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Transforming our World through Universal Design for Human Development

Proceedings of the Sixth International Conference on Universal Design (UD2022)

Editors: Ilaria Garofolo
Giulia Bencini
Alberto Arenghi

IOS Press

TRANSFORMING OUR WORLD THROUGH UNIVERSAL DESIGN FOR HUMAN DEVELOPMENT

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The image on the front cover represents the Winged Victory of Brescia, a bronze statue from the first century CE. The statue is preserved in the Roman Archaeological Park in Brescia.

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NEAR PROJECT – Accessibility Plan for the Monumental Complex of the Opera di S. Maria del Fiore in Florence. Accessibility as an Element of Social Cohesion

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Abstract. Italy is the country with the highest number of sites recognised as World Heritage by UNESCO and one of the nations with the highest density of sites of cultural interest both in Europe and in the world. Unfortunately, only a small part of these are completely and easily accessible, and certain of the most fragile sections of society, for example disabled persons, are in fact excluded from the possibility of visiting and discovering the said places. The research presented here represents an "experiment" in the application of the methodology of the Accessibility Plan to the monumental complex of the Opera di Santa Maria del Fiore in Florence, in other words the attempt to increase the degree of accessibility of the complex through a medium and long-term innovative strategic planning tool that takes into consideration not only material aspects (physical and sensory accessibility) but also aspects of an intangible nature, thus making it possible for people to fully understand the cultural meanings of the places, and focusing on the "experiential dimension of the visit" [1].

Keywords. Accessibility, Architectural Barriers, Human Development, Accessible Tourism, Inclusive cities

1. Introduction

The wish to increase the level of accessibility of places of cultural interest (often inherently inaccessible due to their ancient layout), through more or less complex actions or design interventions, is undoubtedly a worthy operation, useful for enhancing the places where we live. The worthiness of this ambition consists in ensuring access to certain specific places, which the community considers important in terms of its culture and identity, to an increasing number of people. Very often, however, intervention programmes aimed at improving the useability of places of cultural interest tend to consider them as elements that are isolated from the urban structure in which they are located, and this, to some extent, undermines the efforts to increase their level of accessibility. The use of a multi-scalar approach [1] that interprets the accessibility of a

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building not only in terms of its planimetric and spatial features, but also in relation to the urban structure on which it stands, to the paths that connect it to its surroundings and to the public services that complement it, represents the most appropriate solution for trying to modify the built environment so as to make it more inclusive, comfortable and welcoming. The expectation, in the view of a considerable scientific production on the subject, both theoretical and methodological, as well as operational, is that the research and projects aimed at increasing the environmental accessibility of places respect the multi-scalar nature of this issue, in other words that the need to address the improvement of the accessibility of places should take into account the entire urban structure and the dense relationships that exist between its various parts, both in relation to the activities and to the uses and behaviours of the people who live in them. As long as municipal administrations do not address the issue of urban accessibility seriously, considering it as a crucial element in their strategic planning, projects and researches, although necessary for enhancing the condition of places and increasing the degree of accessibility, will regrettably remain partial and produce a limited impact.

Since the topic of accessibility to cultural heritage represents a very vast and articulated field of investigation, with numerous parallel lines of study, in developing the NEAR project we attempted to focus not so much on possible solutions to the accessibility issues involving the monumental complex, but rather on the collective character of the theme of accessibility, understood as a resource that involves cultural, ethical and economic aspects. For this reason, since the early phases of the research we referred to goal number 11 of the United Nations 2030 agenda, that is to "*Make cities and human settlements inclusive, safe, resilient and sustainable*". In this framework, accessibility is considered in terms of inclusiveness, emphasising the need to modify the built environment in which we live so that it can allow all people to benefit from the available resources, both tangible and intangible, to express and fulfill their aspirations, and to use the services and functions that characterise contemporary life. This goal, applied to historical contexts of considerable historic-artistic value, can be achieved by activating a complex process based, on the one hand, on the needs of people, and on the other on the safeguarding and preservation of the built heritage [2]. This takes on a distinct character in places of cultural interest, and necessarily requires the establishment of a synergy between different competences and the use, increasingly essential, of technologies, and in particular of *Information and Communication Technologies* (ICTs).

