# Design for Inclusion
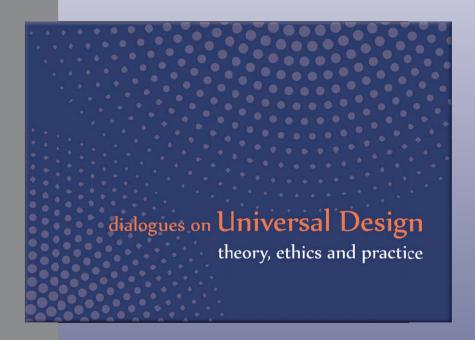
*Dialogues on Universal Design:*
*Theory, Ethics and Practice*

dialogues on Universal Design

theory, ethics and practice

Editors: Ilaria Garofolo
Giulia Bencini

IOS Press

Current ideas about human diversity often highlight the importance of the relational and dynamic nature of interactions across different domains of human function, activities and participation. Universal Design (UD) is defined as design that is usable by all people, to the greatest extent possible and without the need for adaptation or specialization. The term 'universal' is intended to embrace human diversity, making it the opposite of the one-size-fits-all approach.

The Universal Design conference series was started in 2012 with the aim of promoting UD as a discipline-independent philosophy and approach which can transcend the boundaries between communities of knowledge and communities of practice. The first part of this book is a collection of 6 invited papers arising from some of the informal and semi-formal discussions and debates which took place as part of the UD 2022 conference in Italy. Authors were invited to submit papers presenting real case studies, and asked to discuss not only the opportunities and strengths, but also the challenges encountered when implementing UD in various domains. The second part of the book presents 6 essays by researchers who have worked on different aspects of UD over the years, each written from the perspective of the author's own research strand.

The book will be of interest to all those working in the field of universal design and inclusivity.

# DESIGN FOR INCLUSION

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# Design for Inclusion

Dialogues on Universal Design: Theory, Ethics and Practice

Edited by

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and

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# Preface

Although the origin of the term 'design' comes from the applied world of industrial product design where 'user testing' was already part of the industrial production process, it is thanks to the pioneering work of Ronald Mace (1985) that the term design has been reconceptualised as a domain and discipline-independent process, applicable to any product, space or service. In addition, by using the term 'universal' Mace implies that any product, space or service should meet the needs, preferences and expectations of real human beings in specific contexts. Mace introduced a core conceptual and methodological shift: the notion that design should address the multiplicity of human beings, not an idealised standard: 'Universal design is design that's usable by all people, to the greatest extent possible, without the need for adaptation or specialised design'. It is clear from the definition that 'universal' is intended to embrace human diversity, and is therefore the opposite of the one-size-fits-all approach.

Modern conceptualisations of human diversity highlight the importance of the relational and dynamic nature of human-context interactions across the different domains of human functioning, activities and participation (ICF-WHO, 2001). The multi-dimensional nature of environmental factors (see the range of ICF Environmental Chapters, encompassing the human, built and natural environment) and the complexity of human-environment interaction, necessarily require a multi-disciplinary and multi-scale approach to design if they are to achieve inclusion. It is within this conceptual framework that both the Convention on the Rights of People with Disabilities (CRPD, 2006, Art 4f), together with the subsequent UN 2030 Agenda for Sustainable Development, promote Universal Design as the optimum approach to ensure that all human beings, including people with disabilities, can enjoy fundamental rights and freedoms (EU Strategy for the rights of persons with disabilities 2021-2030).

The force of UD as a discipline-independent philosophy and approach is precisely what we need to transcend the boundaries between academic disciplines and separations which currently exist between communities of knowledge and communities of practice. One way to foster cross-disciplinary encounters and dialogue is to create opportunities and formats that allow academic, governmental and professional communities to come together. This is the tradition of the Universal Design conferences, started in 2012, the last edition of which took place in Italy in 2022.

In addition to the main thematic sessions, UD 2022 offered several informal and semi-formal occasions for discussion and debate. This volume gives value to the outcomes of these sessions. Authors were invited to submit papers that presented real case studies, with the request that they discuss not only the opportunities and strengths, but also the challenges encountered when implementing Universal Design in different domains. During the mini-sessions (in the form of science cafes) authors had the benefit of being able to present their studies to a wider audience, promoting an enriching exchange of views for both speakers and listeners. These papers form the first part of this volume.

The second part of the volume includes scholarly essays by researchers who have worked on different aspects of Universal Design over the years. Although working in

different fields, they share a UD framework and philosophy. We asked each of them to contribute their theoretical, philosophical, and methodological essay from the perspective of their own research strand within UD.

# About the Authors

**Giulia Bencini**

An Associate Professor in English Language and Linguistics at Ca' Foscari University of Venice, Giulia Bencini's basic research focuses on psycholinguistics and neurolinguistics. Her applied research focuses on interventions aimed at applying UD and UDL to the building of inclusive educational environments with a focus on language and communication rights.

**Elisa Bertolini**

Elisa Bertolini's thesis for her PhD in engineering from the University of Trieste focused on the strategic assessment of cross-border transport scenarios, a multidimensional problem domain in which multiple alternatives have to be evaluated within different criteria. Currently a research fellow at the University of Trieste, her work focuses on decision-making support in the field of transport, planning and logistics, applied to the FVG regional territory.

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Lorenzo Castelli is an associate professor in Operations Research at the University of Trieste, Italy. For the last twenty years, Lorenzo's research activity has focused on productivity analysis and mathematical optimization as applied to logistics and transportation. The results of these research activities have appeared in top-ranked journals (such as Transportation Science, Transportation Research Part C, Transportation Research Part E, European Journal of Operational Research). Lorenzo has managed several EU research projects, acting as Project Leader on two EU projects and as University research group leader for 10 international and 2 national projects.

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Barbara Chiarelli is an architect and Ph.D. She is currently a research fellow and member of the research group TrIAL (Trieste Inclusion & Accessibility Lab) at the Department of Engineering and Architecture, University of Trieste. She became aware of the world of Universal Design in 2011 while working on her thesis, developing a PEBA proposal for the city of Trieste. Since then, she has devoted her professional and research activities to the world of accessibility and inclusion, collaborating on numerous projects over the years, including INU's Accessible Cities for All Community.

## Ilaria Garofolo

Ilaria Garofolo is a civil building engineer and a full professor at the University of Trieste. Her research interests include the themes of human-centred design (inclusive and safe design, accessibility to cultural heritage, healthy and accessible cities) and the technological culture of design (materials and systems) for technological innovation, healthy and quality environments, sustainability of the building process, study of models for the management of building projects and the settlement transformation processes, as well as the design and trial of protocols for environmental and sustainability education.

## Anthony Giannoumis

The co-founder of Inclusive Creation AS, based in Oslo Norway, Anthony Giannoumis is an internationally recognised expert in universal design policy and practice. He leads several large-scale research and innovation projects based in over 27 countries.

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Muriel Molinier

Muriel Moliner has been teaching Museology at Paul Sabatier University in Toulouse (France) for 7 years. In her PhD thesis in Information and Communication Sciences 'The path to inclusion through museum education (mediation) in museums of fine arts: from vulnerable publics to a universal public', defended in 2019, she questioned the universality of mediation and the hybridization of museum-health practices. Since then, she has proposed the rethinking of the transposition of universal design in museums for narratives, specifically on labels.

Lilian Müller

Lilian Müller is an industrial doctoral student at Certec, Department of Design Sciences at Lund University. She is employed by the City of Lund as an accessibility advisor in the Spatial Planning Department, and has a long experience of working in the area of accessibility and universal design. Her current research deals with universal design and accessibility in urban planning and the built environment. With a comprehensive approach to urban development, the research is focused on the patterns and factors which support or impede universal design in the built environment, and how knowledge and awareness of planning and building with human diversity in mind can be increased throughout the planning and construction process.

### Laura Nota

Laura Nota is a full professor at the University of Padova and the Director of the Larios Laboratory for career research and intervention. She was a former Delegate for Rector for Inclusion and Disability (2015-2021), and since 2020 she has been the Coordinator of the Inclusion and Social Justice Group of the Network of Italian Universities for Sustainable Development. She teaches Career construction and Career counselling, as well as Psychological Counseling for Inclusion and social disease, and her research efforts are directed towards the building of inclusive contexts and reducing barriers and inequalities, devising procedures and instruments for school and other contexts, and verifying the efficacy of interventions.

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### Sara Santilli

Sara Santilli is a researcher at the Department of Philosophy, Sociology, Education and Applied Psychology of the University of Padova. She also collaborates with La.R.I.O.S. (Laboratory of Research and Intervention in Vocational Guidance). Her research interests include the fields of career counselling, social sustainability and inclusion. She is vice president of the Italian Society for Vocational Guidance (SIO) and a member of the Advisory Board of the *International Journal for Educational and Vocational Guidance.*

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# Contents

# Part 1

# Mini Session Contents

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# Who Are We Building for? Tracing Universal Design in Urban Development

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**Abstract.** Despite laws, policies, and political visions to create cities and societies for all, barriers still exclude people from using buildings and public places. The commitments made in global agreements such as the Convention on Rights for Persons with Disabilities (CRPD) and the 2030 Agenda for Sustainable Development require significant changes in urban planning to meet the variety of needs and conditions in the population. Implementing Universal Design (UD) in urban planning processes is one important step towards a society for all.
Three recent studies in Sweden focused on UD in the urban development - how, where and what factors that supported or impeded UD along the planning and construction processes. The whole process, from signs in visionary programmes and development plans to process-related factors and visible results in the completed buildings and places, were analyzed from a UD perspective. The findings highlight three critical areas to pay particular attention to, when implementing UD in the built environment: Competing and contradictory interests, Critical choices and aspects and Images of the user. These challenges need to be addressed by all actors involved, together in a in a goal-oriented work, to reach common understanding on how an inclusive built environment can be designed and realized.

**Keywords.** Universal Design, Urban Development, Accessibility, Disability, Sustainability

## 1. Introduction

Three recent studies, by the author and colleagues, shed light on UD in urban development, on patterns of its presence and the underlying drivers for this in the urban development processes. In designing a built environment that will be usable by all people to the greatest extent, the principles, and goals of UD [1, 2] is particularly relevant. It responds to several contemporary overarching urgent matters as democracy, social justice, health, sustainability etc, and can help us to move away from design for an average person towards a wide range of users [3-5].

Building a society for all is a clear public interest and a basic condition for creating a sustainable society [6]. The definition and content of public interest is although since long a subject for discussion. With the shifts in dominating planning theories, a change has also occurred in who defines a public interest. In the rational planning theory, it was the planner as an expert who could define the public interest; in the neoliberal planning theory, it is the market. In postmodern planning, it is questioned whether public interests can exist at all [7]. The public interest can be seen as a decisively important argument for the public's involvement in planning in general. The states' intervention in land and property development after the second world war was considered "necessary to protect

public interest against private and sectional interests", to define what is 'good', a normative standard [8]

The design processes in urban development involve a long range of actors, from the public and the private sectors. In contemporary planning, the role of the planner has changed: from a previous rational practice where the planner was an objective expert who should meet the goals set up by politicians; to a network-oriented practice with strong influence from the market, where the planner is just one actor among many others [7][9].

The Swedish Planning and Building Act [10] states that all planning shall support built environments that are accessible and usable by all citizens, and this is specifically expressed as a public interest. By signing the Convention on Rights for Persons with Disabilities (CRPD), the signing States have committed themselves to ensuring and promoting the full realization of all human rights and fundamental freedoms for all persons with disabilities without discrimination of any kind based on disability [1].

In contemporary planning, certain ideals challenge the idea and vision of a society for all. Some of these contemporary urban trends also have a clear connection to the sustainability discourse. Such concepts are for example *densification* and *mixed areas* as *shared space,* where the mix of motor vehicles, bicycles and pedestrians in the same space is meant to calm traffic by mutual understanding and respect [11][18].

In the urban planning discourse, urban densification is since long time considered an important measure for reaching a sustainable society and has also been associated with economic growth [12]. However, recent studies show how the understanding of densification as a measure to reach a sustainable society, does not correspond with the results shown by research. According to this research, positive effects exist for public infrastructure, transport, and economics, while there are considerable negative environmental, social and health impacts. Related to health issues, particularly negative effects on mental health are associated with densification, where the compactness of the built fabric and the lack of open space plays an important role when explaining perceived urban stress [13]. Furthermore, sustainability within planning and building is still strongly associated with the green dimension, further reinforced by concerns about climate change, while social aspects are less discussed. There are different descriptions of what social sustainability is, and whether the sustainability dimensions have the same weight or are placed in a hierarchy. Nevertheless, creating places and buildings that support the full range of human needs belongs to the core principles of sustainable urban design [14].

Analyses from the studies show that UD needs to be involved in all phases of urban development and that critical factors can be found in different fields such as norms and values, actors' way of cooperating and urban planning trends. The aim of this paper is to highlight and discuss some of the critical areas and aspects that might support or hinder the implementation of UD and a built environment for all. The research questions that form the basis of the studies can be found in the articles [15-17].

## 2. Traces of UD in the urban development

In the first study [15], an analysis was made of policy documents, programmes and development plans, to get a picture of what kind of users that were expressed in early stages. The second study [16] was a multi-case study of new constructions and remodelling, with the aim to catch signs and patterns of UD in completed buildings and

environments, both in new constructions and remodelling. In the third study [17], the findings from the second study were used as a base for discussion among actors involved in the process. In workshops and interviews participants from the city (planners, strategists, administrators of building permits, building inspectors and other professional roles from different departments involved in urban development) and private actors (developers, builders, property owners and architects) participated.

Some critical areas, to pay particular attention to in the urban development processes that emerged in these studies were *Competing and contradictory interests*, *Critical choices and aspects* and *skewed images of the user*. These challenging areas are presented below with examples of particularly critical factors to consider for all actors involved, in supporting the implementation of UD.

## 2.1. Competing and Contradictory interests

One recurring theme in the studies was '*competing and contradictory interests between actors in the process*'. Among these, were collisions between public and commercial interest, lack of consensus between city departments, and contradicting needs in different target groups leading to priorities for whom the design solutions were intended.

One example discussed in the workshops was a newly built housing area in a very hilly terrain. To cross the yards, reach the outdoor gym or use the common greenhouse, all tenants were assumed to be able to use stairs (figure 1). The outdoor gym was placed at the end of the slope, behind the last building, and the greenhouse was located around stairs.



**Figure 1.** A newly built housing block, where tenants need to be able to walk in stairs to use the outdoor environment and reach common areas.

In the workshop discussion around this example, critical questions were raised, like *"does everything really have to be accessible for everyone?"* and "*should we not use this space at all* (where an outdoor gym was placed, reachable only by stairs) *just because there are persons who cannot use the stairs?"*. In the deepened discussion some raised the question if *we should accept that the cost of using all available space in an efficient way might lead to the exclusion of users?*

The participants agreed that this example is a clear example of collisions between public and commercial interests. The number of apartments that could be built on this piece of land was prioritised over the quality of the design of the outdoor areas. The location of the outdoor gym was a decision where the maximal use of land was prioritised over values such as inclusion and equity. The greenhouse was designed to attract apartment buyers, without paying attention to the exclusionary effects. According to the workshop participants, the public interest in building a society for all was not understood to be at the forefront of the project.

In another example, the lack of consensus between city departments, and the prioritization between target groups were discussed. The newly built hub for public transport has a large open public space in front. The location of a bicycle express lane in front of the building is invisible to the viewer, e.g., a pedestrian. No signs or contrasting ground material give warnings to pedestrians (figure 2).



**Figure 2**: A newly built hub for public transport, where a bicycle express lane is crossing the walkway towards the entrance.

When locating the bicycle express lane, the departments had two alternatives. The one that was opted out would have been placed on a parallel street. Two different approaches were discussed: maintaining a high level of traffic safety by separating different types of traffic and vehicles or creating a shared space to calm the traffic and create conditions for a changed perception of risks and safety. In this case, the two city departments involved in this project stood for opposite positions. This collision of policies, within the city organisation, came into force both in workshops and interviews. One interviewee expressed: *"We are thinking safety, while they are thinking security. We do what we can to get around their policies here"* [17]. In the workshop, participants agreed that an overall, holistic perspective is needed. When discussing possible alternative solutions, separations of bicyclists and pedestrians, contrasting ground materials and rules for cycling on the terms of pedestrians were suggested [17].

The results clarified conflicts of interest and different policies, not only between public and private actors but also between different administrations within the city.

## 2.2 Critical choices and factors

Critical resources, factors and choices along the planning and construction process, supporting or impeding UD, were highlighted in the discussions. Drivers supporting and impeding a UD approach in the urban development process emerged.

Among the important drivers for UD, a strong vision to build for all users from the start of the process was an important starting point. Allocation of resources (time, money, knowledge) and clear requirements in public procurement and contracts with developers were successful factors in implementing the UD approach in the project. Other important factors were to involve users and experts at an early stage and carry out pre-studies and consequence analyses based on human diversity aspects all along the process.

Aspects impeding UD were multifaceted. Urban trends like densification and mixed areas, the involvement of many actors with competing interests, a lack of assessment focused on human diversity, and what consequences that different choices and decisions had for different users were some of the strong factors counteracting a UD approach. Sustainability policies without a social dimension tended to put high demands on users' abilities, and accessibility dealt with late in the processes risked ending in special solutions for some users [16].

The results in this area can be important guidance in the various choices and priorities made during the process.

## 2.3 A skewed image of the user

Already at an early stage, in public visions, policies and guidelines, there are clear expressions of the imagined user. The perception of the users' abilities also showed to be drivers for choices and priorities in the planning and designing of buildings and places.

In the study of policy documents, programs and development plans in a medium-sized Swedish municipality, the results showed that categorisations of bodies and roles appeared widely in the documents and that patterns of differences and inequalities were found throughout the material. Prominent characteristics of expected users were youth, education, health, and success. Particularly notable was how older people and people with disabilities were absent from the materials. The analysis of policy documents also made a gap visible between laws and vision on one side and practice on the other hand, already at this early stage, in illustrations and text that did not conform to actual regulations. Both in planning documents and the environments analysed in the case study showed how high demands were placed on the users' functional abilities, not least in connection with descriptions of environmental sustainability. Citizens were expected to be able to walk and bike, use stairs, have quick reaction skills to handle mixed areas such as shared spaces and cope with quite far distances between modes of transport (public transportation or car park) and entrances to services and activities. [15].

A more inclusive and equal society requires that planning based on human diversity is embedded in the entire process.

## 3. Concluding discussion

The support of UD in the urban development process depends on the public sector's commitments and demands. In a public-private planning process, the definition of and solutions for, public interests should be solved in a cohesive process [7][8][9].

The number of actors with competing interests is a huge challenge when planning and constructing a society for all [7]. The need for a coherent overall view in all phases of the planning and construction process is clear, although a complex issue as the planning and construction projects are usually very extended in time. Conflicting policies and the contradictions between commercial and public interests are underlying conflicts that must be discussed among public and private partners. Finding innovative solutions that can appeal to all actors involved is a huge challenge.

Certain design trends in urban development are of particular interest to pay attention to, both from UD and sustainability perspectives, and need to be discussed and questioned. Visions of a city for all are at risk of failing when densification and mixed areas are shaped without considering human diversity and UD values and goals. Inequalities can increase, instead of being reduced, in the built environment. More research and more discussions are needed, for instance about the social and health consequences of densification [11][12][13]. This is also urgent when discussing mixed areas which could raise noise, air pollution and lived safety. Design solutions like the example of shared space discussed in the workshops should have been evaluated from a human diversity perspective at an early planning stage, together with users with different abilities and experiences.

Sustainability rests on three equally important pillars. The high ambitions and successful initiatives in the building industry to support the development towards a sustainable society from an ecological standpoint must not be blind to social and economic perspectives. The considerable negative environmental, social and health impacts [13] need to be discussed and lead to changed practices. The sustainable urban design supports the full range of human needs [14] and is a pre-requisite for a society for all [6].

The fulfilment of obligations stated in national laws and global agreements to create a sustainable and inclusive society for all [1][2][10] must be taken seriously, and active measures need to be taken more quickly. Public actors should protect the public interest and the rights of persons at risk of being excluded from an environment, where higher demands are placed on individual abilities.

Having UD in the toolbox and using it in all phases of the project increases the probability of succeeding in creating a society for all. What norms and categorisations of the intended users that lie behind the descriptions and plans in the early phases, have an impact on the final completed building or place [15]. Instead, planning and construction based on human diversity facilitate thoughts and strategies to build for all [3][4][5][16][17].

Experiences from the workshops and interviews showed that there are clear opportunities to reach common positions when it comes to planning and building for all users, when gathering around concrete, practical examples. Networking between actors with competing interests can work when the public interest is in focus. When analyzing the examples of existing built environments and urban development trends, very few signs indicate that a more inclusive built environment will be reached without a conscious, cohesive, and goal-oriented work by all actors involved. If public actors stand strongly behind all citizens' rights and private actors contribute with their innovative

power, there are conditions to find common paths. Based on the experiences from the workshops, Universal Design appears as a useful and important asset in such a strategy. A built environment accessible and usable by all is not a modest demand – it is a minimum requirement.

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# Funding and Provision Models for Mobile Technology for Persons with Disabilities

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**Abstract.** Research has yet to full investigate the multidimensional factors and mechanisms that contribute to access and adoption of Assistive Technology (AT). This mini-session aims to explore this gap by providing initial indicators for the social return on investment (SRoI) for including mainstream consumer technology in AT provision schemes and report on an analysis of key stakeholder perspectives and documents funded by the Global Accessibility Reporting Initiative (GARI).

**Keywords.** Assistive technology, universal design, accessibility, mobile technology

## 1. Introduction

Research has yet to full investigate the multidimensional factors and mechanisms that contribute to access and adoption of Assistive Technology (AT). This mini-session aims to explore this gap by providing initial indicators for the social return on investment (SRoI) for including mainstream consumer technology in AT provision schemes and report on an analysis of key stakeholder perspectives and documents funded by the Global Accessibility Reporting Initiative (GARI).

## 2. Assistive Technology in Norway, the United Kingdom and Poland

**Norway:** There is one assistive technology centre in every county [1]. The assistive technology department (NAV Hjelpemidler og tilrettelegging) of the Norwegian Labour and Welfare Service has the overall professional, financial and administrative responsibility for the assistive technology centres. The Norwegian Labour and Welfare Service manages one of the cornerstones of the Norwegian welfare model: the national insurance scheme and other social security schemes. The national insurance scheme intends to secure income for individuals, compensate for expenses and help people to help themselves so that they can manage the challenges of daily living. The Norwegian Labour and Welfare Service has the overall responsibility for the administration, initiation, follow-up and development of the national insurance scheme, which includes assistive technology. Their responsibility is to: • Ensure that the national insurance scheme fulfils the intentions of the law;

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- To guarantee the population legal protection, so that they are treated equally no matter where they live in Norway;

- Be a national 'motor' in developing the services, and ensure that they are always adapted to the needs of the users, and to consider comprehensive solutions for the users in cases where other welfare schemes are involved;

- Cooperate with and establish relations with other relevant stakeholders in the society. The provision of assistive devices in Norway is linked between different services and sectors that cooperate to achieve a holistic assistive device solution in which case the user has to cooperate with different people. Good solutions depend on teamwork between the user and the stakeholders to achieve a common goal, and the stakeholders are the employment services, national insurance service, the employer, transport and communication, cultural sector, technical services, suppliers, health services, social welfare service and the education sector [1].

**United Kingdom:** In the UK, according to the Authority of the House of Commons, employed and self-employed people can apply to Access to Work which covers fully the cost of communication support (interpreters or captioners per year), workplace adaptations, transport costs etc. The maximum support grant per year is currently £62.900 (Authority of the House of Commons, 2018). Furthermore, the fund also provides for workplace adaptation and it usually requires co-financing from the employer. However, the fund is still not very well known among employers and employees. A major drawback is the requirement to provide 3 different quotes for the AT or service in question and usually, it is the cost that is the deciding factor, not what is working best for the disabled person (Department for Work and Pensions, 2021). This is not means-tested and does not require medical tests etc. The fund supports those with long term disability or illness. However, those who are employed by ministerial government departments, including the Department for Work and Pensions or one of its agencies, will have their departments paying for the support.

