottom-up approach ensures that interventions are relevant and supported by the community, leading to greater acceptance and sustainability.

Tactical urbanism also encourages *experimentation and prototyping*, a trial-and-error approach, where temporary installations serve as prototypes that can be refined based on feedback and performance. This method reduces the risk associated with urban projects and allows for data-driven decision-making.

Lastly, the principle of *cost-effectiveness* is central. By utilising affordable materials and volunteer labour, tactical urbanism makes urban improvements accessible to communities with limited resources. This democratises urban planning, enabling more widespread participation and implementation (Mohankumar et al., 2020).

To enhance urban accessibility, tactical urbanism employs a variety of methodologies that address different aspects of the urban environment such as:

1. *Pop-up Infrastructure* - temporary bike lanes, pedestrian walkways, and public transit stops are created using inexpensive materials like paint, planters, and cones. These installations not only provide immediate accessibility improvements but also serve as demonstrations to gather public and political support for permanent infrastructure.
2. *Street Reclamation* - streets are transformed into pedestrian-friendly spaces through car-free events, parklets, and street furniture. This methodology reduces vehicular dominance, encourages walking and cycling, and provides safe, inclusive public spaces for social interaction.
3. *Community-led Workshops* - engaging the community in the design process through workshops and charrettes fosters a sense of ownership

and ensures that the interventions reflect the users' needs. These collaborative sessions can generate innovative ideas and build consensus around urban improvements.

4. *Urban Prototyping* - creating temporary prototypes of public spaces, such as plazas or markets, allows for real-world testing and refinement. These prototypes can gather user feedback and data on usage patterns, informing the design of permanent installations.

Specific tactics used in tactical urbanism projects vary widely, but several common strategies have proven effective in enhancing urban accessibility.

1. *Parklets and Pocket Parks* - these small-scale green spaces are often created by repurposing parking spaces or underutilized areas. They provide residents with accessible outdoor spaces for relaxation and recreation, enhancing the liveability of urban neighbourhoods. A study on the restorative health benefits of tactical urban interventions along urban waterfronts highlights the positive impacts on mental health and social well-being. These interventions, such as creating temporary parks and walkways, provide accessible recreational opportunities and reduce stress, contributing to overall urban health (Roe et al., 2016).
2. *Pop-up Bike Lanes* - by using temporary barriers and paint, cities can quickly establish bike lanes, promoting cycling as a viable mode of transportation. These lanes can be tested and adjusted based on user feedback, ultimately leading to permanent installations.
3. *Street Murals and Crosswalk Art* - colourful street art can draw attention to pedestrian areas, making streets safer and more inviting. These visual interventions can also reflect the cultural identity of the community, fostering a sense of place.
4. *Temporary Plazas* - converting intersections or vacant lots into temporary plazas with seating, shade, and activities can activate underused spaces and create hubs of social interaction. These plazas can be pivotal in demonstrating the potential of public spaces to city planners and the community.

According to Mohankumar et al. (2020), successful tactical urbanism projects often share several best practices:

1. *Stakeholder Collaboration* – engaging local governments, community organizations, and residents from the outset ensures that projects are inclusive and have broad support.
2. *Clear Objectives and Metrics* – defining clear goals and success metrics from the beginning allows for effective evaluation and adjustment of interventions. Metrics might include increases in pedestrian traffic, user satisfaction, or reductions in traffic accidents.

3. *Flexible Design* - utilising adaptable materials and designs allows for quick modifications based on real-time feedback and changing conditions.
4. *Effective Communication* - transparent communication with the public about the goals, benefits, and temporary nature of interventions helps build understanding and support.

3. Case studies

3.1. *The Accessibility Icon Project: an emblematic tactical urbanism initiative*

It is worth mentioning an iconic project called Accessibility Icon Project² as a form of tactical urbanism directly addressing inclusivity challenges. The project combats societal attitudes towards people with different abilities, striving to change perceptions towards independent living as a right for everyone, recognising people with disabilities as potential and active members of society.

While it claims to be an ongoing work of design activism by redesigning the common icon for people with disabilities from a passive person in a wheelchair to an active image, the tactical urbanism aspect is evident in the actual work of painting urban communication areas with this sign replacing the old one.

Projects like the Accessibility Icon Project illustrate how tactical urbanism can directly address inclusivity challenges by redesigning symbols and spaces to reflect active and empowered representations of people with disabilities.



Fig. 1. A volunteer paints the accessibility icon using a stencil, source: accessibleicon.org.

² The Accessible Icon Project. Accessible Icon. Available at: <https://accessibleicon.org/>. Accessed July 12, 2024.

3.2. Transforming urban access: Map4Accessibility & tactical urbanism – 4 cities across Europe

The book you are reading now has been created under the Map4Accessibility Project co-funded by the Erasmus+ programme of the EU³. It has developed a pan-European accessibility mapping app to assess the accessibility of public spaces across four EU cities. The way the app has been co-developed is via urban walks and through a service-learning to engage students and other community stakeholders in mapping practices. What are urban walks then? Urban walks are organised group trips in the city, which use a questionnaire from the Map4Accessibility app to gather data which is then used to improve the app's pathways.

In the context of tactical urbanism, urban walks are a wonderful format and the Map4Accessibility app – a great tool to identify obstacles that obstruct city accessibility. The walks can be a starting point for groups of enthusiasts and experts united by the desire to improve the accessibility of urban spaces. With ideas, networks and resources they can thus create and implement impactful tactical urbanism projects together.

To access resources for urban walks and download the app, visit the Map4Accessibility website: map4accessibility.eu/resources and app.map4accessibility.eu.

³ “Map4Accessibility”. Erasmus+ funded Map4Accessibility Project. Available at: <https://map4accessibility.eu/>. Accessed July 2, 2024.

3.3. *I want to study outdoors’ competition. An initiative by the Safe Playgrounds Association - Sofia, Bulgaria*

The ‘I want to study outdoors’ initiative was carried out in 2022 in several schools in Sofia, Bulgaria. Started by the Safe Playgrounds association⁴ and approved and facilitated by schools’ management teams, tens of volunteers participated

in designing, planning, drawing, and reorganising the spaces of schoolyards. Parents, children, and other

enthusiasts and experts took part during non-school hours to paint basketball, volleyball and football yards adhering to sports, safety and accessibility requirements. Active games were drawn on the school floors to enhance and diversify students’ play experiences – a key element of communication at a young age. The inclusive environment was further enhanced by tailoring spaces for outdoor classes, recreation, and board games.

To best illustrate an example of the setup of a tactical urbanism initiative, we have used the interview method. The method provides the perspective of a recruited volunteer who had been involved in the long term. The respondent is architect Valeriya Hitova, holding Master degrees in Architecture and Urbanism and who has experience in urban planning projects within the National Centre for Regional

Development, including open urban spaces, playgrounds and architectural



Fig. 2. A man and woman paint colourful markings on a schoolyard asphalt, with people and trees in the background. Source: Author’s archive.



Fig. 3. A group of people are working together to stack wooden pallets in an outdoor area. Source: Author’s archives.

⁴ “Safe Playgrounds Association”. Safe Playgrounds Association. Available at: <https://safeplaygrounds.bg/>. Accessed July 2, 2024.

design. Her participation in the initiative was in her capacity as a parent and citizen enthusiast.

Do you know what tactical urbanism is? No, I have only a vague idea.
Are you a co-founder of the initiative? No, I am a volunteer.



Fig. 4. A group of people are sitting on benches made of wooden pallets in an outdoor area surrounded by trees and colourful fencing. Source: Author's archives.

If not, how did you learn about it? I saw a post on Facebook in one of the district groups. I found out that the school of my son was to be refurbished following a civic initiative. It caught my interest as I wanted to show my children that to have something good and valuable, one should take care of it and make some efforts towards it.

Some history: I know from direct exchange with the founder, Maya Tzaneva, that the Safe Playgrounds Association was founded after an unpleasant situation on a playground. She reported the issue to public authorities, but no relevant actions were taken. Now, she launches initiatives to enhance the urban environment, recruiting various volunteers to support their implementation with minimal funds to be invested in the activity. Among them are architects, urbanists and urban planners to design infrastructure, and other citizens to implement the work.

What is your professional background, including previous volunteering, and was it helpful in this initiative? I am an architect and urbanist. I have worked in the private sector designing residential buildings, then moved to public authorities where I participated in projects related to improving urban environments and accessibility for people with disabilities and energy efficiency in public buildings such as public primary and secondary schools. One

project involved the design of a brand new public building to serve as a family-type accommodation centre for children with disabilities aged 3-18 years. In terms of volunteering, apart from this initiative, I have also participated in the design and obtaining the permit for operation of the 'Acoustica' villa. It is municipally owned and was reconstructed to address professional treatment for children with autism and other disabilities.

What motivated you to take part? What made me participate is that in the same year I had felt the pain of a helpless parent – my daughter had gone through an accident. I felt the cause was personal to me. I wanted to make a difference and show that we are not helpless parents.

In what way did you participate? How much did you get involved? I was part of the technical team for architectural design. I also actively participated in drawing, painting and restructuring 3 schools.

Did you recruit other participants? If yes, how did you inspire them? I convinced my husband and children to join, and we had a lot of fun. I also recruited my sister and her family and encouraged other friends to participate. I promoted the idea of drawing and adding fun elements while improving the old school infrastructure of institutions that hadn't yet received national, municipal, or EU funds.

What was the experience like and how do you feel now about it – a few years later? I was happy doing things together my family and other like-minded people. The organisers supported us with food and beverages, so it really felt like a party and the children felt they belonged to the initiative. Today, every time I go to my son's school to pick him up, we look at the painted yard and we feel content with us having drawn some of the games. When I wait for him to come out, I see other kids playing and feel happy I have contributed, and that it did make a difference to them.

What do you know about inclusivity and accessible environment? I know quite a bit, having designed parks, playgrounds and buildings for people with disabilities. In my designs, depending on the investor, private living estate or other, I consider accessibility principles. I also respect and teach my children to respect the enhancements in urban spaces for people with disabilities – e.g. not walking on marked areas on the pavement for people with visual disability, etc. What's more – all warning and notification markings and signals are also relevant for them to keep safe.

3.4. *An Urban Waterfront Study – Toronto, Canada*

The study *The Restorative Health Benefits of a Tactical Urban Intervention: An Urban Waterfront Study* was conducted in Toronto, Canada, in 2018. Led by urban planners from the University of Toronto in collaboration with local government officials and community organisations, the intervention transformed the waterfront area with temporary parks, walkways, and recreational spaces designed to promote relaxation and social interaction.

The primary objective of the study was to test the hypothesis that tactical urbanism interventions can provide significant restorative health benefits. A mixed-methods approach, including surveys, observational studies, and physiological measurements (such as heart rate variability) to assess stress reduction were applied with the focus being on measuring improvements in mental health, social well-being, and community engagement. Interventions, as is typical for other tactical urbanist such, were designed to be low-cost, scalable, and easily replicable in other urban settings, thus providing a model for future urban planning projects.

The implementation of the project involved several phases, starting with community workshops to gather input and identify the needs and preferences of residents. Following this, the temporary installations were set up, and the community was encouraged to use and interact with the new spaces. Throughout the project, continuous feedback was collected from participants to refine and adjust the installations. The study also included control sites to compare changes in well-being between areas with and without interventions.

The findings of the study were compelling. Residents who frequented the waterfront intervention areas reported significant reductions in stress and anxiety, increased feelings of happiness and relaxation, and a stronger sense of community. The data showed that even temporary urban interventions could lead to meaningful improvements in mental health and social cohesion. The success of the project highlights the potential for tactical urbanism to create health-promoting urban environments and underscores the importance of community participation in urban design.

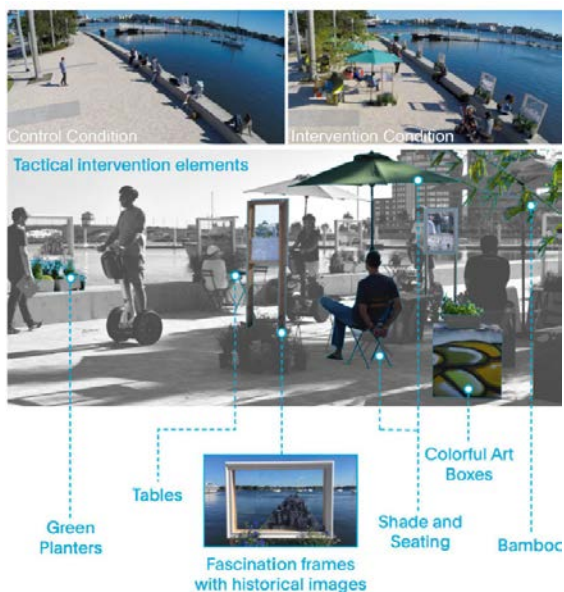


Fig. 5. Control and Intervention conditions of the Urban Waterfront Study. The image shows a waterfront transformed by tactical urbanism, featuring green planters, shaded seating, historical image frames, and colourful art boxes.

In terms of accessibility, the study demonstrates how tactical urbanism can be leveraged to create more inclusive and accessible urban environments. A similar example is the transformation of the Biscayne Green Park in Miami in 2017 which involved the temporary conversion of a vacant lot into a vibrant public space, attracting over 20,000 visitors in just 23 days. This intervention featured accessible pathways that ensured smooth navigation for wheelchair users and those with mobility issues, strategically placed seating areas that provided rest spots for elderly and disabled individuals, and sensory gardens that catered to people with sensory processing disorders by offering calming and stimulating experiences through varied plant textures, scents, and colours⁵. Both examples clearly underscore the fact that improvements in well-being and environmental accessibility are frequently interconnected or the same and tactical urbanism interventions can successfully contribute to both.

⁵ Global Designing Cities Initiative. "From Pop-Up to Permanent: Five Lessons in Tactical Urbanism." Accessed July 9, 2024. <https://globaldesigningcities.org/>.

4. Step-by-step guide on implementing tactical urbanism

Do you have ideas on how to improve your nearby urban environment? Now that you know about tactical urbanism and feel you can make a difference, you may be wondering how to make it happen? It's important to understand that tactical urbanism lacks legal foundations, so you may wish to prepare your pitch and initiate a meeting with local public authorities. You might want to recruit co-thinkers and co-actors to support you on this rewarding journey! This could be a local community, association or foundation, or a group of enthusiasts. Get prepared and build your project:

Step 1: Warm-up. Dream about your initiative, view it from different perspectives and write down your initial thoughts. Structure them into consecutive, interdependent steps.

Step 2: Review what others are doing. If a similar initiative already exists in your neighbourhood, connected with them and ask your questions. Understanding the challenge from multiple angles is a leading point to implementing optimal actions.

Get inspired by articles, books, or even Pinterest boards on tactical urbanism (such as those offered by *Urbangranola* – many success stories might offer aspects and insights you have not thought about previously. Maybe you will see the exact same idea implemented in a different city or being used in a completely new way. Be mindful that there is always room for innovative approaches – so be bold to address the challenge from your unique angle.

Step 3: Read through all the practical guides that provide you with working tips, actionable tools and materials. A good start may be the *Tactical Urbanist's Guide to materials and design* (Lydon et al., 2016). It outlines at the beginning other useful guidelines and summarizes the aspects they address. It further provides an overview of common projects of tactical urbanism, suggesting materials which can be best fit.

Tip: You may want to search for an existing guides or regulations at the local level that establish collaborative processes between cities and partner organisations or groups of enthusiasts.

Step 4: After the explorative phase, map out the expertise you will need to make the project a success. Develop a communication strategy to involve

relevant professionals, other stakeholders and volunteers. Community work is a key element of tactical urbanism.

Step 5: Organise collaborative sessions, such as design-thinking workshops, to define the initiatives' parameters. In other words, co-create your action plan.

Tip: Co-explore the issue you are willing to address from the perspective of all stakeholders, outlining needs, constraints and mitigation actions as much as possible.

Note: Good planning of necessary materials and finances are key to the project's success.

Step 6: Seek for approval, permits, facilitation, collaboration or, why not, investment from the responsible public authorities.

Step 7: You are already into it! Start small and grow exponentially: plan your first actions, learn by doing and update your action plan accordingly.

A leading note to bear in mind is that tactical urbanism projects are usually achievable with frugal resources, active, yet short-term engagement of the community and loads of enthusiasm. Hence the name – DIY Urbanism or Planning-bydoing.

5. Conclusion

Tactical urbanism can revolutionise urban accessibility with its innovative, low-cost, and scalable interventions. Projects such as pop-up parks, bike lanes, and pedestrian plazas not only rejuvenate public spaces but also make cities more liveable, inclusive, and accessible for everyone. Imagine the impact you can make by implementing tactical urbanism projects in your neighbourhood – by starting small and thinking big, you can transform underutilised spaces into vibrant, accessible hubs that reflect the needs and aspirations of your community. With all the resources at your fingertips, you are now ready to launch your first tactical urbanism journey to transform your urban environment!

References

- Green, J. (2015), “Everything You Wanted to Know About Tactical Urbanism”, *The Dirt*. The American Society of Landscape Architects. Available at: <https://dirt.asla.org/2015/05/19/everything-you-wanted-to-know-about-tactical-urbanism/>. Accessed July 1, 2024.
- Lydon, M., and Garcia, A. (2015), “Tactical Urbanism: Short-Term Actions for Long-Term Change”, Island Press, Washington, DC. ISBN 978-1610915267.
- Lydon, M., Garcia, T., Flynn, J., Murriente S., Wall D., Simpson C. (The Street Design Collaborative) (2016), *Tactical Urbanist’s Guide to materials and design*, version 1.0. Available at: <http://tacticalurbanismguide.com>. Accessed July 2, 2024.
- Mohankumar, V., Rajalingam, S., Venkatesan, V., Saravanan, N. and Yasmin, N. (2020), *A Tactical Urbanism Guidebook*, Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH.
- Muller, H., Rehn-Groenendijk J., Wasmer A. (2023). “Small-scale urban design interventions - a framework for deploying cities as resource for mental health & literacy”, *Front. Psychol., Sec. Environmental Psychology*, 14.
- Munro, K. (2017), “Tactical Urbanism. A new approach to your libraries’ work”, *American libraries*, American Library Association. Available at: <https://americanlibrariesmagazine.org/2017/09/01/tactical-urbanism/>. Accessed July 1, 2024.
- Olmos, C.A.M., Borchers, T., Martinelli Guerreiro, T., (2021), “Implementation of Temporary Bike Lanes as Support Tools for Mobility in Bogotá, Colombia, During the COVID-19 Emergency”, in *Fórum Ambiental da Alta Paulista*, 17(4).
- Roe, J., Barnes, L., Napoli, N.J., Thibodeaux, T. (2019), “The Restorative Health Benefits of Tactical Urban Interventions - An Urban Waterfront Study”, *Front. Built Environ., Sec. Urban Science*, 5.
- Tuna, G. (2022), *Tactical Urbanism: What is in a Name?*, United Nations Development Programme. Available at: <https://www.undp.org/turkiye/blog/tactical-urbanism-what-name>. Accessed July 1, 2024.

4. Accessibility to cultural heritage. Urban planning as a regulating principle in the definition of tools and strategies

by Maurizio Francesco Errigo

1. Accessibility to cultural heritage

The paper returns the reflections resulting from research and experimentation activities on the theme of cultural accessibility with particular reference to accessibility aimed at public functions. Accessibility is understood in different meanings, from the social to the economic one and, usually, accessibility and cultural heritage are two often dialectical, sometimes antithetical terms. In this research project they are investigated following the dimensions, interpretations, strategies, rules and interventions for a truly connected and synergistic territorial project that aims to enhance the rich and precious testimonial palimpsest of the territories, marked by historical centers. Intervening in these spaces, many with precise constraints and protected as cultural assets, is a very complex operation that requires constant attention in the formation of an inclusive regeneration process aimed at promoting social, cultural and economic revitalization by counteracting the decline of Italian historical centers. The central theme is the design of the continuity of the public space and the high not only physical-geographical but also ergonomic and social value that covers the theme of accessibility, considered as a tool aimed at defining rules for the conformation of paths and public spaces of quality. In the all-encompassing definition of “people with disabilities”, the project will include not only people with physical difficulties but also people with cognitive, sensory, and emotional problems, including, among the profiles, not only users with permanent pathological disabilities but also the so-called “subjects with reduced mobility” such as the elderly, pregnant women, families with small children and/or strollers, injured people or people with movement limitations, heart patients.