2. The NEAR Project

The project entitled "NEAR – Inclusione all'*Opera*" contemplates the drafting and development of the Accessibility Plan (A.P.) for the monumental complex of the Opera di Santa Maria del Fiore (O.S.M.d.F.), in other words the determination of an operative tool aimed at identifying and classifying access issues (architectural barriers and lacking services) that limit and hinder the usage of the spaces open to visits and worship, and to either solve them or mitigate them through a coordinated set of interventions organised in accordance to a precise order of priority. The general goal of the *Accessibility Plan* does not regard exclusively the overcoming of existing architectural barriers and the adaptation of spaces to current regulatory requirements, but also aims to attune accessibility-related needs (to spaces and cultural content) to those concerning the safeguarding of the cultural heritage, so as to promote a culture of heritage protection and social inclusion. The ultimate goal of the drafting of the A.P. is to improve the

experience of the visit for all categories of users through interventions that promote access to culture while also preserving the historical and cultural value of the spaces and artifacts on which it intervenes.

The development of the A.P. is not, therefore, the definitive solution to all the problems concerning accessibility, yet it does represent a *plausible alternative* for allowing the inestimable heritage safeguarded by the Opera di Santa Maria del Fiore to become accessible to the widest possible public. Although it is inevitable that some accessibility issues will remain, both of a subjective and an objective nature, the reliance on the *architectural project* and the support from the most sophisticated immersive and virtual simulation technologies will ensure a greater degree of accessibility also to those places that are currently completely inaccessible to disabled and more fragile users. It is from these considerations that the procedural nature of the A.P. derives, which means that it is not constituted as a definite and finished product, but rather configured as a *tension* towards a goal to be achieved in time, aimed at ensuring, through adequate managerial and/or architectural solutions, better conditions concerning:

- The recognisability, reachability and accessibility of places;
- The enjoyment and understanding of cultural contents (the symbolic meaning and value of works of art and architecture) safeguarded at Santa Maria del Fiore.

Considering the monumental nature of the context of intervention, as well as the fact that the pressing preservation requirements impose strong restrictions to any possibility of modifying the existing state of places, the attempt by the A.P. of the Opera of S.M.d.F. consists precisely in determining those interventions which, while slightly modifying the appearance of the buildings and spaces, respect their worth and avoid any loss of value.

2.1. The main methodological aspects adopted

One of the challenges presented by the drafting of the A.P. of the monumental complex of Santa Maria del Fiore concerned the boundary delimitation of the context of intervention and the classification of the various spaces which compose the monumental complex. The field of application of the A.P. is in fact both articulated and complex since, being located at the heart of the historic city of Florence, it involves spaces and buildings which have been stratified in time, with functions, features, spaces and cultural values that are very different from each other. The first action undertaken thus concerned the determination of a *general unified map*, Figure 1, of the spaces and buildings involved in the A.P. The area under analysis is made up of a portion, albeit limited, of the historic city, namely the two squares, Piazza di San Giovanni and Piazza del Duomo (with their relative access routes); the three main elements of the monumental complex, in other words, the Cathedral of Santa Maria del Fiore, Giotto's Bell Tower and the Baptistery of San Giovanni; as well as the other spaces owned by the *Opera*, which overlook the squares or are in the immediate vicinity of them, and serve the operation of the entire monumental complex.