Another fund mentioned by the participants, which in fact is a benefit, is the Personal Independence Payment (PIP) (The Department for Work and Pensions, 2021). The fund is notoriously criticized as being available to very few persons with disabilities. From the interviewer's experience and point of view, the benefit is very difficult to obtain for many disabled people. The fund is supposed to support independent living with monthly benefit payments and as with Access to Work, it is not means-tested.

Universities often signpost their students to Disability Student Allowance (DSA) (The Department for Work and Pensions, 2021). The interviewer does not have any reviews of how DSA supports AT, however AT is listed as part of what it pays for. Finally, the Social Services are often mentioned, there are sensory teams within local government that lend environmental aids and some specialized AT to users. Non-means-tested but it is loaned equipment that is not usually able to work with mobile technologies and apps.

Finally, the National Health Service (NHS) provides people with disabilities with some AT, such as hearing aids (low and middle market level), assistive listening technologies (only with cochlear implants) and as mentioned diabetics AT.

The Access to Work programmed provides vital funding for adjustments and support that help disabled people stay at work. Over half of Access to Work users currently benefit from funded aids and equipment, including AT. The scheme is not, however, as

cost-effective as it could be. Some assessors remain wedded to recommending specialist equipment. Mainstream alternatives are often cheaper and just as good. Microsoft Windows' magnification option, for example, performs the same function as specialist magnification software. The latter can cost hundreds or thousands of pounds; the former is free. The Department needs to ensure assessors consistently recommend the latest and best value equipment. It should review and amend assessor training, introducing new, structured professional development requirements. It should also review its support for AT training in Access to Work. Currently, this is offered by specialist equipment providers only, further binding assessors to those providers and their equipment. The Department should introduce a new, general "Access to Work (training)" option. This would provide AT training not linked to receiving specific equipment, opening up the market for AT training and driving down costs. Some users would be trained to use technologies they already own, further reducing costs to the Department.

**Poland:** In general, AT funding varies in Poland by different funding programs available such as PFRON (State Fund for the Rehabilitation of the Disabled), NFZ (National Health Fund), PCPR (District Family Assistance Centre) and various targeted programs such as employers support to adapt employment environment (European Blind Union, 2018).

The majority of persons with disabilities receive funding from PFRON to obtain some assistive technology, with a co-finance option (State Fund for the Rehabilitation of the Disabled, 2021). NFZ is mostly co-funding medical devices which are also assistive devices, such as hearing aids and cochlear implants. Finally, PCPR is a regional fund that is the most unpredictable. The reason for its unpredictability is the perceived needs of the local population based on previous claims, this means if mostly blind people were approaching the Centre, the majority of funds are expected for this group (perceived greater need). In addition, the fund is fixed, if many people request assistance at the beginning of the financial year, then it is first come first serve, leaving those with sudden disabilities with no support from the centre.

It is interesting to note that the most extensive responses came from two participants who provided great detailed explanations of how the different funding sources work in practice.

Is there a legal right to assistive technology, aids and equipment? This issue has been generally described in the aforementioned Act on Vocational and Social Rehabilitation of Persons with Disabilities and Employment. In more detail, this issue was included in the Regulation of the Minister for Labour and Social Policy on tasks and duties performed by a commune and financed from the means given by the State Fund for Rehabilitation of Persons with Disabilities. The CRPD states that governments should make sure disabled people know about aids, technology and assistive devices and how to use them.

Non-governmental organizations and companies that sell equipment for the visually impaired give advice and information about new technologies. What training is provided in the use of equipment and technology? If local governments or ministries assign tasks to conduct training, the training is as follows:

- computer skills with the use of assistive technologies: speech and magnifying software; and

- the use of modern smartphones and assistive applications. The idea of modern technologies is relatively new in Poland. Thus, training e.g., how to use a smartphone are not conducted in the whole country but in certain groups.

How eligibility for equipment, technology and training is determined depends on who provides the money. If the State Fund for Rehabilitation is the donor, this institution usually sets out the eligibility criteria: children, people with disabilities at working age, the elderly, etc. It is hardly the case that a particular project is addressed to all persons with disabilities. How are aids, equipment and technology funded (for example, free, paid for by the user, means-tested)?

For assistance in financing the purchase of special equipment and software a visually impaired person can apply to the local family aid centre. Such centres receive money from the State fund for Rehabilitation to cover the expenses. The above support is provided by the following programmes:

- the programmes to overcome barriers in communication; and

- the programmes to overcome technical barriers, an Active Self-governance. Financial assistance can also be given by National Health Service. The frequency of financing is determined by the programme and the kind of equipment.


## 3. Findings

The analysis of the key features that support accessibility for smartphones and tablets has suggested that they are most likely to be classified as accessibility features of a device and hence not immediately likely to fall under the remit of those procuring assistive technologies. Despite the evidence of the relationship with the WHO APL, significant parts of a core product list can be delivered at relatively low cost through a single device, especially where that device is further enhanced with hardware peripherals and apps.

The EAA and MDR would additionally suggest that in most cases, the efforts of manufacturers to ensure that their devices are accessible to the broadest user base is the correct direction to take. The challenge emerges not as a result of the features and functions, but as a result of the limited criteria for procurement which do not support the provision of smartphones and tablets for persons with a disability.

The research has further shown that there is potential for AT to offer wider participation in employment for people with disabilities and increase their independence. Additionally, AT available at mainstream reach, with their lower cost thresholds than specialist equipment, can reduce the costs to the taxpayer and provide a good ratio of SRoI. Mainstream AT devices supplied to people with disabilities based on their individual needs can widen the availability of support and choices based on each individual's preference. The benefits of widening the reach significantly outweigh the cost of supporting funding for mobile assistive technologies.

Overall, GARI listed devices could bridge the gap in what is provided to people with disabilities and their specific needs. The GARI list describes many devices that can be helpful to people with disabilities having in mind that these devices are equipped with built-in accessibility features which are of great use and beneficial to people with

disabilities. Supporting disabled people with access to AT can significantly reduce loneliness and allow them to be more active and participate in society.

The results reveal some complexity in the role of smartphones and tablets, consumer technologies, with assistive technology. Whilst the broad definitions of assistive technology would suggest that the devices would offer features that fall within the remit of assistive products and services. The more detailed analysis of relevant standards indicates that many of the features and functions of the phone, are likely to be classified as contributing to ensuring that the device as a unit is accessible to, as wide a range of users as possible. There are situations where the device is enhanced with a range of third-party products, including emerging technologies and innovative software, where the complete package can be more clearly identified as assistive technology. The package is unlikely to be used by a person without a disability and therefore falls within the definition of assistive technologies.

As a result, it would be challenging to make a solid case to define the "vanilla" version of the device as an assistive technology for procurement within the current framework of specifications and classification. However, a much stronger case can be made to expand the provision of technology for people with disability to incorporate accessible digital technologies, including consumer technologies. Further research into such technologies' benefits and cost-effectiveness would significantly strengthen such a case.

A case would be founded on the principle that any provision is based on purpose and outcomes rather than an increasingly blurred distinction between accessible and assistive products. This would have the additional benefit of "future-proofing" provision to include new technologies such as smart speakers and wearable technologies where the help of those products is demonstrable for people with a disability.

The results additionally revealed six key themes from interviews conducted in Norway, the UK, and Poland. These focused on the funding of AT devices and the needs of people with disabilities; mobile technology as a means for filling the AT gap; improving the quality of life for people with disabilities through access to mainstream technologies; changes for ensuring access to mainstream AT; non-financial barriers to accessing assistive technology; and potential impact for widening the scope of assistive devices by including mainstream devices.

The results suggested that the funded ATs are not meeting the needs of people with disabilities. Barriers exist in the funding processes. Both the technology distributed, and the processes were not up to date. The list of funded devices available limit the choices and exclude technology that can effectively improve the independent living of persons with disabilities. Mobile technology is essential in the lives of people with disabilities. It has the potential to bridge the gap by doing what the AT equipment cannot do. In addition, mobile technology makes better use of AT equipment by enabling interoperability among specialized AT.

or people with disabilities, access to mainstream technologies greatly improves their lives by enabling them to participate in different areas of life. In addition, mainstream technologies help them make better use of the external technologies they own and get the most out of the available applications for mobile phones. The participants supported the idea of ensuring access to mainstream AT for people with disabilities. Changes need to be made in buying and supplying AT devices, software, and equipment. A solution is for the government to step in and provide support or the training needed in an accessible format.

On the other hand, barriers to accessing AT include the lack of training, support, and digital competencies. The lack of awareness of AT and its potential to enhance individual functioning was also emphasized. Interoperability also emerged as a key issue where some mobile phones work poorly with specialized AT. Finally, expanding the list of funded AT devices to include mainstream devices would positively impact and increase the quality of life for people with disabilities, including the elderly, for whom it would reduce loneliness.

The results further revealed 43 potential new metrics for measuring SRoI of AT provision. These metrics focused on the economic and personal benefits of effectively providing AT; and support, provision, eligibility evaluation, and other factors for AT provision.

There is potential for AT to offer wider participation in employment for people with disabilities and increase their independence. Additionally, AT available at mainstream reach, with their lower cost thresholds than specialist equipment, can reduce the costs to the taxpayer and provide a good ratio of social return on investment (SRoI). Mainstream AT devices supplied to people with disabilities based on their individual needs can widen the availability of support and choices based on each individual's preference. The benefits of widening the reach will outweigh the cost of funding for mobile assistive technologies. Overall, Global Accessibility Reporting Initiative (GARI) listed devices could bridge the gap in what is provided to people with disabilities and their specific needs. The GARI list describes many devices that can be helpful to people with disabilities having in mind that these devices are equipped with built-in accessibility features which are of great use and beneficial to people with disabilities. Supporting disabled people with access to AT can significantly reduce loneliness and allow them to be more active and participate in society.

## 4. Key Recommendations

This report poses several key recommendations for policy and practice.

- Promote access to enabling technology as a right, in line with and achieving sustainable development goals and UNCRPD for people with a disability.

- Publish a case for the use of consumer digital technologies as an essential requirement to access virtual and hybrid services for people with a disability.

- Promote and disseminate the need to remove the artificial limitations of a narrow focus for provision as no longer appropriate because of the pervasive nature of personal digital technology.

- Build a case for increased access to personal digital technology at a policy level based upon enhanced expectations and positive attitudes towards the devices.

- Leverage the potential impact of emerging technologies built upon personal digital technologies to enhance the lives of people with a disability.

- Seek to create sustained and independent information sources with key partners such as GSMA for distribution to professionals and funders.

- Develop structured and certified training in the use of accessible digital technologies and their impact for professionals and other stakeholders.

- Collate and curate resources to support peer to peer training in personal digital technologies for people with disabilities.

- Establish a framework of approaches and resources for use by manufacturers and operators as a coherent approach to providing information for customers.

- Build an online tool by which people with disabilities can draft a personal rationale and case for the provision of personal digital technologies.

- Undertake a review of initiatives by operators and vendors for people with a disability to include low-cost handsets or discounts, specialized leasing opportunities and customized tariffs.

- Create resources and materials to support lobbying for the removal of sales tax of personal digital technologies for those with long term disabilities.

- Initiate and awards for innovation in the provision of personal digital devices with partners such as Zero Project and GSMA.

- Create examples of integrated packages of handset and peripherals which could be made available through telecoms operators and device vendors directly to those with disabilities.

- Provide updates and information on innovation and trends for facilitators and policymakers.

- Promote the need for National AT strategies that include personal digital technologies by drafting a model strategy for customization by public bodies and NGO's.

- Promote direct funding models such as the AT Passport model proposed in Ireland.

Further, the results suggest a need for continually raising awareness, primarily via civil society organizations of persons with disabilities as well as mainstream media outlets. This would enable advocates to:

- Raise awareness for the different kinds of accessibility features of mainstream technology that can fill the gaps between the needs of people with disabilities and the AT equipment they use as well as the situational barriers they find themselves in.

- Showcase the value of mobile technology for people with disabilities to improve and enhance independent living.

- Demonstrate the ways in which the GARI listed technologies have the potential to fill the gaps for people with disabilities by increasing interoperability with specialized AT.

- Promote access to mainstream technologies in order to improve the quality of life for people with disabilities by facilitating ease of communication in an IoT context.

### Acknowledgments

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# Towards Universally Designed Communication: Opportunities and Challenges in the Use of Automatic Speech Recognition Systems to Support Access, Understanding and Use of Information in Communicative Settings

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**Abstract.** Unlike physical barriers, communication barriers do not have an easy solution: people speak or sign in different languages and may have wide-ranging proficiency levels in the languages they understand and produce. Universal Design (UD) principles in the domain of language and communication have guided the production of multimodal (audio, visual, written) information. For example, UD guidelines encourage websites to provide information in alternative formats (for example, a video with captions; a sign language version). The same UD for Learning principles apply in the classroom, and instructors are encouraged to prepare content to be presented multimodally, making use of increasingly available technology. In this chapter, I will address some of the opportunities and challenges offered by automatic speech recognition (ASR) systems. These systems have many strengths, and the most evident is the time they employ to convert speech sounds into a written form, faster than the time human transcribers need to perform the same process. These systems also present weaknesses, for example, a higher rate of errors when compared to human-generated transcriptions. It is essential to weigh the strengths and weaknesses of technology when choosing which device(s) to use in a universally designed environment to enhance access to information and communication. It is equally imperative to understand which tools are most appropriate for diverse populations. Therefore, researchers should continue investigating how people process information in a multimodal format, and how technology can be improved based on this knowledge and users' needs and feedback.

**Keywords.** automatic speech recognition, captions, transcriptions, technology, communication, communicative settings, universal design, universal design for learning, universal design and individual differences, multimodality.

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# 1. Introduction

Access to information in critical domains for citizenship and well-being such as, for example, health, emergency information, individual rights and the law by any means of communication (e.g., television, the internet) are fundamental rights for all citizens. However, there are instances in which individual circumstances or characteristics hamper access to information or communication. Unlike physical barriers, communication barriers are difficult to overcome due to the heterogeneity of populations: factors such as literacy, proficiency, disability, can interfere with access to information if this is presented in ways that are unavailable or inaccessible to the end user [1]. Universal Design (UD) principles and Universal Design for Learning (UDL) guidelines have contributed to the matter by proposing strategies to overcome communication barriers depending on different contexts and speakers [2-4]. For example, these guidelines suggest the employment of *multimodality*, that is, the presentation of information in more than one modality (e.g., spoken + written modalities), also with the help of technological tools [5]. One of the devices that can help with the multimodal presentation of information is automatic speech recognition (ASR), a system that turns the speech signal into a written transcription [6].

The purpose of this essay is to discuss the role of ASR systems in facilitating access to information for diverse users. I will discuss the opportunities ASR systems offer and the current limitations of the technology. It will also provide a brief overview of the roles of UD principles and UDL guidelines in developing policies to increase the use of technology suited to diverse users. Finally, I will address some of the challenges developers and researchers have to face before implementing these systems in universally designed environments.

# 2. Universal Design and technology use

UD principles guide experts in the design of environments, products, and communication systems [2-4]. The ultimate goal is to ensure that users benefit from final designs without having to be further adapted to their needs. While this approach can contribute to the elimination of architectural barriers in public or private buildings, there is no easy solution to remove *communication barriers*. Different native languages between two or more speakers or various proficiency levels in a foreign language can hinder access and dissemination of information in communicative settings. In the same way, the modality with which information is conveyed is another frequent obstacle. One modality may be available to a large segment of the population, but not to others: for example, audio input for deaf and hard-of-hearing people or written input for blind people. If information is delivered in only one modality (e.g., spoken or written only), it could preclude access to crucial information for these individuals, potentially excluding them from communication. Luckily, technological advancements in the last decades have contributed to removing some of these barriers. Today, these tools can assist people in presenting information in more than one modality simultaneously (*multimodality*), such as combined spoken and written input. For these reasons, UD principles and UDL guidelines encourage designers and instructors to combine the use of various technological tools to deliver information multimodally, supporting users and communication [5].

Researchers have been studying the cognitive mechanisms underlying the processing of multimodal input for years. Specifically, research has highlighted how the presentation of information in multiple modalities (e.g., audio + written input) benefits language comprehension, vocabulary learning, and memory for content [7, 8]. For example, the simultaneous presentation of auditory input and written transcription help diverse students recover missing or incomplete information [9]. Another example concerns low-proficient speakers of a foreign language. In this case, written input can help these speakers in segmenting their interlocutor's speech stream while following a lecture [10].

With this in mind, governments and supranational organizations have developed policies and projects aimed at improving the use of technology and enhancing the inclusion of diverse users in various settings, especially in the educational one [11-13]. The higher education sector has begun to equip its buildings with more advanced technological tools and adopt UD and UDL guidelines to promote inclusion, but this process is still ongoing [14, 15]. Specifically, UDL guidelines recommend the use of technology to enhance individual autonomy and encourage the use of alternative learning strategies. These guidelines also prompt instructors to explore different methods of presenting the content of their lectures to provide easier access to information and improve communication, combining multimodality and technology use [5].

In the last few decades, developers have focused on building a system that institutions are starting to employ to present information multimodally and improve communication, that is, automatic speech recognition (ASR).

## 3. ASR: opportunities and current limitations

Automatic speech recognition is defined as "the process of converting a speech signal into a sequence of words (i.e., spoken words to text) by means of an algorithm implemented as a computer program" [6 - p. 394], with *words* defined as the "best-decoded sequence of linguistic units" [16 - p. 18]. A closer examination of the standard structure of an ASR system reveals that it replicates more simply some of the processes involved in human speech processing and language comprehension [16]. ASR systems are composed of five components:

- The *acoustic front-end* is devoted to speech signal analysis and feature (or parameter) extraction [6].
- The *acoustic model* is a list of statistical representations of the sounds (phones) of words [6].
- The *language model* is the module devoted to word identification. It clusters phones into words, helping the acoustic model disambiguate the phones in a chain. It also groups words based on the statistical probability of appearing together in a sequence [6].
- The *lexicon* is a list of words (with their phonological description) that interacts with the acoustic and language models. As part of the building process of the system, developers create and define not only this list of words but also the data contained in the acoustic and language models [6, 16].
- The *decoder* is an algorithm that searches for "the most likely word sequence $w$ given the observation sequence $o$, and the acoustic-phonetic-language model" based on the target language [6].

While building ASR systems, developers provide sounds, words, and rules of a target language to the two models and the lexicon. This process (alongside the training stage) has the goal of improving the decoding processing of the speech signal and increasing the accuracy of transcriptions from speech to text. When given an input, the acoustic front-end analyzes the speech signal and extracts the relevant features to be processed. The decoder computes the words based on the extracted features and the data contained in the models and the lexicon. The output of this decoding stage is the written transcript of the hypothesized words in the speech signal analyzed by the system [6]. The most relevant outputs of ASR systems are transcriptions and automatic captions - that is, subtitles generated in real-time by an ASR system while a speaker is talking. It usually takes a few seconds for ASR to generate captions: this is due to the computing phase and printing of the outputs. These processes, therefore, cause brief temporal misalignments between spoken input and written output.

ASR is rapidly becoming one of the most relevant tools for multimodal access to information. This technology improves human-human interaction in settings where language barriers impede communication (for example, in the absence of interpreters or when they provide interpreting services only for one language) [9], providing multimodal access to information. These systems can be employed in different settings, such as work meetings, conferences, national and supranational institution sessions (e.g., national parliaments), and legal processes. Users can read whole transcripts after the end of such meetings, but they can also access information on a PC with the aid of real-time captions due to the fast speed of conversion of the speech signal into written transcripts, facilitating communication [17, 9]. The advantage of this method lies in the fact that machines transcribe speech inputs faster than humans. In this last case, the transcription process is a costly and time-consuming task that usually requires days to be carried out [18]: ASR systems thus help users accelerate this process by automating it.

Researchers have been investigating how diverse populations may use ASR outputs in various settings. For example, in educational settings, students may use transcriptions to support note-taking and revision of previous notes [1, 9, 19-22]. Regarding real-time captioning, researchers have investigated how captions affect comprehension during work meetings where communication is carried out in a foreign language (English in the majority of cases). In this setting, users can rely on captions to understand the information conveyed by spoken utterances in those circumstances where comprehension may have been impeded. For this reason, these users prefer that the ASR-generated captions align as closely as possible with the speech signal, while the accuracy of transcription is not deemed as relevant as the speed of text presentation [17, 23]. However, the accuracy of captions plays a relevant role in other settings, aiding access to information and supporting listening comprehension [10, 19, 23]. In the educational setting, for example, research on the benefits of captions on language comprehension in different populations, has mainly focused on human-made subtitles, while ASR-generated captions have generally received less attention. ASR has been the core of the Liberated Learning concept, a project that focuses on how these systems could "provide universal access to lecture material for students with diverse backgrounds" [1, 19-22]. Experimental studies conducted in this project and others have highlighted the benefits for students (e.g., an increase in word recognition and better comprehension of the content of lectures), but they have also sought to surface common problems with current ASR systems. The major problem (as already briefly mentioned) was the lack of accuracy in transcriptions [1, 9, 19-22].

Improving the accuracy of ASR systems has always been a challenge for developers, and this is due to various reasons. Speech variability is one of these factors that affect ASR systems' accuracy and general robustness (defined as "the system's ability to successfully deal with different aspects of variability in the speech signal" by Karpagavalli & Chandra, 2016 - p. 401). Speech variability is linked to:

- Characteristics of speakers (physical traits that affect voice structure);
- Sociolinguistic factors (regional or foreign accents);
- Spontaneous speech (speech rate, connected speech, disfluencies such as false starts, hesitations, etcetera);
- Emotions [6, 24, 25].

Each of these factors defines the uniqueness of each speaker. At the same time, they challenge the ability of ASR to accurately decode speech signals: these factors alter the spectrum of the speech signal, affecting its features and preventing the correct decoding of sounds, lowering the accuracy of transcriptions [24]. Additionally, signal degradation may be caused by external factors, including the structure of the ASR system itself, environmental noise, and the quality of the hardware that collects the speech signals [6, 24, 25]. It is clear that, if these systems are not accurate at transcribing speech signals, they cannot be reliable for a wide range of users, as this will hinder comprehension when they should be helping [9, 26].

## 4. ASR and technology: what's next? Considerations for the future

Developers are facing many challenges to improving ASR [24, 25], and some of the problems are currently undermining the implementation of these systems as a primary service in various settings [9]. Feedback from users also highlights the need to increase transcription accuracy before considering the adoption of this technology to support communication and facilitate access to information in universally designed environments [1, 9, 20, 21].

For ASR to become fully implemented, a well-refined and ethically-approved user-centered approach will have to be incorporated into the process of technology development [27]. Specifically,

- Different users should be encouraged by developers throughout the development process of ASR systems to state their needs, share their doubts, and provide feedback.
- At the same time, developers need to enhance the accuracy of ASR systems by increasing the robustness of speech recognition models.
- Researchers should continue expanding their knowledge of the mechanisms underlying the processing of multimodal information by cooperating with persons with different needs.

Human beings are complex. We all have different characteristics and needs. Taking a user-centered approach to technology advancement implies that individuals from diverse populations work together with researchers and developers to (I) contribute to an increase in knowledge about the mechanisms behind human cognition and (II) express their views, requirements, and feedback during the development phase of devices.

All around the world, individuals should actively cooperate with academics by participating in research projects that aim at expanding their knowledge of the cognitive mechanisms involved in accessing and processing multimodal information. This refined knowledge should then be transferred to developers for technology development [28] since it will help them create or enhance systems that meet the characteristics of users. At the same time, developers should listen to diverse individuals and encourage them to share their requests, doubts, needs, and feedback during the entire development process of any technological tool. Research on the impact of ASR systems on comprehension where feedback from participants was collected has already demonstrated how imperative it is to listen to diverse users [9, 19, 26]. Additionally, national and supranational organizations should continue funding projects that integrate basic research with technology advancement, promoting user-centered approaches. It is critical to underline the importance of supporting these projects since progress in this kind of technology is linked to knowledge of the mechanisms behind human functioning [28].