The methodology illustrated in the paper is based on the axiom that «the

project is the creative synthesis of the different needs, where what is done to remove barriers assumes, like many other functional needs, the role of normal providence intended to ensure, for all, the best use of the good». It follows what is contained in the Guidelines for overcoming architectural barriers in places of cultural interest which take into account the new disability model identified in the United Nations Convention on the Rights of Persons with Disabilities, the meaning of which also becomes the key to define – in an extensive and articulated way – the concept of “architectural barrier” including, therefore, elements of the most varied nature, which can be the cause of perceptive, as well as physical, limitations or particular conformations of objects and places that can be a source of disorientation, fatigue, discomfort or danger.

2. Accessibility, urban planning, urban visions

In Italy we have 62 cars per 100 inhabitants; Italians are considered the “major car consumers” in Europe; travel by car represents around 80% of urban mobility in Italy: more than double the European average. In Stockholm, the use of the car as a means of private transport represents only 25% of urban mobility. In London, 85% of commuters travel on public transport, in Milan only 45%. 50% of trips that occur in urban areas are less than 5 km, 30% are less than 3 km; they are distances that can easily be covered by bicycle or, in some cases, on foot.

According to a survey by the Italian Automobile Club¹, out of 105 Italian provincial capitals, the city of Viterbo is characterized by one of the highest Italian motorization rates with 77 cars per 100 inhabitants, on par with cities such as L'Aquila and Potenza and only surpassed by Catania and Vibo Valentia (78 cars per 100 inhabitants), Isernia (79 cars/100 inhabitants) and Frosinone which holds the national record with 80 cars per 100 inhabitants. Virtuous cities in this context appear to be some metropolitan cities such as Bologna (53 cars/100 inhabitants), Florence (56 cars/100 inhabitants), Genoa (48 cars/100 inhabitants) and Milan which has as many as 49 cars per 100 inhabitants as evidence of the important strategies on public urban mobility carried out in recent decades. Looking at the cities with which Viterbo is related by system hierarchy or by similarity in size, we can see that Terni and Siena have 67 cars per 100 inhabitants, Perugia 75 per 100 and Rieti 74 per 100, all lower numbers, some not by much, to the reality of Viterbo.

Another interesting aspect to know in order to make considerations on

¹ Source: ACI, 2021.

urban mobility is the presence and extension of cycle paths²; the data is clearly older than the effects of the PNRR and therefore it may not reflect the current situation of the cities, but it is still good study data that photographs urban situations defined in recent decades. Here too, the city of Viterbo is among the national black jerseys with an extension of cycle path equal to 0.35 m² per 100 inhabitants, preceded only by Salerno (0.24 m²/100 inhabitants), Enna (0.26 m²/100 inhabitants). ab) and followed by Nuoro (0.39 m²/100 inhabitants), L'Aquila and Naples (0.43 m²/100 inhabitants).

Remaining on the cities mentioned above, we find that Genoa has a path of 1.26 m²/100 inhabitants, Milan 4.75 m²/100 inhabitants, Florence 7.23 m²/100 inhabitants, and Bologna 12.4 m²/100 inhabitants. Cities comparable to Viterbo reserve surprising data for Rieti (11.57 m² per 100 inhabitants), very high values for Terni (4.69 m²/100 inhabitants) and Perugia (4.64 m²/100 inhabitants), and an average low path in Siena (1.72 m²/100 inhabitants) which pays orographic and political conditions not based on cycle mobility, a bit like Milan for large cities.

Another useful indicator³ is the number of annual trips per inhabitant on local public transport; Viterbo is also on the podium of the black jerseys here with 8 trips in total, surpassed only by Sondrio with 2, and Cremona, Caltanissetta, and Agrigento with 6. Among the metropolitan cities mentioned, Milan stands out as it occupies first place nationally with 467 trips, Genoa 308 trips, Bologna 204 trips, and Florence 173 trips. Among the cities similar to Viterbo, the data is medium-low and we find Siena with 78 trips, Perugia with 46, Terni with 38, and Rieti with 17. How to justify these data? Firstly, it is appropriate to place them in the instrumental, normative, and regulatory framework that the different cities have and secondly to analyze the morphological and climatic situation of the different urban centres. To do this, however, we will limit ourselves to the medium-small sized cities with which Viterbo can be compared and which are located in a position not too far from the provincial capital of Lazio.

Let's start from Viterbo which has a very old urban masterplan dated 1956, and updated in 1979 (masterplan variant) and numerous partial variants which have distorted the overall structure.

Viterbo has never had any plan for the historic centre, despite the fact that the 1956 Master Plan already indicated the executive planning for that living and beating heart of the historic centre, and no instrument currently approved for what concerns urban mobility and overcoming architectural barriers.

² Source: Legambiente, Ecosistema urbano, 2021.

³ Source: Legambiente, Ecosistema urbano, 2021.

There is currently an effort aimed at drafting a PEBA, a PUMS, and a Recovery Plan for the Historic Center, but it is only in the start-up phase without any certainty at the moment regarding the definitive drafting of the three instruments. The Recovery Plan, among the three, is the one that raises the greatest concerns both because the works, although entrusted, have been postponed by a few months and above all due to the complexity of the historic center of Viterbo, mainly a medieval and Renaissance fabric with various additions created thanks to the Reconstruction Plan of 1945 which distorted the fabric, allowing the doubling of land indices. A further fact that should not be underestimated is the breadth of the executive planning because the part of the historic center made up of the walled city of Viterbo alone is equal to approximately 100 hectares with over 3 million cubic meters of built volume and with a commercial fabric characterized by many problems.

Perugia also has the first Urban Plan (PRG) approved in 1956 (like the Smargiassi-Salcini Plan of Viterbo), renewed with a new urban planning instrument in 2002 adapted over the years to Regional Law n.1/2015; For over 30 years the city's planning documents have spoken of a significant cut in building forecasts, such as the transformation in 1990 of 14 Peep zones (popular zone) into areas for agricultural use as well as a hundred hectares of production zones and other forecasts which were never implemented. The last Master Plan dates back to 2002, when another three million cubic meters were cut. Among the fixed points of that document are, among other things, the push towards the recovery of the existing and a stop to other urban expansions, a precise definition of the urban components of the territory, the mechanisms of "transfer of development rights", the protection of the territorial strip around the compact city and more stringent rules for rural areas as well as for naturalistic and landscape assets. In Perugia, from 2014 to today there have been around 50 variations adopted by the Municipality and numerous efforts have been made to improve accessibility to the historic centre, from the construction of mechanized lifts to the creation of a huge free car park with mini metro service (Pian Massiano) with a capacity of 3000 parking spaces.

Siena has a Master Plan dated 1936, a second Urban Plan (PRG) drawn up by Luigi Piccinato in 1956, Secchi's PRG in 1996; Siena drew up a Structural Plan in 2007 and with Resolution n. 216 of 11/25/2021 the City Council approved the Operational Plan with the Variant to update the Structural Plan pursuant to art. 19 of the Regional Law. 65/2014 Siena has around 50 thousand resident inhabitants, but the city is actually frequented daily by a population which, depending on the days and seasons, varies from 70 thousand to 90 thousand people. In fact, the city hosts permanent residents, but is also

frequented by a substantial population of temporary users (city users), made up of university students, teachers and researchers, workers from different sectors who reside in the municipality for more or less long periods (from year to five/six), by workers and high school students who frequent the city every day coming from neighboring municipalities (in particular from neighboring municipalities, but also from more distant areas), by occasional users of major services (in particular the hospital, but also large cultural facilities and the stadium) and finally by tourists, who live in Siena for very short periods. The Structural Plan proposed the strengthening of the extension of the pedestrian areas (which will also affect parts outside the current delimitation of the historic center), the review of the methods of temporary access to the ZTL (rethinking for example the lack of limitations on mopeds and motorcycles); the definition of new bands with differentiated accessibility; the destination of a part of the parking spaces located in structures built or to be built to the residents of the historic centre, in order to reduce the size of the parking areas within the walls; pricing for parking in car parks in a graduated structure based on their proximity to the centre... In Siena the historic center has been a UNESCO world heritage site since 1995; On the 6th July 1965, the mayor's ordinance no.148 was issued., entitled *Special traffic rules in the city centre*, in force since the 11th July, with which a no-traffic zone was created.

It was an innovative measure at an international level, which would have set a precedent in Italy and abroad. In the 80's and 90s, the ZTL was established over almost the entire rest of the historic centre, divided into circulation and parking sectors reserved for residents only. Residents, the only ones authorized to park in the centre, were asked for a stamp of 50,000 lire per month to be allocated to increasing public transport, a very high sum. Again, it was an innovative experiment at a national level.

The construction of parking lots on the outskirts was also started, creating a network of minibuses. Since 1990, after several years of closure of the historic center to buses, the Municipality of Siena, in agreement with the transport company *Train*, introduced a minibus called "Pollicino" into the heart of the city to allow access to the narrow city streets, starting from parking lots, where those coming from outside would park their cars.

Terni has a Master Plan drawn up by Mario Ridolfi in 1967 and a new urban planning tool approved in 2008 (project by Paolo Portoghesi), The promotion of accessibility policies in accordance with the Agenda 22 action program and through the tools of the Plan for the elimination of architectural barriers and the Integrated Plan of urban spaces. To improve accessibility to the historic center, Terni has equipped itself with 3 free car parks for approximately 700 cars.

Rieti has a Master Plan approved in 1940; in 1956 a new urban planning instrument was drawn up and in 2004 a General Variant was approved; in Rieti mobility is almost exclusively by road and the historic center still maintains its centrality despite many services having been located outside of it. The PRG approved in 2004 has among its main objectives that of improving accessibility by aiming to develop the use of the local public transport system, trying to create new access points to the historic city which could be configured as interchange nodes between private mobility and public mobility, strengthening the railway station node and strengthening other nodes with the creation of car parks which should have had the capacity to free the road infrastructure from parking and return it to transit. Rieti has a parking plan for the historic center approved in 2024. There is also an investment of almost 3 million euros from the PNRR for the historic center, in particular for two important streets of the historic center such as via Varrone and via Sant'Agnese.

3. Ongoing research and the role of urban planning. Aims and purposes

In all the analyzed case studies there is great attention to mobility policies and the enhancement of accessibility to the historic center; the regulation and management of traffic and parking, aimed at defending the environmental balance and accessibility to the historic center are defined as more effective actions in the presence of ring roads which, with a plurality of accesses, can drain and diversify traffic, avoiding crossing phenomena, differentiated parking or rest areas and adequate transport systems. The use of public transport must also represent a change in culture and habits; changing habits or access rules to the center must also represent an economic convenience for citizens aimed at representing a significant reversal in the trend of urban mobility which, continuously increasing, according to recent surveys consists of a daily flow which during peak hours approaches the congestion of the infrastructure system.

Public transport is competitive if it recovers speed and the problem of urban traffic and the city parking system are two of the priorities that must always be evaluated and addressed. Considering that the population's main place of activity is the historic centre, it and the surrounding areas are, at present, often at their limits due to the need for parking. For this problem it is necessary to adequately address the more particular cases of residents and their limited and sporadic needs. Improving accessibility to the historic cen-

ter will allow the maintenance of optimal conditions for economic and service activities. In the future, the historic center will be able to maintain an important role from an economic and social point of view only if the accessibility conditions for residents and users of this part of the city are improved.

From the extensive documentation in the previous paragraph we note that Viterbo, compared to other cities, is mainly characterized by the absence of urban planning as an ordering discipline of urban development, by the lack of a clear and systemic vision of the city and of clear and applied prescriptions and regulations in local government. The lack of a regulatory and prescriptive framework has repercussions on the inadequate management of the phenomena of urban mobility and care of the historic center which, for too many years now, has been at the cost of the lack of tools and rules to comply with. Urban accessibility, being a systemic element deeply linked to rules and regulations, is clearly deficient.

The quality of a public space depends on various factors such as accessibility, the intensity of use and the social relations it can foster, the visibility and mixing of different behaviors and social groups, the ability to promote the symbolic identity of the place, adaptability to different uses over time; public space is heterogeneous, it is made up of an innumerable quantity of elements but the predominant portion is public space: streets are the most widespread public spaces, covering a percentage of them of over 70%; it goes without saying that the accessibility exercised on them therefore has a very high urban quality value.

Since the 1980s, following the studies of Kevin Lynch, Jane Jacobs, Jan Gehl and William White, design strategies have changed and attempts have been made to build places for the community; in the design of a public space it is necessary to pay attention to the stimuli aroused by the surrounding environment, to the perception and aesthetics of the lived spaces, to the imageability and legibility (and therefore identity) of the spaces, to the social diversification in the use of the spaces, and to the environmental stress or lack of safety perceived by users of public space.

The literature on the accessibility and inclusiveness of the urban environment has historically focused on the processes of disability integration, starting from theoretical constructs and educational impact, up to urban planning with the related interventions⁴. A city is accessible to residents, tourists, young people, families, the elderly, commerce and services.

⁴ M.R.A. Muscatello and C. Mento (2023), "I disturbi psichiatrici nella percezione degli spazi urbani consolidati", in Errigo M.F., Pizzio M., Paolucci R., Mento C., Muscatello M.R.A., "Psycho Urbanism. Città, cura dello spazio ed inclusione sociale Una ricerca sulla città di Viterbo", *Urbanistica in Urbanistica Dossier*, vol n. 24, ISBN: 978-88-7603-195.

“Accessible is the place that can truly be said to belong to everyone, the non-discriminating, non-selective, non-alienating place” (De Rubertis, 1994)

while that place that induces conscious or conscious sensations of uneasiness on the individual who is experiencing it can be characterized as psychotropic, unconscious and discomfort in its passage.

In 2006, with the Convention on the Rights of Persons with Disabilities, the term “accessibility” became a synonym of “freedom”, in particular when talking about places: everyone should have the freedom to access goods, services, activities and opportunities that the urban and territorial milieu offers. Today the theme of accessibility, disability and physical vulnerability is becoming increasingly transversal and is also entering the lexicon of toy manufacturers, such as Playmobil which has introduced ramps and motor aids in some configurations of classic games.



Fig. 1-2. Some Playmobil game scenarios.

The accessibility of Viterbo began to be studied in 2017; the first research started was called “Accessible Viterbo”, from there arose “Psycho Urbanism” which also led to the creation of a workshop in Croatia on urban mobility and then there was the first research financed by the La Sapienza University of Rome whose title was “Psycho Urbanism. City, care of space and social inclusion⁵” and the second, again financed by Sapienza University of Rome whose title is “Otherwise, the city of 5 senses. An inclusive urban project for the physical and sensory accessibility of cultural heritage in minor centres, hamlets and villages⁶”.

Over the last few years, the research network has developed some territo-

⁵ Research project financed with the SEED PNR call by La Sapienza University of Rome, three-year activities from December 2021 to December 2024.

⁶ Funded with Academic Senate Resolution n. 45/2024 of the 6th February 2024.

rial animation and shared planning initiatives with some urban design conferences and workshops on the themes of accessibility and social inclusion held both in Italy and abroad. For example, we recall the workshop held in Croatia in May 2018 at the University of Rijeka entitled “Psycho Urbanism: vulnerable users through healing spaces”, the “Viterbo Accessibile” design workshop organized with the Italian Multiple Sclerosis Association (AISM), and the specialization course organized by the University of Rijeka in May 2020 entitled “Unidesign – Universal and inclusive design for better human environments”.

One of the first analyzes carried out concerned the parking system of the city of Viterbo, which is fundamental for accessibility policies. Viterbo has approximately 829 intra-moenia parking spaces and approximately 1235 in the extra-moenia circular ring serving the historic center (tab. 1).

Tab 1. Parking spaces in the car parks serving the historic centre

<i>Intra-moenia</i>		<i>Extra-moenia</i>	
<i>Parking</i>	<i>Parking lot</i>	<i>Parking</i>	<i>Parking lot</i>
Sacrario	260	Stazione P.ta Fiorentina	91
Piazza Verdi	40	Angolo F.lli Rosselli	108
Via Santa Rosa	26	Viale Capocci	82
Piazza della Rocca	134	Via del Carmine	19
Sallupara	47	Via Vico Squarano	68
Via Cavour	22	Valle Faul	100
Via Garibaldi	20	Via Nino Bixio	24
Pza San Sisto	40	Via Cattaneo	98
Pianoscarano	42	Cittadella Salute	152
Via Mazzini	8	Via Romiti	44
Porta della Verità	5	Università Tuscia	95
Piazza Dante	37	Fortezze	232
Valle Faul	98	San Biele	31
Via Matteotti	50	Stazione P.ta Fiorentina	91
TOTAL	829	TOTAL	1235

Analyzing the different road sections of the city, one often notices the lack of direct connections between pavements and pedestrian crossings, the reduced width of the pavements which in the historic center often do not exceed 60-90 cm, the lack of platforms for getting on or off excessive slope of the same, and in some points there is a certain danger in pedestrian road crossings (especially in Piazzale Gramsci and in the Porta Romana area). In many points of the city the ramps are placed parallel to the paths (fig. 3) impeding functionality and there are also numerous architectural barriers present along the paths. Particular attention must also be paid to street furniture which in many places constitutes an element of reduction in the width of pavements and an obstacle especially for people in wheelchairs but also

for families with strollers. The historic city is also characterized by infrastructures built with stone slabs, often basaltic, which constitute a major practicability problem for users with physical disabilities.

A separate discussion, but strongly connected with the problem of accessibility, must be made regarding the habits of the inhabitants in their use of private means of transport; many respect the indications and prescriptions but a not too small percentage adopt self-centric behaviors, placing their personal comfort in a priority position with respect to collective well-being and improperly occupying precious spaces of the city's cultural heritage such as the historic Renaissance squares or the streets as a resting place. of the medieval district of San Pellegrino.

Regarding the mobility system, Viterbo suffers from a low use of public transport and a high dependence on travel by private car, as demonstrated by a motorization index among the highest in Italy.



Fig. 3. The Piazzale Gramsci area.

According to research by the American Community in 2004⁷, 15% of the world population are users with disabilities, 5% have cognitive disabilities, 4% have sensory disabilities and 11% live with someone with disabilities, data that reveal how the theme is of fundamental importance in the planning and management of a city where designing for users with fragility would mean designing for everyone (also according to the principles of Universal Design).

A point to pay attention to is the legislation for public spaces and buildings which is quite crystallized over time being regulated by Law n.41 of 1986, by Law 104 of 1992 and by the application of Italian Presidential Decree n. 503 of 1996; however, the prescriptive rules are quite clear and act on all the physical elements of an urban structure such as sidewalks, ramps, accesses, car parks, defining rules and performance measures to be followed and applied; however, it has a manual-type prescriptive system that defines,

⁷ American Community Survey, 2004.

in the city, accessible elements but not accessible fabrics, acting from a punctual and non-systemic perspective. The application of the legislation often leads to the development of PEBA (Architectural Barrier Elimination Plans) and not PAU (Urban Accessibility Plans) whose difference is fundamental and lies precisely in the systemic approach to problem solving.

