

ASSESSMENT OF THE ACCESSIBILITY LEGISLATION IN SPAIN AND ITS EFFECTIVE APPLICATION

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Abstract: The existence of legislation on accessibility does not always imply it is enforced effectively. This article aims to answer the following question: Is the existence of accessibility legislation enough to make physical environments truly accessible?

This study assesses the current Spanish legislation as well as any existing voluntary regulations in the country. This assessment is done chronologically, so as to show the historical evolution of the accessibility regulations in Spain.

In order to determine whether accessibility legislation has been truly effectively enforced, the issue is studied as it affects Spanish municipalities with respect to urban planning, public buildings, public transportation and websites.

The conclusion of this study is that the existence of accessibility legislation per se is not enough to ensure its practical application, and ultimately, to render physical environments, products and services accessible to the majority of the population regardless of their functional capabilities.

Keywords: legislation, accessibility, regulations, municipalities, urban planning, public buildings, public transportation, and websites.

Introduction

Accessible physical environments, products and services improve the quality of life of all people, regardless of their functional capabilities. Obviously, accessibility is an essential condition for people with disabilities to be able to exercise their basic rights as citizens on equal terms with the rest of the population. This is why while the struggle to attain accessible physical environments, products and services originated in the disability rights movement; it has doubtlessly become a fundamental right for all citizens. According to the 1st National Accessibility Plan approved by the Spanish Government in 2003, 40% of the population benefits directly from accessibility (IMSERSO, 2003). Let's also bear in mind the European Institute of Design and Disability's motto, which is shown in its Stockholm Declaration and reads as follows: "Good design enables, bad design disables" (EIDD, 2004).

The principal original demands of the accessibility rights movement were focused around the creation of a body of law powerful enough to force both the public administration and the private sector to introduce accessibility "Design for All" criteria, which would then achieve its greatest possible reach. While a priori it might seem obvious that the existence of a legal framework should create the conditions for a seamless incorporation of accessibility elements into surroundings, products and services, the reality can be very different.

It is, therefore, important to assess first, whether the existing Spanish legislation on accessibility is sufficient, and second, whether its practical application is proving truly effective.

Spanish Legislation

The Spanish legislation on the removal of architectural barriers and universal accessibility is analysed below.

The first Spanish legislation to introduce the concept of barrier removal was Act 13/1982, of April 7 on the Social Integration of the Disabled (Spanish Government, 1982); its treatment of the accessibility issue is however very superficial, as only a small part of the Law (section 1, title IX) refers to it. The physical environments the law deals with in terms of objectives for accessibility improvement are basically urban, with the responsibility to develop specific accessibility legislation assigned to the Autonomous Communities of the country.

The next legislation approved in Spain regarding the removal of barriers was the Royal Decree 556/1989 of May 19, which establishes minimum accessibility requirements in buildings.

It was only in the late 1980's and in the 1990's that each Autonomous Community exercised its mandate by passing its laws on the removal of urban, architectural, transportation and communication barriers. These laws focused particularly on tending to the needs of people affected by limits in their motor functional capabilities, but neglected the needs of citizens with sensory, mental or intellectual limitations.

Despite the national and regional governments' efforts to regulate architectural, urban and transportation accessibility, these laws were drafted without a penalty system. This meant that any infringement of such laws did not result in a penalty, which led to widespread non-compliance. This situation was reflected in the 1st National Accessibility Plan, approved on July 5, 2003 and effective from 2004 through 2012: "The field work carried out to prepare the Plan revealed that the measures currently being undertaken to improve accessibility in Spain are often disjointed and uncoordinated, producing an unsatisfactory overall result." (IMSERSO, 2003)

Overall, this Plan was established, as the ruling document, to promote accessibility in Spain during its period of effectiveness. In addition, it established both specific goals and a cross-sectional methodology appropriate for the development of the Plan's motto: "Achieving Equal Opportunity and Full Participation through Design for All." It is in this document that the concept of "barrier removal" is replaced with the

concept of “Design for All.” In general, the terminology used was revised, with a view to replace negative terms with more positive and inclusive ones. However, as pointed out in the “Guide to Gender Mainstreaming in Public Disability Policies; Chapter 3: ‘Accessibility’ (Hernández-Galán et al),” the Spanish term “diseño para todos,” as used in this Plan, which is a literal translation of the English term “Design for All,” is considered a sexist terminology. Consequently, a more “politically correct” translation, such as “diseño para todas las personas” (Design for All People) is suggested.