There is another matter to remember when considering the implementation of ASR in communicative settings. Designers and instructors should remember that there does not exist a single device or system that guarantees the same degree of effective communication and access to information for diverse individuals. Therefore, they should regard ASR as one of the many tools that can potentially be employed in universally designed environments. As a large body of research has already highlighted, this is because users utilize technology based on their characteristics, needs, and strategies. For example, native speakers of a target language do not use ASR outputs the same way as second language learners [19]. To the same extent, some deaf and hard-of-hearing individuals may rely on ASR as support for the input received from sign language interpreters, while others will not [9, 26]. To promote access to information and communication, institutions should provide a range of technological tools for students, ask them which devices they prefer, helping them find the ones most suitable for all. Last, but not least, once ASR systems will have reached acceptable accuracy levels, local governments should also consider implementing ASR in public settings such as post offices, banks, hospitals, and municipal/national offices. ASR use will help improve communication between officials and citizens, facilitating access to information. The implementation of this technology in public and private settings also requires policies aimed at guaranteeing funding to buy these systems and providing support to users. Developers and researchers should continue conversations with supranational institutions, local governments, and the public to stress the importance of access to information and efficient communication.

Technology and ASR can be active players in the progress of society, ensuring equity in communication and access to information in universally designed environments where a service is provided to all.

## 5. Conclusions

Over the last few decades, advances in information and communication technology have widened access to information and communication for a wide range of users. Electronic devices, websites, and mobile apps have been developed following UD principles to improve access to information and facilitate communication for all via multimodality [3, 4]. At the educational level, instructors have been encouraged to follow UDL guidelines to create multimodal content with the same aim [2, 5]. ASR is one of the tools that can

be used to present information multimodally, supporting equity in accessing information for diverse learners and improving communication [1, 9, 19-22]. However, this technology needs to be refined before being implemented in universally designed settings. In this essay, I focused on ASR technology, its opportunities, and current issues. ASR systems can be improved thanks to the synergistic work of developers, researchers, and users, combining basic research with technological advancement, and focusing on the characteristics of end users. Designers and instructors should be aware of the need to evaluate the use of a range of technological devices rather than choosing one solution for all. The choice should be made based on how these tools can benefit diverse users and students in the context in which they are planning to implement them.

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# Gathering Travel Needs and Preferences to Customize Truly Inclusive Experiences. The Case Study of the Interreg E-Chain Project

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**Abstract.** Accessibility is a central element of any responsible and sustainable tourism policy: it is both a human rights imperative, and an exceptional business opportunity, as mentioned by UNWTO Secretary-General Taleb Rifai. Accessible tourism for all is not only about providing access to people with disabilities, but also addresses the creation of universally designed environments that can support people that may have temporary disabilities, families with young children, the ever-increasing ageing population, as well as creating a safer environment for employees at work. It must also be considered that accessible tourism benefits everyone: as more individuals enjoy the opportunity to travel, the tourism industry gets more visitors, longer seasons and new incomes. This contribution presents the approach taken within the Italy-Croatia Interreg Project "E-Chain – Enhanced Connectivity and Harmonization of data for the Adriatic Intermodal Network", focused on the provision of useful and personalized information for the traveling user.

**Keywords.** Accessibility, Inclusive tourism, Universal design, Tourism for all

## 1. Introduction

Approximately 15% of the world's population lives with some form of disability [1]. This number is steadily increasing and represents a huge business opportunity for global industries [2][3]. However, tourism, one of the largest economic sectors on the planet [4], continues to neglect [5][6] the emerging demand for accessible tourism [7], thus excluding a large proportion of people [3].

In light of the UNWTO's statement on Recommendations on Accessible Tourism [8], there is an increasing emphasis in tourism research on the role that tourism plays in enriching the lives of tourists, including impacts on health, well-being, happiness and quality of life [9]. The concept of tourism as a human and social right is gaining ground, yet in practice there are few solutions that tend to go in the direction of enabling everyone to enjoy accessible tourist destinations, both on site and during the journey to reach them.

The following discussion presents the approach taken within the Italy-Croatia Interreg Project "E-Chain – Enhanced Connectivity and Harmonization of Data for the

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Adriatic Intermodal Network"[2], focused on the provision of useful and personalized information for the traveling user. Attention to the needs of the different traveler profiles has been present since the beginning of the project: however, some issues dependent on external conditions have brought out critical aspects, highlighting how crucial the commitment of the entire tourism chain is.

## 2.     The Importance of a Seamless Tourism Chain

For a tourist destination to be defined as accessible, the presence of accessibility throughout the so-called tourism chain is essential [10]: links between all sites, services and activities must be well planned and tested. Elements of the tourism chain include:

- tourism destination management;

- tourism information and advertising (preparation, information and booking);

- urban and architectural environments;

- modes of transport and stations;

- accommodation, food service and conventions;

- cultural activities (museums, theatres, cinemas, and other);

- other tourism activities and events.

This implies that all those involved in various forms in the shaping of a tourist destination are called on to assume responsibility for incorporating the dimension of accessibility into their own sphere of competence.

The preferable approach to an inclusive tourism business or destination, as also specified by the UN Convention on the Rights of Persons with Disabilities [11], should go beyond the concept of disability, shifting the focus from "special and dedicated design" to "universal design", as the heart of the problem is not the disability of a person, but the environment that is disabling him/her. An environment can be disabling even in temporary or situational situations, thus excluding many other groups like people with trauma or who are taking medications, new parents spending much of their time doing tasks one-handed, tourists in a foreign country whose language they do not know, etc. The fact should therefore be emphasized that almost everyone is directly or indirectly affected by some form of disability at some point in their lives [12], so the concept of accessible tourism should consider the requirements of all of humanity for accessible tourism development.

## 3.     The E-chain Info-Mobility Platform: a Tool that Provides Customized Info

The project effort has moved in the direction of creating a multimodal info mobility platform useful for offering to transit passengers with a range of integrated intermodal

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[2] E-chain is an 2014-2020 Interreg V IT-HR CBC program project funded by the European Regional Development Fund https://www.italy-croatia.eu/web/e-chain

transportation services and travel solutions between the two sides of the Adriatic, allowing them to optimize the search for information during all phases of travel (before, during, after). Through a preliminary registration, the user is profiled according to specific categories, e.g., user travelling with family, user travelling specifically with small children (0-3 years old), user with disability, user travelling as a helper of a person with disability. The needs of those categories are very different from those traveling alone or with other adults, starting from the planning of the trip which becomes a strategic phase: knowing in advance what you will encounter before, during and after the trip is essential information to avoid problems or inconveniences that could make the experience a negative one. Thus, profiling when registering on the platform allows the user to receive useful information relative to his/her needs, which are different depending on the category he or she belongs to.

To function at full capacity, and thus provide useful and personalized information to travelers, the platform needs to receive data of various types, both from the public and private sectors: transportation schedules, types of services offered, characteristics of venues and spaces open to the public. Where do we stand with the availability of useful and specific information for special categories, such as those travelling with small children or those who have a disability?

The following are the results that emerged from analyzing some of the characteristics linked to the choice of travelling by ferry, the means of transport that the project investigated with more interest than others, as it is less polluting and more sustainable - and therefore to be encouraged more.

A first analysis concerned the presence of information on services dedicated to specific categories of travelers on the websites of the main ferry companies operating in the Adriatic or Tyrrhenian seas, connecting the Italian and Croatian coasts, and on E-chain pilot ports' websites (Ancona, Split, Venice).

A second analysis, based on the responses to a survey provided during project activities to a sample of users through social media communities[3], both Italians and Croatians, examined the criticalities generally encountered by them when facing a ferry trip, collecting feedback according to the different categories of traveler. Answers highlighted some trends and some critical issues that are generally encountered, which are useful for directing efforts and design choices with respect to the different needs of individuals.

### 3.1.    *Availability of information from ferry companies and ports for those who travels with special needs*

The analysis covered the websites of the ten main ferry companies connecting the ports between Italy and Croatia, the project's area of interest. The analysis of websites[4] focused on the search for information dedicated to two categories of traveler who might need to know more details when embarking on a trip, namely people traveling with family and small children, and people with disabilities or caregivers. In addition to verifying the

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[3] The survey was developed and distributed with a CAWI (Computer Assisted Web Interview) technique using Google Forms. The link to access was delivered via email to a list of internal contacts and it was posted on social media on dedicated pages or groups, such as pages dealing with tourism, accessible tourism, traveling in Croatia, traveling with children, etc. Results are available on project library, D 5.3.3. Assessment and evaluation report https://www.italy-croatia.eu/web/e-chain/docs-and-tools

[4] last websites access: April 2023

presence of such information both on dedicated pages and on other parts of the sites, the analysis also focused on the possible presence of additional information related to connected ports or cities.

### 3.1.1 Travelling with family

Making traveling experience and destinations child-friendly is a challenge that has been tackled collectively fairly recently: the first attempt to network good practices in the European context was addressed by the Interreg Adrion project Wonder [13], whose overall objective was to increase the attractiveness and competitiveness of destinations in the Adriatic-Ionian Region through a child-friendly approach aimed at improving the liveability of cities and the tourist offer (governance, environment and services) through the development of new and innovative participatory methods. The project highlighted the need to activate cooperation between all players and common strategies to make destinations child-friendly, adopting both top-down and bottom-up approaches to listen to and gather the needs of the target groups, namely children and their families.

The needs of those traveling with family, specifically with young children (under 12 years old), are very different from those traveling alone or with other adults. The planning of the trip becomes an important phase. Some elements to consider when planning a trip are the choice of transportation method(s), the time it takes to reach the destination, and the cost saving. Regarding the transportation system, but also the departure and arrival stations, the dimensional and spatial characteristics of the visited areas and the availability of some services play a fundamental role on which the success of the trip can largely depend.

The analysis of the websites of some ferry companies operating in the Adriatic or Tyrrhenian Sea (Tab.1) shows that, in general and in recent years, almost all travel companies are offering child-friendly spaces, providing play areas, specific equipment in dining areas (highchairs, bottle warmers) and equipment to facilitate hygiene care (changing tables). The presence of these services is almost always stated on dedicated pages of the companies' websites, instead of generic pages, precisely because the importance of knowing about these facilities in advance to be able to face a more journey with more awareness is acknowledged and recognized. No information has been found regarding supplementary services in ports or destinations connected by ferries.

**Table 1.** Availability of information about services for users traveling with family, on ferry companies' websites

| Travel companies | Info on family-friendly services | Info on supplementary service on port or cities |
|---|---|---|
| Adria Ferries | yes | no |
| Caronte tourist | yes | no |
| Corsica Ferries | yes | no |
| GNV | yes | no |
| Grimaldi Line | yes | no |
| Jadrolinja | yes | no |
| Moby Lines | yes | no |
| SNAV | no | no |
| Tirrenia | yes | no |
| Ventouris Ferries | no | no |

### 3.1.2 Travelling as a person with disabilities or as a caregiver

The category that includes travelers with disabilities or caregivers is particularly wide-ranging and well researched. Those who experience disabilities, whether permanent or temporary, whether physical, sensory, or cognitive, encounter daily battles to assert their basic human rights, such as accessing places, taking an active part in community life, not being excluded, or discriminated against because of the conditions they experience. It must be said that, differently from how it was conceived years ago, "disability results from the interaction between people with impairments and attitudinal and environmental barriers that hinder their full and effective participation in society on an equal basis with others" [14]. Environmental accessibility is therefore particularly decisive in the process of full integration of people with disabilities into social life.

To design and propose travel solutions that are not excluding, the research field of so-called "accessible tourism for all" has emerged, which not only concerns access for persons with disabilities, but also "the creation of universally designed environments capable of supporting persons who may have temporary disabilities, families with young children, and the ever-growing elderly population" [14]. Thus referring to the criteria that go into designing accessible tourism solutions for all allows for the design of improved spaces and services for many more beneficiaries.

Also in this case, the planning of the trip is a decisive phase: knowing in advance what you will encounter on the trip is essential to avoid problems or inconveniences that could make the experience negative, or even impossible to carry out. Elements to be considered to undertake a conscious journey are the choice of means of transport, the time it takes to reach the destination, and the savings (both economic and CO2).

Regarding the means of transport, but also the departure and arrival ports, the dimensional and spatial characteristics of the visited areas and the existing (or available) services play a fundamental role on which the success of the trip may depend to a large extent.

The needs of travelers with disabilities are also often referred to as "special," a way to prevent the person from feeling like they are the focus because of their condition. To refer to this category, some companies use the term "PRM - people with reduced mobility" which includes physical disability (also temporary), mental disability, pregnancy, or persons with reduced mobility due to their age.

Depending on whether they have physical, sensory, or cognitive disabilities, the "barriers" that can be encountered during a trip differ and are numerous. Solutions designed following the discipline of Universal Design seek to avoid customized designs, instead trying to meet different needs more broadly. We also refer to the European legislation in force which establishes safety requirements for passenger ships and high-speed passenger craft for people with reduced mobility.

Accessibility of the spaces and services offered on the ferries show that, in general, there is great attention paid by all travel companies, which also provide information on the dedicated pages on their websites (Tab. 2). No information has been found regarding supplementary services in ports or destinations connected by ferries.

**Table 2.** Availability of information about services for users traveling with special needs, on ferry companies' websites

| Travel companies | Info on accessible services | Info on supplementary service on port or cities |
|---|---|---|
| Adria Ferries | yes | no |
| Caronte tourist | yes | no |
| Corsica Ferries | yes | no |
| GNV | yes | no |
| Grimaldi Line | yes | no |
| Jadrolinja | no | no |
| Moby Lines | yes | no |
| SNAV | yes | no |
| Tirrenia | yes | no |
| Ventouris Ferries | no | no |

### 3.1.3 Availability of information from terminal passengers' websites for those who travel with special needs

Useful information found on almost all the websites of the major ferry companies, however, are not present on all the websites of the ports of arrival or destination analysed, namely the three pilot cities identified by the project: Ancona, Split and Venice.

*Ancona*
The Port of Ancona has a website that does not provide dedicated information for people with special needs. However, there is a direct link to the app 'Welcome to Ancona' https://www.porto.ancona.it/en/ that gives useful information on ferry schedules, the location of museums, hotels and other services. There is no information dedicated to family-friendly services or regarding the accessibility of routes or places.

*Split*
The Port of Split has a website that does not provide dedicated information for people with special needs. However, there is a page dedicated to the possible excursion program, to inform users about tourist possibilities around the https://portsplit.hr/en/dobrodosli-english/. There is no information dedicated to family-friendly services or regarding the accessibility of routes or places.

*Venice*
Venezia Terminal Passeggeri http://www.vtp.it/ is the only company that has a website with a page dedicated to persons who travels with special needs, namely 'PRM - passengers with reduced mobility'. In addition, the site has a link that leads to the official tourism website of the City of Venice https://www.veneziaunica.it/, which links to a site properly dedicated to the city's accessibility, with a focus on accessible itineraries and public services, https://www.comune.venezia.it/it/content/venezia-accessibile-itinerari-senza-barriere.

**Table 3.** Availability of information about services for who travels with special needs, on terminals passenger websites

| Ports | Info on special needs services | Info on supplementary services or link to other tools |
|---|---|---|
| Ancona | no | no |
| Split | no | no |
| Venice | yes | yes |

## 3.2.　　Criticalities generally encountered when traveling by ferry

As specified above, one action of the project was the distribution of a survey to various categories of users including those with special needs, intended to be able to better outline the characteristics of the E-chain platform. The total number of responses analysed is 206, specifically 71 by Italians and 135 by Croatians.

One question specifically investigated the most critical issues usually encountered during a ferry travel experience, also considering routes other than those between Italy and Croatia and vice versa.

In response to the question, users were asked to choose the three most critical issues from a sample list:

- general trip organization

- booking tickets

- waiting for boarding

- journey on the ferry

- arrival at destination

- finding information

- long waiting times

- inaccessible spaces

- other

Respondents in the category of people who travel with family and small children highlighted that the most critical issues concern waiting for boarding; long waiting times; journey on ferry. Respondents in the category of persons with disabilities highlighted that the most critical issues concern waiting for boarding, finding information, and inaccessible spaces.

**Table 4.** Criticalities encountered by people with special needs when traveling by ferry

| Criticalities generally encountered | Traveling with family | Traveling as a caregiver or having a disability |
|---|:---:|:---:|
| General trip organization | | |
| Book tickets | | |
| Waiting for boarding | X | X |
| Journey on ferryboat | X | |
| Arrival at destination | | |
| Finding information | | X |
| Long waiting times | X | |
| Inaccessible spaces | | X |
| Other | | |

Another survey question also investigated whether any information about the presence of family-friendly spaces / accessibility of spaces and services (e.g., presence of baby-friendly solutions; presence of equipment to overcome architectural barriers; presence of dedicated parking) also in ports and cultural and tourist attractions in destinations would be an appreciated element.

Respondents from people traveling with family or as a caregiver, or with a disability clearly answered that they would appreciate finding services of this type; respondents from other categories (people travelling alone or for business purposes; people travelling with friends; campers) gave different answers. Yet, the existence of dedicated services designed to be more usable would improve not only the experience of people with special needs, but that of everyone, also considering the fact that the difficulties encountered in dealing with the built space may be related not only to permanent, but also temporary or situational disability conditions.

## 4.    Data Availability on Services and Facilities for People with Special Needs: Reflections and Scenarios

As specified in the previous paragraphs, in order to function fully, the E-chain platform needs to receive data of various types, both from the public and private sectors. Where do we stand with the availability and accuracy of data that can be useful for customizing the travel experiences as intended by the project?

It has been observed that the availability of such information is almost completely guaranteed compared to the ferry companies' websites, whereas it is no longer ensured when observing the websites of the ports or port cities analyzed.

Venezia Terminal Passeggeri is the only company that has a website with a link that leads to the official tourism website of the City of Venice, which links to a site properly dedicated to the city's accessibility with a focus on accessible itineraries and public services. However, the private sector remains uncovered by this specific service: to find out the characteristics of a hotel, for example, it is necessary to search for information on its website, but this does not necessarily mean that it can be found. At the same time, there may be some hotels that provide accurate data regarding the accessibility of their rooms, with a lack of information with respect to the urban accessibility of the neighborhood and nearby services. This problem arises because, to date, there are no shared regulations or standards on what information should be published and with what accuracy.

It follows that the availability of incomplete data, and at partial stages of the journey, does not allow the provision of truly personalized information to users. This lack can be traced back to a number of reasons, also in line with what emerges from some studies related to the disciplines of User Experience Design (UX design) and Human Centred Design (HCD), which highlight how a general lack of awareness of the needs of the users for whom a solution is designed leads to exclusionary outcomes [15]. A non-systematic involvement of the most vulnerable users is another aspect that experts point to as a problematic aspect, considering that accessibility can only be studied and implemented with the participation of people and the NGOs representing them [16]. An overload of information, often inaccurate, is also perceived as an obstacle, that is, when there is so much available and potentially useful information that it becomes an obstacle rather than a help [17].

In order to address this critical issue, there are several areas in which to intervene. A first step is undoubtedly to raise awareness of the difficulties that people with special needs may face during a trip, in combination with the consciousness that everyone in life is destined to experience a permanent, temporary or situational disability [12]. The target audience for these awareness-raising actions are all those who are involved in the management of a tourist destination: from the public sector to tourism promotion

agencies, to hotel, transport and entertainment managers, everyone must be aware that investing to improve accessibility and providing the necessary information are indispensable actions to ensure positive trip and leisure experiences. Through an intense awareness process, the most relevant information for vulnerable users should begin to emerge in order to obtain a broad overview of the possibilities that a place can offer in terms of accessibility and welcome to all.

## 5.    Conclusions

The results of the presented studies highlight two main aspects.

Although the purpose of E-chain was to improve users' travel experience by providing them with personalized information through a platform, a general unavailability of data emerged, which therefore does not permit the platform to function fully. Having encountered this critical issue in the context of a European program is nevertheless a positive element as it allows partners, beneficiaries and all stakeholders involved to increase their awareness of the importance of addressing the situation in a choral manner, co-designing policies, initiatives and solutions by paying attention to how data are collected, managed and released.

Reflecting on the critical issues generally encountered by tourists with special needs when travelling by ferry, the need emerged to intervene on several levels to promote a different culture that takes into consideration, first of all, the needs of users, their participation and their involvement for the co-design of new and inclusive solutions.

It is certainly a great challenge, but if, for example, it were conveyed through the next European programs on an ongoing basis, it could lead to interesting experiments touching different territories and actors.

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# Every Museum Label for All?
# Reflection on Inclusive
# and Communicative Writing

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**Abstract.** Since our PhD, we aim to rethink the transposition of universal design (UD) in museums for narratives, specifically on labels. We have conceptualised a model of universal label, adding inclusive and communicative writing: inclusive, by using universal design merging on the same device several forms of communication (sign language, Braille, easy to read); communicative, because it explains and learns how citizens perceived as disabled communicate. UD writing could initiate and encourage communication. In this paper, we applied our reflections on UD writing to the label of *The Mona Lisa* at the Louvre Museum.

**Keywords.** museum, cultural heritage, mediation, label, Universal Design, inclusion, communication, Sign Language, Braille, Easy to read.

## 1. Introduction

According to statistics, 29% of Europeans aged 16 or over with a disability are at higher risk of poverty or social exclusion (France 23.8%)[2]. What can be done for a social Europe? How to combat social exclusion? How can disabled and non-disabled people be involved? Where can we experiment with the inclusion of citizens? In the light of this alarming finding, the European Commission aims to decrease the number of people at risk of poverty or social exclusion by at least 15 million by 2030, with the ambitious *Strategy for Rights of Persons with Disabilities 2021-2030[3]*. This strategy proposes to give more rights to people with disabilities in all areas of life and to improve their independent living and autonomy as well as equal access and non-discrimination, which means equal opportunities in life. Specifically in the field of culture, the Commission calls on Member States to "make more art collections and museums accessible to persons with disabilities"[4].

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[2] Statistics Eurostat: https://ec.europa.eu/eurostat/databrowser/view/hlth_dpe010/default/table?lang=en

[3] European Pillar of Social Rights Action Plan: https://ec.europa.eu/info/strategy/priorities/2019-2024/economy-works-people/jobs-growth-and-investment/european-pillar-social-rights/european-pillar-social-rights-action-plan_en
  Union of Equality:
https://ec.europa.eu/social/main.jsp?catId=738&langId=en&pubId=8376&furtherPubs=yes

At the international level, the museum is an institution that seeks and experiments with a social role. Since the new ICOM museum definition of August 2022, a museum has to be "accessible and inclusive" [5] . Moreover, according to the UNESCO Recommendation concerning the Protection and Promotion of Museums and Collections, their Diversity and their Role in Society (2016)[6]: "Museums are vital public spaces that should address all of society" and "The social role of museums, along with the preservation of heritage, constitutes their fundamental purpose". But how can museum collections be made more accessible? How can all publics be included? The tool of inclusion is universal design (UD), which is defined and promoted in the general obligations of the United Nations Convention on the Rights of Persons with Disabilities (UNCRPD, Article 2, 2006)[7], as "the design of products, environments, programmes and services to be usable by all people, to the greatest extent possible, without the need for adaptation or specialized design". From our perspective, museums are therefore both inclined to take more responsibility for inclusive work and predisposed to develop universal design.

Our approach in the field of Information and Communication Sciences is based in the relationship between the museum, publics and a third-party mediator, in museum education (mediation) [4]. We develop an empirical research which is born in our PhD on inclusion in fine arts museums in France and North America [11]. Since, we observed how cultural institutions concretize inclusive mediation. In this paper, after defining universal mediation, we will focus on museum labels as well as on our proposal for inclusive and communicative writing, and then apply it to a label. For this experimentation, we choose the most famous masterpiece of the Louvre, *The Mona Lisa*, which recently change its written mediation on label and room panel.

## 2. From Universal Design to universal mediation

### 2.1. UD in mediation

At present, in museums, disabled or disadvantaged publics are generally separated with responses to their special needs. They must justify these needs for access to additional devices (such as Braille and tactile booklets) or book special tours (e.g., in sign language) or be selected for tailored programmes. There is a proliferation of specific tools, which require visitors to declare their disabilities or disadvantages before entering the museum: this is not inclusion. Universal Design is not actually deployed in museums for mediation. Only a flexible version of UD is employed and recommended by the French government, allowing the addition of separate devices: putting in place "diverse systems" to meet "the diversity of needs", "even if each device, in its specificity, is not accessible to all" [16]. What about UD in a strict version with only one device for everyone? We observed just one device for all (combining all special needs responses) at the Musée de la Musique in Paris [11-10]. Why? Our analysis is that mediators (museum educators) are not trained in issues of disabled and disadvantaged publics: there

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[5] ICOM: https://icom.museum/en/news/icom-approves-a-new-museum-definition/

[6] UNESCO, *Recommendation*, 2016: https://unesdoc.unesco.org/ark:/48223/pf0000246331

[7] UNCRPD, *Art. 2*, 2006: https://www.un.org/development/desa/disabilities/convention-on-the-rights-of-persons-with-disabilities/article-2-definitions.html

is a lack of knowledge. So, mediators are not able to merge all the answers. Moreover, in France, UD focuses in particular on wheelchair users and visually impaired people (as in Denmark and Norway [14]). In the field of mediation devices in museums, one French company is the market leader, focusing on the Braille transposition and tactile reproduction of the exhibit for touching. Another company focuses on sign language translation. Each company promotes UD, but none combines all the solutions.