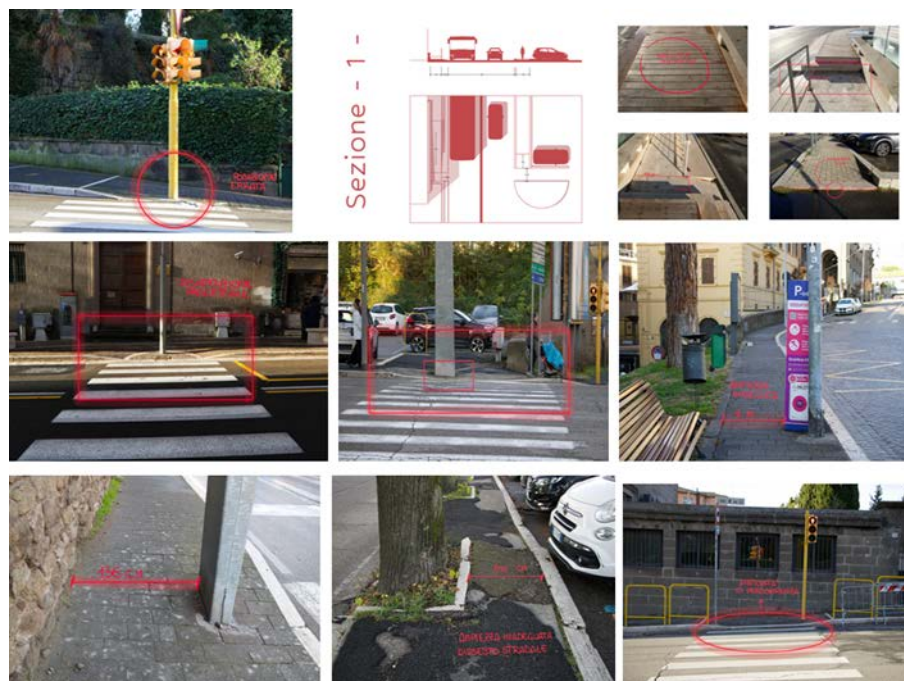


Fig. 4. Examination of some architectural barriers in the historic center of Viterbo.

Viterbo deserves particular attention to the reconstruction of the programmatic and prescriptive framework, the city needs a new season of tools, rules and regulations capable of giving the right commands to the definition of the city, to the valorisation of its historic center and to the physical achievement of that complex objective which is to make the city accessible to heterogeneous fragilities.

A precious work that has already been started with the project to remove the physical, sensorial and cognitive barriers of the most important museum in the city, the Museo dei Portici which was the winner, in 2022, of the tender issued by the Ministry of Culture⁸ to promote accessibility to places

⁸ The Call was promoted by the Ministry, was published on the 12th May 2022, and concerned proposals relating to intervention proposals for the removal of physical, cognitive and

of culture. An ambitious project, carried out with competence and characterized by a broad convergence on the ambitious theme of accessibility.

The proposals were promoted by the Municipality of Viterbo (ref. Department of Quality of Urban Spaces – Urban Planning; City Decorum; Viability and Sustainable Mobility; Spaces for Wellbeing and Relationships; – Arch. Emanuele Aronne) and by the Department of Planning, Design and Technology of Architecture of the University of Rome La Sapienza (Working Group Prof. Maurizio Francesco Errigo, Prof. Laura Ricci, Prof. Irene Poli, Prof. Carlo Martino, Prof. Luca Ruzza). The proposals were also conceived with the collaboration of the Italian Multiple Sclerosis Association (AISM) and with the psychiatry group of the BIOMORF Department of the University of Messina.

In compliance with the Ministerial Guidelines on museum planning, the interventions have been divided into macro-interventions aimed at improving accessibility from the outside, reachability and access to itineraries and services, the improvement of horizontal and vertical itineraries, staff training and museum enhancement.

In detail, the project actions relating to the macro-areas have been defined as follows:

- creation of access routes and shuttles with disabled stalls;
- website definition and communication project, accessible;
- implementation of wayfinding and entrance to the museum with an acoustic and Braille orientation system, with the possibility of video-projecting it and making it dynamic;
- creation of a museum App;
- creation of a Smart user profiling system capable of switching the orientation system;
- definition of audio texts for the visually impaired (audio guides – multimedia audio/video files) – Video guides on tablets/multimedia audio files for the hearing impaired;
- definition of written texts (including Braille) for the deaf that reproduce all the captions in the museum – Tactile use with reproductions;
- creation of tactile maps;
- positioning of LOGES tactical routes (paving and services map);
- creation of rest areas inside the museum;
- adaptation of the lighting system in the toilets;
- operator training;

sensory barriers of public and private museums and places of culture with funding from the Ministry of Culture.

- creation of the LAP (Permanent Accessibility Laboratory) with interactive educational laboratories for various types of users, in particular children and the elderly but also for the cognitively disabled and special programs for access to prisoners;
- location of the museum exhibition at a height between 80 and 110 cm.

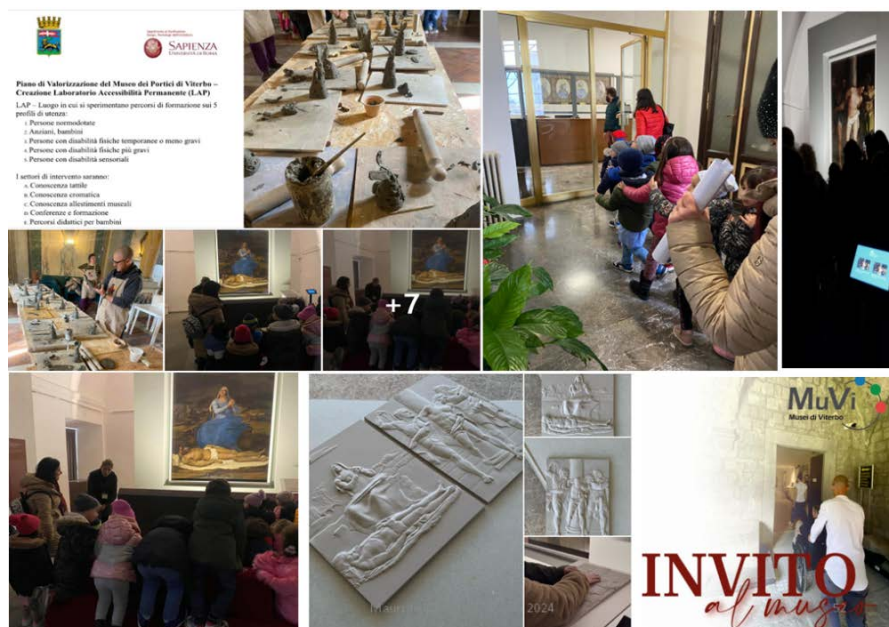


Fig. 5. Main planned project in Museo dei Portici.

The LAP is an inclusive cultural project/process, within which the following laboratory activities will be envisaged:

- tactile knowledge, through the construction of tactile tools and through the decoding of the tactile language used in museum spaces;
- chromatic knowledge, through appropriate color laboratories connected to the emphasis on information;
- simple knowledge, through a decoding and simplification of the language curated in the various museum displays;
- knowledge and/or training, with the creation of learning places based on educational seminars and conferences or on techniques for setting up or restoring finds or canvases;
- Intuitive knowledge, i.e. training courses for children and users with sensory disabilities;

- Open knowledge, study and knowledge days for prison inmates.

Scientific Responsible of the whole project is Prof. Maurizio Errigo who is developing other two important projects that have as their ultimate goal the creation of two accessible neighborhoods whose mapping of the problems will be carried out (starting from October 2024) with some inspections coordinated by the University La Sapienza di Roma in which neighborhood schools, residents, traders, the various economic forces and stakeholders and the various associations representing the different forms of physical and cognitive fragility⁹ will participate and is supported by the Municipality of Viterbo – Quality Department of Urban Spaces and by the municipal Volunteer Council.

References

- Bobbio, N. (2004), *La democrazia non abita a Gordio*, FrancoAngeli, Milano.
- Calabrese, M.L., Houben, F. (2003), *Mobility a room with a view*, Distributed Art. Pub, Biennale Rotterdam.
- Carbonara, G., Text of the lesson held at the X edition of the post-graduate course “Designing for all without architectural barriers”, Rome 2002. It follows the contents of the Guidelines for overcoming architectural barriers in places of cultural interest (Decree of the Ministry of Cultural Heritage and Activities of 28 March 2008).
- De Rubertis, R., “The problems of accessibility”, in AA.VV., *The pedestrian space in the design of the city, Proceedings of the Conference Perugia 15th March 1994*.
- Errigo, M.F., Pizzio, M., Paolucci R., Mento C., Muscatello M.R.A. (2023), “Psycho Urbanism. Città, cura dello spazio ed inclusione sociale Una ricerca sulla città di Viterbo”, in *Urbanistica Dossier*, volume n. 24, ISBN: 978-88-7603-195-3.
- Errigo, M.F., Poli I. (2024), “Cultural accessibility to overcome physical, cognitive and sensorial barriers”, presentato alla call dell’Istituto Nazionale di Urbanistica INU dal titolo Inclusive cities and regions, Sepe M., (edited by), *Inclusive cities and regions. Territoires Inclusief. 14° Biennale of European Towns and Town Planner*, INU Edizioni, Napoli, ISBN 978-88-7603-254-7 (e-book).
- European Commission (2007), *Green Paper. Towards a new culture for urban mobility*, EC, Bruxelles.
- Guidelines for cities accessible to all* defined by the INU in the Accessible cities project.
- Lynch, K. (1962), *Site Planning*, MIT Press, Cambridge.

⁹ At the moment the network makes use of the following associations: AISM, ANGSSA Viterbo APS, ACLI.

- Milgram, S. (1970), "The experience of living in cities", *Science*, n. 167, 1461-1468.
- Monardo, B., Cerasoli, M., Ravagnan, C., Valorani, C. (2020), "L'accessibilità come strategia di rilancio dei centri minori nei territori storici italiani", *Ananke*, n.90, 146-150.
- Museum Guidelines (Decree of the Ministry of Cultural Heritage and Activities of 28 March 2008).
- The United Nations Convention on rights of persons with disabilities, 2008.
- Yin, R. (1993), *Applications of case study research*, Sage Publishing, Newbury Park, CA.

5. The architecture of public toilets: a measure of accessibility

by Sebastiano D'Urso

1. The public toilet as a measure of accessibility

In democratic and technologically advanced contemporary societies we have witnessed the rise of the “third nation of the world” (Schianchi, 2009) a “nation” of over a billion individuals in 2011 already (WHO, World Bank, 2011). We must admit however that the world we have built is not for everyone. It is full of obstacles, material and immaterial, which can potentially involve or affect everyone, obstacles that prevent the affected people to enjoy a normal life. A concept of normality not to be meant in generic terms but as the possibility that every person should live with dignity (Marcantoni, 2014), enjoying equality. An idea of normality therefore impossible to standardize (Baldini Buti, 2013; Marcantoni, 2014), as it is usually thought with regard to the concept of ‘normal’. It’s impossible to generalize because every human being experiences their own development and evolution as individuals, different from any other person. It’s clear however, how complex is the exact opposite, that is, imagining an approach to architectural designing which takes into account the adventure of diversity (Vattimo, 2001). To all diversities however, we cannot include, without further specifications, disability. Disability is in fact the condition that, regardless of the lens through which we interpret it – social, medical, psychological, etc. – it cannot be easily solved because, as stated by Tom Shakespeare, “an accessible environment reduces to a minimum disability-related inconveniences, but this doesn’t make people with disabilities equal to non-disabled ones” (Shakespeare, 2017, p. 69). But if we acknowledge that what makes people disabled is both society and their bodies, Shakespeare – as a solution – proposes a relational conception of disabilities. A relational conception that should be applicable also to architectural designing, and just because of this it must be a multisensory one (Bandini Buti, Bisson e al., 2010).

The first answers in order to overcome the difficulties of an inclusive project where every person is also different can be found in the research, invention (De Santis, 2014) and creativity (Baldini Buti, 2013) by those whose job is to plan, design and manage the new environment. An environment that should emerge from this constructive work, using the same creativity we see in the development of hostile architecture (Baratta, Conti, Tatano, 2013). Architectures these which if on one hand they try to prevent anti-social behaviors, on the other hand they constitute real material barriers (road humps, spikes, skatestoppers, etc.) against the access to public spaces. The paradox of those who try to counter immaterial barriers (unwanted and/or anti-social behaviors) with the construction of material ones, is a clear indicator about the work ahead that has to be done in order to make our cities as accessible as possible. Indeed, one of the main immaterial barriers (arrogance) is to think that accessibility can be achieved by adding physical impediments to the plethora of the other well-known ones: ignorance, lack of awareness, prejudice, stupidity, foolishness, apathy, disregard, frivolity, denial, discrimination, marginalization, irresponsibility, smugness, highhandedness, ineptitude, disinformation, negligence.

In this scenario, an architectural project must not reflect society but, has to try, in line with the principle that designing spaces means planning behaviors (Murgia, 2016), to improve society itself. In order to plan following this principle it's indispensable to empathize with all end users (Mallgrave, 2015), excluding none. This can be done by avoiding standards, archetypes and pre-packaged models with a focus on their health as well (Neutra, 2015). This approach should be extended to any kind of project, starting from those that are apparently less noble, but just because of this they give the measure or reveal the state of the art of our culture and especially our system of values.

The paradigm of public toilets constitutes a measure of one of the most topical parameters concerning the level of civilization of any society: accessibility to one's own public spaces. It, the paradigm of public toilets, measures our civilization because it's in the bathroom where the child "learns the basic elements of cleanliness" (Neutra 2015, 39); because through the way inequalities become evident in public toilets we measure the degree of accessibility and inclusion of people with disabilities (De Santis, 2023). Through this paradigm we also measure the respect for their right to be citizens just like any other person (Wiseman, 2019). Last but not least, the quality of public toilets reflects the standards of the public spaces in general. Society and civilization make progress hand in hand with architectonics, including public toilets'. The complexity of this topic (De Santis, Marzi, Secchi e al., 2023) can be tackled through different approaches. And each of these too is, in turn, a measure of the culture which expresses them.

2. THE TOKYO TOILET: a case study

Japan is particularly sensitive to the issue of public toilets for everyone and their accessibility. This can be associated, besides their culture, to the data on their ageing population showing that the Japanese population is the oldest in the world (Italy is second after Japan). The 29.1% of the population is in fact 65 or older. As the average age of the population increases, the demand for services for senior citizens including public toilets increases proportionally.

Japan is giving an exemplary answer to this demand through initiatives such as the Happy Toilet¹ program by the Restroom Society of Singapore and THE TOKYO TOILET in Shibuya City². In particular the facilities of THE TOKYO TOILET project managed by The Nippon Foundation with the full cooperation of Shibuya City is very wide, inclusive and innovative. Thanks to their very creative planning approach, they have replaced the existing but quite ordinary public toilets with a complete range of new services for all kinds of users: women, men, accessible facilities, priority facilities for elderly people, priority facilities for expecting mothers, baby care rooms, priority facilities for those with small children, children's toilets, facilities for ostomy patients, care beds, baby chairs and changing boards.

The 17 pavilions (Benedetti, 2020) are all located in the Shibuya City and are designed by internationally famous architects, university professors, designers, industrial designers, interior designers and fashion designers. All experts who use their creativity and inventions not for standardized projects, but for an architecture that aims at meeting the demands and needs of all users.

The research work for new structures easily recognizable for their perfection typical of the Japanese culture is applied to areas of interest that are only apparently more humble or unexpected (Benedetti, 2020). The issues of care and attention to every detail are here all ingredients that, as Wim Wenders said, have created bathrooms that are “small shrines of peace and dignity” (Annichiaro, 2024), turning out to be unexpected and surprising protagonists of his last motion picture, PERFECT DAYS³.

It's the architectonic language that gives these public toilets their poetic connotation. This is because, as suggested by Juhani Pallasmaa, “the inherent language of architecture speaks of permanence, durability, faith, and human care” (Pallasmaa 1999, 24).

¹ Cfr. <https://www.toilet.org.sg/loomapdirectory>

² Cfr. <https://tokyotoilet.jp/en/>

³ Cfr. <https://www.perfectdays-movie.jp/en/>

An architecture that breaks the above mentioned barriers, eliminates obstacles and is at the service of society, making accessible to all the public spaces available.

The synthetic description of THE TOKYO TOILET projects shows how the measure of accessibility can also be read through the poetry that inspires creative work, starting from their cultural frame of reference, and their local and architectural traditions.

The public toilet designed by Tadao Ando located in the Jingu-Dori Park is known as “Amayadori” (Fig.1). This name refers to the action of taking shelter from the rain or a small umbrella. The architect in fact, built a toilet capable of conveying a strong feeling of safety and comfort. In order to do this he drew on the Japanese traditional household architecture, specifically the “engawa”. The “engawa” is the external space around the house similar to a portico or veranda that is covered by the roof, and the flooring around the roof’s perimeter is paved with timber boards or bamboo. The filtered light atmosphere and the ventilated microclimate within the space enclosed between the opaque walls of the toilets and the external, partially opened one (made with vertical slats) protects the users of the facility and makes them feel welcomed at the same time. The circular plant hosts toilets for everyone (with baby care room, facilities for individuals who have undergone ostomy, and baby chair), the one for men (this too fitted out with baby chair) and the toilet for women. The washbasins furnished with large mirrors are, just like the urinals, located within the “engawa” passageway. The circular facility has two entrances, which means more accessibility and safety: the first next to the toilet for everyone; the second, divided in two by a central wall, leads to the bathroom for women and the one for men. The huge egg-shaped roofing is asymmetrical. It extends more in front of the entrance of the toilet for everyone thus allowing the passerby the opportunity to enjoy a space where they can rest. Pictograms and Braille language are used to provide information on the organization and usage of the facility.

The water theme shapes the toilet designed by Sou Fujimoto (Fig.2). Water, the essential element for a bathroom to work, is metaphor and substance for Sou Fujimoto, as confirmed by the fact that he calls his public toilet “vessels and fountains”. Water as the metaphor of a big white vessel’s navigation which arrives at the city and is impossible not to notice: it must be visible to all both for its shape and color.



Fig.1. Amayadori by Tadao Ando. Photo by Satoshi Nagare, Courtesy by Shibuya City.



Fig.2. Vessels and Fountains by Sou Fujimoto. Photo by Satoshi Nagare, Courtesy by Shibuya City.

An excess of visibility, obtained by the structure's pure white walls and roof and its sculptured patterns as well, making it immediately recognizable thus enhancing its accessibility. Visual accessibility is guaranteed at night too, thanks to a warm light that illuminates the facility making it a safe place. This underscores Sou Fujimoto's public toilet's autonomy with respect to the surrounding environment. The toilets for everyone are accessed directly from outside, whereas the toilets for women and men, which are found next to each other, are accessed through a small open-air corridor area surrounded by a wall.

This wall having a concave outline makes it possible for users of any age, height and people on wheelchairs to easily access the faucets installed along the various heights of the wall, to drink and wash their hands. The wall, fitted with the faucets, is a sort of interface between the small open-air corridor and the rest of the city. The toilet thus becomes a public space useful also for those who don't necessarily need to use the bathroom. It reminds us that water is the element around which people gather and socialize.

The urban dimension of Kengo Kuma's public toilet is enhanced by its location inside the Nabeshima Shoto Park. Kuma designs a "public toilet village" made up of five small huts covered with Japanese cedar boards louvers. Each hut offers a specific service as to nearly complete the range of facilities as required by THE TOKYO TOILET. The village-like compound besides being more compatible with the wood surrounding it, it also encourages enjoying the natural environment it is located in. That's why Kengo Kuma calls his toilet "a walk in the woods" (Fig.3). A walk that is meant to be a return to nature. The toilets are linked with each other by a series of paths, easily walkable, safe and ventilated where the contact with nature is tangible and scenic. The exterior walls covered with irregular cedar louvers and the different terrain levels of the huts over the area's uneven topography make Kengo Kuma's public toilet immediately visible. The same happens at night when the wooden boards are lit up from the ground as if to shield the small village of restrooms with a warm glow. The different terrain levels of the village plot are handled by large steps leading to its various services, while the bathroom for everyone and the toilets for men and women with changing boards are both at the same height of the surrounding public space. Attention to detail and the environment are also found inside each toilet. They are in fact decorated with recycled cherry or dawn redwood timber disks.