The Plan defines Design for All as “the approach through which products, services and built environments should be designed right from their inception so that they can be used by as many people as possible.” Thus, both the concept of “equal opportunity” as well as that of “Design for All”, which constitute the two core ideas driving the struggle for accessibility in the last few years, appear together in the Plan’s motto.

This concept establishes a pro-active attitude geared towards overcoming the stigma attached to the different way in which people with disabilities have traditionally been treated. In addition, it emphasizes the need to take into account the diversity of individual functional capabilities as it incorporates them in the process of designing physical environments, products and services. Incorporating the Design-for-All approach cross-sectionally to the processes of designing, project drafting and planning is essential in order for their results to be truly usable by everybody (Kercher, 2007).

One concept that has not yet been incorporated into legislation but is being made part of the design processes is that of “Design Thinking.” This concept applies a much more holistic vision to the design process, and strives to resolve more complex problems than those exclusively focused on form and functionality. It also incorporates solutions to problems related to tending to the needs of the most vulnerable, such as social collectives at risk of exclusion, people living in extreme poverty, etc. (Brown and Wyatt, 2010).

Both the concept of “Design for All” and that of “Design Thinking” are undoubtedly convergent, even though they differ in origin and focus on solving different problems.

A few months after the National Accessibility Plan became effective, on December 2, 2003, a new law was approved by the Spanish Government: “Act 51/2003 on Equal Opportunity, Non-Discrimination and Universal Accessibility for People with Disabilities (LIONDAU)”. This law aims to establish measures to both guarantee and make effective equal-opportunity rights for people with disabilities.

In addition, the law establishes that, within a period of two years, basic accessibility requirements would be determined for the following fields:

- Basic accessibility and non-discriminatory requirements for public administrations;
- Basic accessibility and non-discriminatory requirements for the access and use of technologies, products and services related to the information society and to social communication media;
- Basic accessibility and non-discriminatory requirements for the access and use of transportation;
- Basic accessibility and non-discriminatory requirements for the access and use of public urban areas and buildings;
- Basic accessibility and non-discriminatory requirements for the access and use of goods and services available to the public.

In order to institute quality management in the use of public resources, all of the above-mentioned basic accessibility and non-discriminatory requirements must also be applied to protected natural areas.

Even though the government was legally bound to follow up LIONDAU with specific regulations within a period of two years, it was not until 2007 that they were put in place through the following Royal Decrees:

- RD 366/2007 of March 16, which establishes the accessibility and non-discriminatory requirements for people with disabilities in their dealings with public administrations;

- RD 505/2007 of April 20, which approves the accessibility and non-discriminatory requirements for people with disabilities for the access and use public urban areas and buildings;
- RD 1494/2007 of November 12, which approves the Regulations on the basic requirements for people with disabilities' access to technologies, products and services related to the information society and to social communication media;
- RD 1544/2007 of November 23, which regulates the accessibility and non-discriminatory requirements for people with disabilities' access and use of transportation.

On December 26, 2007, Act 49/2007 was approved. It establishes the rules on infringements and penalties regarding issues of equal opportunity, non-discrimination and universal accessibility for persons with disabilities. This law has provided a tool for people with disabilities to defend themselves from any discriminatory action taken against them. Penalties for serious infringements can reach up to one million euros. None of the previous laws on disability included a penalty system, so they were habitually breached.

On March 17, 2006, the Spanish Royal Decree 314/2006 establishing the Technical Building Code was issued without technical regulations on accessibility, which had to await the issuance of the Royal Decree 505/2007 mandating the setting up of basic accessibility requirements in buildings. Such requirements were finally put in place in 2010 through Royal Decree 173/2010 of February 19. This latest decree amended the 2006 Technical Building Code on accessibility and non-discrimination of people with disabilities established by the Royal Decree 314/2006.