In concrete terms, what is the difference between accessibility and UD? Accessibility consists in responding each special need by creating specific tools and multiplying responses. Universal design is the creation of only one tool including all the solutions to special needs, a single tool for all that anyone can use. In the process towards inclusion (UNESCO *Guidelines for Inclusion*, 2005)[8], accessibility corresponds to the step of integration: society is able to UNDERSTAND special needs, but these are outside the norm. Universal design is the last step of inclusion and corresponds to knowledge: society will KNOW, it will have learned about special needs and then considered all citizens. Therefore, the standards are changing.

UD was created by Ronald Mace in the 1980s for architecture and design. Therefore, it did not initially think about narratives. Later in the 2000s, Universal Design for Learning was adapted for schools/education and aimed to provide students with multiple ways of understanding. Now, considering the language dimension of mediation [2], we aim to rethink the transposition of universal design in museums, specifically for narratives: our focus is on labels [12-6].

### 2.2. From simple to universal label: a typology of labels

The museum label is a small text that establishes a mediation relationship between the visitor and the exhibit [7]. A label accompanies and documents every exhibit [3]. They are inscribed in a "relationship of dependence" [13]: the label creates an exhibit [6] but cannot exist independently [13].

We have recently proposed a typology of labels [8]. In addition to the simple label (with only minimal information about the exhibit) and the developed label (with additional texts such as descriptions, details, comparisons), we add three other types of labels: vulgarised, partially accessible and universal labels. Their specific characteristics are the following:

- The *vulgarised label* applies the Louvre's vulgarisation charter [17]: this label does not repeat the information of the simple label, because it implies a systematic explanatory action on the scientific vocabulary used and the technical terms mobilised. This begins with the title of the exhibition, which can be completed or reworded. Arabic numerals are used to facilitate understanding, and the historical sites are indicated according to contemporary geography. In addition, as in the developed label, a short text provides details about the exhibition.

- The *partially accessible label* designates labels that do not meet all the conditions of accessibility, i.e., they do not take into account the four disabilities of motor, mental, auditory and visual impairments: e.g., tactile stations or polysensory devices that do not have a translation in sign language. Indeed, deaf

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[8] UNESCO, *Guidelines for inclusion*, 2005: https://unesdoc.unesco.org/ark:/48223/pf0000140224

people need information other than written language, which they do not know well (80% illiteracy in France, but the easy to read – simple writing method – helps to understand written language).

- The *universal label* implements universal design, the key element of inclusion. This way, obstacles and disability situations are anticipated from the design stage, all accessibility is gathered and included into a single device: it is then a matter of innovating by thinking for all (inclusion), and no longer limiting ourselves to specific adaptations (integration).

We have previously analysed a complete universal device [11-10] – not label –, including in particular:

- o  Height and displacement designed for visitors in wheelchairs,
- o  Vulgarised and pictorial text,
- o  3D tactile modules and sensory modules for visually impaired visitors,
- o  Braille translation for visually impaired visitors who can read Braille (i.e., 10,000 French people),
- o  Video in sign language for deaf signing visitors (i.e., 100,000 French people).

All these layers of understanding, mixed in the same tool, meet the needs of disabled publics and the preferences of the general public.

## 3. Each museum label for all: example of *The Mona Lisa* label at the Louvre

### 3.1. *Current* Mona Lisa *label*

During our PhD, we have adopted qualitative observation and interview methods to study in particular the Louvre Museum Charter [11], which proposes a new approach to the vulgarisation of museum labels. Since, focusing on "the communicative dimension of accessibility" [5] through an immediate understanding, we conducted experiments through university projects with our students and research projects in our laboratory. We were able to concretely realise, on the one hand, the complexity of applying accessibility guidelines, and on the other hand, the lack of links between responses to disabilities. In the light of these obstacles and the gap between guidelines and reality, we conceptualised a universal design model for museum labels (a *universal label*), to which we added *inclusive and communicative writing* [8]: inclusive, by using universal design combining several forms of communication (sign language, Braille, easy to read) on the same device; communicative, because it explains and learns how citizens perceived as disabled communicate. This UD writing could initiate and encourage communication [8]. The framework for this reflection is Article 21.b of the 2006 UNCRPD[9] on freedom of expression and opinion, and access to information: "Accepting and facilitating the use of sign languages, Braille, augmentative and alternative communication, and all other accessible means, modes and formats of communication of their choice by persons with disabilities in official interactions".

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[9] UNCRPD, *Art. 21*, 2006: https://www.un.org/development/desa/disabilities/convention-on-the-rights-of-persons-with-disabilities/article-21-freedom-of-expression-and-opinion-and-access-to-information.html

When we tried to reproduce the universal label, we observed the need to produce a large device: it seems impossible for each museum label. So, we elaborated a reflection on how to apply universal design to all museum labels, focusing on the exhibit title [9]: UD writing could then be used on any type of label (simple, developed, vulgarised, partially accessible, and universal label). For this example of UD writing on a label, we chose *The Mona Lisa* by Leonardo da Vinci, as presented in June 2021 at the Louvre Museum (figure 1). The mediation has been rethought, and the label was vulgarised, duplicated and placed directly in the queue. Furthermore, there are larger panels with numerous details about the masterpiece in another part of the room, behind the painting.



**Figure 1.** The vulgarized *Mona Lisa* label, duplicated throughout the "zig-zag" queue, to reach the painting visible at the far left, photo by author, 2021.

With regard to the English translation of the labels, the Louvre's instructions are to include only: title of the work, subtitle, date, materials used, and development text, if applicable [15]. It should be noted that the developmental text explaining the title is also translated.

Furthermore, the Louvre's vulgarisation charter seems to have been applied to this label. It can be observed that:

- Arabic numerals are used (no Roman numerals);
- As regards geography, the city of Amboise was recontextualised in its country (France), but not the town of Vinci (which is in present-day Italy;
- The title of the work has not changed since the last label, but it is still not clear with this succession of names, of which the usual title of the work (in French *La Joconde*) is placed at the end of this very long title, while it should be the first information provided;
- A short text explaining about the diminutive Monna in Italian was added.

The intellectual accessibility sought by the work of rewriting this label does not seem to us to have been achieved, both because of the non-reformulation of the title and failure to place the town of Vinci in contemporary geography. Moreover, the opportunity of the queue could be used, for example to disseminate various details of the masterpiece (even rapidly, in order not to slow down the queue). In any case, in our opinion, the vulgarised label itself is not really accessible because hearing and visual impairments are not included.

## 3.2. Model of UD writing for The Mona Lisa label

To apply our inclusive and communicative writing (or UD writing) to a label, we rely on 4 main elements [8]:

1. Sign language drawing: like using in dictionary, where the different hand positions are separated to explain how to form signs. Adding signs for titles on the label could be interesting for everyone. On the deaf side: to enrich and spread the language; to overcome the lack of accessibility with only a small selection of explained exhibits; to make sign language visible in a world of hearing people and oralisation. On the general public side: to have a pictorial vision and to de-centre from written language; to become familiar with sign language; for cultural sharing.
2. Braille Neue font: rather than juxtaposing Braille, the Braille Neue font (created by Kosuke Takahashi) aims to combine the Braille and the Latin alphabets. Therefore, Braille readers would discover each exhibit's title, and other visitors (visually impaired or sighted) would gradually learn Braille and be able to use it regularly.
3. Luciole font: researchers have recently created an optimal readability font for visually impaired people. This font must also be high-contrast and in large print.
4. Easy to read : simple illustrative writing method with a clear layout, applicated or at least validated by intellectually disabled people (we use only the spirit of easy to read if the text is not validated by the persons concerned). It is also helpful for people who have reading difficulties, who are learning a language, who come from other countries or also for deaf people. It is useful for adults and children, as a starting point for explanations.

Let us now apply these considerations about UD writing to the label of *The Mona Lisa* (figure 2).

**Figure 2.** Proposition by author of *The Mona Lisa* label with UD writing.

First, we decided to simplify the title to the usual French *La Joconde* and develop the explanation in the text development. We then we proposed to use:

1. Sign language drawing of the title at the top right: the French *Joconde* sign, which corresponds to bringing twice arms together, one on top of the other with closed fists, focusing attention on the woman's crossed hands in the painting.
2. Braille Neue font for the title on the top left and the audio guide number on the bottom right: large and different characters make it possible to identify the title and numbers. We propose this organisation, which could become a convention, so that the blind public can know where the Braille information is positioned on each label.
3. Luciole font for the remaining text. Furthermore, we used large print, and different contrasts to provide nuances and avoid the text block effect.
4. Easy-to-read spirit for reorganising the explanatory text of the title for better comprehension, first in French and then in English through the various official titles.

For comfortable reading in autonomy, it is also necessary to think about the positioning of the label (at wheelchair height, inclined for reading Braille, for several visitors to stand in front of, etc.) and the guidance to it (to ensure the safety of visitors and exhibits).

## 4. To conclude: perspectives of UD writing

We think that it is important to consider inclusion as a way to speak to everyone through universal design and not to lead to the proliferation of devices for segmented publics. In museums, a "universal mediation" [11] device could then be used in all autonomy, according to one's own needs or preferences, without justifying a condition or impairment, without being specific, on request or reservation. Intended for all publics, the use of a single mediation device for all could allow "cultural sharing"[1].

By including the means of communication of citizens perceived as disabled (a mother tongue with sign language, a writing with Braille, a rewriting with easy to read) in UD writing, we want to illustrate that they are not in another society: they are members of our society but their forms of communication are not recognised to the extent of their importance. So, we believe that making sign language, Braille and easy to read visible would encourage meeting, exchanging and breaking down barriers: our inclusive and communicative writing could allow all publics to understand each other and also to communicate with each other in order to share cultural heritage. With this UD writing, we could add a new transposition of discourse: after from scientific to vulgarised, from vulgarised to inclusive and communicative [8].

Moreover, the application of UD writing to the label's titles would not be limited to a selection of exhibits, as is often the case in accessibility, but could be applied to all exhibits in and outside museums. In doing so, we could add an essential function to the label text, which, in addition to giving a voice to the exhibit [12], could allow it to address all publics and give them equal importance. We used to find one global device and others for disabilities or disadvantages, but with this reflection on UD writing, we could find a device for all and together constitute a "universal public" [11].

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# The Role of Italy's Ministero della Cultura in the Process of Improving Accessibility to Cultural Heritage: National Lines of Action and Prospects for Protection in the Territory of the Soprintendenza di Cremona, Lodi e Mantova

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**Abstract.** Improving the accessibility of Italy's cultural heritage is one of the essential conditions for ensuring its qualitative fruition and, therefore, one of the main tasks of the *Ministero della Cultura*. Recent renewed interest in this issue has led to the launch of a series of important ministerial initiatives, both at the central and peripheral levels, with the main objective of seeking that delicate balance between the demands for conservation and protection and the improvement of the level and quality of accessibility.

**Keywords.** Accessibility, cultural heritage, Ministero della Cultura, Soprintendenza

## 1. Introduction

The most recent theoretical advances in the field of universal design as well as the publication of a number of recent documents of international importance that have highlighted the issue of accessibility - including the 2030 Agenda for Sustainable Development, the Italian Recovery and Resilience Plan (PNRR), the Rome Declaration of the G20 Ministers of Culture – have led to the activation, within the *Ministero della Cultura*, of a series of concrete actions aimed at exploring this issue.

The main objective of these initiatives is the search for a necessary balance between the demands for the preservation of Italy's unique and very rich cultural heritage - as set out in the Italian Code of Cultural Heritage and Landscape² [1] - and those for the improvement of its level of accessibility and thus its public use.

These issues are the starting point of the research project launched as part of the Executive Doctorate in Preservation of the Architectural Heritage (PAH) activated in collaboration between the Politecnico di Milano and the *Soprintendenza Archeologia,*

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² D.Lgs. 42/2004 e ss.mm.ii.

*Belle Arti e Paesaggio per le province di Cremona, Lodi e Mantova* (headquartered in Mantova), which is still ongoing. The findings and experiments carried out during the first two years of research as well as the first results obtained are the main content of this contribution.

## 2. Accessibility to Italy's cultural heritage: national lines of action

In the Italian context, the problem of overcoming architectural barriers in protected cultural heritage began to be addressed already at the end of the 1980s: initially addressed only at a regulatory level, the issue soon became the subject of studies and research, the results of which are today real milestones in the field. The results of these first studies were finally consecrated in 2008 with the publication by the *Ministero della Cultura* (MiC) of the Guidelines for overcoming architectural barriers in places of cultural interest [2].

This regulatory text - formally adopted with the Ministerial Decree (DM) dated 28 March 2008 and later also prepared in the form of publication - determined the official entry of the issue/problem of accessibility (at that time still almost coinciding with that of overcoming architectural barriers) in the discipline of conservation and protection, introducing a series of reflections that are still valid today.

The analysis of the peculiar relationship between conservation and accessibility - included in the introductory chapter of the *Guidelines* to confirm its importance - highlights issues that are still valid and binding today, despite a significant theoretical maturation on the subject. Among these, it is worth noting: accessibility as a central point of the conservation project; the need to strike a balance in the delicate relationship between accessibility-fruition-use-conservation; the acknowledgment of a series of "limits" in relation to the barriers that historical buildings present as closely related to it.

The transition from a vision linked to overcoming individual architectural barriers to that of accessibility in the broadest sense coincides with the theoretical cultural evolution that has matured on the subject: intervention on cultural heritage is no longer conceived as a punctual regulatory adaptation, but as the creation of the necessary conditions for fruition to materialise, for which accessibility is a necessary requirement for its pursuit.

The reasons for this paradigm shift are essentially related:

- the continuous and progressive development of the theories of design for all in its various forms (such as design for all, universal design) thanks to which the culture of design has been disseminated no longer for specific user profiles but for a broad user base, ideally including all people (regardless of age, physical and mental conditions, etc.);
- the strengthening of the centrality of the concept of public fruition, so that (from 2004 onwards, with the adoption of the new Code of Cultural Heritage and Landscape) it constitutes the very essence and purpose of protection. This centrality implies, both for the owners of the public cultural heritage and for the bodies responsible for its protection, the launch of a joint effort to search for tools, methods, and plans aimed at improving its use, also by increasing the degree of accessibility.

After the publication of the Guidelines and following a period in which the issue of accessibility to cultural heritage seemed to be less binding, a new phase of particular ferment and interest is now underway with regard to this issue.

In July 2021, the G20 Ministers of Culture, who met in Rome for two days of discussion and debate on the role of culture [3], included some important reflections on the role of inclusion and accessibility for all in the final declaration. In one of the actions included in the text, cultural institutions are specifically invited "to make continuous progress in the areas of accessibility, Design for All and multi-sensory experiences including through digital means, to facilitate participation and engagement in culture and to promote new learning experiences, innovative pedagogies and active interpretation in the field of culture".

At the national level too, many wide-ranging initiatives have recently been launched, involving, in various ways, most of the offices that make up the *Ministero della Cultura*. This include, but are not limited to, the launch of the "Sustainability Project" by the *Direzione Generale Educazione, ricerca e istituti culturali* [4] and the publication of two public notices by the *Direzione Generale Musei* [5]:

- The first initiative aims to build an archive of virtuous projects in the context of some of the objectives of the 2030 Agenda (including Objective 11 Sustainable City and Communities) thus giving new impetus to the aspects of joint research on accessibility applied to architectural heritage and urban settings;
- The second to collect project proposals for interventions to remove physical, cognitive and sensory barriers in museums and cultural venues, such as private and public libraries and archives, to be funded under the PNRR. These projects, to be completed by 2026, are part of and complement the Strategic Plan for the Elimination of Architectural Barriers in Cultural Institutions and Sites, approved in May 2022, which provides a true snapshot of the state of accessibility to Italian cultural sites. The publication of the rankings of the project proposals approved for funding in December 2022, will allow the effective launch of the actions proposed in the context of the two aforementioned public notices, and thus open an important new season for improving the accessibility of Italy's cultural heritage.

## 3. Protection and accessibility: operational proposals of the *Soprintendenza Archeologia, Belle Arti e Paesaggio per le province di Cremona, Lodi e Mantova*

As regards the *Soprintendenze Archeologia, Belle Arti e Paesaggio*, which are the peripheral offices of the Ministry responsible for ensuring the protection of cultural heritage in the area falling under their respective jurisdictions, no measures or guidelines have yet been issued to guide the work of these offices in terms of accessibility. The aforementioned 2008 Guidelines are still the main reference used by the operators involved in the day-to-day work of protection. However, faced with the great difficulty of finding balanced solutions from time to time that take into account both conservation and accessibility, the decisions taken have sometimes proven to be partial, poorly shared, even problematic or criticised.

For this reason, convinced that protection must also play an active role in this dynamic process of improving the level of accessibility, the *Soprintendenza di Cremona,*

*Lodi e Mantova* has launched a series of experimental initiatives that allow reflections on and comparisons with the many different players involved in the management and use of cultural heritage. These concrete initiatives, correlated with the effective protection activity carried out by the Office, have also been developed within the framework of the PhD programme, with the aim of making a possible advance in research also at a theoretical level.

## 3.1. Strategies for the definition of an accessible urban area in the historic centre of Mantua

The first initiative concerns the comprehensive planning that has been carried out in collaboration with the *Diocesi di Mantova*, with the contribution of some professors of the territorial offices of the *Politecnico di Milano*, appointed designers, experts and legal, technical and management consultants. The proposal aims to improve accessibility not so much of a single religious architecture but rather of a complex system made up of a group of buildings, thus going beyond the conventional limits of an accessibility project, which aims from the architectural scale to the urban scale. The design proposal includes four of the most famous religious buildings in the city of Mantua (Cathedral of San Pietro Apostolo, Basilica of Sant'Andrea, Diocesan Museum and Palatine Basilica of Santa Barbara) and the urban paths connecting them, thus creating a network of architectures made accessible to each other.

For each of the four religious buildings, the interventions necessary to increase their use have been defined based on an assessment of the current degree of accessibility, the main objectives to be achieved, and the potential criticalities and limits. The individual projects, drawn up by the *Diocesi* and constantly monitored by the *Soprintendenza*, therefore aim to ensure a broader and higher quality cognitive experience of the protected heritage to the largest number of users possible. The real novelty lies in the fact that the four projects have been developed simultaneously and with the support of several actors (public and private) in order to envisage accessibility on a large scale, involving entire areas of the historic city centre.

## 3.2. Accessibility in the rules of use aimed at protecting the landscape of Soncino (CR)

The second initiative launched by the *Soprintendenza* is part of the complicated process aimed at protecting part of the territory of one of the municipalities covered by the Office, also in this case imagining a level of accessibility on a larger scale than the architectural one.

In fact, working at an urban scale, the procedure was launched to declare Soncino a site of considerable public interest, an interesting rural village in the province of Cremona, characterised by the presence of valuable defensive and religious architecture and surrounded by a traditional rural environment in the Po Valley. For the first time, a proposal has been made for this small village to introduce precise rules of use aimed at guaranteeing both the improvement of urban accessibility at an urban level and the protection of its historic centre and the surrounding landscape. In this second case, too, the reasoning for improving accessibility has not been limited to specific buildings (e.g., the Rocca Sforzesca and the Church of Santa Maria delle Grazie), but has been extended to the urban system as a whole.

**Figure 1.** One of the towers of the Rocca Sforzesca, a privileged point of view of the surrounding landscape but currently not accessible to all user profiles.



**Figure 2.** The existing difficult access to the church of Santa Maria delle Grazie.

## 4. Conclusion

The activities proposed and briefly presented so far, developed in the context of the doctoral programme and in fact still in progress, are of an experimental nature. Therefore, it is now difficult to predict what the actual impact will be in terms of improving accessibility and use. What can be highlighted at this stage is the strong commitment of the *Ministero della Cultura* in this regard, continuing along the path already charted out in 2008 with the Guidelines and strongly renewed in recent months, also thanks to the extraordinary measures and resources included in the Italian Recovery and Resilience Plan.

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# Part 2

# Reflections on UD

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# The Particular and the Universal. Reflections on Knowledge Production, Human Diversity and Human Rights in Universal Design

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**Abstract.** This article discusses universal design as a concept and strategy in light of human diversity. Inspired by the German-American philosopher Hannah Arendt, plurality is understood as a condition of humanity. From this recognition of human diversity, the term 'universal' is analysed, focusing on the ambivalences inherent in the concept. I argue that universal design, as a human rights concept, must respond to human plurality and avoid the ableist risk of excluding persons and groups of people, when implementing universal design strategies. Interdisciplinary knowledge, education and skills are important for the practice of universal design. According to Article 4 of the Convention On The Rights Of Persons With Disabilities (CRPD), new research is needed to apply universal design strategies in different contexts. I then focus on disabling barriers in education and research. I conclude by arguing for developing a culture of access and embedding universal design strategies in disability research recognising the socio-cultural aspects and human plurality.

## 1. The dynamics of the singular and the universal

The Canadian musician Buffy Saint Marie wrote the song *The Universal Soldier*, which was released in 1964. The song draws attention to the universality of all soldiers regardless of their individual characteristics and the country and regime for which they fight. The term 'universal' draws the attention away from the particularity of the individual to the general characteristics of a soldier.

Similarly, the term 'universal', as used in universal design, shifts attention from the specific characteristics of human beings to a general vision of design for all human beings. Does the use of the term 'universal' also hide the specificity of disability as a human condition?

What is a characteristic feature of humanity? I will argue that diversity is one, perhaps *the* most prominent feature characterising humanity. We are all different in particular ways. According to the German American political philosopher Hannah Arendt, plurality is a condition of human life [1]. The political response to this diversity has traditionally been to create hierarchies, where, for instance, men were more valued than women, and abled persons more valued than persons with disability. The democratic

political response to diversity, however, must be political equality based on the recognition of equal status.

## 2. Ambivalences in the term 'universal'

Universal design is both a praxis and a concept, it is a technical specification and as such based on the idea that what works in one place in one situation will work everywhere for all people. This is the logic of 'best practice'. But universal design cannot be reduced to a mere technical concept or best practice; it is also, and perhaps above all, a human rights concept. I will focus here on the conceptual aspects of universal design (UD). The term 'universal' is a general concept referring to the general population or an unspecified 'all people'. The concept has been criticised from postcolonial perspectives for neglecting the concrete differences between people. This critique is also relevant in a universal design context. To date, few scholars in disability research have engaged in universal design research. Perhaps what can be interpreted as a gap between disability studies and universal design lies in the ambivalences related to the term 'universal'?

Through its inclusion in the *UN Convention on the Rights of Persons with Disabilities* (CRPD), Article 2 on definitions [2]. Universal design is included in the human rights treaties. As a human rights concept, the human dimension of the concept is emphasised. Design is always contextual, specific, and concrete, addressing human needs in a situation and context.

As a human rights concept, universal design is conceptually and ethically rooted in the lives and circumstances of people with disabilities. The aim of the concept is optimistically to improve the living conditions of people with disabilities by changing the premises for designing a socio-material world for all human beings.

## 3. Recognising the individual dimension

While writing this essay, I fell and broke my left ankle. The accident happened in a public space and was related to interior architecture. I was standing at the counter in an old-fashioned pub, asking where the toilet was. Underneath the counter was an iron list for patrons to rest their feet on. I didn't see it, and since I do not have much senses in my feet, I didn't notice that my left foot was on the inside of this iron list, between the wall of the counter and the list. So, my left foot was in a locked position, without me noticing it. When I turned around and my whole body was facing the direction I was headed, my foot could not move. My body twisted from the ankle and up, and I fell to the floor. After this fall, when I was helped to my home and then to the emergency room two days later, I got a cast on my foot and was sent home with crutches. My whole body and soul felt extremely vulnerable. When I looked at the x-ray image, I could see a broken leg in my ankle, the broken fibula. I felt vulnerable and out of sync with my body.