The complexity, articulation and diversity of the spaces involved in the A.P., have imposed the necessity to identify different strategies of intervention in accordance to their type and function. The choice of including public spaces in the Plan (squares and access paths) responds to the wish to satisfy, at least partially, the requirement of multi-scalarity, which the theme of accessibility to the architectural heritage demands [1]. By including public spaces and their access routes in the analysis, an attempt was made to reduce the degree of incompleteness resulting from the limited context of intervention

and the impossibility (in terms of resources and time) of considering a larger section of the city, such as the entire UNESCO centre. The survey phase highlighted the numerous access issues involving the buildings of the monumental complex, as well as the public space that surrounds them, and therefore also the need to identify a tool for organising and planning the necessary adaptation interventions within such a valuable context. It was therefore decided to ascribe a higher priority to organisational/managerial interventions (that do not intervene on the material structures of the buildings) and, only in the case in which these types of interventions are not sufficient or feasible, to devise adequate architectural solutions which, although modifying the context, do so in full respect of both its value and quality.

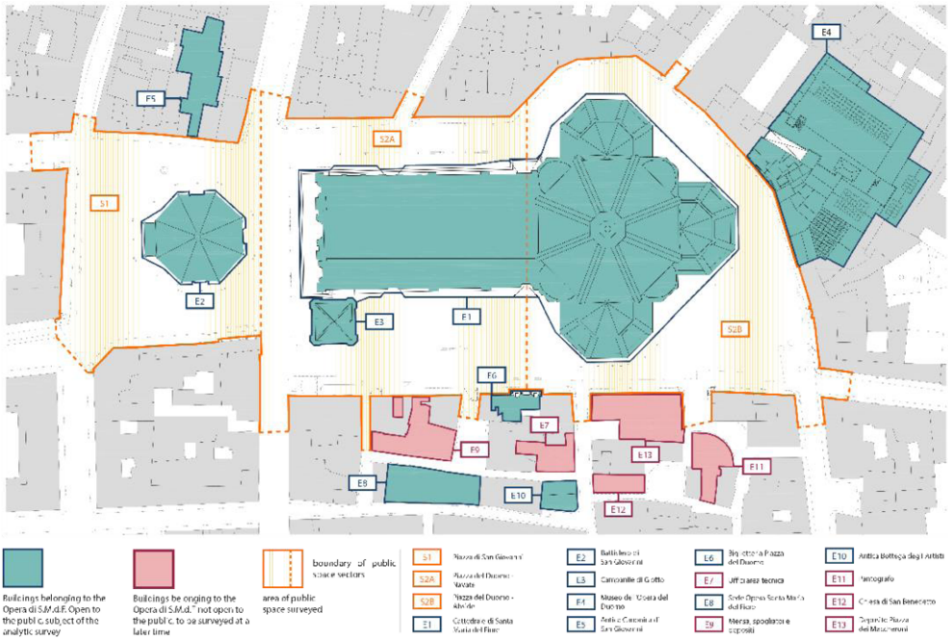

Figure 1. *General unified map* of the open-air spaces and of the buildings analysed.

Since the monumental complex of Santa Maria del Fiore presents elements with inherent inaccessibility issues, such as the Brunelleschi Dome or Giotto's Bell Tower, for example, and the use of mechanical solutions to ensure physical accessibility to these places is difficult and in many cases impossible, there are numerous solutions contemplated by the Action Plan that make use of *Information and Communication Technologies* (ICTs) in order to offer an alternative experience and the possibility, for everyone, to access content, information and data that are currently inaccessible [3]. Finally, since the possibility of enhancing the accessibility of a place is connected to its inherent features and its architectural essence, it was considered useful to assess, for every building and space analysed, the *carrying capacity*, in other words the threshold beyond which the intervention contemplated irretrievably alters the structure's essential features, as well as the *points of minor resistance*, that is the parts or areas of the asset that are better suited for accommodating the devices aimed at increasing the general degree of accessibility. The process of collecting this information is intended to promote the development of sensitive projects that are able to harmonise, from a functional, aesthetic and symbolic point of view, the needs of accessibility with the countless

objectives that the architectural project must achieve [4]. The acquisition of this information, as well as of the accessibility issues detected, will allow architects and designers to devise sensitive projects which are appropriate to the context of intervention, while avoiding the use of pre-packaged and standardised solutions, which usually tend to convey an idea of neglect and of lack of interest in the accessibility of places.