On December 13, 2006 the UN approved in New York the Convention for the Rights of Persons with Disabilities. On May 3, 2008 both the Convention as well as its Optional Protocol became effective in Spain, having been previously ratified, as reflected in the Spanish Official State Gazette of April 21, 2008 and April 22, 2008, respectively. This Convention has come to fill a void in the framework of international human rights legislation as no previous regulation had taken into account the special circumstances of

people with disabilities. As such, it constituted an ultimate recognition in support of, and an essential step for the promotion of, their full integration in all areas of society.

It is important to highlight that the ultimate purpose of the UN Convention is to enumerate the rights of people with disabilities and to establish a specific code for their application. Consequently, its 50 articles specifically detail the rights of people with disabilities, which encompass, among others, civil and political rights, including accessibility, participation and inclusion, as well as the rights to education, health, employment and social protection. It should be noted that the Convention recognizes the need for a change in societal attitudes as a requisite for people disabilities to enjoy equal rights.

Standardization

In addition to legal provisions, there exist other tools to promote accessibility, prominently among them standardization and certification. Standardization and certification have been powerful promoters of concepts such as quality and environmental and labour risk prevention. This has been amply demonstrated by the success of ISO 9001, ISO 14001 or OHSAS 18001 standards. Standardization and Certification have also shown themselves to be important elements in harmonizing national and regional legal provisions.

AENOR, the Spanish Association for Standardization and Certification, has been working for years on the standardization of accessibility, propelled in part by social agents and in part by its principles. While this work has been on going for years, it has notably intensified during the last five years. Among the results of these efforts are the developments of UNE standards and the participation in European activities geared towards accessibility standardization.

Several UNE standards have been developed including:

- UNE 26316:1983. "Passenger cars. Driver-hand controls in passenger cars;"

- UNE 41500:2001 IN. "Accessibility in urban areas and buildings. General design criteria;"
- UNE 41501:2002. "Accessibility signage. Rules and usage;"
- UNE 41510:2001. "Accessibility in urban areas;"
- UNE 41512:2001. "Accessibility in beaches and their surroundings;"
- UNE 41520:2002. "Building accessibility. Horizontal inter-action components communication elements;"
- UNE 41522:2001. "Building accessibility. Access to buildings;"
- UNE 41523:2001. "Building accessibility. Access to bathroom facilities;"
- UNE 139801:1998 EX. "Computer applications for people with disabilities. Computer accessibility requirements. Hardware;"
- UNE 139802:1998 EX. "Computer applications for people with disabilities. Computer accessibility requirements. Software."

In 2001, the UNE 170.001 standard "Universal accessibility: criteria to facilitate accessibility to the physical environment," was published. It consists of two parts:

- Part 1. MGLC requirements (Mobility, Grasp, Localization and Communication);
- Part 2. Universal accessibility management system.

This new standard represents an entirely new approach to standardization processes from that followed until that point and introduces three new concepts:

- It adds MGLC requirements, which approach disability from the point of view of its effects rather than the kind of disability;
- It establishes an accessibility management system and, as a result, an ongoing improvement of accessibility within a built environment;
- It sets out a certifiable standard.

MGLC requirements. In part 1, UNE 170.001 standard reads: "This standard establishes the requirements to be met by a specific physical environment

(places, establishments, buildings and facilities) so that their users can overcome any accessibility limitations.”

The requirements specified in this standard aim to “integrate the different needs of people in any kind of built environment so as to guarantee that such environments be used independently and in the same way by all people.” The standard also defines MGLC requirements as “the set of requirements related to the actions of mobility, grasp, localization and communication to be satisfied in order to guarantee universal accessibility to all built environments.”

The universal accessibility management system is based on the structure of the Quality Management System established by the UNE-EN ISO 9001 standard. Its definition follows an examination of the processes the user must follow to be able to enjoy a particular physical environment, on the basis of the MGLC requirements. Such system will allow determining the accessibility needs, which once satisfied will lead to an accessible environment.

The Universal Accessibility Management System is certifiable. As such, it can be evaluated by an established independent entity with competence in this area. The results of that evaluation would lead such entity to issue a certification of the system as meeting the UNE 170.001 standard requirements. (Fontanals, 2006).

Assessment of Accessibility in Spanish Municipalities

In order to verify whether current accessibility legislation is being enforced effectively, it is important to perform the necessary fieldwork to assess the actual state of both built environments and transportation systems.