Fig.3. A walk in the woods by Kengo Kuma. Photo by Satoshi Nagare, Courtesy by Shibuya City.



Fig.4. Toilet of the Town Lights by Junko Kobayashi. Photo by Satoshi Nagare, Courtesy by Shibuya City.

The hectic and increasingly impersonal metropolis, where it's easy to get lost in the web of its entangled transport system, needs highly recognizable and, because of this, easily accessible structures.

“Toilet of the Town Lights” by Junko Kobayashi fulfils this necessity typical of contemporary big cities (Fig.4). As in many other instances of THE TOKYO TOILET project, it's a substitution more than a renovation of a rather anonymous public toilet located under a railway overpass.

The new public toilet is made up of a number of separate cylindrical steel blocks of different heights but grouped together below a yellow, oval-shaped roofing. This color gives the feel of an artificial sky in the daylight hours interposing the overpass intrados. At night the yellow roofing reflects the light that illuminates the bathroom cylinders below conveying a feeling of safety and cleanliness. The ludic aspect of the toilet's architecture lends a strong identity to the place, now far from being anonymous like the previous one. The ludic aspect is further emphasized by the presence of bunny silhouettes as if they're looking out round windows. The chosen colors and materials, besides giving a strong identity to the toilet facility, emphasize the brightness of a place otherwise gloomy and unsafe, typical of the way things usually look below an overpass. Stepping into the toilets, they offer a diffuse but soft brightness from the ceiling's perimeter all along the oxidized metal walls of the cylinders

Another public toilet located below an overpass is the one by industrial designer Marc Newson (Fig.5). He draws on the reassuring style of vernacular architecture to lend his public toilets the feel of safety, comfort and tranquility they need. The Minoko roof, a typical Japanese architectural solution, stands out thanks to its shape, its drooping verge and material, copper. This peculiar roof, as seen in shrines, temples, tea halls and rural areas is used in the city to create a contrast with the hectic life of the metropolis and make the place more remarkable. The use of materials like copper and technological solutions like the lighting system enhance the attractiveness of this public toilet, a truly hidden treasure to discover in town. A surprising discovery that goes hand in hand with its functionality and simplicity of interiors: monochromatic spaces lit up along the perimeter by lines of light, others coming down very close to the walls. The clear and transparent atmosphere conveys cleanliness and comfort. The same type of lighting from the roof along the external walls lights up the facility at night, offering the city a pleasant place for its freshness.



Fig.5. Toilet in Urasando by Marc Newson. Photo by Satoshi Nagare, Courtesy by Shibuya City.



Fig.6. Monumentum by Tomohito Ushiro. Photo by Satoshi Nagare, Courtesy by Shibuya City.

It's a bathroom that can also be seen as a monument telling us that, as put by Tomohito Ushiro, "we are all the same in the sense that we are all different" (Fig.6). This public toilet is a sort of technological work of art where there is a big screen, set up on the rear side of the structure, that features 7.9 billions of different combinations of light, representing the number of human beings alive on Earth when the toilet was designed. The artistic bathroom then, besides its functionality in terms of safety and hygiene, through that screen, it's as if it – figuratively – keeps posing questions to the facility's users. The effect of the changing lights projected onto the luminous panel interacts with the natural surroundings of the Hiroo East Park where it is located. These changing lights go from green in daylight to tenuous white at night. Behind the small pavilion, creating a nice contrast with the screen, there's a low vegetation garden bordered by a stone wall. The small building hosts one public toilet for everyone and one for men and women. Large pictograms feature on the walls and toilet doors inviting visitors to use them.

The "Hi Toilet" by Kazoo Sato exploits the technology of voice command to reduce physical contact with the structure to the bare minimum (Fig.7). A contactless toilet is safer and hygienic also in case of pandemic. The structure has an almost alien look: a wholly white sphere with a horizontal cut in the lower part, where it firmly rests on the ground, and a vertical one to makes space for the toilet entrances. Here, on the right there are the urinals that are always open as there is no door, on the left the toilets for everyone. Vocal commands allow users to open and close the doors and operate the restrooms inside. At night the peculiar sphere seems floating over the white cobblestone it's built on, also thanks to the lighting system running along the perimeter, which further enhances the alien appearance of the structure. It's elegant geometry allows the designer to have fun choosing to have the base of the structure shaped as its section. A section which eases natural air change from below also in the absence of windows.



Fig.7. Hi Toilet by Kazoo Sato. Photo by Satoshi Nagare, Courtesy by Shibuya City.



Fig.8. Three Mushrooms by Toyo Ito. Photo by Satoshi Nagare, Courtesy by Shibuya City.

The public toilet facility designed by architect Toyo Ito, represents three big mushrooms grown next to the forest around the Yoyogi-Hachiman shrine (Fig.8). The closeness with this natural environment led the architect to look for something related to nature through which harmonize the public bathroom with the natural context. The Three Mushrooms, as he aptly called his toilet, is a three cylinder-shaped pavilion complex. The one for women is made up of two intersecting cylinders; the toilet for everyone is the largest cylinder; the bathroom for men is a cylinder with a detached, round, parallel wall to protect urinals and the washbasin. Every block features an over-hanging dome-shaped roof a little larger than the structure below suggesting the idea of mushrooms. Also the way the cylinders appear to smoothly rise from the ground of the area delimiting the three blocks' perimeter, hints at a more natural development than the right angle option. Further, this also favors cleanliness and hygiene. The flooring material with its small tiles in fact, covers the cylinders up to their top. The pattern of these small tiles creates different horizontal strips or bands getting lighter and lighter (from dark red to white) toward the upper end of the structures. Natural light enters through the space between the roof and the cylinders. The layout of the three pavilions ensures maximum safety and privacy. The chromatic and geometrical choice transform the three mushrooms into lanterns at night which light up from above the public space around them.

White is both the color that characterizes Kashiwa Sato's public toilet and the name of the structure (Fig. 9). A pure white that signals cleanliness and safety. A white that, says the designer, "should not be too conspicuous", though his public toilet looks dazzling and as such it stands out in the public space where it is located.

A rectangular parallelepiped structure whose external "walls" are constituted by thin, horizontal aluminum slats separated from each other by a 2-centimeter gap allowing the passerby to see the movement of the users inside the toilet around its perimeter. These external, semitransparent walls do not touch the ground thus conveying the idea of floating and lightness. Also, this allows the feet of the users only to be seen from outside the structure, which is a very discreet but effective way to monitor the building and improve safety. The toilet is built on a squared area whose flooring is white too, surrounded, along its perimeter by recessed spotlights which at nighttime emphasize the idea of floating and lightness of the structure.



Fig.9. White by Kashiwa Sato. Photo by Satoshi Nagare, Courtesy by Shibuya City.



Fig.10. The House by NIGO®. Photo by Satoshi Nagare, Courtesy by Shibuya City.

The designer's care regarding this project can be appreciated through the frame of references he draws on: from the S-House by Sanaa in Okayama to the installation of *The Square* of the homonymous film by Ruben Östlund. Care and attention with regard to communication can also be seen through the pictograms used in every toilet of THE TOKYO TOILET project. Likewise every bathroom displays a plate bearing the name of their designer, to underscore the importance of and respect for these structures by everyone.

Fashion designer NIGO® chooses the more reassuring type of good old one-story house for his public toilet (Fig.10). He aims at creating a striking contrast with the city's skyscrapers concerning architectural and functional aspects: a place easily accessible for all also in terms of collective consciousness. A bathroom in a real-looking house with a pitched roof complete with windows and doors, and painted just like any regular house, to communicate a feeling of household intimacy. The reassuring look of the structure is completed with its low picket fence at its sides. The toilet's difference in scale and shape makes it look – in relation to the context – singular though in reality it isn't singular. Hence, singularity in terms of the toilet being easily identifiable and therefore also accessible.

Andon is the typical handmade washi paper and timber Japanese lantern. Having this object and name in mind, architect Takenosuke Sakakura makes the new public toilets he designs more welcoming (Fig. 11). He believes that for these types of structures it's not enough meeting all the efficiency and accessibility requirements in accordance with the law. He thinks that it's also necessary to try to improve, with their presence, the contexts where they are built. The reference to the Japanese lantern is translated into reality thanks to translucent glass walls which in daylight emphasize the movement of the plants around the public toilet and at night light up the surrounding environment, just like lanterns do.

"... with the toilet" is the name of the project by Miles Pennington, professor of design, The University of Tokyo (Fig.12). The key question the project aims at answering is the following: "Does a public toilet ever try to be the center of attention in a local community?". In this case, the professor not only designs a public toilet, but also envisions something that for all intents and purposes works as a multifunctional space that can be used for exhibitions, as a pop-up kiosk, information center and meeting place. The public toilet therefore as a real multi-purpose hub for the local community. The bathroom, as a meeting point is part of the Onsen Japanese tradition, namely the Japanese thermal baths. The building is completely white, five meters tall and with a large central space opened on one of its sides looking toward the city and furnished with multiuse wooden and chromed steel benches. On every side of this open space whose floor is elegantly paved with white and

light grey marble, users can find the various toilets which at night are lit up by the ceiling spotlights. The structure, located at the corner of a very busy intersection, is a very useful facility for the city and a betterment for the urban environment.

The ludic dimension of Ebisu East Park is exploited by Fumihiko Maki for the public toilet he calls “Squid Toilet” (Fig.13). The Prizker Award architect therefore draws on Ebisu East Park’s moniker “Octopus Park” that circulates among the community for the park’s octopus-shaped slide. Maki’s bathroom is in fact an extension of the public space it is meant to complete and enrich thanks to all those services accessible to everyone, which are all-important in modern city parks. Fumihiko Maki’s public toilet compound is made up of a few pavilions crossed by a path leading to the park. These structures are covered by a light and curving roof. The structure that hosts the washbasins is of semi-transparent glass, whereas the other ones are white like the roof. The roof’s design, besides facilitating ventilation and the natural illumination of the toilet, is light and cheerful like the park’s recreational facilities.



Fig.11. Andon Toilet by Takenosuke Sakakura. Photo by Satoshi Nagare, Courtesy by Shibuya City.



Fig.12. ...With Toilet by Miles Pennington / UTokyo DLX Design Lab. Photo by Satoshi Nagare, Courtesy by Shibuya City.



Fig.13. Squid Toilet by Fumihiko Maki. Photo by Satoshi Nagare, Courtesy by Shibuya City.



Fig.14. Toilet in Higashi Sanchoime by Nao Tamura. Photo by Satoshi Nagare, Courtesy by Shibuya City.

It's the origata, the Japanese way of wrapping gifts, the idea that inspired Nao Tamura for her project of a universal bathroom as universal human needs are (Fig.14).

Put in these terms, age, sexual identity, religion, color of skin become insignificant, as in the privacy of our bathroom we are all equal, and because of this, public toilets especially must be accessible to everyone, safe and capable of ensuring privacy. In the narrow and elongated lot along the railway tracks, Nao Tamura wraps her gifts for the Shibuya community. She chose a shade of bright red to finish the external walls and roof of the reinforced concrete structure. The shape of the lot determined the layout of the toilet with three separate, but close to each other entrances, those for men, women and for everyone. The bright red of the building stands out in the urban context making the structure easily recognizable.

Interior designer Masamichi Katayama proposes a “modern kawayaya” for his public toilet in the Ebisu Park (Fig.15). The kawayaya was a primitive hut made from rammed earth and timber, but the kawayaya kami is also the divinity that, according to the Shintoist tradition, protects those who go to the bathroom (Hanley, 1997) which in the past was usually located in dark and unsafe areas. From these cultural references the idea of an “ambiguous space” made up of fifteen tall, reinforced concrete walls leading to three different toilets (for everyone, male and female). The chosen style for the walls, was architectural concrete. The labyrinth-like facility is an invitation to play with the space around it, which at night is lit up from below to welcome the users. The veinlike markings of the formwork impressed on the concrete call to mind the rammed earth walls used for the original building and characterize also the interiors of the bathrooms therein.

Architect Shigeru Ban has designed two identical public toilets in terms of shape and operation: one for the Yoyogi Fukamachi Mini Park, the other for the Haru-no-Ogawa Community Park (Fig. 16). Cleanliness and usage of the two toilets were the focus of this project. The solution to both is central for the management of structures like these located in a park. Shigeru Ban achieves his objectives by exploiting the technology that enables the transparent glass walls and doors to turn opaque and vice versa. The two toilet boxes he designed display a different color to indicate the type of bathroom therein. Both boxes are transparent when free, turning opaque when busy. This guarantees a twofold advantage as it allows to check the toilets' cleanliness and to see if either is busy or not without even stepping into them. The technology that makes the glass to turn opaque, during the warmer seasons works reliably. During the colder seasons however, the switching system fails to work properly and the toilets' walls remain always opaque, thus compromising Shigeru Ban's system.



Fig.15. Modern Kawaya by Masamichi Katayama / Wonderwall®. Photo by Satoshi Nagare, Courtesy by Shibuya City.

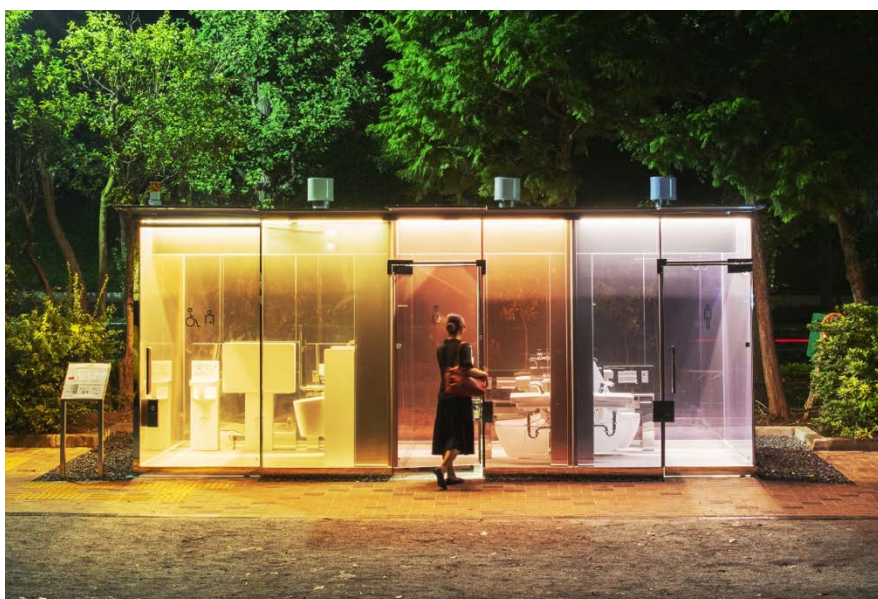


Fig.16. Toliet by Shigeru Ban. Photo by Satoshi Nagare, Courtesy by Shibuya City.

What does work all the time though it's the quality of things and ideas, which ultimately, are the measure of everything: be it a piece of furniture, a public toilet, a shrine or a cathedral. It's the quality of the environment that has been created and built, its architecture that, again, measures the level of civilization achieved by any given society. Quality that, in turn, has to be measured using the parameters derived from the empathic answers arising from the needs of contemporary society, attention to detail and care for the people, where no-one has to feel marginalized or left behind.

References

- Annicchiarico S. (2024), "Vi raccontiamo le toilette pubbliche di Tokyo, protagoniste dell'ultimo Wenders", *Domusweb*. Available at: <https://www.domusweb.it/it/architettura/2024/01/15/vi-raccontiamo-le-toilette-pubbliche-di-tokyo-protagoniste-dellultimo-wenders.html> (accessed on June 2024).
- Bandini Buti, L. (2013), *Design for all. Aree di ristoro. Il caso Autogrill*, Maggioli, Santarcangelo di Romagna (RN).
- Bandini Buti, L., Bisson, M., Boeri, C., Gellini, G., Zingale, S. (2013), *Progetto & multisensorialità. Come gli oggetti sono e come ci appaiono*, FrancoAngeli, Milano.
- Baratta, A. F. L., Conti, C., Tatano, V. (2023), *Manifesto lessicale per l'accessibilità ambientale. 50 parole per progettare l'inclusione*, Anteferma, Conegliano.
- Benedetti, S. (2020), "Servizio pubblico", *Abitare*, 599, 90-98.
- De Santis, M., Marzi, L., Secchi, S., Setola, N. (2023), *Specie di spazi. Promuovere il benessere psico-fisico attraverso il progetto*, Anteferma, Conegliano.
- Grillo F. (2023), "Tokyo, un bagno pubblico che è anche un cinema e un chiosco", *Domusweb*. Available at: <https://www.domusweb.it/it/architettura/gallery/2023/04/05/a-tokyo-un-bagno-pubblico-multifunzionale-si-rivolge-alla-cittadinanza.html> (accessed on June 2024).
- Hanley, S. B. (1997), *Everyday things in premodern Japan: the hidden legacy of material culture*, University of California Press, Berkeley.
- Ingram, T. (2020), "How Covid-19 illuminated a big public toilet issue – And how 'high design' could help", *Frameweb*. Available at: <https://frameweb.com/article/how-covid-19-illuminated-a-big-public-toilet-issue-and-how-high-design-could-help> (accessed on June 2024).
- Mallgrave, H. F. (2013), *Architecture and Embodiment. The implications of the new sciences and humanities for design*, Routledge, New York.
- Marcantoni, M. (2014), *Vivere al buio. La cecità spiegata ai vedenti*, Erickson, Trento.
- Murgia, M. (2016I), *Futuro interiore*, Einaudi, Torino.
- Neutra, R. J. (2015), *Progettare per sopravvivere*, Comunità, Roma/Ivrea.
- Pallasmaa, J. (1999), "Toward an Architecture of Humility", *Harvard Design Magazine*, 7, 22-25.

- Schianchi, M. (2009), *La terza nazione del mondo. I disabili tra pregiudizi e realtà*, Feltrinelli, Milano.
- Shakespeare, T. (2017), *Disabilità e società. Diritti, falsi miti, percezioni sociali*, Erickson, Trento.
- Shakespeare, T. (2018), *Disability. The basics*, Routledge, New York.
- Tataro, R. (2020), “Vetri che diventano opachi: i servizi pubblici di Tokyo secondo Shigeru Ban”, *Domusweb*. Available at: <https://www.domusweb.it/it/architettura/gallery/2020/09/14/pareti-trasparenti-i-bagni-pubblici-di-tokyo-secondo-shigeru-ban.html> (accessed on June 2024).
- Vattimo, G. (2001), *Le avventure della differenza*, Garzanti, Milano.
- Wiseman, P. (2019), “Lifting the lid: Disabled toilets as sites of belonging and embodied citizenship”, *The Sociological Review*, n. 67(4), 788-806. <https://doi.org/10.1177/0038026119854255>.
- World Health Organization (2018), *Guidelines on sanitation and health*, WHO, Geneva. Available at: <https://www.who.int/publications/i/item/9789241514705> (accessed on June 2024).
- World Health Organization and World Bank (2011), *World Report on Disability*, WHO, Geneva. Available at: <https://www.who.int/teams/noncommunicable-diseases/sensory-functions-disability-and-rehabilitation/world-report-on-disability> (accessed on June 2024).

Part Three

Accessibility and novel research paths

1. A methodological proposal for the evaluation of urban spaces' accessibility

by Viviana Pappalardo, Erika Russo, Daniele La Rosa and Luca Barbarossa

1. Understanding, surveying, assessing, and mapping urban accessibility

Ensuring access to key functions of the city, such as urban green spaces, squares and public spaces, areas, education, healthcare, or administrative services, represent a fundamental objective of urban planning (La Rosa et al., 2023). Understanding which functions are lacking, or maximizing accessibility to existing functions by the retrofitting of the urban environment are basic planning and design actions to increase the quality and equity of contemporary cities (Yue et al., 2020).