This is the embodied experience that the universal is meant to meet. Not the general person but the situated person. This is the ethical dimension of universal design. Because universal design is about usability, the human dimension is inherent in the concept. It is the individual person who is the target of universal design.

The individual dimension of universal design represents the particular as opposed to the universal. In my research and teaching I have focused on disability and gender when studying barriers to equal status and access to participation. Women's bodies are for

example vulnerable in public space [3]. There are both similarities and differences regarding these social identities and embodied human characteristics. In architecture and planning, both gender and disability perspectives are important. Public space was the domain of men and the private space the domain of women, children and disabled people. One iconic material element illustrating access for people with disabilities is the ramped kerb providing level access for wheelchair users. The first ramped kerb cuts in Norway described by the road authorities dates back to 1971. When arguing for the design of the zebra crossings, both women wheeling prams and wheelchair users were interviewed [4].

A gender and disability perspective relates to the micro context, respecting the equal dignity of all citizens, and to the overall political context where human dignity is recognised as a fundamental democratic value. In other writings, I have proposed a stratified approach to implementing universal design in different contexts [5][6]. This stratified approach can be described as a micro-, meso-, and macro-level approach, where the individual and particular is represented at the micro level. My focus here is on the micro and macro levels.

At the micro level, equal access is perhaps the best concept, the individual person experiences access, barriers and often friction. I use the term 'friction' to describe the person-environment interaction where there are some barriers and some difficulties, but these are manageable. A person can negotiate with the socio-material environment and improve access by changing the conditions for example by having personal service or more than one technical solution available. This can be a place where universal design and individual accommodation merge, supporting equal access for individuals with different accommodation needs.

The macro dimension can be described as the human rights framing of universal design and the embedding of the strategy in a disability perspective as represented in the CRPD. Countries party to the convention are responsible for facilitating research on universal design of products, environments, services, and programmes, and to educate professionals on the rights of persons with disabilities. If universal design is implemented without this human rights framing, there is a risk that the result will be a minimum standard.

## 4. Ableism and universal design

"Ableism" can be defined as a societal, structural system that marginalises disabled people [7]. According to Fiona Kumari Campbell [8], ableism is not simply a matter of neglect or negative attitudes towards disabled people; it is an unrealistic path to perfection and a deeply ingrained way of thinking about bodies. It feeds the idea that disability is negative and undesirable. Ableism is then a network of beliefs, processes and practices that produce a particular kind of self and body (the corporeal standard) that is projected as the perfect, species-typical and therefore essential and fully human. Disability is cast as a diminished state of being human [9].

I have been reflecting upon the extent to which universal design strategies can counteract ableist tendencies and attitudes. One of my concerns is that an emphasis on the technical aspect of universal design can lead to an implementation of the standard or specification that results in limited accessibility. On the other hand, a more holistic interpretation of universal design, based on the recognition of human diversity, can provide room and space for the equal participation of persons with disabilities. Recognising the existence of ableism should encourage universal design proponents to

explicitly embed the strategy in disability as a human condition and in disability research. There is a need to establish an epistemological, political and ethical connection that merges universal design with disability. As adopted in the CRPD, the human rights framing of the strategy is a strong indication that these perspectives are interrelated.

## 5. Access to education and research

I will now move on to discuss the implementation of universal design and individual accommodation in the context of education and research. These are important arenas, and they are intimately linked together. In modern democracies, education is understood as a common good [10]. Education provides access to research and research on topics relevant universal design is both interdisciplinary and dependent upon participatory approaches, including the participation of people with disability and disability rights organisations in research. Education and higher education are also contexts with specific barriers that are meant to exclude those who are not recognised as fit for education and those who do not pass their exams [11]. There is therefore limited interest in individual accommodation in higher education and students in primary and secondary education, if categorised as students with special needs, often do not receive individual accommodation as learners [12].

Interdisciplinary knowledge, education and skills are important for the practice of universal design. According to Article 4 of the CRPD, new research is needed to apply universal design strategies in different contexts. States that are party to the convention are responsible for initiating research on universal design as defined in the convention. People with disabilities are crucial to the development of new knowledge and research. One problem, however, is the barriers in education, and even ableism in higher education and in education in general. What research and how can sound and relevant interdisciplinary knowledge be produced? I will argue that participatory approaches are fundamental, therefore, access to education and knowledge production is crucial. Primary, secondary and higher education are all important, recognising that it takes many years to educate people and academics. Education is also crucial for access to the exercise of one's rights, such as the right to political participation and freedom of speech.

After having taught universal design in higher education for more than a decade, I recognise that it is both a pedagogical and didactical challenge. The concept is technical, practical, instrumental, humanistic and visionary. It is a contradiction in terms, representative and utopian, and does not exist in the real world. I doubt that anyone can point to something or some place and insist that it is universally designed. Design and socio-spatial planning are full of dilemmas, compromises, and difficult priorities. Design is as good as it gets in that particular place with the specific constrains that exist.

For the last four years I have been teaching a 10 ECTS course on universal design and democratic socio-spatial planning in the Master programme in Citizenship and Cooperation. The students come from the Master programme, and some are external students who only take this course. It has been an interesting experience as a professor and teacher. The course is interdisciplinary and engages students from health professions, planning professions and pedagogy. The content is described in terms of topics linked to disability studies. These are the history of disability, bioethics, public health, and human rights. The students come from an interdisciplinary context and often work in practical settings, such as local administrations. What has struck me as a professor is that the students often come with a simplistic understanding of what universal design is all about.

The complexity and the ethical and practical dilemmas are often surprising. The experience indicates a need for more research and teaching, both in different disciplines and with an interdisciplinary approach.

## 6. A culture for access

The reason why it is important to take universal design seriously in research and education is that it is all about human access to resources and democratic participation. Still, 10 years after Norway's ratification of the CRPD, disability-based discrimination is seldom acknowledged as discrimination. A general, political misrecognition of people with disabilities as equal citizens is still evident in 2023.

As a theologian, I have used the theological concept that all human beings are created in the image of God, "imago Dei", to develop an understanding of what I have called a radical equality. Being created in the image of God means that we are all equal as different human beings. The Human Rights Convention refers to all human beings as "born equal", which is the same idea without the theological framing of creation. This is not described as an empirical fact, but rather as a value base for human rights conventions.

This means that instead of political hierarchies in which men are more valued than women and able-bodied persons are more valued than people with disabilities, humans are equal in terms of their inherent dignity. Through these human rights conventions, dignity is a practical and political concept [13]. Article 1 of the CRPD states that the purpose of the Convention is to "promote, protect and ensure the full and equal enjoyment of all human rights and fundamental freedoms by all persons with disabilities, and to promote respect for their inherent dignity." I will now go into more detail about what this means and implies. I will do so using the phrase "a culture of access". A culture of access is based on renewing laws, policy and practice that consolidate the structure supporting anti-discrimination and equal participation.

Today, when the rights to access and equal status are neglected for people with disabilities, there is little or no cost to those who neglect or discriminate. The Norwegian disability researcher and professor Jan Grue has shown in both his research and autobiographies how little is at stake in not implementing laws in this area [14]. Reparation and compensation, both historical and contemporary, are seldom discussed and acknowledged. The most important factor when striving towards a culture of access is recognition of the individual experience, condition and situation, recognition of the individual as an equal citizen.

As I finish writing this essay, my ankle is getting better. The socio-cultural dimensions of my disability lead me to a more segregated lifestyle, partly because of the winter conditions in Norway, with ice and snow. However, after weeks in a fibreglass cast, I have been using crutches in public spaces and at work and have experienced the *sound of disability* in crutches tapping on the floor and the rattling when they fall on the floor, which happens often. People look at me and I feel as vulnerable as when the fracture was new, and I was immobile and clumsy when I went out. I also experience the importance of learning disability in a practical way, including learning to be stared at. As a person with invisible disabilities, I now, with this very visible impairment, recognise, as Garland-Thomson argues, that I am developing competence in being seen as disabled [15].

Building a culture of access starts with recognising vulnerability as a human condition, and that vulnerability comes in many forms. A radical understanding of human

equality is all about building worlds for human plurality. This depends on interdisciplinary knowledge and research, skills and competences. The first article of the CRPD uses the term respecting the *inherent dignity* of persons with disability. Universal design as a concept and human rights strategy reminds us all that such respect has both attitudinal and socio-material aspects

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# Inclusion, Sustainability, and Equity at the Heart of a 5.0 Society

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**Abstract.** Our everyday reality is perceived as more complex, unpredictable, and filled with barriers created by not-so-evident factors that can stifle thought, reflection, and the desire and energy to act. All of this intertwines with the reduction of physical and psychological well-being for many people, encouraging the presence and escalation of situations of vulnerability which are rapidly increasing nowadays. In addition to the more traditional and known ones, such as vulnerabilities connected to the presence of disabilities or diseases, today other forms of vulnerabilities are strongly emerging, such as environmental vulnerabilities or vulnerabilities connected to climate change, ecologic vulnerabilities, financial vulnerabilities, 'health-related' vulnerabilities, digital vulnerabilities, and professional vulnerabilities. Considering this standpoint, in this chapter we will focus to inclusivity, sustainability, social and environmental justice, human rights. Furthermore, we introduce the construct of Society 5.0 that aims to improve the living conditions of everyone and to relatively resolve problems at the micro-, meso-, and macro-social levels.

**Keywords.** vulnerability, inclusion, sustainability, social justice, environment justice

## 1. Introduction

There are many threats and challenges to face in the present and the near future. At the same time, inequalities, especially economic and social, are multiplying and are filling every gap in the fabric of community life, making a full quality of life increasingly difficult. Our everyday reality is perceived as more complex, unpredictable, and filled with barriers created by not-so-evident factors that can stifle thought, reflection, and the desire and energy to act.

The pandemic has contributed to this and the war now affecting Europe can only further exacerbate the negative global conditions. Balbaa et al. [1] have highlighted the geopolitical and cultural tensions and the lowering of global growth expectations due to uncertainty about the impact of the conflict, especially on the global supply chain. Conflicts have led to energy, commodity, and trade supply shocks, and to rising energy, food, and commodity prices, thereby causing global inflation in many countries, increased economic and political instability, and social and civil unrest [2].

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All of this comes at time of growing poverty, high rates of emigration and immigration, persistent levels of social heterogeneity, exploitation of natural resources, and environmental degradation, amplifying the presence of negative conditions and the reduction of physical and psychological well-being for many people, and encouraging the presence and escalation of situations of vulnerability, which are rapidly increasing today [3].

## 2. Growing vulnerabilities

Let's start with the concept of vulnerability, which generally indicates the susceptibility ("vulnera" in Latin) to being damaged by natural phenomena or human activities [4], to experiencing conditions that may lead to difficulties, discomfort, and negative consequences from a social, economic, and psychological point of view [5]. Research over the last decade has highlighted that there is no such thing as vulnerability; there are vulnerabilities [6]. In addition to the more traditional and better known forms of vulnerability, such as those connected to the presence of disabilities, disease, conditions of economic poverty, and migration, other forms of vulnerabilities are now strongly emerging and, by intertwining with the traditional ones, are exacerbating their consequences. The emerging vulnerabilities are environmental or climate change vulnerabilities, ecological vulnerabilities, financial vulnerabilities, 'health-related' vulnerabilities, digital vulnerabilities, and professional vulnerabilities.

*Environmental vulnerability* expresses the degree to which a system or individual is unable to cope with the negative consequences of climate changes; it represents the degree of exposure to such changes together with that individual's sensitivity and ability to adapt [7]. Nguyen [8] identifies the three main aspects of climate vulnerability: the degree of exposure to significant climate variations (floods, droughts, storms, soil erosion, etc.), the sensitivity to these variations and the associated damage, which is perceived more by certain groups (elderly people, farmers, etc.) and the adaptive skills linked to the presence of social, physical, and financial resources. Guillard-Gonçalves and Zêzere [9] highlight the need to use complex indicators to measure this type of vulnerability. These indicators cam simultaneously take into account social aspects (e.g., the age of people, their employment status, etc.) and environmental characteristics (e.g., safety of buildings, accessibility, etc.).

*Health vulnerability* refers to exposure to the risk of developing disease or suffering physical harm. These aspects can be made more consistent by a number of different personal, collective, and contextual aspects [10]. A recent example we are all familiar with is the exposure to the COVID-19 pandemic. This phenomenon is associated with significant physical and psychological health risks [11]. In addition to this, today and in the near future, health vulnerability will be exacerbated by environmental pollution.

The Who has reported that in 2016, about 600,000 children died from acute lower respiratory tract infections due to air pollution [12]. Moreover, the risk of chronic diseases such as cardiovascular diseases increased for different age groups.

*Financial vulnerability* is defined as the exposure to different forms of financial shocks that may lead to an unexpected loss of income and/or a sudden and uncontrollable increase in expenditure [13]. Chipunza and Fanta [14] note that the financial structure of our society is a complex system, penetrable for the few and impenetrable for the many. Understanding it requires a set of specialised information that only certain groups of people have. Thus, financial vulnerability is linked to the less than optimal management

choices of one's own assets compared to those who are not exposed to the same difficulties, whether it be the management of savings (difficulty in putting money aside), investments (high-risk gambling) or the adoption of a more advantageous lifestyle (mismanagement of money to meet one's needs). Moreover, these situations can be even aggravated by scams and manipulations perpetrated by those who tend to exploit the lack of skills of certain people have in this area and their naivety [15].

*Digital or cyber vulnerability* is defined as the exposure to the risk of being attacked in the system processes or internal checks of a computerized processor. These digital vulnerabilities can lead to actual cybercrimes, allowing hackers to illegally access systems and cause serious damage to data privacy [16]. Therefore, cybersecurity vulnerabilities are extremely important to monitor for the overall security posture, as gaps in one network can lead to a large-scale system breach. With this in mind, Wijayanto and Prabowo [17] highlight how the COVID-19 period and the subsequent increase in the amount of time people spend on the internet, has exposed them more to cybercrime phenomena. Through the Cybersecurity Behavior Vulnerability Scale, the authors measured the level of cybersecurity in universities and, in particular, in data management. The collected results showed that the lack of knowledge connected to cybersecurity is linked to high rates of digital vulnerability and to the possibility of being exposed to a higher number of cybercrimes. Ong et al. [18] use this scenario to describe parents sharing behaviour (sharing pictures of their babies or children on the internet and social media). While acting in the hope of receiving feedback and support, these parents expose themselves and their children to a form of digital "predation".

Lastly, *professional vulnerability* is linked to the proposal of undignified jobs, which expose people to various forms of exploitation and prevent them from drawing personal and social value from their different work experiences that, in addition, occupy a large part of the day and life [19]. Gutiérrez-Barbarrusa [20] highlights the four main dimensions that characterise professional vulnerability: insecurity regarding the continuity of the employment relationship, which makes it difficult for workers to exert control over their future professional and social life; a 'poor' salary that does not allow them to adequately face costs and expenses; the weakening of workers' social protections with the consequent progressive weakening of the legislation in support of quality working conditions; increased discretionary power of employers, combined with insufficient coverage of public social protection systems. This is particularly true for unemployment benefits and pensions, thus increasing the levels of workers' insecurity in the face of market forces.

From the above, it is clear that there are numerous vulnerabilities, of which we must learn to speak in the plural. These tend to affect an increasingly growing portion of the population and are intertwined and are capable of creating systems that trap people in ever deeper forms of impoverishment.

## 3. Inclusive, sustainable, socially and environmentally just context

We must oppose this spread of vulnerabilities and the substantial devaluation of the idea of the human person: the progress and flourishing of communities are achieved through cooperation, coexistence, and the construction of inclusive, fair, and supportive contexts.

It is important to start from the idea of inclusion, which has nothing to do with the idea of placement[2].

*Inclusion* is not about being interested in the single individual with vulnerabilities but focusing on the context and the capabilities our living environments have to allow *everyone* to actively participate and have a satisfying level of life [24]. Inclusion explicitly considers, with equal emphasis, the right everyone has to receive the attention, flexibility, and adaptations they need. According to the writings and words of Shafik Asante, former leader of the New African, inclusion is, on the one hand, closely linked to 'uniqueness': "Inclusion is recognizing that we are 'one' even though we are not the 'same'". On the other hand, inclusion is connected to the recognition of the heterogeneity of all contexts and working to ensure that said contexts can allow every person, with their uniqueness, to actively participate in social and civil life [25].

We would like to focus our attention on a core idea of the concept of inclusion: vulnerabilities are considered context-dependent, and require, as argued in the universal design approach, the breaking down of contextual barriers [26]. If, on the one hand, there are individual aspects such as the presence of impairment, diseases, etc. that can characterise people's lives, on the other hand, it is important to highlight the significance of events (traumatic or not, temporary or permanent), contextual, economic, legal, administrative, and ideological conditions and other circumstances linked to the macro-system, often activated by those with more power and opportunity to influence, which characterise, multiply, and accentuate the difficulties people have [5]. Carelessness, ignorance, and cynicism give rise to different conditions and create pain, insecurity, discomfort, and loss [27]. Vulnerability cannot be the explanation for struggling phenomena [28]. An individual has a vulnerability, or worse, is vulnerable (this means they are vulnerable in all circumstances and forever, there is no way out), because they have poor risk management skills, are less able to defend themselves and face negative events, and to protect their interests. The idea of inclusion does not consider all this as an individual responsibility and a defeat of an individual. It encourages us to consider the role of the contexts and the conditions that can create vulnerabilities, barriers, and obstacles; it invites us to highlight them and examine them carefully in analyses and intervention projects.

*Sustainability* is a complex construct that is articulated in environmental, economic, social, and educational sustainability [29].

Environmental sustainability considers, firstly, the integrity of the terrestrial ecosystem and the quality of the environment intended as an asset that improves the quality of life and, consequently, leads to development.

Economic sustainability involves creating income and working for people's sustenance with a long-term view for sustainable and intergenerational equality. This is achieved through the rational and efficient use of resources and reducing the use of non-renewable resources [30].

Social sustainability aims at an equitable social distribution of benefits and costs in a world where men and women can manage the environment. This should be done on a global scale to diversify and integrate both socio-cultural and economic human resources, to value heterogeneity and diversity, local identities, and biodiversity, thus fulfilling the values of universal design [31].

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[2] placement refers to the right minority groups have (people with disabilities, with stories of migration, people with problems regarding mental health, etc.) to use common spaces and services, to experience less and less restrictive conditions to reduce the risk of institutionalization and marginalization [21][22][23].

Educational sustainability aims to build awareness and knowledge of sustainability issues as well as to develop students and schools that can think critically, innovate, and provide solutions towards more sustainable patterns of living, developing a transformative, participatory, cosmopolitan, and eco-centric agenda. This agenda should be based on taking a step back from neoliberal policies, overhauling existing institutions, integrating environmental values, and expanding participatory governance [32].

For these reasons, sustainability is at the centre of national and international efforts, so that policies and actions at different levels can be inspired by it. To support this idea, let us mention just two documents, the 2030 Agenda and the recent amendments to the Italian Constitution. The 2030 Agenda for Sustainable Development, signed in September 2015 by the governments of the 193 countries of the United Nations, has developed an action plan expanding the *intervener* context, that is to say, the fields and actions that concern organisations, systems, policies, and social practices that can be modified to pursue the goal of a sustainable world from an environmental, economic, and social point of view [33].

Looking at Italy's Constitution, since 8 February 2022, sustainability has been included, specifically in articles 9 and 41. The new article 9 of the Constitution states that the Italian Republic protects the environment, biodiversity, and ecosystems also in the interest of future generations. The new article 41 states that if private economic initiative is free, it cannot take place in contrast with social benefit or in a way that damages health, environment, safety, freedom, and human dignity. These deep considerations are in line with Groppi's work [34], because sustainability is about the aspiration that a certain present value – environment, the wealth of a country, cultural heritage, etc. – will continue to exist in the future. The use of an asset or a resource does not destroy it but allows it to be passed on to future generations. This is also in line with Cella's work [35], which emphasises the topic of 'social dilemmas', situations in which interdependent individuals face choices in which maximising short-term interest produces results that leave everyone worse off. In essence, sustainability is a complex issue that involves the ability to deal with the dilemma of balancing the very short term with the long term in order to create the conditions to reduce the afore mentioned vulnerabilities.

These contents are linked to the topics of *social justice* and *environmental justice*. Among the different definitions, we mention the following: the fair treatment and meaningful involvement of all people regardless of race, colour, national origin, or income with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies. They will be achieved when everyone enjoys the same degree of protection from environmental and health hazards and equal access to the decision-making process to have a healthy environment where to live, learn, and work [36]. Recent literature highlighted that the promulgation of environmental and social justice issues may be mutually reinforcing [6]. Environment-social justice promotes climate policies that also address social inequities, such as affordable housing, green jobs, renewable energy projects in traditionally disadvantaged communities, and access to public transportation [37].

It is increasingly clear that if we care about improving the living conditions of people and reducing the possibility of experiencing vulnerabilities, we must take action. We have to stop the so-called 'natural and social lotteries' [38], i.e., the inequalities linked to one's genetic and/or social (family) background that work to the disadvantage of many people. We also need to act with increasing urgency also to avoid the negative

consequences of what we can call 'geographical and temporal lotteries', i.e., the inequalities associated with the place and time of birth.

According to Japanese Professor Fukuyama [39], in order to make life possible in the future and to ensure quality lives, it is necessary to support the evolution of society not only in terms of economic and individual well-being but also of environmental and social well-being, encouraging the development of a good life with and for others, and supporting sustainability and justice.

## 4. Toward a 5.0 Society

We must recognise that we have the duty to promote the worldviews that take into account the abyss that lies before us. We are 'threats to the creation' and, at the same time, we are 'guardians of the creation' [40]. This worldview must involve a new idea of quality life for everybody, focused not only on personal well-being and the 'I' but also on the 'we', the earth [41], environmental and social characteristics, the quality of air, water, and soil, and the characteristics of inclusion and social justice [42]. Today, the idea of hedonistic well-being requires to add value to happiness created by sustainable responsibility and processes of careful and responsible consumption. At the same time, the eudemonic construction of meaning should be increasingly focused on the contributions to sustainability and inclusion. The European Commission itself underlines the importance of focusing our attention on social justice and sustainable development and the need for a profound transformation. It does so in the document "Industry 5.0 - Towards a sustainable, human-centric, and resilient European industry" [43] and in the idea of a 5.0 society in general [44].

Society 5.0 aims to improve everyone's living conditions and to solve problems at the micro-, meso-, and macro-social levels. This will be possible thanks to technological support and a socio-economic system that is no longer centred on unstoppable profit, but that instead respects the value of human and natural capital. Therefore, to be effectively recognised as a Super Smart Society, as we hope, it must also demonstrate that the well-being of people and our planet is its primary interest. In support of this, it must also prove to have successfully addressed the fears and perplexities associated with the development and spread of automation in the world of services and products [39]. This is a society that, according to Bryndin [45], will have to be characterised by the "creation of equal opportunities for all and also providing the environment for realization of potential of each person" and, through the use of emerging technologies, will have to remove physical, administrative, and social barriers to allow people to achieve self-realisation. In this way, every individual, including elderly people and women, can live a safe, secure, comfortable and healthy life and each and every individual can realise their  desired lifestyle.

From this perspective, from this moment on, we all have to commit ourselves to tackling the health, social, and environmental threats and problems identified [46][47]. This must be done while avoiding the use of visions, paradigms, and tools of the past, some of which are even considered accomplices or even causes of the malaise we wish to remedy [48].

# 5. Conclusion

Societies 5.0 are not born alone; they need the investment and work of everyone. They need strong and incisive legislative, economic, and cultural processes. Above all, they need strong cultural processes: a culture based on a critical awareness of various factors, primarily those that are fuelling inequalities and vulnerability, widespread poverty, and concentrated wealth. From this point of view, it is necessary to move on to carefully consider inclusivity, sustainability, social and environmental justice, human rights without ifs and buts, and the dilemmas they entail, to finally move to indignation and collective commitment [49][11]. There is a need for research and professional responsibility for all disciplines and knowledge to focus on the constructs described, together with a deep awareness of the inequalities, the various complex dynamics that define them, and the relationships between local and global. Moreover, it is necessary to create connections with other disciplines, activism, and intertwined collaboration between different scholars and professionals to tackle such complex problems [50]. In cases where we try to act in this way, it seems to be possible to "move" in this direction, with children [51] and adults alike. Focusing on the latter, the pilot and innovative experiences started with the National Federation of the Italian Press, with the Advanced Training Course "Telling the Truth. How to Inform While Promoting an Inclusive Society" for journalists [52]. This shows that it is possible to build challenging but incisive and transformative community-building experiences. These make it possible to instil in those who work a culture for new societies, for a regenerative process, an energetic one, within a path of collective social flourishing.