It is also important to take into account the individual’s capacities as well as needs in terms of its interaction with the physical environment (Tyler, 2011). To this end, one must consider the capacity model developed by the University College of London.

In order to carry out the fieldwork systematically, it is necessary to develop an appropriate methodology that makes it possible to assess all the parameters and elements affecting accessibility conditions in built environments and transportation systems. It is also necessary to quantify them effectively. To this end, Fundación ONCE put in place in 2010 the Observatory for Universal Accessibility in Spanish Municipalities (Fundación ONCE, 2011). What follows describes the methodology as well as the results obtained in the above-mentioned study.

Methodology

The methodology used consisted of:

- Municipalities' selection: carried out through a stratified random sample. Six strata were identified based on the number of inhabitants. They are: less than 20,000; from 20,000 to 50,000; from 50,000 to 100,000; from 100,000 to 500,000; from 500,000 to one million; and more than a million. A total of 70 municipalities were evaluated.
- Limitations: the study has focused on urban planning, public buildings, public transportation systems and municipality websites.
- Items: measurable and quantifiable elements have been selected which are included in current legislation, establishing accessibility percentages in the evaluated municipalities.
- Evaluation: this methodology does not evaluate the degree of accessibility or inaccessibility of the studied elements. Instead, it measures the degree (in percentage) to which the current legislation is being enforced, and thus it deals with objective facts and not subjective assessments.
- Thoroughness: the accessibility assessment has been carried out with a great level of detail. One hundred seventeen indicators were reviewed and evaluated for urban layouts, 147 for buildings, and 68 for transportation systems.

- Specialization: architects specialized in accessibility gathered all data. The use of self-assessment, systems that can distort accuracy in the gathering of data, was avoided.
- Objectivity: in no case have the data been based on users' perceptions. All data are objective, as they are obtained on the basis of current legislation, and have been accounted for and registered every time a deficiency was observed.

In the 70 municipalities included in the study, evaluations were undertaken in 330 routes encompassing more than 254 km of streets, 354 public buildings, and 70 transportation units. One hundred forty in-depth interviews were carried out with municipal technicians and architects, as well as with local representatives of the disability rights movement.

Results

This article presents the principal results of the study undertaken by the Observatory for Universal Accessibility in Spanish Municipalities. They have been grouped according to the different areas of study, i.e., urban planning, public buildings, transportation systems, and websites.

Urban layouts

- Pavement: of the 254 km of street assessed, 1.7% was found to be deficient. These deficiencies are usually related to firmness, use of cobblestones, instability, etc.
- Loose parts, bumps, ditches, etc., which impede accessibility are due to deficient execution of public works, inadequate selection of construction elements (such as excessively wide grates) or both. These obstacles affect 0.7% of the evaluated urban layouts.
- Tree basins. Of all the assessed basins, 69.7% are not covered or inadequately covered.
- Occasional sidewalk slopes: 42.3% are caused by driveways to garages, 30.2% by curb cuts, 9.3% by access to building entrances, and 18.2% by other causes, such as road works, stairs, etc.

- Pedestrian crossings: 64.7% of the assessed crossings were affected by some deficiency and as a result could not be used properly by all people, and in 17.4% of cases, there were no crossings at all. Moreover, in 35.7% of cases, warning pavement was inexistent or incorrect; in 19.7% there were no curb cuts, and 15.7% lacked proper signposting.
- Traffic lights: 67.6% lacked acoustic signals, which impede blind or visually impaired individuals to be able to make it across streets safely and independently.
- Stairs: a very high percentage (90.6%) does not meet at least one of the basic design requirements. The most frequent flaws are the lack of accessible banisters or handrails (26.5%); absence of warning pavement both entering and exiting (26.5%); and lack of sidewalls, and uneven steps (16%).
- Ramps: 6.78% are not wide enough, which makes them very hard or even impossible to use; a ramp with a steepness or length above the limit established by law (1.7%) requires a greater effort and higher balance control on the part of the user, which not all of them can achieve. When handrails do not meet the appropriate design criteria (15.5%), they do not serve their purpose and thus become useless. The lack of sidewalls (32.8%) entails a dangerous level of falling risk.
- Bollards: 10% present design deficiencies in their shape, height or paint contrast with the surroundings.
- Dumpsters: 74.7% of the assessed dumpsters present design deficiencies.