The attributes of the built environment influence walkability and accessibility in urban areas, and many researchers have focused on understanding how to survey, measure, analyze, and report such attributes (Forsyth, 2015; Saelens et al., 2003).

Land use density and diversity, distance/proximity to key amenities, city center and attractions, car parks and public transport, street network connectivity, pedestrian facility and comfort, streetscape design, and safety and security are the main categories of the built environment's attributes that can be usefully considered at different scales to look at different urban morphologies by using the lens of walkability (Fonseca et al., 2021).

In particular, conditions of the sidewalk surface, presence and density of sidewalks, slopes, and environmental obstructions at the street level affect the walking speed and time, the comfort and safety of walking, as well as the energy and effort required for walking, greatly impacting on elderly and impaired people, thus restricting their opportunity for walking or wheeling and accessing the city functions (Moura et al., 2017; Arellana et al., 2019). Walk-

ing has been acknowledged not only as a core, mandatory urban design element for healthier, more livable, and sustainable built-up areas (Baobeid et al., 2021) but also as a research methodology, and has now a diverse and extensive history, especially in the social sciences and humanities (Springgay and Truman, 2018). In particular, the interpretation of urban accessibility for the impaired might be importantly informed by the subjectivity of walking, perceptions, judgments, and emotions concerning the environment (Lima and Machado, 2019).

To capture the relative location of flaws in the built environment that become obstacles and affect accessibility for a few or a large group of impaired citizens, a comprehensive field survey is required, based on checklists that are carefully designed to ensure special attention towards those urban features and environment qualities that affect security and mobility for vulnerable people (Svensson, 2010). The availability of information about architectural elements and urban facilities can greatly support citizens' mobility by enhancing their independence and their abilities to conduct daily outdoor activities (Prandi et al., 2014). Map-based representations of urban accessibility, as the results of digital mapping through geo-referenced-based systems, could be envisioned to equip citizens with urban accessibility information, as constructed from the assemblage of different data. Such data could be official reports supplied by researchers and experts (e.g., municipalities, local authorities, associations or organizations of people with disabilities), data produced by sensors, and contributions provided by the citizens via crowdsourcing (Prandi et al., 2017).

A new methodological proposal is advanced to characterize the urban environment based on its potential accessibility by different social groups. In addition, the evaluation of the urban accessibility level comes up with the proposal of specific interventions addressed to meet different needs in accessing the urban environment.

2. Materials and method

The method focuses on the needs of impaired people and assesses walkability and accessibility at different spatial scales, by taking into account multiple features of the urban environment.

The proposed methodology is structured in 4 phases:

1. The organization of the field survey and the use of the “Map4Accessibility” Progressive Web Application (data collection);
2. GIS-based analysis;
3. Assessment of accessibility of urban environment;

4. Identification of planning and design scenarios to improve accessibility.

2.1 Field survey and data collection

Exploratory urban walks were employed as a participatory research method offering the participant groups an active role as “cowalkers”, which move together on foot (or via a wheelchair) in a selected space to explore the relationship between this space and community life and conduct conversations regarding observed phenomena, processes and regularities (Bazuń D., Kwiatkowski, 2021). This type of experience focused on increasing the necessary context knowledge to envision local strategies toward accessibility and to advance effective and viable interventions.

The Map4Accessibility Progressive Web App (PWA)¹ served as the digital environment to collect and map the detailed data related to different characteristics of accessibility of the urban environment including, errors of planning/realization, obstacles, or facilities to accessibility in the explored area.

Each information pin to the area is geolocated and visualized within a digital map. In particular, the built environment was explored to collect data on current urban functions (residential and commercial uses, public services and greenspaces, cultural functions, etc.), on existing relations among the main urban features (roads, squares, non-urbanized areas, pedestrian and parking spaces), and potential accessibility barriers with particular focus on physical elements such as sidewalks, staircases, urban furnishing, urban signals, vegetated elements (urban trees, flower bed, etc.).

At each stop, the co-walkers used the Map4Accessibility PWA to assess the accessibility of buildings and adequacy of services, adapted spaces and furniture, outdoor area, and parking arrangement; to add comments and better clarify the reasoning for the accessibility evaluation provided; to add new hit obstacles, taking into account the accessibility demand of specific groups of citizens (e.g., disabled, children or the elderly) and mapping the actual configuration of the urban context so that users may be better informed on the various itineraries available to enjoy the areas of interests. The backend of the PWA which runs in the background, includes the servers that handle processing and the databases that hold all critical data collected and elaborated during the urban walk.

¹ <https://map4accessibility.eu/our-app/>

2.2 GIS-based analysis

The digital map of the area was then reproduced within a GIS environment, and all the information collected in the previous phase regarding buildings, sidewalks, and roads was spatialized and used to analyze and represent the physical accessibility of the urban context (Fig.1).

Data collected in the PWA backend were downloaded and georeferenced based on geographic coordinates.

By overlaying these data with spatial features representing roads and sidewalks, these latter were attributed with all necessary specifications to define the physical characteristics potentially hindering urban accessibility that were collected in the previous phase.

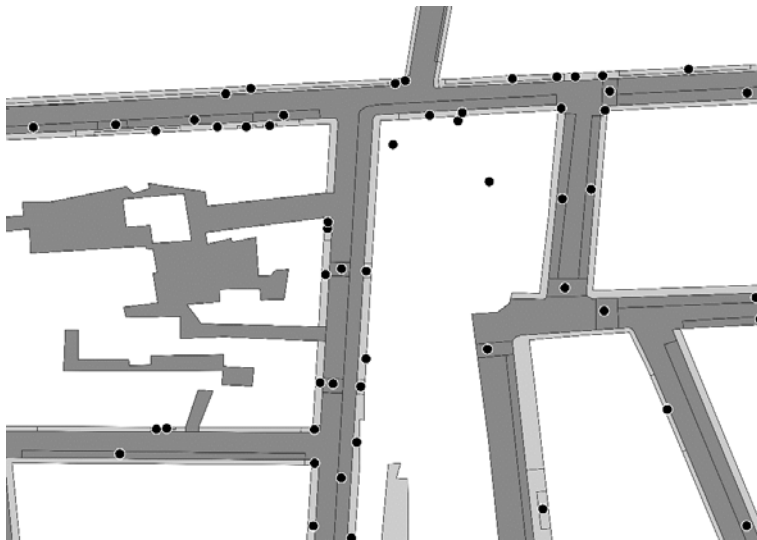


Fig. 1. Example of spatial data for streets, sideways and public spaces in GIS

2.3 Assessment of accessibility of the urban environment

Aiming at considering as many impairments as possible, streets and sidewalks were also characterized based on the number of disabilities potentially concerned by mapped obstacles and the physical characteristics of the explored area. This information was also used to recognize and classify the accessibility issues that emerged during the exploratory urban walks, according to:

1. problems caused by deficiencies in the design of urban spaces;

2. management and maintenance shortcomings;
3. improper use of spaces.

An accessibility index was then defined based on the combination of the numerosity of disabilities affected and the number and the level of accessibility issues (low, medium, high) characterizing each street and sidewalk feature: the latter elements were thus classified based on accessibility values ranging from “less accessible”, to “average accessible” and to “more accessible”. Actions to improve the current accessibility are prioritized from less accessible features to more accessible ones (the higher the accessibility index, the higher the priority).

2.4 Identification of planning and design scenarios

The actions envisioned for addressing the accessibility issues were distinguished into two macro-categories: the first group includes basic interventions or maintenance and is identified as “ordinary interventions”; more structural actions requiring space reconfiguration belong to the second group, identified as “extraordinary interventions”.

In particular, these actions can be defined based on comments provided by the App users while evaluating places’ accessibility. Namely, each comment can be related to the most coherent macro-categories.

For example, missing ramps or ramps unaligned with pedestrian crossing can be considered comments on ordinary interventions as preferred options. In contrast, the excessive slope of the platforms or discontinuity in pavements due to private accesses can be considered comments on necessary extraordinary interventions.

Thus, the location and type of the most urgent interventions were identified by overlapping this data with the map of urban features classified based on the accessibility/priority index.

3. Accessibility evaluation of urban spaces in Catania

3.1. Case study areas

The proposed method was tested in the city of Catania, a medium-sized Italian municipality, located on the east coast of Sicily. Its metropolitan area hosts the highest population density of the Sicilian island, as well as main industrial, commercial and tourist hubs.

The contribution of walking to community safety, accessibility, and social inclusion has emerged as a particular challenge to the design of the urban environment, as over the past century pedestrian access has declined steadily in the city.

Two different built up areas were selected, so to explore the accessibility levels of urban contexts that differ in morphology, building types, date, concentration of utilities, and green spaces (Fig.2).

The sub-area no.1, is located in the modern neighbourhoods of the city, delimited by high-traffic routes, and includes a range of land uses such as public or green spaces, education, and cultural complex, residential and mixed blocks, shops and groceries, pharmacies, medical offices, etc. Public and private transport lines cross the area, and numerous bus stops are deployed, together with the metro stop a little further away.

The sub-area no.2 is located within the more historic center of Catania, offering several cultural attractions such as numerous churches and archaeological sites. Public open spaces are scarce but frequently enjoyed, and the area has a high-density resident population in addition to being very popular with tourists and students.

The two case studies have a similar total area: Sub-area 1: 75000 m²; Sub-area 2: 79000 m².

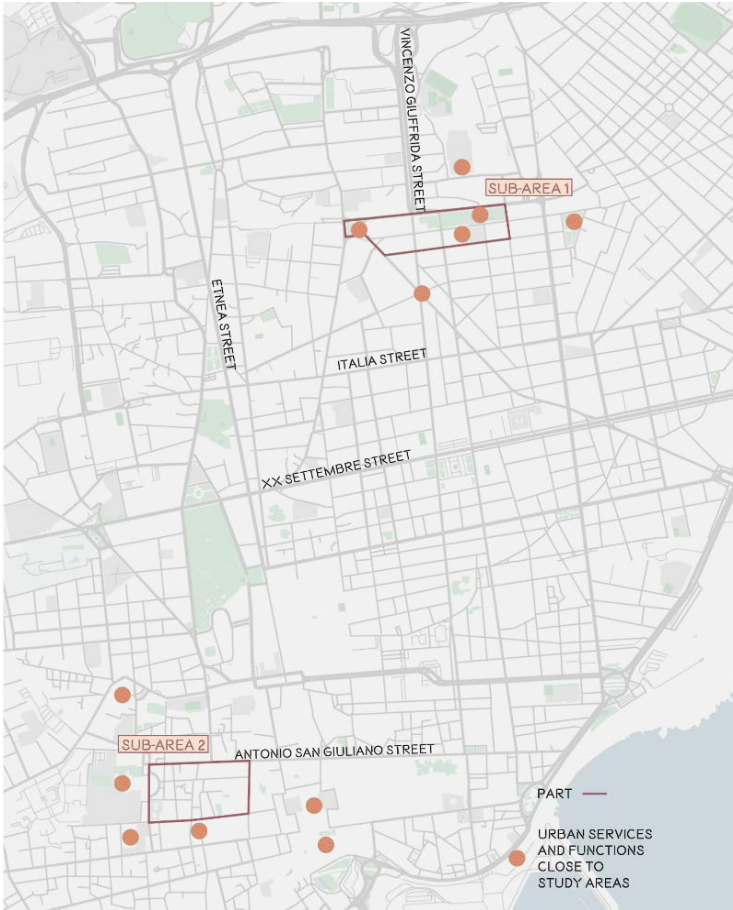


Fig. 2. Selected case study areas.

3.2 Field survey and Data collection and GIS analysis

Following the methodological approach, sidewalks and roads have been mapped and analyzed by gathering the data collected during the exploratory urban walks and using the Map4Accessibility PWA. For each focused area, comparable results were extrapolated in terms of accessibility indexes and typology of accessibility issues.

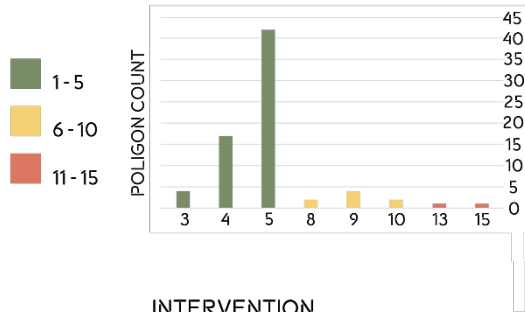
Figure 3 and Figure 4 illustrate, as an example, the results of the investigation for the sub-area n.1. Both physical accessibility issues and the concerned disabilities were analyzed and mapped respectively for the sidewalks and the streets.

In the depicted urban block of Figure 3, thirteen sidewalk geometries were attributed an accessibility score based on the number and types of accessibility issues found. Features with higher scores (in red) account for the the worst accessibility level, while features with the lowest score (in green) indicate the highest level of inaccessibility. The yellow-colored polygon in the figure, for example, has an accessibility index value equal to six, calculated as the result of the sum between the number of disabilities concerned and the value attributed to each cause of the accessibility problems. Namely, for the considered feature, the digital mapping returned the required information on the accessibility conditions, including comments uploaded by the users of the APP, and useful to depict the “visual impairment” as the sole disability concerned, and both urban design based issue and management issues as the causes of the encountered barriers. Accordingly, the accessibility index was calculated as the sum between 1, 3, and 2 (1-n. of disability; 3-value for urban design issues; 2-value for management issues). Interventions required to improve the current accessibility of the focused urban block are derived based on the specificities of collected comments. Only a minimum percentage (1%) is considered to be “extraordinary”, so the majority of the accessibility issues could be addressed by implementing “ordinary” interventions. Actions are considered urgent for the less accessible physical elements (the red-colored polygons with the higher accessibility index) and their priority decreases as the accessibility index value decreases.

The analysis of urban accessibility in the Catania study areas revealed that, as a result of original urban morphology and low design quality, the primary problems in both urban settings are related to the current spatial configuration. Some exceptions regard those areas where the incorrect use of space mainly hinders free access and walkability. Accessibility indices are mostly low with the prevailing need for ordinary interventions. The small percentage of extraordinary interventions in a few medium-high priority areas should thus correspond to a prioritization of policy decisions, planning actions, and design outcomes, involving the reconfiguration of the urban space.



ACCESSIBILITY INDEX



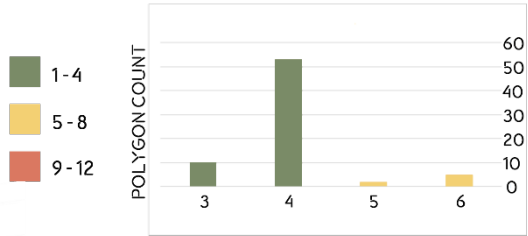
INTERVENTION



Fig. 3. Example of Gis based analysis and results from the PWA mapped for sub-area n.1 (sidewalks).



ACCESSIBILITY INDEX



INTERVENTION



Fig. 4. Example of Gis based analysis and results from the PWA mapped for sub-area n.1 (streets).

3.3 Identification of planning and design scenarios

The method applied for assessing the accessibility of urban spaces is useful to advance design proposals for reconfiguring those areas where ordinary interventions are considered insufficient to ensure the accessibility of vulnerable residents, but also to collect information about other potential and site-specific opportunities for the retrofit of the modern and historic neighborhoods and the increase of their overall accessibility.

Tracing Universal Design and accessibility planning in urban retrofitting could be extremely challenging, due to the increased costs of retrofitting infrastructure, the limited space availability, the lack of political sensitivity, and the willingness to pay for enhanced urban equity in public accessibility. However, the urban space re-configuration could conveniently start with an enhanced integration of existing micro and macro public areas in the surroundings; the introduction of additional accessible and safe green urban “pauses” and connections; and the conversion of in-between and unused urban spaces into walkable urban paths, to ensure a better quality of the overall urban experience and multiply the opportunities to reach the desired destination for all capacities.

According to the principle of universal design (Steinfeld and Maisel, 2012), various elements have to be introduced for impaired-friendly rest spaces and their facilitated access, among which:

- adequate lighting, to make the spaces safer throughout the day, and to be functional for the visually impaired interested in a more autonomous practicability of environments;
- graphical support in the form of signs and markings;
- walking paths with non-slippery coverings and applied tactile tiles and ramps;
- spaces equipped with greenery and comfortable benches, sheds, benches, litter bins, handrails, and emergency call buttons;
- parking lots with provision of parking spaces for disabled people.

For example, Fig.5 and Fig.6 highlight respectively the location and priority of the interventions proposed for a basic re-design of a portion of the sub-area 1, and accessibility criticalities related to the management of urban features and the incorrect use of public space.

The project consists of site-specific interventions that include: the re-configuration of traffic routes’ travel directions, the introduction of green stops, and the physical connections of public spaces to be accessed by all.

The concerned area, which is no more than a raised space in the middle of a carriageway for separating traffic directions, is planned and designed to become a new public pocket area, connected to existing green spaces, and to enable improved accessibility to the surroundings.

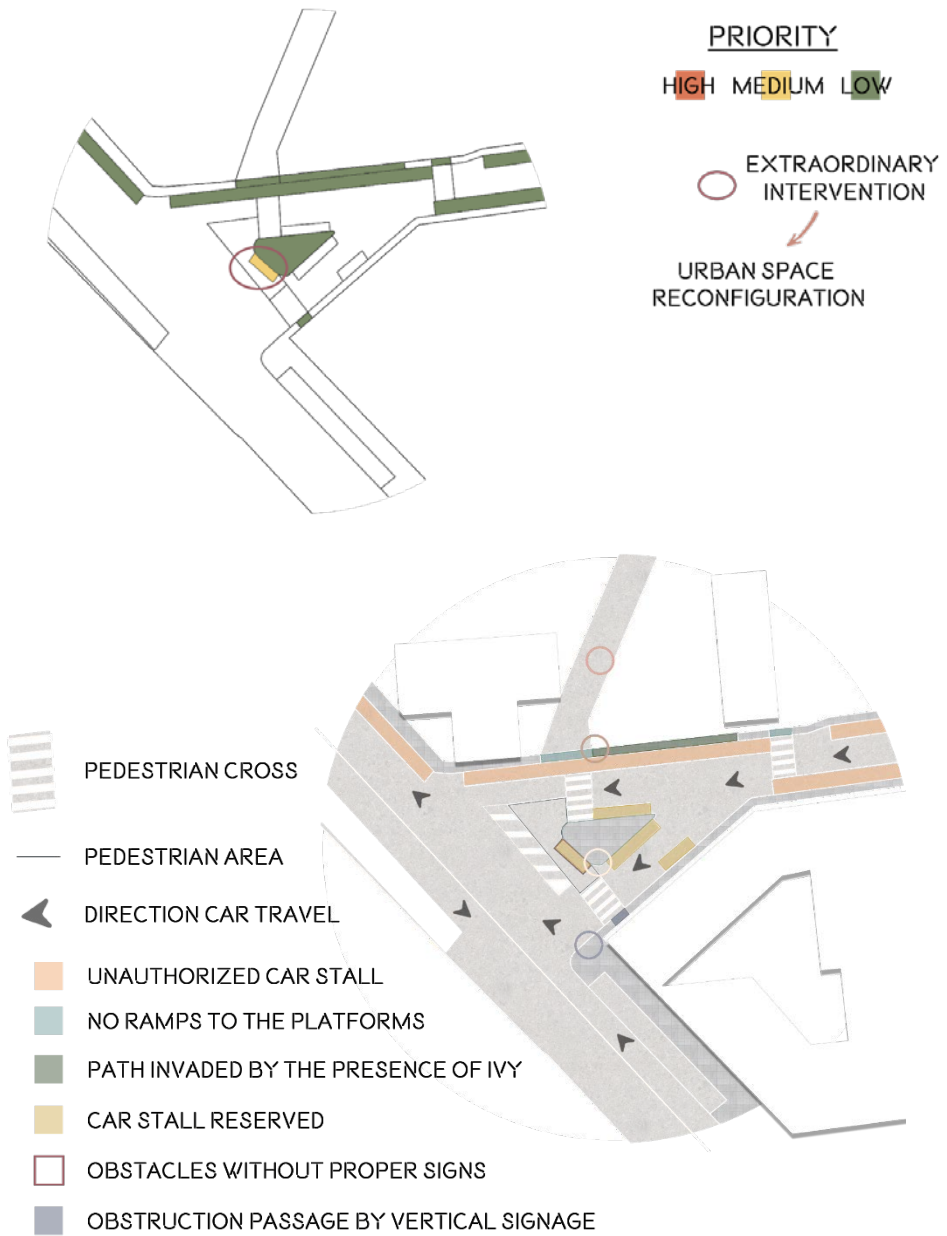


Fig. 5. Location, priority for interventions, and identification of accessibility issues in a portion of the sub-area n.1.