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# The Role and Implication of UD to Foster Inclusion in Built Environments

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**Abstract.** The level of inclusion of all its members in the complex of community activities is a fundamental indicator of the progress of a society that wants to be defined as civil and there is a rising awareness about the evidence that diversity and inclusion are linked to positive outcomes. The Universal Design approach is increasingly recognized as the one that helps to shape environments - in terms of physical and virtual environments, as well as buildings, goods and services - so that it can be accessed, understood, and used to the greatest extent possible by all people, regardless of their diversity. Thus, making a more inclusive society for all. This short essay summarizes some reflections resulting from studies, research and field practices reported by literature, and also experienced by the author in her training as a researcher and university professor. Attention is focused in particular on some critical issues and implications inherent in the practical application of UD principles, as well as on the importance of its multidisciplinary dimension, which also entails a different attitude towards the training of professionals.

**Keywords.** Inclusion, Universal Design, Built environment, Education

## 1. Addressing Disability in the Perspective of Inclusion

Over the past few decades, the world has witnessed many deep, rapid changes: economic, demographic and social challenges have sharply affected communities at international, national and local level.

Because of these large and cross-scale trends, diversity has become one of the most critical issues we face, and inclusion is a challenge for communities and organizations worldwide. By virtue of their key role, the topics of diversity and inclusion are at the heart of strategies and policies worldwide, and the relevant issues are the subject of research in different scientific fields.

The leading principle of the Sustainable Development Goals (SDGs), officially known as Transforming our World: the 2030 Agenda for Sustainable Development, is the global eradication of disadvantage through the improvement of situations for all peoples. Inclusion is one of the guiding principles of the Agenda, which includes the commitment "*to leave no one behind*" and to create a "*just, equitable, tolerant, open and socially inclusive world in which the needs of the most vulnerable are met*" [1]. The commitment to inclusion specifically addresses persons with disabilities and the 169 targets of the 17 SDGs integrate specific indicators related to disability.

The Agenda is consistent with the Convention on the Rights of Persons with Disabilities (CRPD), which affirms equal rights for all people, regardless of their disability status, and puts forth a development agenda for ensuring full inclusion in all aspects of society. The adoption of the CRPD by the United Nations General Assembly in 2006 marked a turning point in the definition of minimum requirements to consider when addressing the rights of persons with disabilities (see art.4 par.f); through its

ratification, the EU committed to comply with the Convention's obligations and set up the necessary coordination and development mechanisms for its implementation.

Launching the new Strategy for the Rights of Persons with Disabilities at the EU Parliament on March 3rd 2021, President Ursula Von der Leyen once again stressed the relevance of the issues while affirming "*people with disabilities have the right to good working conditions, independent living, equal opportunities and full participation in the life of their community. Everyone has the right to a life without barriers. And it is our duty as a community to ensure their full participation in society, on an equal footing with others*". [2]

However, despite the strong commitment expressed by the international community, and the pledge "*to tackle prejudice and misinformation and find new approaches and tools to work for and with persons with disabilities*" [3], persons with disabilities continue to face significant challenges to their full participation in society, experiencing everyday discrimination, stigma, exclusion and negative attitudes towards them. Moreover, in the majority of public places as well as in virtual environments, the persistence of barriers leads to the lack of accessibility and therefore the impossibility of using spaces, goods and services.

In the new EU Strategy 2021-2030, accessibility is still one of the top priorities, with the need to ensure a decent quality of life and participation – that is the possibility of independent living, social protection, non-discrimination in the workplace and inclusive and quality education.

To develop proper actions and initiatives as a necessary first step towards addressing disparities, it is important to understand the exact nature of the barriers that persons with disabilities still face and to adopt an inclusive perspective to address solutions, compliant with the UD approach. Furthermore, we must also ask ourselves why, despite the efforts and commitments made in the last twenty years, we are still a long way from reaching a satisfactory outcome in terms of inclusion.

The inclusive perspective goes beyond the vision confined to deficit and limit and is the result of a conceptual evolution, both cultural and social, which should affect the actual condition of people with disabilities. In addition, inclusion calls for greater attention to the recognition and respect of that dimension of diversity which is a part of everyone and which requires the realization of a real culture of human differences. The ones that may concern every person, in different moments of his/her life, permanent or temporary depending on the disabilities (as well as personal histories, languages and different cultures, and social or economic conditions).

## 2. Some UD Implications and Critical Issues to Address

If we look closely at its definition, Universal Design is "*the design of buildings, products or environments to make them accessible to people, regardless of age, disability or other factors. It addresses common barriers to participation by creating things that can be used by the maximum number of people possible*" (Mace, 1985). UD therefore holds the perspective of inclusion in its meaning.

Recent studies suggest that the concept of UD is not so widely accepted and that some scepticism about its ideas persists. In one of his interesting articles, Rob Imrie highlights how UD is a difficult theory to practice [4]. Other researchers investigated the reasons why, despite a clear assumption of UD and a growing understanding of the

widespread societal benefits of a universal design approach, still today it is very difficult to design in a universal way.

The research outputs from experiences gained in the field and applications to real cases study (particularly in urban planning and building construction) highlight some key issues about designing for inclusion in light of UD principles, that are still being questioned and on which some considerations will follow:

- the need for a broader and shared vision on what disability is, and the lack of a common language among professionals and, in general, among the various stakeholders;

- the challenges associated with the adoption of standards or compliances that the built environment is asked to meet;

- the involvement, still low, of *expert* stakeholders (person with disabilities) in the development process of design and the related question of evaluating a UD project by means of effective indicators.

More and more frequently, we are witnessing the use/abuse of two recurring words, not only in the field of design or among the various actors involved in the processes of envisioning and shaping the environments: inclusion and accessibility.

The term inclusion should define the orientation of society towards people; very often, the term is juxtaposed, and sometimes even confused, with the word integration. As noted by thematic literature, unlike integration, which tends to counter the differences, inclusion entails the acceptance of all diversities and peculiarities of the individual.

The role of environment as an enabling factor, as well as the wide definition of what a barrier is, is clearly asserted by the International Classification of Functionality (ICF). ICF is a framework for describing and organising information on functioning and disability in the frame of a multidimensional construct. It provides a standard language and a conceptual basis for the definition and measurement of health and disability, and it presents a bio-psychosocial model of functioning, according to which disability is defined as the interaction between a person's capabilities (limitation in functioning) and environmental barriers (physical, social, cultural or legislative) that may limit their participation in society.

On the inclusiveness of a UD project, an observation by Rob Imrie [4] is interesting, who claims that a UD approach by many professionals still shows "*vestiges of a medical model [with] clinical and physiological rather than cultural (social) criteria ... shaping its design mentalities and approaches*".

Undoubtedly, the language of the ICF could be a useful tool for a new approach to design based on a shared model of disability in relation to the environment in which people move and act. As argued by some researchers [5] the social model recognizes marginalization, exclusion and oppression as the main causes that prevent the full participation of disabled people in wider society; however, such a position could divert attention from the fact that the disabled person's experience of the living environment is in any case shaped by his or her residual physical abilities. However, there is no doubt that an enabling environment characterized by accessibility - understood in the broadest sense of the term and in a holistic way - is a fundamental element for guaranteeing participation.

The term accessibility has today lost its strong connotation linked mainly to the presence (and therefore to the concept) of barriers and has acquired a value that we can define as more dynamic.

Physical accessibility, as always recalled by international strategies on the rights of persons with disabilities, is "*an enabler of rights and a prerequisite for the full participation of persons with disabilities on an equal basis with others a necessary*

*condition for full participation in social life based on equity*" [6]. Despite being an essential requirement of built space, today it is also guaranteed by a different potential for the use of spaces and services.

In particular, after the recent COVID-19 pandemic, the development of home delivery services, or services available remotely, changed the way of carrying out activities - even daily ones - and rooted habits previously confined to small groups of population, effectively dematerializing physical accessibility. This did not necessarily lead to the improvement of the "enabling" process, but rather transformed the accessibility issues from a material to an immaterial fact. Let's think, for example, of a "service" provided by an organization, such as that of "consultation of a bank account", where the person's physical accessibility to the bank space is no longer essential as they are able to resort to home banking services.

ICF could therefore be the basis of a shared language for the shared intention of having an inclusive vision in the project, since it clearly defines what a barrier is rather than a facilitating element. Despite the fact that ICF is a multipurpose classification system designed to serve various disciplines and sectors — from education, to transportation, health and community services — and across different countries and cultures, it is still little known by those involved in the design of living environments and little understood in its potential.

Looking to theories and to the principles of the UD, and observing how in practice these are applied by designers, it becomes evident how the lack in different national contexts of an articulated and multidisciplinary debate on universal and inclusive design has so far produced largely modest results, both in terms of the quality of the built space and the real effectiveness of the solutions implemented.

In some cases, we note paradoxes permeating the design culture: for example, in Italy there is a recurring belief that designing in an accessible way means eliminating architectural barriers (even in new construction projects, which naturally should not include barriers of any kind) and that it is sufficient to comply with the law to guarantee an inclusive environment. It is a pity that a regulatory framework, which is rather dated, has generated a conspicuous apparatus of programmatic documents and handbooks, communicating technical design principles, which are often characterized by a marked distance from the ethical engagement and the epistemological foundations of UD.

The lack of specifications should give designers the opportunity to develop innovative solution, to meet different needs and to fit different contexts. Nevertheless, designers and builders, but also the administrations' internal control bodies, are still largely influenced by "compliance with the rules" culture.

The reading and understanding of the requirements could be difficult and time consuming, in addition to to the fact that the complexity of the procedures related to accessibility (as. i.e. overly strict requirements) can therefore be an obstacle to the implementation of a truly inclusive design. Therefore, we can easily understand that the availability of clear specification can speed up the design processes and make the control of solutions easier.

It is also widely recognized that compliance with the building codes itself does not guarantee the improvement of design quality in terms of accessibility, usability and in general of "inclusion". Moreover, despite many architects now being able to create accessible solutions that are immediately functional and architecturally satisfying without being overpriced, there is a widespread belief that the costs of a universally designed project are too high.

Actually, it is more suitable for designers and controllers to have readymade solutions to apply to the project or to be used as a reference in project evaluation processes. Sometimes these schemes are provided in the form of schematic indications, often containing stereotypes and generalizations referring to disability; they are intended as standardized blocks to take from a "library", that guarantee compliance with the building codes as they can be "pre-accepted solutions" and lead to the simple and fast quantification of construction costs, to create affordable solutions.

In order to develop further progress, there are two issues to reflect on: a new shaping process for regulations to support designers' creativity and new concepts, and the wider awareness of related responsibilities; we also need a deeper investigation of the understandings and the motivations of UD from architects' and users' perspective, that continues to be the unbalanced. The gap between the perspectives has been largely investigated and as Imrie argued "*ableist bodily conceptions underpin architectural discourses and practices, with evidence to suggest that the specific mobility and/or access needs of disabled people rarely feature in the theories and practices of designers or architects*"[7].

Taking into consideration the needs and preferences of persons should be the core of design, and in particular of the design for inclusion, according to a user-centred paradigm; but the understanding of the relationship between people and their built environment as a further dimension of the project is often missing because of the lack of contamination between the different actors. This implies the involvement of end users by means of a participatory approach that enhance the capacity of users, and in particular persons with disabilities, to affect decision-making during the design process.

Even if we consider the best technical knowledge and professional expertise, making decisions and interventions that will directly affect their everyday life requires a meaningful involvement of people, that means doing more than just making sure the solutions are technically compliant with regulations.

It is widely recognised that participatory design is a controversial domain, and that it reflects many of the definition issues that afflict UD; it can be understood as an umbrella term given to an "extended family" of practices that challenge problematically unequal power relations between architects and their publics" [8].

Several field research practices have demonstrated how it is possible to focus more attention on processes through which architects could understand the role of "non-architects" in the design of buildings and spaces and take benefits from their expertise. Involvement of end users in the process of making and evaluating design solutions provide knowledge that can challenge or validate the goodness of the solution supported by regulatory compliance or technical literature (for example, design handbooks or guidelines). It is therefore also important to adopt practical tools to measure the effectiveness of solutions in the framework of UD principles. As some scholars highlighted [9], despite difficulties inherent in the evaluation of buildings' empathy, there is a need to have practical instruments for measuring UD  that can also address local specificities.


## 3. The Role of Education in Fostering Universal Design

A last issue to highlight is the difficulty inherent in the process of training professionals and the growing need to address professional skills towards a multidisciplinary approach.

A good design of living environments is a pivotal key to guaranteeing full accessibility to spaces and services: that is a pre-requisite of a universally designed project. Therefore, it is essential to broaden awareness of the need for universal design knowledge in future designers and to incorporate UD-related disciplines into educational pathways, to enable them to practice it in innovative ways.

To practically implement UD, diverse and dedicated subjects and master classes have arisen in higher education worldwide, to develop knowledge and skills. Several research projects have recorded a changing attitude in the last decade towards architectural education and its growing awareness of UD as an important aspect of architectural practice. However, although UD is increasingly permeating design education, it still remains difficult to interpret as anything more than a set of good intentions, and to implement with effective project ideas and solutions [10].

Creating environments able to accomplish expectations from the widest range of people in an inclusive perspective, responding to their well-being needs, corresponds to the need to guarantee the willingness of professionals to engage and compete with the multidisciplinary approach and knowledge that characterizes UD. Diversity rhymes with multiplicity, the one belonging to disciplines that combine to frame and address the issue of inclusion. The design practice can play a key role, particularly if it favours the contamination and a positive dialogue among the aspects traditionally belonging to the discipline and other sciences: the relationship between architectural space and the human mind and body is acknowledged today through the explicit link of neuroscience and architecture [11].

Traditionally, the approach to multidisciplinarity implies the provision of different perspectives within a training course, therefore offering different contributions within basic and specialist training. It requires specific planning of the training courses and therefore the teachers or, rather, groups of teachers, who work in teams, must be prepared in this direction. On the other hand, multidisciplinary training needs greater interaction with strong recourse to teaching formats that actively involve the students.

Centres supporting advanced and long life-learning education to UD, that ensure a permanent spot for supporting public and private bodies and professionals, promote the multidisciplinary approach within inter-professional education better than Universities, where there is a tendency towards what is known as "educational silos" and teachers remain isolated in their own little part of the academic neighbourhood .

Higher education institutions should provide strategies for breaking down the barriers between faculty members and fostering interaction, also at cross-faculty level. "Systems thinking" and "team learning" must be particularly encouraged in the field of architectural design. As proof of the strong conviction of how much architects remain anchored and confined to their own discipline, research findings demonstrate that they have a peculiar predisposition about their own strong identity, even if involved in large and complex projects.

Moreover, there is a greater predisposition towards interdependence rather than inter-professional collaboration [12]. Recent research investigated the role of UD in the context of architectural education, and the output has been presented in forms of recommendations and guidelines [13]. One study refers to an attempt to embed universal design practice education in the curricula of architecture and occupational therapy students, to evaluate the impact on students' readiness for inter-professional learning [14], but it provides evidence of uninspiring results.

Providing students with the opportunity for experiential learning is an important element of the UD curriculum, particularly if developed in a cross-cutting perspective,

at multi and inter-disciplinary level and when based on the strong contamination between theory and practice. Current literature records different practices tested in the field in various Universities for many years now. Personal experience developed at the University of Trieste, where the elective course Inclusive Design (32h, 4 CFU) for architecture students was held in the period 2011-2015, and several curricula design workshops included in subjects on urbanism and architectural design, show that learning based on direct experience with users and trained designers endow a practical understanding of the application of UD knowledge.

The experiences were developed in the field of design for housing and public spaces, and included different formats: open debates with different stakeholders, guided tours of buildings and spaces, the collection of direct testimonies by people with disabilities involved on-site inspections, site visits at places where involved users were living, and interaction with residents. To implement the practical design exercises, the students were required to develop a project, and to document it not only by means of drawings but also by recorded comments - video or voice - taken from dialogue with potential users, during simulations of a participatory planning phase.

To empower architects to creatively approach designing for an increasingly diverse population is a challenge; a multidisciplinary and participatory approach is important for this aim, as an inclusive design for spaces, good and services, based on a broader concept of accessibility, embraces sociological, psychological and behavioural as well as technical consideration. To design inclusively means to educate professionals to think inclusively and to work in collaborative teams composed of diverse groups of people. Education and awareness are essential factors to encourage an inclusive mind-set amongst architectural design professionals and other stakeholders [15] and putting UD principles into practice with creativity and innovation can facilitate the formal implementation of CRPD, to achieve an inclusive, sustainable society and social innovation based on the human diversity.

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# Universal Design and Communication Rights: Meeting the Challenge of Linguistic and Communicative Diversity

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**Abstract.** This essay discusses Universal Design (UD) with respect to language and communication rights. Because Universal Design approaches aim at meeting human variability from the get-go, they must be able to address linguistic and communicative variability. Variability must individual variation in language functions and communication activities in the absence of disability and variability when speech, language or communicative disorders are present. Current conceptualizations of speech, language and communication disabilities take a person-centered approach and a bio-psycho-social framework of health and disease (WHO-ICF) that encompass three ontological domains: body functions and structures, activities, and participation. The framework crucially lists environmental factors that interact with each domain. I illustrate how UD can successfully be integrated with an ICF framework in the domain of speech, language and communication impairments; I then propose that the ICF model can be extended beyond disability to non-clinical populations and settings, to meet the communication rights for all.

**Keywords.** Human rights, ICF, speech, language, communication, individual differences, universal design.

## 1. Introduction

In this essay, I approach language and communication from a human rights' perspective, and sketch the positive ways in which Universal Design (UD) approaches, as they apply to the domains of language and communication, can contribute to the realization of language and communication rights as human rights, for all people.

By definition, Universal Design aims to meet human variability from the get-go [1, 2]. However, both at the level of individuals and of socio-cultural-linguistic communities, variability in core language functions – how people comprehend and produce language in spoken, signed and written forms, and variability in how people communicate with each other – exchange messages in spoken, signed or written form – pose greater challenges to UD than variability in other human functions, such as vision or mobility. Being able to plan for language and communicative variability, therefore, entails considering many different factors and sources of variability. Some of these factors are best characterized as *linguistic individual differences*. These include a person's language

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proficiency due to their age, linguistic exposure, literacy, and multilingualism and the presence of developmental or acquired language and communication impairments. Message level and additional contextual factors interact with individual differences and may facilitate or impair language functions and communication success. Known sources of variability are the quality and composition of messages themselves (register, message complexity, domain-specific discourse and terminology, real-world, cultural and extra-linguistic knowledge). Even greater variability comes from the interactive and dynamic nature of communication, so "interlocutor" properties are also at play (e.g., familiar vs. unfamiliar interlocutor), or whether communication occurs with one person or many. We will see in section 4 that there are explicit ways to code the importance of interlocutors as part of the "human environment UDHR" which is relevant for communication. In addition to the human environment, one must also consider acoustics, lighting, and digital media characteristics. These dynamic environmental characteristics interact: the experience of having a difficult time understanding a multi-way conversation in a language or dialect we are not proficient in, or the difficulty in following a conversation remotely with poor audio quality is probably one we can all relate to. Therefore, anyone who deals with language and communication, and works in a UD framework, should be aware of these dimensions and should intervene when they are in the position to do so, whether it be conversing face-to-face with an interlocutor, writing a document, planning a classroom in a school, or designing signage in a public building.

The rest of the essay is organized as follows. I start from a brief overview of how language and communication rights were initially addressed in international human rights treaties [3, 4, 5, 6], and how they were assimilated into the Convention on the Rights of People with disabilities (CRPD, UN 2006) [7]. The CRPD is the first international treaty to explicitly address different aspects of linguistic and communicative accessibility. I then review how speech, language and communication are conceptualized in the International Classification of Functioning, Disability and Health (ICF, WHO) [8]. I show how a UD approach to the environment (as defined in the ICF) can complement interventions addressed at an individual level so as to increase functioning, activities and social participation of all people, including people with language and communicative disabilities. I end with some environmental considerations that UD practitioners should keep in mind when planning for linguistic and communicative diversity.

## 2. Language and Communication rights as human rights

The ability to acquire and use a human language and the ability to communicate are essential to human functioning and well-being. Human languages allow people to represent, produce and understand an infinite range of expressions from the combination of a finite set of buildings blocks. Being able to send and receive messages and to participate in communicative exchanges in verbal, signed, written form is essential to freely express one's needs, wants and opinions, to form meaningful bonds with other human beings, to seek information and to understand others, to interact freely with familiar or unfamiliar interlocutors across all life domains, including health-care, education, culture, employment, mobility, and leisure.

Individual linguistic rights fall under individual fundamental freedoms in Universal Declaration of Human Rights (UDHR, UN, 1948, Article 19: "Everyone has the right to freedom of opinion and expression; this right includes freedom to hold opinions without

interference and to seek, receive and impart information and ideas through any media and regardless of frontiers") and anti-discrimination provisions (discrimination on the basis of "language") [3]. Linguistic rights at the community level are affirmed as the right of linguistic minorities to use their own language, as stated, for example, in the Declaration on the Rights of Persons Belonging to National or Ethnic, Religious and Linguistic Minorities [4]. The declaration on the rights of linguistic minorities also carries with it implications for language policies as they relate to acquisition, education (e.g., access to education in one's native language), the connection between language and identity and language and culture, as expressed in Article 4 [4]. Language and communication rights are affirmed in additional international treaties (e.g., Articles 5 and 15 of the International Convention of the Elimination of all Forms of Racial Discrimination, UN, 1965; Articles 19, 21 of the International Covenant on Civil and Political Rights, UN, 1966) [5, 6].

Although fundamental human rights – by definition – apply to all people, explicit mention to the language and communication rights of people with disabilities appears for the first time in Article 21 (Freedom of expression and opinion, and access to information) of the Convention on the Rights of People with Disabilities (CRPD, UN, 2006) [7].

Two observations with respect to the definitions that the CRPD gives of "language" and "communication" are in order, the first one is very positive, the second one is very critical. I will start with the positive comment. "Language" in the CRPD is defined as to include "spoken and signed languages". This is an important milestone for human rights, as the CRPD is the first international human rights treaty to include sign languages as human languages. My critical comment comes from the observation that "languages" (spoken and signed) appear listed on par with communication systems. In the definitions section of the CRPD (Article 2), we read that "Communication" is: "languages, display of text, Braille, tactile communication, large print, accessible multimedia as well as written, audio, plain language, human-reader and augmentative and alternative modes, means and formats of communication, including accessible information and communication technology. Listing "language" in the definition sections along with and almost on par with communication systems, writing systems, or the media or formats through which language can be expressed, can lead to gross misunderstandings and perpetuate still too common harmful misconceptions, such that Braille is a "universal language", or that there is a universal sign language, or that sign languages are mutually intelligible (I have heard different versions of these statements more than once, among well-meaning and culturally aware individuals). The constitutive properties of human languages – spoken or signed – are distinct from those of communication systems. Although the intention is clear (describe the different ways in which communication may take place), it is inappropriate to confuse language – a generative combinatorial system pairing form and meaning – with the modalities through which communication via language may take place.

The CRPD does not specifically refer to people with language or communicative disabilities (or any specific disability at all). Article 21(b) lists "sign languages" (i.e., full-fledged human languages) on par with Braille (a writing system), again something that derives from a lack of precision in the definitions in Article 2. Nonetheless, the real force of the CRPD in asserting communication rights as human rights lies in the fact that it is the first international treaty to state that humans may communicate in a variety of ways and to make explicit reference to the importance of providing multiple ways of conveying information. In a disability perspective, this requirement may be framed as an

accessibility requirement or a reasonable accommodation requirement, depending on the context. A UD perspective, however, goes beyond accessibility. Meeting human diversity with respect to communication rights requires thinking about how environments be communicatively friendly for all people. The perspective of people with language and communication impairments must also be taken into account.