2.2. The main methodological aspects adopted

The NEAR project is divided into three subsequent phases:

- *Knowledge Phase* – construction of an exhaustive cognitive framework regarding the context of the intervention (analysis of the places, services and stakeholders' needs, and of the issues concerning access to the monumental complex through the application of dialogue tools and on field analysis;
- *Planning Phase* – determining a schedule for the adaptation interventions and their sequence, in accordance with clearly defined priority criteria;
- *Design Phase* – definition of a set of suggestions useful for determining suitable solutions to the accessibility-related issues detected, with the purpose of developing a guidance tool for the gradual increase of the degree of accessibility.

The core of the first phase, in addition to the application of the dialogue tools, consisted in the analytic survey of access issues, such as the identification and classification of both the existing architectural barriers and the missing quality indicators. The twofold interpretative key with which the places under scrutiny were analysed derives from the nature of the A.P. itself, in other words from the consideration that the improvement of the degree of accessibility of a place is not to be achieved only through the removal or elimination of what are commonly known as architectural barriers, but also through the installation of those services and equipment that are lacking and which contribute to making the said places welcoming and safe for differently abled people [4]. It is worth underlining how the survey of access issues represents a very delicate phase of the Plan, since it has a direct influence on the subsequent phases. In fact, both the determination of the *List of adaptation interventions* and the chronological order in which it is proposed to carry out the said interventions, are based on the information gathered during the survey, whose accuracy and precision are therefore crucial for the Plan to meet its objectives.

The accuracy of the survey is closely related to the quality of the available maps. For this reason, we proceeded to construct an updated cartography including all those elements necessary to determine the level of accessibility[2] and only then did we begin the phase involving the identification of architectural barriers and of quality indicators, based on specific functional categories [4]. In order to facilitate the visualisation of the architectural barriers and quality indicators, labels with an alphanumeric code were placed on the various plans of the surveyed spaces, Figure 2. Each label unambiguously identifies a barrier or a quality indicator and refers both to the *descriptive card* and to the corresponding *adaptation intervention* contemplated for the overcoming of the issue identified by the label. The system of alphanumeric codes and colours, facilitates the

2 Available maps often do not include the necessary information for assessing the various degrees of accessibility, such as, for example: the indication of the connections between streets and footpaths, the location and size of rubbish bins, storm drains, manholes, poles, and bollards, etc.

management, control and updating of the state of accessibility of the places covered by the Accessibility Plan, thus allowing an easy reading of the current condition.

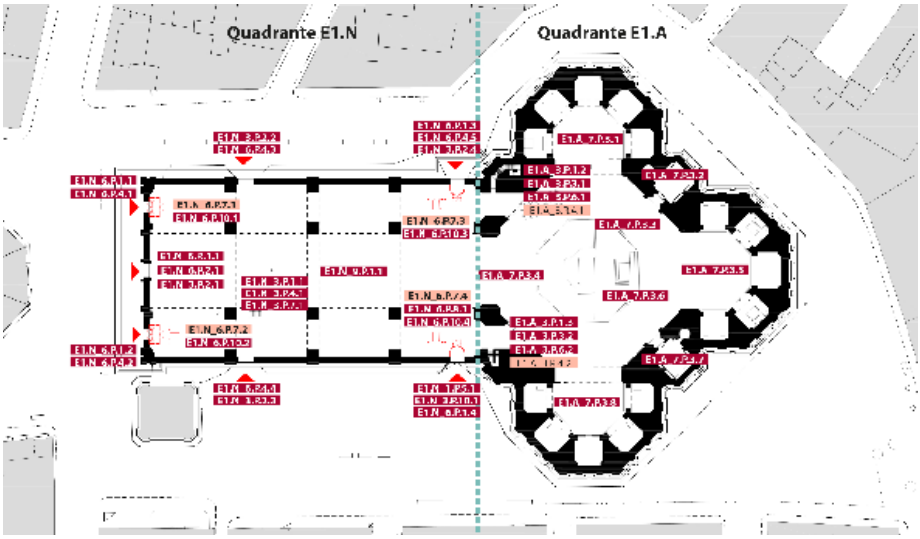

Figure 2. Identification of the existing architectural barriers in the Cathedral of S. Maria del Fiore.