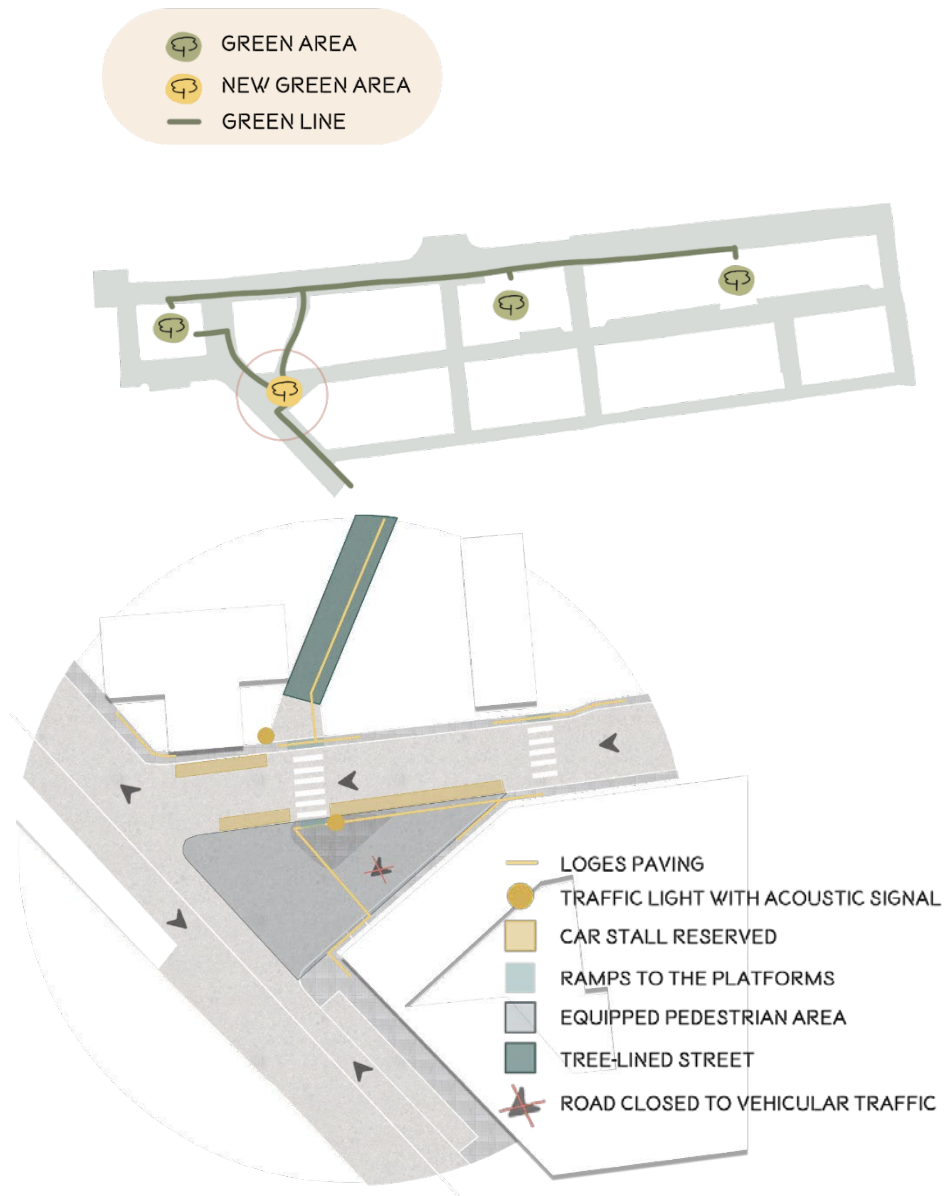


Fig. 6. The green connection of existing and new green areas and redesign of impaired-friendly rest spaces

4. Towards more accessible urban spaces

The elimination of barriers and the equality of access to the environment is an issue of civil rights and cannot be faced haphazardly. This important ethical goal has challenged urban planners and designers to create enabling public spaces.

The International Classification of Functioning (WHO, 2001) and Universal Design both emphasize the close relationship between humans and the built environment, which is why our cities and towns require high-quality urban spaces to improve the social dimension of daily living. (Arenghi, 2020).

A political stance on this subject has already been made non-discrimination laws require a certain level of accessibility are actually in place. Some authors argue for a much more thorough definition of the “accessibility” concept, which may be ambiguous even if applied in the same context, and discuss what effects it may have on measurability, conformance with standards, and the overall usability for the widest possible range of target users (Persson et al., 2014).

New digital projects use geographic information systems (GIS) and crowdsourcing applications to gather data about the accessibility of public spaces for disabled people. These approaches are innovative by recognizing marginalized experts; by redefining the concepts of data, crowdsourcing, and public participation; by offering new stories about disability and public belonging; and by materializing the principles of disability justice, an early twentieth-century movement emphasizing intersectionality and collective access (Hamraie, 2018).

The urban accessibility mapping method applied in this study fully capitalized on citizens as urban walkers to collect reliable data about barriers and facilities in small dense urban contexts and served as the basis to identify areas where to start actions for improved accessibility for all. This involved the use of GIS techniques and map walks with impaired people and local stakeholders, integrated with digital data analysis and subsequent visualization and re-design of the explored areas.

References

- Arellana, J., Saltarín, M., Larrañaga, A. M., Alvarez, V., Henao, C. A. (2019), “Urban walkability considering pedestrians’ perceptions of the built environment: a 10-year review and a case study in a medium-sized city in Latin America”, *Transport Reviews*, 40(2), 183-203.
- Arenghi, A. (2020), “Universal Design in Sustainable Urban Planning Research for Development”, in Dall’O’, G. (2020), *Green Planning for Cities and Communities*, Springer, Cham
- Baobeid, A., Koç, M., Al-Ghamdi, S.G. (2021), “Walkability and Its Relationships With Health, Sustainability, and Livability: Elements of Physical Environment and Evaluation Frameworks”, *Frontiers in Built Environment*, 7, 721218.
- Bazuñ, D., Kwiatkowski, M. (2021), “Exploratory walk and local cohesion. The concept and application”, *Mobilities*, 17(4), 565-584.
- Fonseca, F., Ribeiro, P. J. G., Conticelli, E., Jabbari, M., Papageorgiou, G., Tondelli, S., Ramos, R. A. R. (2021), “Built environment attributes and their influence on walkability”, *International journal of sustainable transportation*, 16(7), 660-679.
- Forsyth, A. (2015), “What is a walkable place? The walkability debate in urban design”, *Urban Design International*, 20 (4), 274-292.
- Hamraie, A. (2018), “Mapping Access: Digital Humanities, Disability Justice, and Sociospatial Practice”, *American Quarterly*, 70 (3), 455-482.
- La Rosa, D., Pennisi, F., Pappalardo, V., Privitera, R. (2024), “Identifying Accessibility Gaps to Urban Functions and Services – Examples of Italian Medium-Sized Cities”, in Marucci, A., Zullo, F., Fiorini, L., Saganeiti, L. (eds), *Innovation in Urban and Regional Planning. INPUT 2023. Lecture Notes in Civil Engineering*, vol 463. Springer, Cham.
- Moura, F., Cambra, P., Gonçalves, A. B. (2017), “Measuring walkability for distinct pedestrian groups with a participatory assessment method: A case study in Lisbon”, *Landscape and Urban Planning*, 157, 282-296.
- Persson, H., Åhman, H., Yngling, A. A., Gulliksen, J. (2014), Universal design, inclusive design, accessible design, design for all: different concepts—one goal? On the concept of accessibility—historical, methodological and philosophical aspects, *Universal Access in the Information Society*, 14(4), 505-526.
- Prandi, C., Salomoni, P., Mirri, S. (2014), “mPASS: Integrating People Sensing and Crowdsourcing to Map Urban Accessibility”, *Proceedings of the 13th IEEE Annual Consumer Communications & Networking Conference (CCNC’14)*, 10-13.
- Prand, C., Mirri S., Ferretti S., Salomoni P. (2017), “On the Need of Trustworthy Sensing and Crowdsourcing for Urban Accessibility in Smart City”, *ACM Transactions on Internet Technology*, 18(1), 1-21.
- Saelens, B.E., Sallis, J.F., Black, J.B., Chen, D. (2003), “Neighborhood-Based Differences in Physical Activity: An Environment Scale Evaluation”, *American Journal of Public Health*, 93(9), 1552-1558.
- Steinfeld, E., Maisel, J. (2012), *Universal Design: Creating Inclusive Environments*, Wiley & Sons. Hoboken, NJ.

- Svensson, J. (2010), “Accessibility in Urban Areas for Citizens with Impairments: Using GIS to Map and Measure Accessibility in Swedish Cities”, in Maisel, J.L., *The State of the Science in Universal Design. Emerging Research and Developments*, Bentham Science Publisher.
- WHO: ICDH-2 (2001), “International classification of functioning, disability and health: final draft, Full Version”, Classification, Assessment, Surveys and Terminology Team, World Health Organization.
- Yue, W., Chen, Y., La Rosa, D., (2020), “Which communities have better accessibility to green space? An investigation into environmental inequality using big data”, *Landscape and Urban Planning*, 204 c.

2. Dynamic route generation for people with disabilities in the city of Córdoba based on Artificial Intelligence

by José Manuel Alcalde Llergo and Enrique Yeguas-Bolivar

1. Introduction

Automatic route generation on a map within a specific city is a problem with applications across various domains. Literature provides different kind of examples including the optimization of routes to access nearby bus stops (Dewi, Wp, and Purwaningsih, 2020), or to minimize urban noise pollution (Wang et al., 2021). Notably, the generation of accessible routes for individuals with disabilities within a city stands out as a particularly critical area (Prandy et al., 2023). This chapter will focus extensively on this branch of study, exploring both the challenges and the technological solutions that facilitate greater accessibility in urban environments.

Routes generation using artificial intelligence based on the behavior of people with disabilities is a crucial tool for improving accessibility and quality of life in cities in general, and in the city of Córdoba in particular. Our approach aims to adapt navigation routes to meet the individual needs of people with disabilities, taking into account physical, sensory, communicative, and social barriers. By providing precise and personalized directions, it promotes the autonomy and independence of these individuals, allowing them to move more safely and efficiently. Additionally, the creation of accessible routes helps to reduce obstacles and barriers in the urban environment, promoting greater inclusion. From detecting roads or parts thereof in poor condition to identifying areas with adapted facilities, this technology seeks to eliminate barriers and ensure an urban environment that is accessible to all. By adapting to different types of disabilities, such as reduced mobility or visual impairment, greater equality of opportunities is achieved, leading to a more inclusive city where everyone can fully participate in daily life.

2. Digital model of Córdoba

The digitalization of the city model through a graph data structure is a strategy that seeks to leverage the advantages of technology and digital information to improve the management and functioning of cities. A graph is a visual representation of relationships between elements, where nodes represent entities and edges represent the connections between them.

In the context of city digitalization, a graph can be used to represent different aspects of urban infrastructure and the interactions between them. For example, nodes may represent buildings, streets, parks, public transport stations, points of interest, and systems for water or electricity supply, among other elements. Edges may represent physical connections, such as the roads connecting streets, public transport lines, or water pipes, as well as logical relationships, such as dependencies between different entities.

The graph data structure is particularly useful for capturing the complexity and interconnection of urban elements. It allows for modeling relationships between different parts of the city, which can provide a comprehensive view and facilitate informed decision-making. By using this data structure, it is possible to analyze information in real time and gain insights into the city's operation, resource optimization, urban planning, mobility, safety, and other key aspects. *Fig 1* shows a graph model that captures information about the streets of the city of Córdoba.



Fig.1. Modeling the city of Córdoba using a graph.

By digitizing the city model using this kind of graph, it is possible to apply advanced algorithms and artificial intelligence techniques for analysis and simulations that help understand the impact of different decisions and policies. For example, traffic flow analyses can be conducted to optimize mobility management, and behavior patterns in population distribution can be identified to improve urban planning.

Furthermore, digitizing the city through a graph enables the integration of various data sources, such as urban sensors, geographic information systems, public transport data, and social networks, among others. This real-time data integration provides a comprehensive and up-to-date view of the city, which can facilitate early problem detection, emergency response, and continuous improvement of urban services.

Digitizing the city model using a graph data structure offers an efficient and powerful way to represent, analyze, and manage urban complexity. By leveraging the analytical capabilities of graphs, cities can make more informed decisions, improve the quality of life for their residents, and progress toward a more sustainable and resilient urban future.

2.1. Digital city representation for estimating routes for people with disabilities

Digitizing the city model using a graph where streets are represented as edges and intersections as nodes is a technique commonly used in urban planning and management. This representation efficiently and effectively captures the structure and connectivity of a city's road network. In this model, each street is represented as one or several edges in the graph, connecting two intersections or nodes. The intersections, in turn, are represented as nodes in the graph. Each intersection node may have multiple edges connected to it, reflecting the different streets located at that intersection.

This graph-based representation, following the ideas given in (Walde et al., 2013) and (Yeguas et al., 2011), is especially useful for performing analyses and optimizations related to the city's road network. Some of the most common applications include route planning, transport optimization, road safety analysis and urban planning. Moreover, digitizing the city model using a graph for streets and intersections facilitates the integration of other related data important to be considered in daily routes of people with disabilities; such as barriers, traffic sensor data, demographic data, or public transportation data. This enriches the representation and allows for a more comprehensive analysis of the city considering people with disabilities.

2.2. Representation of neighborhoods in the model

Due to the application of the model to determine behavioral habits with a set of users belonging to a pilot group will correspond to certain neighborhoods of the city, it will be important to know how to integrate the selected postal codes into our model considering the historic center of Córdoba as the connecting nexus.

To incorporate the various neighborhoods of Córdoba designated by postal codes into the digitized city model defined by a graph data structure, several approaches can be followed. Here two possibilities will be analyzed: including new “neighborhoods nodes” into the model and utilizing existing intersection nodes.

Creating additional nodes in the graph can be useful for representing each neighborhood. Each neighborhood node would connect to the intersection nodes corresponding to the streets that border the neighborhood. Edges would be established between neighborhood nodes that share a common border or boundary. This would allow for capturing the connections and relationships between neighborhoods in terms of their geographical proximity.

Utilizing attributes in the neighborhood nodes would be crucial for storing additional information, such as the postal code, neighborhood name, relevant demographic data, etc. In this way, the graph model can reflect the structure of the city, with streets represented by edges and intersections and neighborhoods as nodes, allowing for efficient analysis and visual representation of the different neighborhoods of the city.

On the other hand, using the existing intersection nodes in the graph to represent street intersections within neighborhoods is another suitable approach. Attributes would be added to the intersection nodes, such as the postal code or the neighborhood name, to indicate which neighborhood each intersection belongs to. Thus, each intersection node could have an additional property identifying the neighborhood it belongs to. This representation allows for maintaining a simpler graph structure and reducing the complexity of the model, as the intersection nodes can represent both the streets and the intersections within neighborhoods.

Both approaches have advantages and disadvantages depending on the specific needs of the model and the type of analysis to be conducted. It is important to consider the amount of data, scalability, and query efficiency when designing a mixed approach to graph model representation to incorporate neighborhoods designated by postal codes in the digitized city.

2.3. Representation of Cordoba's neighborhoods

In the digital model of the city of Córdoba, we will consider the neighborhoods corresponding to the postal codes 14005 and 14011. Additionally, we will use the postal code 14001 as a connecting hub, representing the city center. Next, we will describe how this information can be incorporated into the digital city model using a graph data structure.

Each street intersection in the neighborhoods with postal codes 14005 and 14011 will be represented by a node in the graph. These intersection nodes will be connected by edges representing the streets that link them. To represent the neighborhoods corresponding to these postal codes, we will create additional nodes in the graph. Each neighborhood node will have attributes such as the neighborhood name and the associated postal code. Then, we will use the postal code 14001 as a connecting hub to link the neighborhoods of postal codes 14005 and 14011 with the city center. We will create an additional node in the graph that represents the city center and connect it with the neighborhood nodes corresponding to the mentioned postal codes.

Using this graph structure, the digitized model of the city of Córdoba will capture the neighborhoods corresponding to the postal codes 14005 and 14011, and establish a connection with the city center using postal code 14001. This will enable specific queries and analyses involving these neighborhoods and their relationship with the rest of the city. The graph responsible for modeling the information from these areas of the city of Córdoba is shown in Fig. 2 and consists of a total of 5,215 nodes and 16,042 edges.

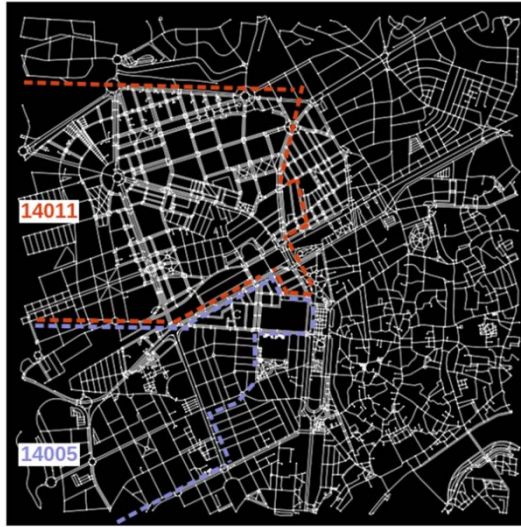


Fig. 2. Modeling through a graph of the areas corresponding to postal codes 14011 and 14005 in the city of Córdoba.

3. Study of the behavior of people with disabilities in their movement around the city

The proof of concept was developed using data collected by a customized mobile application, which was used by a pilot group of 15 people with different type of disabilities in the city of Córdoba. Through this app, the locations and routes of the participants were stored, anonymizing their personal information such as names, home addresses, etc. and ensuring their privacy.

3.1. Obtaining the model

The aim was to build a model based on artificial intelligence techniques in order to compute the optimal routes between two points in the city of Córdoba considering the different kind of disability the users could have. These optimal routes will consider the more concerning barriers regarding these disabilities.

The model was trained with a controlled set of data collected over a defined period of one month during which the pilot group registered their daily routes. It underwent a thorough validation process to ensure its effectiveness and accuracy. Cross-validation techniques and different performance metrics

were used to evaluate its ability to capture the movement patterns of people with disabilities in Córdoba. By applying the model to the collected data, the behavior habits of the participants in the pilot group were identified. Finally, we compared the actual routes taken by the users with the routes recommended by the system, generating warnings when significant deviations were detected.

Furthermore, a classification of the individuals in the pilot group was made based on their movement habits. The model identified different patterns and mobility needs, allowing participants to be categorized into distinct classes, according to further analysis that experts must perform.

The proof of concept demonstrated the feasibility of using the mobile application and the collected data to develop an artificial intelligence model capable of analyzing and predicting the movement patterns of people with disabilities in Córdoba. This provides valuable information to improve accessibility and route planning, enabling better assistance and support for people with disabilities in their mobility around the city.