## 3. Language, speech, sign and communication in the International Classification of Functioning, Disability and Health (ICF)

Around the world millions of people live with a developmental or acquired speech, language or communication impairment. For example, one common – but not widely known [8] – acquired neurogenic language disorder is Aphasia, which affects a person's ability to understand and produce language, and has consequences on their ability to communicate. It is estimated that around the world five million people live with aphasia [8]. Current conceptualizations of speech, language and communication disorders encompass three ontological domains: body functions and structures, activities, and participation (ICF-WHO) [9]. Language functions in the ICF are part of the "body functions and structures" domain, whereas "communication" belongs to the activity domain. The ICF is theory neutral, it does not commit to one particular theory of language or another. The ICF does, however, make some fundamental distinctions, such as those between language as a special mental function (B167 Macro Chapter), voice functions (B310 Macro Chapter) and articulation functions (B320 Macro Chapter); as well as the ontological distinction between language as a mental function and communication as a separate category all together. In fact, in the ICF, communication is classified as an activity, and has its own Macro Chapter (D3) and a number of sub chapters, covering a range of communicative behaviors (e.g., non-speech vocal expressions) communicative genres (e.g., conversation, discussion), units (e.g., initiating, sustaining, ending a conversation), and settings (e.g., discussion with one individual or more).

The fine-grained ontology of the ICF and the distinctions provided in the are much more suitable for UD than the ones included in the CRPD. The definitions in the ICF are brief, comprehensible to a general audience via the use of plain language. As an example, take the definition of d3551: "discussion with many people". This is defined as "initiating, maintaining, shaping or terminating an argument or debate with more than one individual". The fact that the distinction between one or more interlocutors is made comes from the fact that the ICF is informed by clinical and rehabilitation sciences. The ICF model is increasingly used by speech-language pathologists (SLPs) worldwide as a more holistic approach to assessment and intervention for people with speech, language or communication impairments [10].

The ontology of the ICF has its scientific foundation in psycholinguistic models of language comprehension and production, as it contains separate chapters for each processing modality and broad linguistic units (words, sentences, discourse). The field of psycholinguistics as a basic science provides rich knowledge of individual variation in language functions, including age-related variation, task related variation, variation due to language proficiency and multilingualism and variation due to impairment. For this reason, the ICF can be used to capture the full range of human variability in language and communicative functions, irrespective of disability, and should be viewed as compatible with UD.

## 4. Linguistic and communicative environmental factors

As reviewed in previous sections, because of the dynamic nature of communication activities, we must consider a host of human and non-human environmental or contextual factors. In the ICF, these factors are classified into five domains: support and relationships; attitudes; products and technology; natural environment and human-made changes to the environment; services, systems and policies. Environmental factors in the ICF are always encoded in neutral terms. As an example of how to code a communicative environmental factor relevant to a person's communication right in a very frequent socio-communicative setting, consider a common barrier to communication success and participation – sustaining a conversation in the presence of background noise. To code an environmental factor as a barrier, a point (".") is placed after the factor, followed by a qualifier ranging from 0–4 (0 = no barrier; 4 = strong barrier). To qualify an Environmental factor as a facilitator, a plus sign ("+") is used followed by a qualifier ranging from 0–4 (0 = no facilitator; 4 = complete facilitator). If communication with background noise is a moderate barrier for a particular person (irrespective of the etiology – it could be aphasia, hearing loss or even low proficiency of the language being spoken) this corresponding environmental "e2501 sound quality" would be followed by a "." and coded as e2501.2.

The type of intervention or accommodation required in this case is clearly not clinical in nature, but it does require awareness and an ability to operate adjustments to the situation. The kind of adjustment will depend on what is possible and whether a UD approach has been pursued. To make this example even more concrete, if the organizers of an international meeting involving a linguistically and demographically diverse group of participants are aware of the negative impact on communication and participation of certain acoustic environments (e.g., reverberating rooms, poor lighting, noise), they may choose a venue with better sound and lighting characteristics than others.

There are additional system-wide environmental considerations that UD practitioners can adopt to address language and communication rights, and many of these are also listed in the CRPD. These include the provision of information presented in multiple formats, the use of information and communication technology as a means to allow for information to be digitized and transformed into an accessible modality (e.g., providing videos with subtitles or captions, or audio-descriptions). Advances in speech, language and communication technology, such as automatic speech recognition (ASR) are making this option increasingly wide-spread and available [11].

A different example of the application of the neutral coding of the ICF across disciplines with a special attention to language and communication in a complex ecosystem (a university) is described in [12]. We set out to define a set of multi-domain indicators for universally designed higher education environments. In addition to considering physical accessibility and navigation, we included indicators for communicative accessibility, including flexible signage, plain language, and the use of ICT to produce multi-modal texts such as audiovisual recordings with captioning in classrooms and lecture halls. The multi-domain instrument also addresses communication policies, websites, public engagement and indicators for linguistically and communicatively inclusive events. Awareness of the impact of the acoustic and lighting properties of the built environment on how people communicate is also of designers of the built environment. In designing a classroom where people speak multiple languages or where students may be non-native speakers, deaf, hard of hearing or blind, clearly the interaction of the multiple factors (individual, contextual) must be

taken into account from the beginning. The existence of a common, coding system like the ICF, greatly facilitates the enterprise and makes UD more likely to serve its function.


## 5. Conclusions

In this essay I have discussed some of the issues and challenges that UD practitioners need to be aware of with respect to language and communication. For UD to be more than a technical implementation, it must be grounded in values that are coherent with the spirit of UD, namely, to embrace human diversity and to value diversity [1, 2]. This also means approaching language and communication from a human right's perspective, which must also include speakers with language and communication impairments [3-8]. Language rights in a human right's perspective are founded on a number of core tenets, applicable to all speakers/signers and to all languages whether spoken or signed. We can summarize these tenets as follows: *Liberty*: human beings have the right to choose the language(s) they use to express themselves. *Dignity:* all languages have equal dignity, irrespective of language status and or social prestige; *Identity*: language is a form of identity, at the level of the individual, community and/or the state; *Non-discrimination*: individuals should not be unreasonably disadvantaged because of their language preferences; *Diversity*: linguistic diversity is an expression of human richness and creativity, minority and indigenous languages at risk of extinction deserve special attention and efforts.

Irrespective of their field of expertise, UD practitioners benefit from adopting the ICF and using the ICF to communicate with each other across disciplines. Everyone benefits from Universal Design. For UD to succeed in practice, multi-disciplinary design teams are necessary, whether this is in the material design and construction of university classrooms and lecture hall, or when planning an international event that wants to be accessible and inclusive for all. Deciding where to host the post-conference reception so that participants can engage in conversational exchanges with each other and network with equal dignity and opportunity so that nobody is left out, *is* a matter of universal design.


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# Building Accessible Cities: A Reflection Through Time, Towards Future Perspectives

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**Abstract.** Today, against the impacts of aging population and the increase in social unbalances and demands, the call to make European cities more inclusive, safe, resilient and sustainable puts the construction of equally distributed well-being conditions at the core of urban regeneration processes. From this perspective, accessibility to city spaces plays a significant role when understood as a right to citizenship, and as a crucial agent of socialisation. This chapter investigates accessibility as a set of spatial conditions allowing people (regardless of their age, gender, health, wealth and social status) to autonomously and sustainably move every day between their houses, public spaces and equipment. The assumption is that taking accessibility as a key attribute of cities helps conceptualise their spatial quality as a "performance feature" to be defined in relation to how individuals concretely act in places, according to their different bodies, needs, perceptions, lifestyles and co-existence habits. By recalling some past and present planning and design theories and practices, different physical and social dimensions of accessibility are questioned. The aim is to show the need to address urban regeneration towards the cities' transformation into more "place and people sensitive", inclusive and "proactive" environments.

**Keywords.** Accessibility; public space; urban planning and design; performance approach; proactive cities

## 1. Introduction: Accessibility and the Cities

All over Europe, urban settlements are facing structural changes: the impacts of aging population and migration trends [1, 2]; the growth in divides between dynamic and shrinking settlements and territories [3]; and the increasing demand for sustainable mobility and collective facilities to adapt to critical spatial, social, economic and environmental conditions [4]. Today, these issues build the background of impressive funding programmes –from the European Green Deal to the post-pandemic national Recovery and Resilience Plans [5, 6]. One of their key messages is that cities can be major driving forces for a just and green transition, provided that public policies are committed to enhance the spatial and ecological quality, functionalities and extended usability of urban spaces and equipment [7-9].

For years now, European and world agendas have shared the goal of making cities more inclusive, safe, resilient and sustainable, and the aim to offer better and equally

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distributed well-being conditions [10]. However, in spite of the efforts to showcase and disseminate a number of good practices and models [11-14], progress still has to be achieved in ordinary transformation processes and approaches to urban planning, design and governance [15, 16]. Apart from "extraordinary" pilot strategies and projects, strong is the need to orient "routine" instruments and actions towards more effective local communities' involvement in building synergies among diverse operational fields: the upgrade and further provision of primary welfare services and facilities (for education, social and health care, culture, housing, mobility and transportation, etc.), the increase of open and green spaces, the implementation of ecosystem services and climate change adaptation measures, and the improvement of their overall interconnection and effectiveness in providing answers to rising social demands. Better spatial accessibility is one of those demands. It concerns a growing number of citizens with different physical, sensory and cognitive frailties. Therefore, it should be taken as a general objective to strive for, and to help tailor solutions to the various spatial and social characters of existing urban settlements and populations.

From this perspective, and through the lenses of urban planning and design, this chapter investigates accessibility as a set of spatial conditions allowing people (regardless of their age, gender, health, wealth and social status) to autonomously and sustainably move every day between their houses, public spaces and facilities, and as a key agent of socialisation. Understanding accessibility to collective equipment as a right to citizenship goes far beyond talking about soft mobility (pedestrian, cycle, or by public transport). The wider focus is on the role that the usability of urban spaces can play in enhancing individuals' capabilities to actively shape their own conditions of well-being and interaction with others. The assumption is that taking accessibility as an essential design component of physically interconnected systems of facilities can help urban policies and interventions set aside an often still abstract and parameterised notion of quality, and take on a people-centred idea of "quality in use". Namely, a conceptualisation of quality as a "performance feature" of space that needs to be defined and assessed in relation to how individuals concretely act in places, according to their different bodies, needs, perceptions, lifestyles and co-existence habits. Talking about accessibility therefore returns to question the very concept of public space as a collective process and a proactive support for a renewed liveability of cities.

Today, the rush to find quick and "new" answers to emergencies runs the risk of losing sight of issues that have long been recognised as fundamental to ensure urban comfort. Accessibility –with its many social and physical implications– is one of them. The aim of this chapter is to recall the depth –both in time and meaning– of a term that has been repeatedly associated to the theories and practices of modern and contemporary urban planning applied first to the expansion of cities, now to the regeneration of existing urban environments. However, the intent is not historiographical. In the following paragraphs, a selective "constellation" of past references will be associated with reflections on the present and the future, in order to understand the many scales (from that of the whole city to its single spaces), material and performance attributes, theoretical and operational issues, problems and potentials that accessibility calls into question, as well as the challenges that today arise from its application to problematic urban conditions. These challenges prompt us to overcome the trivial repetition of spatial models and technical solutions, whereas the quest is for a radical shift in our cultural approaches towards a more careful "place and people sensitive" way of redesigning existing cities. As the conclusions of this paper discuss, questioning the many dimensions

of accessibility may offer valuable clues to the critical construction of future planning and design perspectives.


## 2. Human-centred and Proximity-based Urban Models

A first journey through time starts from urban models that still play the role of significant theoretical and operational suggestions. They highlight how, since the origins of modern town planning, accessibility to public spaces and facilities has been understood as anything but accessory in the overall organisation of urban environments according to fundamental human functions.

The spatial issues related to the balance between physical movement and standstill are at the heart of Ildefonso Cerdà's *Teoría General de la Urbanización* and of his Plan for the expansion of Barcelona (1859) [17-19]. The Plan translated the principles of isotropy and territorial equivalence into a repeated orthogonal grid of streets (*vías*) and blocks of the same size (*intervías*, 113 metres per side). This choice stems from what Cerdà, drawing on the organic metaphor, called "urban functionomics" (*funcionomía urbana*): "urban life is composed of two essential elements that comprise all the functions and acts of life. Man rests, man moves: this is everything" [17] (p. 592 ff.]. On the one hand, *vías* are assigned not only the task of designing the network for pedestrian and fast mobility, but also that of providing additional fundamental services (i.e., light, air, water and sanitary infrastructures) on the city scale. On the other hand, *intervías* –originally imagined as built only on half of their surface– provide a kind of urban microcosm, a basic element of sociality, and the place where people move and meet on a daily basis. Furthermore, the aggregation of *intervías* offers a precise metric for the distribution of new facilities: every 25 of them, a social and religious centre; every 100, a market; every 200, an urban park; every 400, a hospital. In this way, a uniform provision of collective spaces, its implementation according to different degrees of proximity, are proposed as the key rules of a sound urban growth.

The idea of a city arranged into defined spatial units where essential services can be easily reached on foot orientates another long-lasting urban planning idea. Standing in between Howards' Garden City (1902) [20] and the following English and American New Towns [21], the "Neighborhood Unit" model was proposed by Clarence Perry in the Regional Plan of New York and Its Environs (1929) [22]. Again, the reference is to the human life cycle. The neighbourhood unit is the basic element of a polycentric urban environment based on integrated entities of dwellings and facilities. Its spatial and social focal point is the primary school –a community centre also offering adult education classes and cultural events. The walking and safe accessibility to the school rules the spatial dimensions and the overall organisation of the neighbourhood unit: traffic routes stand outside its borders, while *cul de sacs* residential streets are designed to induce the slow movement of cars. Many have been the critics to this model: from its being elitist and segregationist, to its over-simplification and somehow negation of social mix and spatial diversity [23]. However, its appeal remains, also due to the applicability not only to new expansions but also to the renewal of existing urban situations.

Both the Barcelona and the neighbourhood unit models have shaped –albeit in different ways– some recent urban regeneration projects, widely taken as examples of cities' resilience to the spatial and social impacts of the Covid pandemic. As a reaction to distancing measures, the sanitary crisis has brought back into sharp focus the issues of accessibility to collective spaces, as well as the importance that the material

configuration of places, their reachability as autonomously as possible, and a fair distribution of facilities can have in increasing the capacity of urban environments and policies to respond to critical events.

In Barcelona, the programme called *Superilles* (superblocks) started in 2016. Built upon Cerdà's grid, the programme demonstrates the adaptability to new needs of this urban pattern. The *superilla* is an aggregation of 9 *intervías* that can be replicated to create a city network of green hubs and squares where pedestrians have priority. The reduction and slowing down of traffic within the *superilla*'s perimeter have progressively transformed the streets into collective places, at first with tactical and temporary solutions, then through stable maintenance interventions based on the integration of different planning tools and strategies –including those addressed to climate change and urban biodiversity [24, 25].

Accessibility and urban life rhythms are equally central to the renowned idea of the 15-minute city, and to its many realisations across the world before and after it became a key message in the electoral programme leading to Anne Hidalgo's re-election as mayor of Paris in 2000 [26]. The Sorbonne professor Carlos Moreno describes "la ville du quarte d'heure" as a model for "un nouveau chrono-urbanisme", based on a critique of car-centred planning, and of the separation of urban space into monofunctional zones [27]. Proximity, *mixité*, density and ubiquity are the four principles for rearranging cities into neighbourhoods where a rich combination of urban equipment, business and social functions can be reached in less than 15 minutes by walking, cycling, public transport, and an extensive use of information and communication technologies [28]. The aim is to create a vibrant closeness of people, places and activities, according to a concept that can be replicated, like fractals, across the entire city [29].

However, even if accessibility and proximity are not original goals for town planning, some new factors make their actual use more difficult than in the past: the application to the existing city and the need for adjustment to different spatial, social and economic situations; the plurality of operational fields that are called into question (mobility, equipment and services, housing, work and commerce, environment, etc.); the ability of local institutions' to govern and match the interests of many public and private actors, times and modes of transformation.

In contemporary cities, proximity truly is a "hidden dimension" [30] to be rediscovered and enacted through a critical approach to urban geographies and lifestyles. The spatial fields of neighbourhoods cannot be identified on the basis of a simple 15-minute walkable distance; what is necessary is a deeper understanding of urban populations' daily movements, and of the complex relationships between the immaterial and material resources that characterise a specific city and its districts (i.e., social practices and imaginaries, equipment and goods, house and work places). Moreover, the strong selectivity of economic localisation factors, and the non-isotropic and hierarchical organisation of public services cannot be eluded.

Being accessibility much more than physical proximity, the call for re-centring planning on the neighbourhoods' local dimension thus involves several questions [26]. What is local and what belongs to broader urban relations? What does already constitute an asset and a lever of regeneration and what should be added as a new ingredient of habitability? How can we rethink the organisation of existing collective facilities in order to extend their uses in time and space, beyond their plots and institutional functions? Finally, putting into practice accessibility certainly implies the creation of an adequate system of soft mobility infrastructures (from cycle paths and real pedestrian areas, to the widening of pavements and the establishment of 30 km/h zones). This entails the

structural maintenance and redesign of mobility spaces and services, through interventions that are site-specific but also guided by an overall city vision. In other words, the 15-minute time parameter cannot be applied without considering different travel modes and speeds, and a broader project for public transport and multimodality [31, 32].

In order to overcome a simplified use of neighbourhood-based models, and to carefully address the complex spatial and social issues urban accessibility refers to, the introduction of further scales and critical approaches is, therefore, needed.

## 3. Democratic Spaces for Different Social Behaviours and Bodies

As a design topic, the conditions that make urban spaces truly "public" have been repeatedly questioned. In the late 1980's, more than forty years after Le Corbusier and the International Congresses of Modern Architecture (CIAM) had delivered *La Charte d'Athènes* [33], the Berkeley professors and practitioners Allan Jacobs and Donald Appleyard wrote about the "loss of public space" and the "placelessness" resulting from the implementation of functionalist principles. Their *Urban Design Manifesto* states that "Good environments should be accessible to all. Every citizen is entitled to some minimal level of environmental livability and minimal levels of identity, control, and opportunity. […] We look toward a society that is truly pluralistic, one where power is more evenly distributed among social groups […], but where the different values and cultures of interest- and place-based groups are acknowledged and negotiated in a just public arena" [34] (p. 116). Understanding accessibility as one of the main qualities of public spaces means focusing on the relationships between the physical features of urban environment and individuals' perceptions and actions; namely, on the qualities of the spaces where movement takes place, and on their correspondence to the needs and demands of all the persons who practice them.

Since the 1960's, this pluralistic approach has found expression in a number of theories. Adopting diverse lenses, they claim the "right to the city" as an extensive right to citizenship, starting from a reflection on the everyday dimensions of life, and on how social needs can find answers in spatial organisation. As Henry Lefebvre wrote, these needs are "opposed and complimentary" –i.e., "security and opening", "certainty and adventure", "similarity and difference", "independence (even solitude) and communication" [35] (p. 147); they can ultimately be summarised in the right to participate in decisions concerning space, and in the right to appropriation of space, which should therefore be designed to facilitate fruition and enjoyment [36].

Among the many forms that public space takes on, the street is one of the most investigated; here, in fact, accessibility expresses itself in various facets and contradictory dimensions. The street is the public space that people practice on a daily basis; a sensible manifestation of "life between buildings" [37]; a place of travelling, wandering, unplanned encounters, where coexistence happens among a number of activities, individuals, and behaviours. The street can, therefore, be understood as a place of "cityness" *par excellence*, where "the intersection of differences […] actually produces something new", and the "publicness" of space happens through people's ordinary practices and uses [38] (p. 14-15).

One of the most well-known behavioural approaches to the study of street life is that of Jane Jacobs, the journalist and activist who, in 1961, published *The Death and Life of Great American Cities* [39]. This book is an explicit critique of some of the dogmas of

modern planning (mainly the focus on car traffic issues), and a manifesto against the replacement of small neighbourhoods made up of liveable and busy streets with the large economy-driven and top-down projects (shopping malls, highways and skyscrapers) envisaged by Robert Moses, advisor to New York mayor Fiorello La Guardia. "Streets in cities serve many purposes besides carrying vehicles, and city sidewalks –the pedestrian parts of the streets– serve many purposes besides carrying pedestrians. […] Streets and their sidewalks, the main public spaces of a city, are its most vital organs" (p. 29). As Jacobs highlighted, "contact" is among the "uses" characterising sidewalks and helping generate "the conditions for city diversity": sidewalks "bring together people who do not know each other in an intimate, private social fashion and in most cases do not care to know each other in that fashion" (p. 55).

However, provided that sidewalks are where the everyday "casual" public life of cities develops, not only the neighbourhood functional and social assets and dynamics they are framed in, but also the overall physical layout and uses of streets play a pivotal role in making these spaces really welcoming and inclusive.

More than twenty years after Jacobs, the book edited in 1987 by Anne Vernez Moudon, *Public Streets for Public Use*, provided a multi-perspective reflection on how the design of streets can determine their degree of accessibility to the widest range of users. In his essay, the American architect and planner Mike Francis focused on the very concept of "democratic street": "Friendly to pedestrians and livable for residents", it "does not exclude the automobilist but provides space for vehicles by striking more equitable balance with other street users, namely, pedestrians and bicyclists. Like the livable street, it stresses safety and comfort. Yet the democratic street also emphasizes the access and needs of many different kinds of people" [40] (p. 28). In his foreword to the same book, Donald Appleyard further added: "the street is open to all. Its detailed design, however, can subtly favor one group over another. By changing the surface, by erecting a sign, by adding a bench, one obliges certain users at the expense of others. […] Several competing population groups, establishments, public agencies, and professions vie with one another for control of the street space […]. The most powerful and well-established groups often win, but they do not by any means represent the public interest. […] Not everyone can get what they want from the street, but it […] should be the policy of public agencies and their representatives to support the weaker users of the streets –pedestrians, residents, children, old people, the handicapped, and the poor– because the powerful can generally look after themselves" [41] (p. 9).

Today, these reflections are still topical for their call to rely street quality not just on the use of technical and prototypical solutions (i.e., pedestrianisation, environmental design for liveable streets, speed-reducing traffic devices and *woonerf*, play streets, removal of architectural barriers). Both Francis and Appleyard highlight the difference between public and democratic spaces, whereas the latter are the result of a more complex and site-specific process of discussion and negotiation among the conflictual stances expressed by different users, in relation to their social conditions, habits and movement capabilities.

The picture becomes even more complicated if we add another significant aspect: "the relationship between places and people can be interpreted as a mutual dialectic, in which streets exercise a form of agency: city streets and squares act on our lives, helping to make them what they are" [42] (p. 14) [43]. This action/interaction between space and social behaviours finds in people's bodies –and in their differences– an unavoidable medium. By critically analysing another important planning and design line of theories and practices, Cristina Bianchetti reminds us that: "Relationships with space are built

through physical experience: action, perception, and the senses. […] Space opens up to us through our body; through its position, faculties, strengths, and frailties" [44] (p. 9). Today, "health, sickness, ageing, environmental changes, the plurality of practices, and the political nature of space" are among the most urgent urban issues that planning and design are called to face (p. 13); they highlight the need to rethink urban environments (and urban projects) through the lenses of individuals' bodies, of how they act and suffer in the city, connect and collide with space and other bodies. By claiming "accessibility for all", this is exactly the invitation that major international organisations have been addressing to urban policies for some time now.

With the motto "healthy places for healthy people" the World Health Organization (WHO) has underlined the strong connection between the social determinants of health and the spatial organisation of the urban environment, as well as the direct influence of spatial accessibility over the promotion of cities' and citizens' well-being [45]. Similarly, Universal Design (UD) is defined as the conception of products, spaces, and services to be usable by all people, to the greatest extent possible, without the need for adding specialised devices. The assumption is that disability (in its various forms) is not a condition intrinsic to a person, but the result of the interaction with everyday living spaces [46], and can, therefore, temporarily or permanently affect everyone in their different phases of life. By taking on these perspectives, "Healthy Cities" and "Vital Cities" [47, 48] are among the many labels that have been recently adopted by international city networks sharing the effort to address a variety of actions: the refurbishment of public spaces as usable by people with different capabilities; the combined implementation of mobility, green and healthy infrastructures, and of equipment for outdoor motor and sports activities; and the rethinking of the spatial setting of social and health care facilities.