Only after the survey was completed and the general cognitive framework was established did the Planning Phase, which is the fulcrum of the entire A.P., begin. During this phase all the *Complete lists of adaptation interventions* were established for every building and space included in the A.P., further divided into managerial and architectural interventions. All the interventions were described in their most essential and significant features, so as to better address the subsequent Design Phase. It is evident that the adequacy and feasibility of the interventions described directly determines the quality of the A.P., as well as its effectiveness. Given that the design of the adaptation interventions will take place after the planning phase, the most complex aspect in the programming of the NEAR project concerned the determination of the *Priority lists for the interventions*, in other words, the organisation of the interventions according to a priority scale based on a multi-criteria assessment established in agreement with the entity that manages the monumental complex. This assessment was based on an estimate regarding the *urgency* of every intervention to be implemented (solving safety issues, for example) and the *impact* that the implementation of every intervention could have on the community. Thanks to this scale of values and to the use of an *impact/urgency matrix*, it was possible to determine a precise order of implementation of the interventions that is consistent with the context and the available resources. The use of the matrix makes it possible to rapidly order the various interventions and to graphically display the order using a concise and compact form.

Finally, once the planning and scheduling of the interventions had been established, the first step in the Design Phase was to collect in a brief document the design suggestions proposed, in order to help identify the most appropriate solutions to the various existing issues. These suggestions are collected in a *guidance tool* and organised on the basis of 8 *problem areas*, in other words of 8 themes which have highly marked typical characteristics and can therefore be outlined through elements of a general nature. The purpose of the design suggestions is to provide support to the work of the architect

or designer in the search for solutions that are coherent with the context and with its aesthetic and architectural features, as well as in adopting the design approach (mimetic approach, prosthetic approach, etc.) that is more appropriate for every specific case.

2.3. Results

The results of the research are collected in 11 correlated documents, which together constitute the *Accessibility Plan for the Monumental Complex of the Opera di Santa Maria del Fiore*. The documents can be divided into two categories: *methodological documents*, which contain the data collected during the Knowledge Phase, including the description of the activities carried out, as well as of the methods and tools used to complete them; and *operative documents,* produced during the Planning and Design Phase, which contain the results of the various activities, including a detailed analysis of the current conditions, the framework of needs, maps of critical environmental issues, and a schedule and order of the interventions and design suggestions. In brief, the results of the NEAR project can be summarised as follows:

- identification, classification and description of approximately 400 access issues;
- construction of a website that can be consulted and updated which contains all the *descriptive cards* regarding the access issues detected;
- identification of 5 strategic interventions aimed at improving the management of visitor flows and the general experience of the visit, and description of more than 100 interventions to be implemented in the buildings belonging to the *Opera* and in public spaces of the Municipality of Florence;
- drafting of 16 intervention Priority Lists, organised in accordance with a multi-criteria assessment;
- development of a *guidance tool* which contains the suggestions for a thorough planning of the adaptation interventions identified;
- identification of *concurrent alternatives*, in other words of different design solutions aimed at achieving the same objectives in alternative ways.