Public buildings

- Access: of the 354 assessed public buildings, 42.6% do not have ground level access, and of those, 49.6% of them lack accessible walkways. The result is that a total of 21% of the buildings is not accessible.
- Stairs: 29.2% lack warning pavement; 89.5% have deficient handrails and banisters; 69.2% have de inadequate steps, and 66.2% have no sidewalls.

- Ramps: design deficiencies include excessive steepness (27.7%) and inadequate length (31%); lack warning pavement (96.2%); and the absence of adequate banisters or handrails (85.4%).
- Signage: 66.1% of buildings lack directional signs; 95% have no Braille signs. In addition, of the total existent signs, 13.4% are not accessible.
- Information and communication: 89.9% of buildings lack specialized customer service staff with knowledge of sign language and 95.6% lack documents and brochures in Braille.
- Elevators: 18.5% of buildings with more than one floor have no elevators, and 12.5% of elevators have no buttons with acoustic/luminous detection, raised surface or Braille signs.
- Restrooms: 20% of public buildings lack accessible restrooms, and in 31.6% of buildings that do, they are not located at ground level.

Transportation

- Bus stops and approaching areas: while 89% are favourably located on sidewalks wider than 1.5 meters, negative factors were found, such as badly covered tree basins in 23.9% of the cases, or slippery pavement in 7.7%. In addition, there were no chromatic/podotactile warning strips in 94.1%.
- Bus stop shelters: 36.1% have no signage; 13.1% have no seats, and of those that do, 89.6% are inaccessible.
- Buses: 28.8% are not low-floor buses and 32.8% have no ramps. As for information systems, 79,7% lack audio devices and 56.7% have no visual devices.

Websites

The main accessibility issues relate to multimedia contents, applications such as Adobe Flash, and PDF files. The evaluated municipality websites have been rated at 6.5 in a scale of 1 of 10.

Conclusions

- While legislation on the removal of barriers was approved in every Autonomous Community during the 1990's, it was only beginning in 2003 that the corresponding set of regulations was completed. It was the Equal Opportunity, Non-Discrimination and Universal Accessibility Law and its subsequent legislative elaboration, in particular its basic accessibility requirements, that have provided Spain with a legislative body that constitutes a model.
- By and large, current legislation is not being enforced. One of the main reasons has been the absence until virtually 2008 (December 26, 2007) of a law establishing rules on infringements and penalties regarding issues of equal opportunity, non-discrimination and universal accessibility. This time lapse resulted in a situation where people with disabilities were defenceless in the face of lack of enforcement of the existing Law.
- The previously existing accessibility legislation suffered a high level of dispersion until 2007, when the basic accessibility and non-discriminatory requirements for persons with disabilities were approved for four of the five fields established by the Equal Opportunity, Non-Discrimination and Universal Accessibility Law. In addition, and apart from this lack of homogeneity in national legislation, regional legislation has not been enforced systematically.
- Regional legislation on accessibility suffers from a high degree of obsolescence. The first area that calls for modernization is its terminology, which must evolve from the concept of "removal of barriers" to those of "Design for All" and "universal accessibility". In addition, many Autonomous Communities lack specific accessibility regulations regarding the information society as well as new technologies. This is behind the need to modernize and harmonize regional legislation on the basis of national legislation.
- A National Accessibility Plan was not approved until 2004. This document has provided the public administration and civil society with a strategic tool to make accessibility to environments, goods,

products and services a reality. Previously, there was no specific plan which would prompt all social agents to work jointly towards a shared objective.