3.2. Demonstration of algorithm utility through use cases

In the following section, we will present various use cases to demonstrate the diverse applications of the designed algorithm. For these demonstrations, we have employed over 90 generated routes. These routes have been collected by the pilot group via the mobile application described in previous section. This approach allows us to showcase the potential and flexibility of the algorithm before deploying it in a real-world environment.

The primary objective of the application was to determine the best routes between two points in the city of Córdoba. After training the model with routes taken by users of the application, new values for the edge weights of the graph were estimated, thus allowing for the best routes to be calculated based on those used by people with disabilities. Figure 3 presents a comparison between the fastest route generated using the shortest path algorithm (Dijkstra, 1959) and the route suggested by our model once trained. In this case, the route analyzed was from the Rectorate of the University of Córdoba to the Mosque-Cathedral.

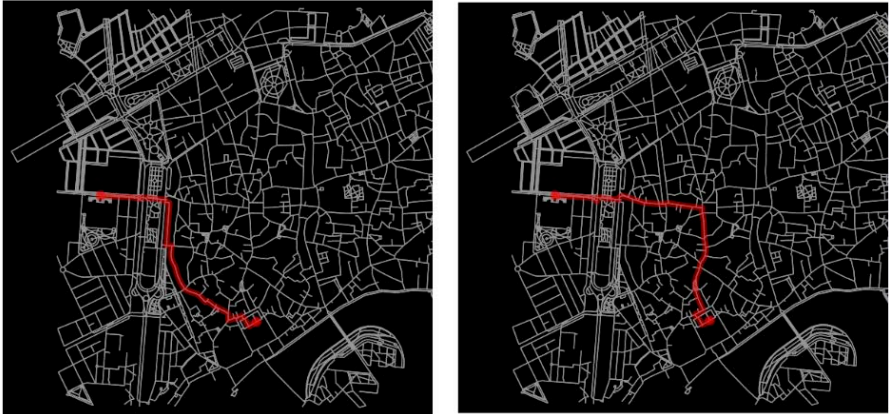


Fig. 3. Comparison of the fastest path by the “shortest path” algorithm against the best path suggested by our trained model.

Another functionality that has been identified as of high interest involves the generation of new edge weights based on the presence or absence of specific types of barriers. This allows routes to be suggested also based on the types of barriers that the application user wishes to avoid depending of these disabilities. These barriers have been detected by the users of the application themselves and categorized by a team of experts. Figure 4 illustrates the different routes that would be recommended for individuals with varying needs regarding barriers to avoid. In this instance, the route analyzed is the one from the medical center Ciudad de la Justicia in Córdoba to the Mosque-Cathedral.

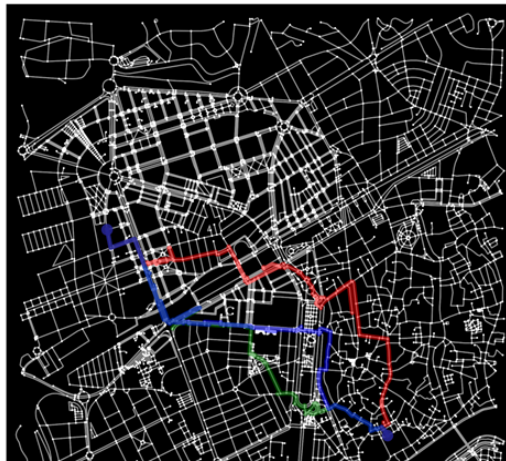


Fig. 4. Different routes suggested regarding the barriers.

Finally, one of the primary objectives of our project was to generate a heatmap for specified areas of the city of Córdoba. This heatmap visually represents the frequency with which individuals with disabilities utilize various streets within the locality. Colors closer to red indicate streets that have been frequented more often, whereas those closer to blue denote streets less traveled by the users. The generated heatmap is depicted in Figure 5.

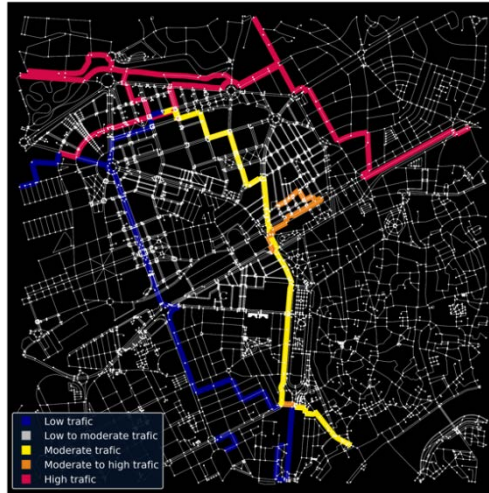


Fig. 5. Heat map representing movement of people with disabilities in Córdoba.

References

- Dewi, R., Wp, D., Purwaningsih, M. (2020), “Aplikasi Penentuan Route dan Waktu Tempuh ke Halte Transjakarta Terdekat dengan Algoritmo Dijkstra Berbasis Location Base System”, *Jurnal Teknologi Informasi dan Ilmu Komputer*, 7, 653. <https://doi.org/10.25126/jtiik.2020741680>.
- Dijkstra, E. (1959), “A note on two problems in connection with graphs”, *Numerische Mathematic*, 269-271.
- Prandi, C., Barricelli, B.R., Mirr, S. et al. (2023), “Accessible wayfinding and navigation: a systematic mapping study”, *Univ Access Inf Soc*, 22, 185-212.
- Walde, I., Hese, S., Berger, C., Schmullius, C. (2013), “Graph-Based Mapping of Urban Structure Types From High-Resolution Satellite Image Objects—Case Study of the German Cities Rostock and Erfurt”, *IEEE Geoscience and Remote Sensing Letters*, 10(4), 932-936.
- Wang, Z., Novack, T., Yan, Y., Zipf, A. (2021), “Quiet Route Planning for Pedestrians in Traffic Noise Polluted Environments”, *IEEE Transactions on Intelligent*

Transportation Systems, 22 (12), 7573-7584. <https://doi.org/10.1109/-TITS.2020.3004660>.

Yeguas, E., Joan-Arinyo, R., Luzón, M.V. (2011), “Modeling the performance of evolutionary algorithms on the root identification problem: A case study with PBIL and CHC algorithms”, *Evolutionary Computation*, 19(1), 107-113.

3. A crowdsourcing user-centered approach to design a navigation system for people with impairment

by Sediola Ruko, Raffaele Pelorosso and Andrea Zingoni

1. Introduction

Crowdsourcing involves mobilizing groups to achieve specific or general goals, such as innovation, invention, and problem-solving, particularly in developing technologies. By securing information from a community of people, crowdsourcing aids problem-solving and service enhancement. One promising area for crowd-sourcing is improving accessibility for people with restricted capabilities. These individuals often face various barriers when accessing public places, structures, and services due to physical, sensory, or intellectual impairments (Karachiwalla and Pinkow, 2021). Recognizing that human rights are inherent to all human beings, accessibility is a universal human right for persons with disabilities. However, millions of people with disabilities worldwide still face barriers that prevent them from fully participating in society. These barriers range from architectural challenges to the lack of internet access. To address these issues, community policymakers should implement facility modifications and technological adaptations. (Nevo and Kotlarsky, 2020).

Information available online through mobile applications and websites significantly enhances the independence of persons with impairments by facilitating convenient movement across various aspects of their lives. These tools leverage crowdsourcing to collect and disseminate information about accessible places and services. Users can report their experiences, provide feedback on the quality of services or facilities, and contribute to a comprehensive database of accessible resources. Despite their benefits, many of these applications face challenges, such as data standardization, limited coverage, and infrequent updates. These issues can undermine the credibility and relevance of the content, potentially depriving users of reliable and essential

information. Addressing these challenges is crucial to improving the effectiveness and utility of accessibility-related applications for persons with impairments. (Karachiwalla and Pinkow, 2021).

Our objective is to develop Map4Accessibility, an application designed to provide people with different impairments with a navigation system that allows them to move freely into a city, from any point to a desired destination. It accurately localizes users and calculates the shortest, most accessible route to their desired destinations, avoiding all potential barriers. This initiative is part of a three-year Erasmus+ project to improve the accessibility landscape for individuals with impairments. Accurate and detailed accessibility information is crucial for empowering people with disabilities, ensuring they have equal choices in planning activities and accessing public places. For instance, knowing whether a restaurant is accessible or a public restroom has the necessary facilities can significantly improve the quality of life for individuals with impairments. Additionally, comprehensive accessibility data enables policymakers and urban planners to make informed recommendations for public spaces, ultimately fostering a more inclusive environment. (Vianna et al., 2020). Despite recent advancements, many accessibility applications rely heavily on pre-inserted data, resulting in often outdated and generic data. We propose an innovative routing application that integrates crowdsourcing to enhance navigation for individuals with disabilities and to evaluate accessibility. Users can rate locations based on their experiences. These ratings generate an ad-hoc accessibility score for each location, ensuring up-to-date and reliable information. Additionally, the application features an intuitive interface designed for ease of use, enhancing the overall user experience and making navigation straightforward and efficient. Moreover, the Map4Accessibility application uses a customized algorithm to foresee and validate accessibility data, ensuring real-time, automatic data acquisition for continuous updates.

2. Related work

In the last decade, several efforts have been made to attempt providing reliable services for accessible navigation to people with impairments. WheelMap (Mobasher et al., 2017) is an application that shares information about wheelchair-accessible places for dining, shopping, and other activities like visiting restaurants, cafes, shops, and public spaces. Reportedly, users find WheelMap easy to use, contributing to its extensive, valuable user-submitted database. However, a significant drawback is the potential inaccuracy of the data, as users are responsible for updates, which can sometimes be

outdated or incomplete (Mazayev et al., 2016). This shortcoming necessitates the integration of advanced mapping technologies and increased collaboration with local authorities to ensure the latest and most accurate information is incorporated into the new application. Another application, AccessNow (Alqadi et al., 2020), provides information on accessible locations worldwide, including cafes and shops. The information provided by AccessNow is crucial for users with specific accessibility needs; however, it often remains unverified and general, with updates frequently delayed, leading to outdated information. Similarly, WheelMate (2012) aims to help wheelchair users find suitable restrooms and parking spaces. However, it suffers from limitations such as covering only a limited number of cities and the presence of outdated information. This will make the Map4Accessibility application more efficient than WheelMate by extending and enhancing its existing functionality. Another comparable application, Mapeirons (2020), provides accessibility information for various premises and supports multiple languages, making it useful for diverse users and regions. This approach creates an intuitive and comprehensive user experience. However, its interface has been criticized for needing more user-friendliness, making some essential information challenging to access. Additionally, iAccessLife (Mehrjerdian and Winfield, 2019) allows users to rate accommodations based on their accessibility and share detailed information through contributions. While this generates a wealth of data, the application faces challenges such as a limited user base and the potential for biased reviews, which can affect the authenticity of the information. AXS Map [6] provides an interactive web-based tool designed to evaluate accessible spaces, allowing users to comment and flag locations on maps. The site also includes a discussion forum, a list of maps for users, and a detailed rating analysis, making it a valuable resource. Additionally, the application utilizes commercial sources such as Google APIs to enhance the accuracy and comprehensiveness of its accessibility information. This combination of community and commercial data sources significantly improves the reliability and relevance of the information provided to users. These collaborations provide access to critical information, significantly improving the efficiency and reliability of the application compared to AXS Map. However, a notable drawback is the reliance on user-submitted data, which can sometimes be outdated or inaccurate. Ability App (Knoll, 2015) enables users to search for places and services for disabled individuals and encourages people to share their discoveries.

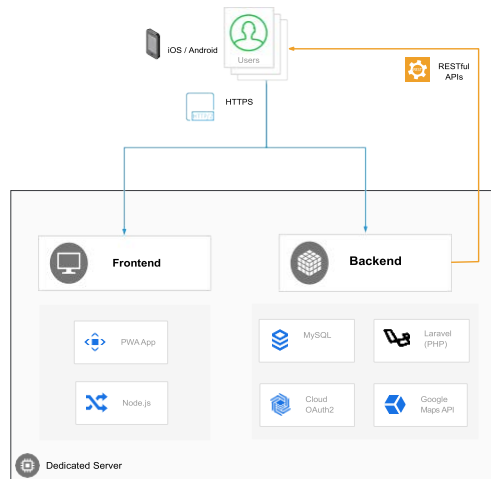


Fig. 1. The system architecture of the Map4Accessibility application.

Although the application offers many services, frequent updates and usability problems often negatively impact the user experience. This improvement addresses the criticisms directed at Ability App and enhances user satisfaction with the software. Lastly, Jaccede (Alqadi et al., 2020) provides accessible venues and services and boasts a well-designed graphical user interface with numerous listings. Despite its benefits and the potential for interesting insights, the application’s dependence on user input limits the scope and precision of its data. These improvements ensure more comprehensive and accurate accessibility information, offering precision and reliability. The Map4Accessibility application addresses the limitations of existing accessibility applications like WheelMap, AccessNow, and WheelMate by providing precise and reliable information through data validation techniques and real-time updates. It enhances user-friendliness, improves data completeness by separating hierarchical technologies, and uses concrete rating parameters to reduce subjective influences, addressing issues in iAccessLife. Collaborations with non-governmental organizations and Erasmus+ partners ensure thorough data testing and validation, surpassing the reliability of AXS Map. By integrating external sources such as Google APIs, Map4Accessibility reduces reliance on user input, overcoming the limitations of applications like Jaccede. The application features a user-friendly interface and predefined rating parameters to ensure consistent and reliable reviews. By actively engaging users and organizations, Map4Accessibility aims to provide a comprehensive and accurate list of accessible locations, improving usability and coverage for a diverse user base.

3. Map4Accessibility application design

Map4Accessibility application is designed to address the need for accessible navigation solutions for individuals with different disabilities. By leveraging modern smartphone technology, this application provides optimized routes tailored to the specific needs of users with motor, visual, hearing, and cognitive impairments. The application operates a client-server model, as depicted in 1. Users can connect from various devices (PCs, smartphones, tablets) to a server hosting the frontend and backend components, accessed via HTTPS. The front end uses Progressive Web App technology for seamless operation across multiple platforms. The back-end, built with PHP and the Laravel framework, handles data processing through RESTful APIs and uses a MySQL database. Users must register, with options for OAuth2 or personal email registration, to access the services. Location services must be enabled for accurate routing, and an internet connection is required as the application is entirely online. The system supports concurrent processing for authentication, profile management, and Google Maps API integration, ensuring a smooth user experience. The following sections detail the system's components, including the navigation module, the crowdsourcing-based rating system, and the inclusive user interface.

3.1 Navigation system

Efficient and disability-aware navigation to points of interest is one of the functions of the Map4Accessibility application. Our application utilizes the A* algorithm, a well-known graph traversal and pathfinding method. This algorithm uses weighted graphs to determine the most efficient path from a starting point to a target destination. By combining actual travel costs with estimated costs to the destination, the A* algorithm optimizes route selection, ensuring that the path chosen is the least costly and most efficient for real-time navigation and accessibility mapping. By combining actual and estimated costs, the A* algorithm ensures optimal path selection. It incrementally builds and evaluates potential paths, adjusting dynamically to find the least costly route. This heuristic-based approach makes the algorithm particularly effective for real-time navigation and accessibility mapping, ensuring minimal-cost routes. In Map4Accessibility, the A* algorithm incorporates a heuristic that considers different disability categories. This customization ensures that the generated routes meet the individual needs of users. The heuristic integrates reported barriers and obstacles between the user's location and destination. If all rated places along a path are marked as "accessible"

for a specific impairment, the algorithm considers the path viable without additional cost. Conversely, paths with “not accessible” places are heavily penalized, and those marked as “partially accessible” incur a time penalty based on the average time required to navigate the obstacles. Accurate user location and orientation are critical for effective navigation. Map4Accessibility relies on a combination of GPS and IMUs (Inertial Measurement Units) sensors. These sensors provide comprehensive data, feeding into the application’s routing algorithm. The A* algorithm adjusts routes dynamically based on real-time data, ensuring users avoid obstacles and follow the most accessible paths.

The application interfaces with the “Google Directions API” to leverage its extensive dataset and routing functionalities. The application fine-tunes these routes by applying custom heuristics to prioritize accessibility according to user-specific disabilities. This integration ensures that the user receives the most accessible path options. The “Directions API” generates potential routes between points of interest, while the “Places API” offers detailed information about the accessibility features of different locations. The “Geocoding API” translates coordinates into human-readable addresses and vice versa, facilitating the smooth integration of sensor data with map information. Users interact with the application and provide their destination and accessibility preferences. The routing algorithm dynamically generates routes prioritizing accessible pathways and avoiding obstacles based on real-time environmental conditions and user inputs. This adaptive route-generation process ensures that the pathways are tailored to the specific needs of individuals with various disabilities.

3.2 Crowdsourcing-based rating system

A fundamental feature of the Map4Accessibility application is its system for rating the accessibility of places. The Map4Accessibility application leverages a crowdsourced rating system to provide up-to-date and reliable accessibility information. This system enables users to report barriers and obstacles at their destinations or along their routes. These reports are communicated to the routing algorithm, which alerts the user and suggests alternative paths. The rating system is based on crowdsourcing, allowing users to evaluate the accessibility of any location. The advantages of this approach are twofold. First, it increases the amount and speed of information updates about the accessibility of various city locations, thanks to the participation of numerous users who can report issues in real-time. Second, it fully engages

the community in the accessibility mapping process, fostering a sense of responsibility and empathy toward people with different impairments. Users can rate both existing points of interest on the map and newly added places at any time. This enables the reporting of new accessibility issues in real-time. The accessibility rating includes three options: accessible, partially accessible, and not accessible. Each rating is assigned a label corresponding to a specific impairment, such as visual or motor impairments, to reflect the varied accessibility needs accurately. An ad-hoc algorithm has been implemented and fine-tuned based on user feedback to determine the final accessibility rating of a location. This algorithm assigns importance to recent ratings, reflecting the current situation of the place while also considering past ratings to avoid subjectivity and errors. The accessibility scores are converted into a numerical scale, where “accessible” is assigned 2 points, “partially accessible” is assigned 1 point, and “not accessible” is assigned 0 points. The initial score initializes the algorithm, and subsequent scores update the final rating by incorporating a weighted average emphasizing recent ratings. This approach ensures that the latest information significantly impacts the overall rating while maintaining a balance with historical data. It uses an algorithm that prioritizes recent data, and the system offers a robust solution for identifying and navigating accessible routes for individuals with different impairments.

3.3 Inclusive and user-friendly interface

Upon opening Map4Accessibility, users are greeted with a landing page featuring five intuitive components designed for accessibility.

1. **Profile Component:** Users can easily register by entering their details, including disability type and preferences. This process ensures that the application tailors its functionality to meet specific needs.

2. **Routing Map:** This feature allows users to find accessible routes by entering their start and end locations. The interface displays multiple route options based on the user’s pre-specified disability and preferences from the Profile component. This customization ensures that suggested routes are suitable for their specific requirements.

3. **Search Area Map:** Users can view their current location, search for points of interest, and add or rate obstacles. The map is user-friendly, offering both a simplified default view and a satellite view, making it easy to switch between these modalities. Users can zoom in and out seamlessly, making navigation straightforward and accommodating for all types of disabilities. A simplified search bar in the upper right allows users to search for

points of interest. Additionally, users can filter locations by type and disability rating, with recommended places displayed accordingly. A visible plus button on the lower left lets users add obstacles, providing details such as name, obstacle type, and accessibility rating. Users can also rate points of interest on the map, contributing to a better understanding of location accessibility from different disability perspectives.

4. Home Component: This component summarizes the user's history, including last visited places, rated places, and added obstacles.