Independently of the results listed above, a broader assessment of the results achieved by the NEAR project is necessary in order to highlight the more general, and therefore replicable, aspects of the A.P. for the Opera di S.M.d.F. Although the A.P. is in fact configured as a tool for implementing a strategy to gradually improve the degree of accessibility of the places on which it intervenes, it also constitutes an important resource for harmonising, within a single operational tool, the entire process of management and preservation of the architectural heritage. In this sense, the A.P. must be understood as an element in a wider Management Plan for the monumental complex, in which all the activities necessary to keep it functioning (be it restoration interventions, extraordinary and ordinary maintenance; activities linked to safety, improvement of accessibility, etc.) are coordinated and included in an overall design. Since the management of an architectural heritage such as the one belonging to the Opera of S.M.d.F. necessarily involves the planning of numerous interventions aimed at the restoration and preservation of monuments, the existence a tool for planning interventions for improving accessibility would allow to coordinate the various different activities necessary for the overall management, and therefore produce positive effects in terms of the following: optimisation of available resources, reduction of the negative

impact of the works necessary for carrying out interventions on monuments, and reduction of the time necessary to achieve adequate levels of improvement.

3. Conclusions

The research work carried out represents a useful assessment of the methodological and conceptual elaborations of the A.P. The application of the principles that inspired the A.P. for the monumental context of the Opera di SMdF, in addition to initiating the implementation of interventions aimed at increasing the accessibility to the complex's spaces and cultural contents, represents one of the first, if not the first, instance of effective "testing" of the methodology of the A.P. as applied to a specific cultural heritage site. The inherent differences that exist between a municipal territory (object of the application of the original A.P.) and a site of cultural interest such as the Opera di S.M.d.F., which has numerous protection restrictions (landscape, monumental, archaeological, etc.), determines the need to adapt the original methodologies and tools to the characteristics of the context of reference. If, for example, we consider that the A.P. of a municipality can contemplate the relocation of a regional office (such as a registry office, for example) from a place that is difficult to access to one that is more easily accessible, simply by identifying a suitable space for that purpose, it is easy to understand how this method cannot be applied to a monumental complex, which is such because it is located in that very place with those specific characteristics. In the same way, if we consider the general *carrying capacity* of the system, in other words its ability to bear interventions without suffering a loss of value, it is easy to understand as well how the carrying capacity available to a municipal A.P. is much greater than that which is available in a context such as that of Santa Maria del Fiore. These and other elements could lead to unexpected results, and although there is still much research and investigation work to be done in order to develop a tool that is up to the standards of the heritage of which we are the custodians, the good results achieved and the experience acquired, in terms both of the obstacles to overcome and of the strategies to be applied regarding the context under analysis, make it possible to envisage the replicability of the experience undertaken at the Opera di Santa Maria del Fiore in many other contexts of cultural interest, increasing the research, studies and projects aimed at preserving the heritage from the past and encouraging its use and enjoyment, remembering that, in the words of Georg Gadamer, "Culture is the only asset of humanity that, when divided between us all, becomes greater rather than smaller".

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An environment, or any building product or service in it, should ideally be designed to meet the needs of all those who wish to use it. Universal Design is the design and composition of environments, products, and services so that they can be accessed, understood and used to the greatest extent possible by all people, regardless of their age, size, ability or disability. It creates products, services and environments that meet people's needs. In short, Universal Design is good design.

This book presents the proceedings of UD2022, the 6th International Conference on Universal Design, held from 7 - 9 September 2022 in Brescia, Italy. The conference is targeted at professionals and academics interested in the theme of universal design as related to the built environment and the wellbeing of users, but also covers mobility and urban environments, knowledge, and information transfer, bringing together research knowledge and best practice from all over the world. The book contains 72 papers from 13 countries, grouped into 8 sections and covering topics including the design of inclusive natural environments and urban spaces, communities, neighborhoods and cities; housing; healthcare; mobility and transport systems; and universally-designed learning environments, work places, cultural and recreational spaces. One section is devoted to universal design and cultural heritage, which had a particular focus at this edition of the conference.

The book reflects the professional and disciplinary diversity represented in the UD movement, and will be of interest to all those whose work involves inclusive design.

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