However, the application of "healthy" and "UD" stances does not necessarily produce democratic or inclusive spaces. In fact, a sectoral implementation of their principles can lead to dedicated solutions, like the ones addressed to the removal of single obstacles, or to the introduction of technological devices to overcome specific motor, sensorial or cognitive disabilities. In this way, the movement of some groups of persons is confined to places other than the ones dedicated the so-called "normal" people (i.e., those who are male, young, healthy). In these approaches we can detect the emergence of "new functionalisms": in the name of ergonomic parameters tailored on specific body frailties, interventions simply add exceptional elements to traditional and often poor ways to design single open and built spaces. As a result, every day and "for all" accessibility becomes not a structural but a remedial and segregating component of city regeneration.

## 4. A Performance Approach

Today, in the face of increasingly complex urban and social issues, the implementation of accessible and inclusive cities escapes easy reductionism. If taken seriously, these terms prompt urban planning and design to set aside the application of merely functional and quantitative solutions, regulations and standards, and to progress towards a performance- and goal-oriented approach.

In 1981, questioning how to "build a general normative theory about cities", the American planner Kevin Lynch wrote: "The linkages of very general aims to city form are usually incalculable. Low-level goals and solutions, on the other hand, are too

restrictive in their means and too unthinking of the purposes. In this dilemma, it seems appropriate to emphasize the aims in between, that is, those goals which are as general as possible, and thus do not dictate particular physical solutions, and yet whose achievement can be detected and explicitly linked to physical solutions. This is the familiar notion of performance standards, applied at the city scale" [49] (p. 108). Among the performance dimensions of a good city form –namely, those that can be understood as "important qualities for most, if not all, persons and cultures" (p. 111)– "access" is defined as "the ability to reach other persons, activities, resources, services, information, or places, including the quantity and diversity of the elements which can be reached" (p. 118). "Access is one fundamental advantage of an urban settlement, and its reach and distribution are a basic index of settlement quality. […] the obstacles to it may be physical, financial, social, or psychological" (p. 203). Being interconnected with a plurality of urban, social and human factors, the significant role of accessibility can be also acknowledged in all the other basic dimensions of performance and meta-criteria the Lynchian theory builds on: "vitality", "sense" and "control"; "efficiency" and "justice" (p. 118).

Further clues for dealing with the normative dimensions of accessibility are offered by past and recent Italian debate on planning standards. Ruled in 1968 by the Inter-ministerial Decree no. 1444, this fundamental tool is still used in town plans to assess and provide the respondence of public assets and facilities (parks and sports fields, schools and libraries, civic and cultural resources, social and health care centres, parking areas) to quantitative parameters established as square meters per inhabitant. Although soon moved to the background, reflections on accessibility can be found in the discussion that preceded the delivery of the Decree, as well as in a number of manuals and practices that in Italy –since the 1940s– have provided its premises, also referring to the neighbourhood model legacy and to its application in the construction of new public housing districts [50, 52]. This rich array of considerations highlighted the need to address accessibility from a number of perspectives and performance dimensions: the relationships between types of equipment, their role in the design of new neighbourhoods, the capabilities of their users, the time and distances that could be covered on foot; the perceived quality and material comfort of urban scenes; the coordination of easy pedestrian usability with the public transport network as a criterion for a sound configuration and reachability of public facilities, their effective spatial connection and integrated service provision [52]. Before defining quantitative thresholds, the call was therefore for a responsible and critical use of planning standards as "'a term of reference', provisional and constantly evolving, aimed at pursuing the greatest social balance in the distribution of all 'urban values' and their accessibility"; "an instrument of social claim and balance"; "a flag [...] that at each milestone must be renewed so that it maintains its value" [53] (p. 110, 111).

No wonder then that, more than fifty years after the enforcement of the Decree, and with an ever-increasing demand of welfare facilities due to ageing processes and economic crisis, discussion has revamped [54, 55]. Among the main topics, two have direct implications on accessibility. On the one hand, the quest to review the list of the equipment identified as standards to include new types of facilities (from ecological services to sustainable mobility infrastructures), and to support their realisation with a proper availability of public land. On the other hand, the need to rethink how the implementation and management of the provided spaces and services are ruled, and how quantitative and performance dimensions can be joined in order to pay attention also to their physical and "in use" qualities. In this sense, the invitation is to take accessibility –

and in particular the combination of greenways and spaces for soft mobility– as an opportunity to focus on the material features of places where the "chain" of daily movements unfolds between one's house and the public facilities that standards have produced over time. Even when numerous and varied, this equipment often takes the form of a disconnected and introverted set of buildings and plots, hardly reachable without cars and where access limitations (i.e., to certain hours, users and activities) prevent this estate to act as an overall system of public spaces.

## 5. Conclusions: Towards a Proactive Perspective

In the frame of the present European cities' regeneration season, the overall performance of urban habitats and their accessibility are key features. Planning and design are often called to combine "intensive" transformations (i.e., the reuse of brownfields and abandoned areas) with "spread" modification of existing urban spaces. However, it is in this latter field of actions that the quality of everyday life in the cities, and its "inclusiveness" attribute gain an evident significance. Both at the urban and the neighbourhood scales, the question is how can we shape what Bernardo Secchi called a "project of the soil", namely a project that starts from the re-knitting of existing open and collective spaces to define new "space-and-time rhythms and sequences where the social practices of our time can be recognised", and daily enacted [56] (p. 160).

As the proposed excursus across past and present theories and models has tried to show, the challenge is to frame the re-design of soft mobility connections among public spaces and facilities into a broader and more complex set of physical interventions aimed to build a new "public city" spatial system, where collective equipment can work as an integrated service and a "social and care" infrastructure. To this purpose, associating the term accessibility to that of "motility" provides further inputs. It helps focus on the quality of life that a person can reach in relation to the physical configuration of the urban environment where they daily move and live. As Vincent Kaufmann points out, "motility" is a "conditioned", "conditioning" and "enabling capital" [57] (p. 37-46). It happens when a person's specific physical, economic, social and cultural capabilities and conditions match with adequate levels of spatial accessibility. In turn, the degree of expression of this capital affects the development of further capabilities, aimed at better organising, interacting and/or adapting one's lifestyle to contextual conditions. Transforming cities into enabling environments can thus lead to new social practices, interactions, and citizen's active involvement in building their own state of well-being.

This approach prompts to take on the perspective of the most vulnerable persons to conceive spaces that are comfortable and usable for everyone. However, the challenge is to make a step beyond, and to more radically rethink cities as "proactive" environments. Namely, as places where a better usability of public spaces and facilities is part of integrated urban regeneration strategies and welfare policies, aimed not just at removing obstacles to accessibility, but at offering individuals the material conditions to move independently and to perform healthy behaviours, while respecting their diverse bodies, genders, cultures, social and economic needs [58].

Making our cities truly accessible and inclusive is therefore not a matter of applying universal standards, nor of implementing single spatial interventions. It is a matter of quality of city design and planning, and of (re)cultivating their capacity to: anticipate and recompose the unavoidable conflicts that in our pluralist cities occur among different habits, lifestyles and capabilities; build inclusive and participatory processes where

citizens can be actively involved in conceiving urban transformations; integrate the refurbishment and upgrading of the physical equipment with a careful rethinking of the provision of welfare services [15]. The reference is, therefore, not only to technical advancement, but to a more complex and deeper cultural change in the ways we take care of our cities and their inhabitants, in our ability to interpret and translate into spatial solutions the complex, contextual and subtle relationships between places and people.

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# ICT for All: Where Do We Stand?

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**Abstract.** Although its importance is undeniable, designing in a more inclusive way is not yet fully adopted in the field of design and planning, whose reference continues to be the standard man. An approach which not only excludes people with disabilities, but also other categories that diverge from the physical and cognitive characteristics of the standard human model, such as women, the elderly, and children. This problem affects different contexts and can be observed especially in the area of Information and Communication Technologies (ICTs), which are often designed without taking into account the peculiarities that distinguish these categories of users. Referring to the categories affected by the digital divide, the article reflects on the need to promote specific methodologies, such as Universal Design and User-centered Design, so that attitudinal and psychological issues related to different categories of users are considered.

**Keywords.** User Experience, User-centered Design, Universal Design, Digital Divide

## 1. Introduction

"For all" has become an intrinsic attribute of a way of designing in which the universality of the individual is placed at the centre. Although many currents have developed over time and in different territorial contexts, recent research [1] tends to equate the concepts of Universal Design (UD), Inclusive Design (ID), Accessible Design (AD), and Design for All (DfA). They are not synonymous, since the solutions they tend towards have different natures (for example, UD: trying to satisfy as many people as possible with a single design solution vs. ID: creating designs that do not exclude or marginalise anyone, possibly providing more than one solution). But looking at the deeper significance, these approaches to design are driven by the same intention:

> *The design for human diversity, social inclusion and equality* [2] *focuses on satisfying a wide range of users, including children, older adults, people with disabilities, people of atypical sizes or shapes, people who are ill or injured, and people who find themselves in difficulty due to circumstances* [3].

This goes with the ideal of an inclusive society in which no person should be excluded from the full enjoyment of human rights and fundamental freedoms, as cited by the U.N. Convention on the Rights of Persons with Disabilities [4].

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People with disabilities are a category often excluded from the enjoyment of many aspects of social life, and this can be traced back to a way of designing that tends to place a model of the normed individual [5] at its centre. An approach which not only excludes people with disabilities, but also other categories that diverge from the physical and cognitive characteristics of the standard human model, such as women, the elderly, and children. This problem affects different contexts and can be observed especially in the area of Information and Communication Technologies (ICTs), which are often designed without taking into account the peculiarities that distinguish these categories of users.

This article questions the extent to which the "for all" approach is considered in a world where ICTs and digital technologies pervade every aspect of our lives.

## 2. The Standard Man, a Model No Longer Valid

From the famous references of Vitruvius' man and Le Corbusier's Modulor to the study of anthropometrics, designers are trained to design for a mythical "average" group of people, but this group does not actually exist [3]. Science, medicine, and engineering often take the young, white, able-bodied 70kg male as the norm [6], yet every individual is unique and as a group, the human species is quite diverse.

As far as disability is concerned, the reference that most supports this thesis can be traced back to the *International Classification of Functioning, Disability and Health* (ICF), which for the first time shifted the focus from a reductive view of disability as a physical or mental impairment to the needs of the person's environment, contributing to the definition of disability provided by the *World Health Organization* (WHO) as a part of being human that almost everyone will experience temporarily or permanently at some point in their life [7].

In addition, the constant ageing of the population contributes to the debate on how mistaken it is to focus on a design centred on the average man: the proportion of elderly people is set to double from 11% to 22% of the total population by 2050. In the next five years, for the first time in the history of mankind, the number of individuals aged 65 and over will exceed that of children under five [8].

Another huge distortion is related to the fact that from a gender perspective, the number of women in the world is almost equal to that of men and is set to surpass it [9]. Nevertheless, the model of the average man continues to be held as a reference, bringing to light difficulties that women experience in handling some products or in dealing with some urban spaces or buildings [10]. An investigation by The Guardian in 2019 [11] listed a number of products designed for standard men that have been shown to be ineffective where used or worn by other categories of users, especially by women. "Designers may believe they make products for everyone, but in reality, they make them mostly for men" the article reports.

This general lack of consideration of categories other than 'standard' for the design of certain products opens reflections to another aspect already investigated in the 1970s by Papanek [12], the so-called reparative design, a design which aims to repair the damage caused by an excluding design. The reconnection of design from a consumer economy to an ecology of needs [13] is what today's society requires, especially in view of the increased awareness of the complexity of human beings and the need to respect diversity.

## 3. Bringing the Real Person Back to the Centre.

From One-size-fits-all leaves most of us out. The answer to this shortcoming can be found in a change of perspective that sees the emergence of specific methods that put the human-being back at the centre. Below is a summary of the methods most used and for which guidance for their implementation is available in the literature.

*Human Factors and Ergonomics (HFE).* The terms 'ergonomics' and 'human factors' are often used interchangeably or as a unit (HFE) [14]. The International Ergonomics Association (IEA), dedicated to research and application of HFE, was founded in 1961. HFE participatory design principles and methodologies apply across the design of tasks, jobs, products, environments, industries and types of work. HFE encompasses not only physical safety and health but also the cognitive and psycho-social aspects of living and working. HFE reflects a holistic perspective toward the design of products and systems, considering the interrelatedness of human, technical and environmental components, and the potential effects of system design changes on all parts of the system.

*User-Centred Design (UCD).* UCD focuses on the active involvement of the user in the design process, trying to obtain a clear understanding of the exact task requirements, involving an iterative design and evaluation process, and utilising a multi-disciplinary approach [15]. The key focus of UCD is that users play a critical role in the design of easy-to-use products throughout the entire development process.

According to the ISO 13407 standard on human-centred design [16] there are five essential processes which should be undertaken to incorporate usability requirements into the product development process.

*User Experience Design (UX).* UX is a broader conceptual design discipline looking at the entire process even before the user interacts with the system or product. In UX, the focus is more on the user's perception of how the product or system interacts. With the proliferation of workplace computers in the early 1990s, user experience started to become a positive insight for designers. Donald Norman, a professor and researcher in design, usability, and cognitive science, coined the term "user experience" and brought it to a wider audience [17] When the UX study is lacking, we speak of UX debt.

*Universal Design (UD)*. The concept of Universal Design was introduced by combining and drawing from developments in all of the above fields. UD has its roots in architecture, engineering and environmental design and its principles espouse the "design of products, services and environments to be usable by all people, to the greatest extent possible, without the need for adaptation or specialized design". Following its seven principles developed in 1997 by a working group of architects, product designers, engineers and environmental design researchers, led by the late Ronald Mace at North Carolina State University, designers have a guidance to better integrate features at the outset that meet the needs of as many users as possible [18].

As stated in extensive research dating back to 2010, to deal with those disciplines and to understand why there are still obstacles to the implantation of this approach in the real world, it is necessary to focus on the term 'usability', a widely recognised critical factor for the success of a system or product. Although the evaluation of usability requirements is part of the HCD process, no precise definition of the concept of usability exists that is widely accepted and applied in practice [19] There are several reasons why it has been so difficult to define this term: usability is not a property of a person or thing, and there is no thermometer-like instrument that can provide an absolute measurement

of the usability of a product [20][21]. Usability is an emergent property that depends on interactions among users, products, tasks, and environments. As expressed by Chapanis [22]*,* although it is not easy to measure "ease of use," it is easy to measure difficulties that people have in using something; difficulties and errors can be identified, classified, counted, and measured. Defining the usability requirements of a product is a rather expensive phase: it is necessary to define effectiveness, namely the degree of success with which users achieve their task goals; efficiency, namely the time it takes to complete specific tasks; satisfaction, namely user comfort and acceptability. Other more detailed usability issues provide more specific design objectives, like understandability (whether users understand what the product or system can do); learnability (the training, time and effort required to learn to use the product or system); operability or supportiveness (supporting the users throughout the interaction and helping them to overcome problems that may occur); flexibility (enabling tasks to be carried out in different ways to suit different situations); attractiveness (encouraging user interest and motivating them to explore the product or system).

The above are a series of suggested steps, which are, however, hardly ever applied.

## 4. Digital Divide: the Categories Most Ignored and Excluded

In a world pervaded by technology, the usability of products and the experience of the users who use them are increasingly considered by ICT development companies. This is also in view of consumer research and surveys, which show, for example, that the usability of products weighs more heavily than the services offered (33% vs. 12%) [23]. However, even in this specific field, we are facing a problem related to the user being considered, which again tends to be the average man. This exclusion may be linked to the widespread term 'digital divide', which refers to that part of civil society excluded from 'digital knowledge'. Some studies identify the elderly, people with low levels of education, and manual workers as those individuals who, having lower access to the web, are more likely to be unrepresented [24][25]. In addition to the ones mentioned above, other research includes among the groups most threatened by digital exclusion, women who are not employed or in special circumstances ("digital gender divide"), immigrants ("digital cultural-linguistic divide"), people in prison, and, generally those who are unable to use IT tools [26]. When analysing the phenomenon of the digital divide, a distinction must be made between the cognitive dimension, which assumes an individual's lack of minimal IT knowledge, and the infrastructural dimension, which focuses on deficiencies in the availability of the technologies and tools necessary to enable effective navigation. Although these are two clearly distinguishable areas, skills and infrastructure should be seen as complementary and inextricable: the former serves little purpose in the absence of the latter, since digital skills cannot grow without adequate infrastructure endowments. The digitally excluded do not correspond to the consumer-type and are therefore also excluded from usability testing processes: a vicious circle. The need to involve all those who will be affected by ICT developments and potential pitfalls is an issue shared by several expert bodies and research studies[2]. Once

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[2] The following are cited as examples: EthiComp (The international computer ethics conference series), IFIP (The International Federation for Information Processing), CEPE (The Computer Ethics, Philosophical Enquiry sponsored by INSEIT the International Society for Ethics and Information Technology) IACAP (The International Association for Computing and Philosophy) communities.

they are identified and characterised, their needs must be represented and addressed. If possible, stakeholders should be invited to work or at least have the opportunity to give some substantial feedback before development can be incorporated into the mainstream, particularly when it regards the most important areas, such as government, public safety, access to labour market, education and healthcare. Nevertheless, the constant involvement of stakeholders and future users of products is not always incorporated into new ICT design processes. Several researchers are discussing this, highlighting how ineffective stakeholders' engagement (inadequate addressing) or lack of relevant support and stakeholder input could be inconvenient and problematic [27].

## 4.1. Gerontechnology and technological fear

This aspect is addressed, for instance, by a recently new discipline called gerontechnology, which is an interdisciplinary field which combines gerontology and technology. It can be described as "the study of technology and aging for ensuring good health, full social participation, and independent living throughout the entire life span" [5, 6]. Gerontechnology is working on understanding the reasons why older people are reluctant to adopt new technologies, such as the Internet, given their potential to improve their quality of life. There is growing attention to gerontechnolgy due to the ageing population in most industrialised countries, and the higher strain this will put on healthcare facilities [28]. Designing technology for older people is quite a complex task. Older people can experience a multitude of age-related issues, and these must be considered when creating the interfaces that the elderly will interact with. In addition, their lived experiences, and ways they wish technology to fit into their lives, must also be taken into consideration [29].

Experts say that the best way to create technology that the elderly will find useful is to develop it from a 'user demand' perspective, rather than from a technology advancement perspective [30]. Guides on how to design for the elderly are easily accessible for designers and should be followed when implementing systems for this age group [31]. However, it is the 'fit' between the system's demand and the user's capability (demand/capability fit) that determines the user's attitude and acceptance of a system [32]. A good performance does not guarantee that the technology will be accepted, adopted, and used by the intended user group if the system is not created to suit the users and how they live their lives.

One characteristic aspect to be considered among the elderly is also the so-called technological fear/anxiety [33]. A different way to conceptualise this anxiety is to term it as confidence or self-efficacy. Prior studies have shown that self-efficacy, or a person's self-belief that they can use a technology, is critical to using an ICT, while feelings of mistrust and worries about privacy and information security decrease use [34][35]. ICT self-efficacy is a potentially important factor in efforts to close the digital divide that separates experienced ICT users from novices [36], not only regarding the elderly but also considering the other digitally excluded categories.

## 4.2. Future effects to worry about

In addition to causing current exclusionary situations, improper ICT design may lead to future risks, especially for certain categories of users, in view of different age groups,

maturity, technology comprehension, ability and propensity to connect with the World Wide Web.

One of the biggest areas of concern is the effects of digital technology on children. Members of the Alpha generation are part of the larger category of digital natives[3], those who grew up with increased confidence in the technology that they were encircled and engulfed by. Among those who speak of a new evolution of the human race (Homo sapiens digital) [37], and those who state that digital natives do not actually possess any digital competence but are simply consumers unaware of the 'world' behind the functioning of the technological tools they use all the time, what is worrying is the fact that children's brains are still developing and may be more sensitive to the effects of technology and its overuse than adult brains. A 2018 review of various studies noted the possible adverse effects of children overusing technologies, including lack of attention, delays in language development, delays in social and emotional development, risk of depression, poor sleep quality, aggressive behaviours, addiction to technologies [38]. The research also noted the importance of teaching children to interact with these technologies in healthful ways: families as well as the education system are called upon to supervise and accompany the learning process and the interaction that children establish with technologies. However, it can happen that it is families and teachers who first have difficulties in using ICTs, and so children are left alone. Still Prensky states that education is the biggest problem facing the digital world, as digital immigrant teachers, who speak an outdated language (that of the pre-digital era), are struggling to teach a population that speaks an entirely new language. Over the past 20 years, technology training for teachers has been at the forefront of policy [39]. However, immigrants suffer from complications in teaching natives how to understand an environment that is 'native' to them and foreign to immigrants.

We are wandering into unknown territory as generations past have never had this same kind of constant technological immersion. Better research is needed in this area.

## 4.3. European digital policies

*By 2030, every person should have safe and affordable access to the Internet, including meaningful use of digitally enabled services in line with the Sustainable Development Goals.* [40]

To follow the two macro-themes analysed in this chapter: how to prevent technologies from excluding? How to lower the digital divide?

Regarding accessibility, the first significant step taken to ensure web content accessibility can be referred to the Web Accessibility Initiative (WAI) by the World Wide Web Consortium (W3C), an international non-governmental organisation which has published several updated versions of the Guidelines for Web Content Accessibility. There has been criticism of the W3C process, claiming that they do not put the user sufficiently at the centre of the process. Looking at the European context, mention must be made of the European Telecommunications Standards Institute (ETSI) initiative in using both UD and UCD as primary concepts for the development of guidelines for ICT products and services [41], and the Web Accessibility Directive [42] which has been in force since 2016 and provides people with disabilities with better access to websites and

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[3] 'Alpha generatiion' i.e. those born after 2012. 'Digital natives' belong to the generation that grew up in the 'digital age', which mainly concerns individuals born after 1980.

public service mobile apps. The latest and most significant initiative by the European Union can be traced back to 2020, in the midst of the Ovid pandemic, namely the ICT accessibility assessment for the Europe region which has reinforced the importance of ICT accessibility [43].

Regarding the digital divide, for several years, the European Union has been systematically working to ensure that all its citizens can acquire the digital competences necessary to be citizens of the 21st century. DigComp, the Reference Framework for the Digital Competence of Citizens, developed by the European Commission, fits into this context, identifying the areas of digital competence needed to use digital technologies in a critical manner. In its most up-to-date version, the DigComp framework is divided into 5 dimensions. Starting with 5 competence areas, the competences and titles of each area are described and the levels of mastery of each competence are specified. This then lists the applicable knowledge, skills and attitudes for each area, finally adding examples of use for different purposes [44].

For both challenges, the path to be taken is neither simple nor short, requiring the joint intervention of public and private institutions, of training organisations as well as companies to provide all citizens with equal opportunities to increase their digital skills, while also making use of lifelong learning methods and tools.

## 5. A Field of Research that Has Just Begun.

Critical issues such as defining the term 'usability,' or iteratively repeating UX tests during design processes are elements that generally do not allow broad application of disciplines focused on human-beings and their complex characteristics. Over the years, many theories have developed around the UD design philosophy, and several countries have taken up the challenge of putting its principles into practice and testing its effectiveness. Despite this, as stated by a study investigating whether UD can be described as a critical theory [45], to date a lot of the information is fragmentary and therefore its theory cannot be defined as adequately developed. The second edition of the Universal Design Handbook [46] stated that "Universal design concepts hold the promise not only to impact the design disciplines but also to influence local and international policies and attitudes". This is starting to occur thanks to the introduction of the term "Universal design" and the reference to its principles in various regulatory instruments in several countries. However, the transition from the repeal of a law to its implementation is not immediate, and the effects will only be measured in the coming years.

The rapid growth and proliferation of ICTs in today's society raises several issues related to the degree of acceptance of new tools or services, leaving the so-called digitally excluded behind. So-called techno-optimists tend to celebrate ICT for the impact they have on society, considering above all their incredible exponential growth, from which they derive ever improved performance at ever lower prices, thus in fact making them more accessible to more people. Economic accessibility is certainly important, but not sufficient to ensure that a certain technology is truly accessible - or easy usable - to all [47].

To make technologies usable for all and to lower the digital divide, disciplines such as HCD, UX, UD and gerontechnology become essential, also considering an integration of them [48].

Finally, the introduction of new ICTs must be handled with great care and respect for the commitment required of citizens who are unfamiliar with the technology; the lack of communication, notice, and phasing is at risk of creating significant disruptions that further alienate those already unwilling to use new technologies.

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