- The conclusions of the fieldwork carried out as part of Observatory for Universal Accessibility in Spanish Municipalities confirm that, to this point, accessibility improvements have focused on the needs of people with limitations in their motor functional capabilities, in particular wheelchair users.
- The needs of blind and visually impaired people have recently begun to be addressed, but their progress has been slower than of actions affecting people with motor disabilities. As an example, while 80.3% of evaluated pedestrian crossings have flattened curbs, only 64.3% display a proper warning pavement. Another example is the very high percentage of traffic lights lacking acoustic signals.
- The needs of people with hearing disabilities and limited cognitive capabilities have seldom been addressed when accessibility improvements in physical environments have been carried out. This is reflected in the fact that 89.9% of public buildings lack specialized staff with knowledge of sign language.
- The actions carried out have not followed a strategic plan but have taken place on an ad hoc basis aimed at implementing partial solutions. This reflects the fact that accessibility issues have not been analyzed holistically, and, therefore, the solutions to the existing problems have not taken into account Design for All principles.
- A very high percentage of the evaluated urban and signage elements do not meet the necessary conditions for them to be used easily and safely by people with disabilities.
- While safety in elements such as banisters, handrails, sidewalls and tree basins are of utmost importance, flaws are widespread. In the case of the first three elements cited, more than 50% of the flaws were found inside buildings.
- As for transportation systems, the situation mirrors that of built environments: the accessibility improvements have been geared

mostly towards meeting the needs of people with motor functional limitations rather than those of people with sensory disabilities.

- As for websites, while their rating might seem acceptable, it should be pointed out that they are sometimes difficult to use, particularly for people with sensory disabilities.

References

- [1] (Brown and Wyatt, 2010). Tim Brown & Jocelyn Wyatt. Design Thinking for Social Innovation. Stanford Social Innovation Review. Winter 2010. Retrieved from http://www.ssireview.org/articles/entry/design_thinking_for_social_innovation/.
- [2] (CERMI, 2003). Pérez Bueno, L. Nueva legislación sobre discapacidad en España. Madrid. 2003. ISBN: 84-609-0013-4. Retrieved from <http://usuarios.discapnet.es/disweb2000/lex/NuevaLegislacionSobreDiscapacidad.pdf>.
- [3] (CERMI, 2012) La transversalidad de género en las políticas públicas de discapacidad. Capítulo III accesibilidad (Hernández-Galán et al). Madrid, 2012. ISBN: 978-84-15305-19-4. Retrieved from [http://www.cermi.es/es-ES/Biblioteca/Lists/Publicaciones/Attachments/288/La transversalidad del genero \(2\).pdf](http://www.cermi.es/es-ES/Biblioteca/Lists/Publicaciones/Attachments/288/La_transversalidad_del_genero_(2).pdf).
- [4] (EIDD, 2004) The EIDD Stockholm Declaration 2004. European Institute for Design and Disability. Estocolmo, 2004. Retrieved from <http://www.designforalleurope.org/Design-for-All/EIDD-Documents/Stockholm-Declaration/>.
- [5] (Fontanals, 2006) Fontanals, J. "Certificado en Accesibilidad, garantía de Calidad". I Congreso Internacional de Turismo para Todos. Huelva, 2003.
- [6] (Fundación ONCE, 2011). Hernández-Galán, J. et al. Observatorio de la Accesibilidad Universal a los Municipios de España. Fundación ONCE. Madrid, 2011. ISBN 978-84-88934-49-9. Retrieved from: http://www.imserso.es/InterPresent1/groups/imserso/documents/binario/observ_accesib_muni_espana.pdf.
- [7] (Gobierno de España, 1982) Ley 13/1982 de 7 de Abril, de Integración Social de los Minusválidos. Retrieved from https://www.boe.es/diario_boe/txt.php?id=BOE-A-1982-9983.

- [8] (Gobierno de España, 2003) Ley 51/2003, de 2 de diciembre, de Igualdad de Oportunidades, no Discriminación y Accesibilidad Universal de las Personas con Discapacidad. Retrieved from <https://www.boe.es/buscar/act.php?id=BOE-A-2003-22066>.
- [9] (IMSERSO, 2003) Instituto de Migraciones y Servicios Sociales. Plan Nacional de Accesibilidad 2004-2012. Ministerio de Trabajo y Asuntos Sociales. Madrid, 2003.
- [10] (Kercher,2007) Interview-with-Pete-Kercher-in-Delo-magazine. Retrieved from <http://www.designforalleurope.org/Design-for-All/Articles>.
- [11] (Tyler, 2011) Tyler, Nick. Capabilities and accessibility: a model for progress. Journal of Accessibility and Design for All. 2011. ISSN: 20137087. Retrieved from <http://www.jacces.org/jacces/ojs/index.php/jacces/article/viewArticle/53>.

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ISSN: 2013-7087

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