5. Accessibility Component: Accessible via the top right of the page, this component allows users to customize the application to their liking by adjusting text font, font size, contrast, and colour. These options enhance accessibility and user-friendliness.

During the development of each component of Map4Accessibility, significant attention was paid to feedback from various user categories. This information guided an iterative design process, ensuring the application is user-friendly and highly customizable. Users can choose how information is presented and in what manner, enabling personalized services that cater to the needs of all different categories of user disabilities.

4. Map4Accessibility application functioning

In this section we will show how Map4Accessibility application works and can be profitably exploited by the users.

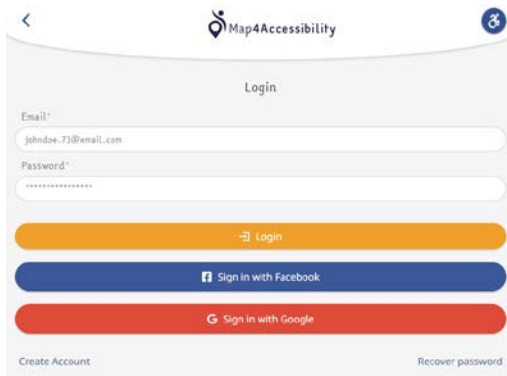


Fig. 2. The sign in the Map4Accessibility application.

4.1 Entering in the Map4Accessibility application

Upon launching the application, users are prompted to create a new account or log in to an existing one as it was already shown in Figure 2. They can quickly create an account by entering their personal information or signing in using their Email or Facebook credentials. This process is streamlined to ensure quick and easy access to the application's features, allowing users to practice immediately. After signing in or logging in, users input their destination, triggering the application to employ GPS and additional sensor data to pinpoint their current location. To start navigation, users can go to the main menu and select the "Navigation" icon option, which will provide turn-by-turn directions to the desired destination while avoiding potential barriers.

4.2 Navigation system of Map4Accessibility application

Users can easily navigate the interface to select their starting and destination points. The routing engine then generates suggestions tailored to accommodate the user's disability and avoid barriers. The Figure 3 illustrates a navigation example from the starting point "Viterbo Porta Romana" to the destination point "Viterbo Porta San Pietro", showcasing the route between two main gates in the medieval city of Viterbo, Italy. The application provides the two or three most accessible routes, depending on the impairment of the user (in these example, two routes was suggested: Route A and B). Each route comes with its accessibility score, so that the user can select the preferred one (in the example, Route B has the highest). Once it has been selected, the user receives information about how to reach the desired destination, also visualizing the possible barriers. The system continuously updates based on real-time sensor data and on the information retrieved via crowdsourcing, providing accurate and adaptive navigation to enhance the user's journey. This allows users to know the optimal path for their specific disabilities.

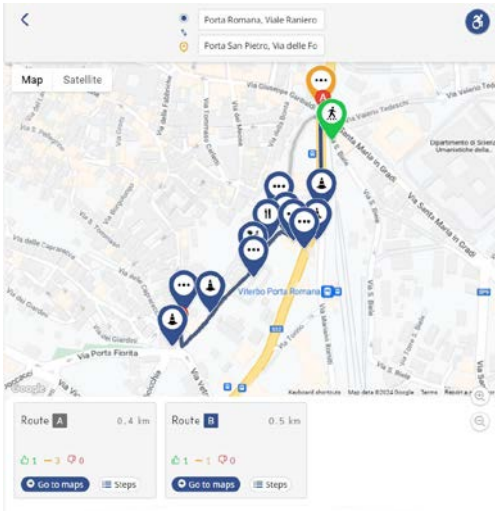


Fig. 3. The navigation system of the Map4Accessibility application.

4.3 Rating system of Map4Accessibility application

Users can provide feedback on the accessibility of various locations by rating them and reporting obstacles. In the application, users can search for specific areas and select the place they want to rate. The rating options include “accessible”, “partially accessible”, and “not accessible”. Users can also specify the type of disability for which they are rating the accessibility, such as mobility, visual, hearing, or cognitive impairments. In Figure 4, the screen displays a detailed rating interface. Users first select the location they wish to rate from a map or a list of nearby places. Once the location is selected, they choose the appropriate accessibility category for different types of disabilities. After selecting the category, users can provide additional comments or report specific obstacles encountered. After giving the score, the application updates the accessibility status of the location in real time. This information is then made available to other users, who can view the ratings and comments when searching for accessible places. The application aggregates these ratings to generate an overall accessibility score for each location, helping users decide which places are accessible for their specific needs.

5. Conclusions

The Map4Accessibility application exemplifies how technological innovation can be harnessed to create inclusive solutions that address the unique challenges faced by individuals with disabilities. By combining sensor technologies and an inclusive design this application offers a reliable and efficient tool for accessible navigation. The easy user ratings validate the system's efficacy and potential to enhance inclusivity, contributing to a more accessible and equitable society. Our application is available for free download from the <https://map4accessibility.eu/> website.

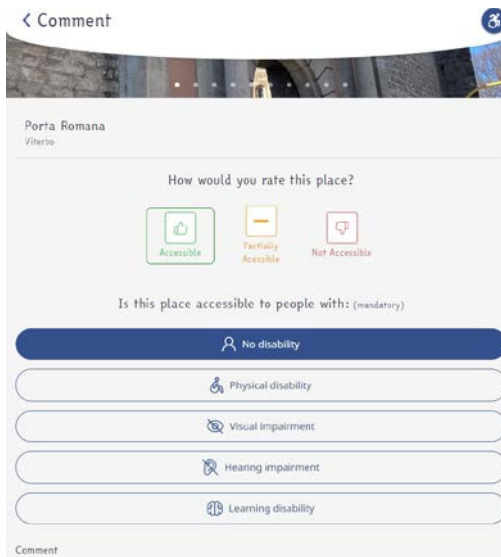


Fig. 4. The rating system of the Map4Accessibility application.

References

- Alqadi, R., Alhowaiti, M., Almohaimeed, F., Alsabban, M., Raviselvam, S. (2020), "Crowdsourcing accessibility: A review of platforms, mobile applications and tools", *Proceedings of HCI International 2020–Late Breaking Posters: 22nd International Conference, Part II 22*, Springer, Cham, 10-17.
- Karachiwalla, R., Pinkow, F. (2021), "Understanding crowdsourcing projects: A review on the key design elements of a crowdsourcing initiative", *Creativity and innovation management*, 30(3), 563-584.
- Knoll, A. (2015), "Ability app". Available at: <https://theabilityapp.com/>.
- Mapeirons (2020), available at: <https://mapeirons.eu/en/?pn=1>

- Mazayev, A., Martins, J. A., Correia, N. (2016), "Improving accessibility through semantic crowdsourcing", *Proceedings of the 7th International Conference on Software Development and Technologies for Enhancing Accessibility and Fighting Info-exclusion*, 408-413.
- Mehrjerdian, S., Winfield, S. M. B. (2019), "iaccesslife". Available at: <https://www.iaccess.life/>
- Mobasheri, A., Deister, J., Dieterich, H. (2017), "Wheelmap: the wheelchair accessibility crowdsourcing platform", *Open Geospatial Data, Software and Standards*, 2, 1-7.
- Nevo, D., Kotlarsky, J. (2020), "Crowdsourcing as a strategic is sourcing phenomenon: Critical review and insights for future research", *The Journal of Strategic Information Systems*, 29(4), 101593.
- Vianna, F. R. P. M., Graeml, A. R., Peinado, J. (2020), "The role of crowdsourcing in industry 4.0: A systematic literature review", *International Journal of Computer Integrated Manufacturing*, 33(4), 411-427.
- Wheelmate (2012), available at: <https://www.coloplast.com/products/bladder-bowel/wheelmate/>.

About the authors

Francesco Alberti

Associate Professor of Urban Planning and Design at the Department of Architecture of the University of Florence, where he is a member of the inter-departmental laboratory “Florence Accessibility Lab” (FAL) and the scientific coordinator of the research unit “Sustainable Urban Projects & Research” (SUP&R), focusing on the issues of inclusive design and urban and mobility sustainability. Since 2016 he has been a member of the group “Accessible-to-all Cities”, a community of experts and stakeholders supported by the Istituto Nazionale di Urbanistica (INU), the Italian National Institute for Urban Planning.

Department of Architecture of the University of Florence, Italy

José Manuel Alcalde Llergo

Computer engineer and a PhD student enrolled in the National PhD in Artificial Intelligence, XXXVIII cycle, course on Health and life sciences, organized by Università Campus Bio-Medico di Roma and supervised by Università degli Studi della Tuscia. He is also pursuing his doctorate in co-supervision at the Universidad de Córdoba (Spain), enrolled in its PhD program in Computation, Energy and Plasmas. His research line focuses on the application of virtual reality and artificial intelligence in the field of inclusion.

Department of Economics, Engineering, Society and Business Organization, Italy; University of Córdoba, Spain

Luca Barbarossa

Engineer, PhD in Town and Regional planning, is Assistant Professor of Urban Planning at the Syracuse School of Architecture and Cultural Heritage, University of Catania. His research primarily focuses on urban sustainability, land-use management, and the interaction between land use and transport

planning, adopting a holistic approach with a strong emphasis on environmental concerns. He has authored numerous studies published in international scientific journals, books, chapters, and conference papers.

Syracuse School of Architecture and Cultural Heritage, University of Catania, Italy

Markus Bick

Full professor of Business Information Systems at ESCP Business School. His current research interests focus on digital transformation incl. digital competencies and digital maturity models, eXplainable AI, trust in LLMs, gamification, knowledge management, or Web 3.0 technologies. He publishes his work regularly in renowned international journals (e.g., Information & Management, Decision Support Systems, Electronic Markets, Business Information Systems Engineering, or Information Systems Frontiers). In addition, he acts as a senior editor of Electronics Markets and Information Systems Management.

ESCP Business School, Berlin, Germany

Sebastiano D’Urso

PhD and associate professor of Architectural and Urban Composition at the Department of Civil Engineering and Architecture, University of Catania. He carries out research activities looking at the contaminations of architecture with other disciplines. He shares research results to foster further contamination by publishing them in journals and monographs.

Department of Civil Engineering and Architecture, University of Catania, Italy

Natali Dimitrova

Senior Consultant and Strategic Planning Manager at Europroject with over 12 years of experience in managing research and innovation projects across programmes such as Horizon Europe, H2020, LIFE and Erasmus+. She specializes in sustainability, ecological engineering, accessibility, and the blue economy. Her commitment to accessibility rooted in both her professional and personal experience drives her to advocate for more inclusive and sustainable solutions.

Europroject Ltd, Sofia, Bulgaria

Maurizio Francesco Errigo

Associate Professor in Urban Planning at the Department of Planning, Design, Architectural Technology of the University La Sapienza of Rome. He teaches Urban Planning II in the Degree Course in Architecture. He taught

Socio-Spatial Processes in the City and Analysis and Design of Urban Form at the MsC in Urbanism AR1U100 R&D of the Delft University of Technology (TUDelft), Visiting Professor at the Escola Tècnica Superior d'Arquitectura del Vallès (ETSAV), Universitat Politècnica de Catalunya and at the Faculty of Engineering of the University of Rijeka in Croatia. He is currently involved as Scientific Manager for the PDTA Department of Sapienza in some projects of cultural accessibility, and tourism enhancement.

Department of Planning, Design, Architectural Technology, University La Sapienza of Rome, Italy

Mariela Filipova

Head of the “Kinesitherapy” department and teacher in the same department at the Faculty of Public Health, Health Care and Sports, “Neofit Rilski”, Blagoevgrad, Bulgaria. Vice-Dean at the Faculty of Public Health, Health Care and Sports, South-West University “Neofit Rilski”, Blagoevgrad, Bulgaria. Scientific interests in the field of neurological and orthopedic kinesitherapy in particular in patients with familial amyloid polyneuropathy, hereditary neurological diseases, Trevor’s disease, etc.

Department of Kinesitherapy, South-West University “Neofit Rilski”, Blagoevgrad, Bulgaria

Hristian Georgiev

Graduated from University of Architecture, Civil Engineering and Geodesy, Sofia, Bulgaria. He has more than 20 years of experience in the field of residential and public architecture, interior design, landscaping, indoor and outdoor built environment. In his portfolio there are several successful projects in planning an accessible urban environment, including Recreation Urban Areas in the City of Pernik. Since 2021 he holds the position of a chief architect of Ovcha Kupel municipality, Sofia, Bulgaria. He has in-depth knowledge of Bulgarian legislation related to the built environment, including accessibility. He is experienced in the field of cultural and architectural heritage. “ИИ 2004 Arch. Georgiev was awarded with the prize ArchIdea” for an innovative family house in Boyana district, Sofia, Bulgaria.”

Ovcha Kupel municipality, Sofia, Bulgaria

Polina Hitova

Innovation consultant with long expertise in European projects setting up and management, including Horizon Europe and Erasmus+ programmes. Among the topics of genuine interest and successful project implementation are sustainable entrepreneurship, renewable energy solutions, and urban and digital accessibility, including activities toward social acceptance and behavioral

change. Sustainable solutions play a major part in her professional and private life.

Europroject Ltd, Sofia, Bulgaria

Daniele La Rosa

(PhD in Urban and Regional Planning) is Associate Professor of Urban and Environmental Planning at the Department Civil Engineering and Architecture of the University of Catania (Italy). He teaches spatial planning and urban design in Building Engineering MSc course at the University of Catania. His research interests include sustainable urban planning, Ecosystem Services, GIS applications for urban and landscape planning, environmental indicators, Environmental Strategic Assessment, Land Use science and landscape studies. He is author of more than 100 publications on the above mentioned topics.

Department of Civil Engineering and Architecture, University of Catania, Italy

Luca Laule

Holds a master's degree in business administration and engineering from the Hochschule für Technik und Wirtschaft, Berlin. He is currently a Ph.D. student and research assistant at the Chair of Business Information Systems at ESCP Business School, Berlin. His research focuses on organizational transformation, particularly in the area of transformation competencies. Luca Laule has presented his work at established IS conferences, including the European Mediterranean & Middle Eastern Conference on Information Systems (EMCIS) and the IFIP Conference on e-Business, e-Services, and e-Society (I3E).

ESCP Business School, Berlin, Germany

Gaetano Giovanni Daniele Manuele

Architect. Doctor of Philosophy (Ph.D) in Architecture. He has numerous participations as a speaker and moderator at national/international events and over 60 publications in the field of urban planning. Member of the scientific committee of "Cities Accessible to All" of the National Institute of Urban Planning, INU. He has won several national and international awards with projects and research on urban sustainability and accessibility.

"Città Accessibili a Tutti" - INU, Istituto Nazionale di Urbanistica, Italy

Viviana Pappalardo

PhD in Evaluation and mitigation of urban and land risks. She works as a

research fellow, focusing on spatial planning for transitioning towards urban resilience and sustainability in Mediterranean areas. She got the Italian National Scientific Qualification as Associate Professor in Urban and Regional Planning, and is the author of more than 40 scientific publications. She is currently involved in different national and international research and cooperation projects. Her research interests also cover planning and policies for green infrastructure and GIS applications for urban risk assessment.

Department of Civil Engineering and Architecture, University of Catania, Italy

Raffaele Pelorosso

Expert in urban and territorial planning, environmental modeling, and decision support systems. Based at the University of Tuscia, his research focuses on creating sustainable cities and landscapes through a systemic and spatial approach, grounded in the thermodynamics of open systems. Raffaele's work spans urban regeneration, climate adaptation, ecosystem services, nature-based solutions, and improving urban accessibility to create more inclusive and connected communities. He has held several editorial roles and is a member of multiple professional organizations, including the European Land Use Institute and the Italian Society of Urban Planners.

Department of Agriculture and Forest Sciences, University of Tuscia, Italy

Sediola Ruko

PhD student with the DEIM department (Dept. of Economics, Engineering, Society and Business Organization) of Tuscia University. Her research focuses on the application of digital mapping technologies to improve accessibility in urban environments, contributing to innovative technological solutions for real-world challenges.

Department of Economics, Engineering, Society and Business Organization, University of Tuscia, Italy

Erika Russo

Civil engineer and architect, with a degree focused on an empirical methodology for assessing urban accessibility and public space regeneration aimed at overcoming architectural barriers. She currently works as an engineer at an engineering firm in Catania and has participated in numerous urban regeneration competitions in the city, contributing his experience and expertise to the design and enhancement proposals for Catania's urban spaces.

Department of Civil Engineering and Architecture, University of Catania, Italy

Miglena Tsvetkova-Gaberska

Lecturer in the Department of Anatomy and Physiology at the Faculty of Public Health, Health Care and Sports, South-West university “Neofit Rilski”, Blagoevgrad, Bulgaria.

Kinesitherapist by profession. Research interests in the field of neurological and orthopedic kinesitherapy, proprioceptive training, isokinetic dynamometry.

Department of Anatomy and Physiology, South-West University “Neofit Rilski”, Blagoevgrad, Bulgaria

Enrique Yeguas-Bolivar

He is an associate professor at the Department of Computer Science and a member of the Computer Vision Applications research group at the University of Córdoba – Spain. His main research fields are Computer Graphics, Augmented and Virtual Reality, and Artificial Intelligence. He is the author of more than ten high-quality contributions published in international journals indexed in JCR. He has participated in several European research projects concerned with Virtual Reality, Artificial Intelligence, and Inclusion (VRAILEXIA, ISENSE, and UNITE).

Department of Computer Science, University of Córdoba, Spain

Andrea Zingoni

(MSc in Telecommunication Engineering, PhD in Information Engineering at the University of Pisa - Italy) is a Researcher in Computer Science at the University of Tuscia (Viterbo, Italy), where he actually teaches “Fundamentals of Computer Science” and “Artificial Intelligence applied to Industrial Processes”. Among his research interests we find Artificial Intelligence, Image Processing, Extended Reality, Remote Sensing, Blockchain and Electro-Optical Sensors, often framed within interdisciplinary contexts in the areas of Education, Inclusion, Biomedicine, Sport, Economics and Finance.

Department of Economics, Engineering, Society and Business Organization, University of Tuscia, Italy

Ensuring accessibility for everyone is essential for building sustainable and equitable cities, regardless of their physical, intellectual, social, economic, gender, or age condition.

Urban accessibility typifies public spaces that are well integrated with vehicular and pedestrian spaces, interconnected through obstacle-free routes, and where urban greenery and public furniture design allow for well-being and safe enjoyment.

Accessibility must also be understood in terms of equal access to different functions and services, society-driven participatory institutions and inclusiveness in government processes, and provision of quality education and job opportunities.

This book collects research studies and project experiences, perspectives, and discussions on different aspects of accessibility, tangible and intangible, with a special focus on urban contexts. As a result of the Map4Accessibility Project, funded by the European Union under the Erasmus+ Program, this book promotes accessibility as a tool for social inclusion and sustainability of development and community.

This book includes contributions by scholars, practitioners, and experts from universities, associations, consulting companies, and municipalities. They have offered their varied views on the topic, contributing to increasing collective knowledge and sensitivity. Throughout the three sections of the book, insights on urban accessibility are gained by critically providing examples from policies, norms, urban practices and architectural models, researches, and education and outreach initiatives.

Viviana Pappalardo is Research Fellow in Urban and Regional Planning at the University of Catania (Italy). Her work spans spatial planning for resilient urban areas, plans and policies for nature-based solutions, GIS applications and urban modeling for urban risk assessment.

Daniele La Rosa is Associate Professor of Urban and Environmental Planning at the University of Catania (Italy). His research interests include sustainable urban planning, ecosystem services, GIS applications for urban and landscape planning, environmental indicators, environmental strategic assessment, land use science and landscape studies.

Luca Barbarossa is Assistant Professor of Urban Planning at the University of Catania (Italy). His research primarily focuses on urban sustainability, land use management, and the interaction between land use and transport planning, adopting a holistic approach with a strong emphasis on environmental concerns.