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CITIES FOR ALL: THE ROLE OF AN INCLUSIVE UNIVERSITY
Case study of Madrid

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KEYWORDS

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ABSTRACT

Educational inclusion in the university setting represents one of the most significant challenges for higher education institutions in the 21st century. Throughout this process, cities play a decisive role. As multicultural and diverse environments, they directly influence how universities approach inclusion.

In fact, urban diversity forces universities to adjust access, services, curricula, and management to serve heterogeneous populations. Priorities change depending on the presence of immigration, race, socioeconomic status, disability, and gender diversity. The type of city in which the higher education institution is located influences how universities must compensate for differences with support programmes in large cities with high social segregation or prioritise efficiency over inclusion, leaving vulnerable groups behind.

Specifically, this article identifies how universities contribute to achieving socially sustainable urban environments in the specific context of Madrid, one of the key centres of Spanish higher education institutions promoting the creation of an inclusive, resilient, and sustainable city.

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1. Introduction

The inclusion of diversity in urban environments represents a significant challenge for contemporary societies. As cities evolve and become centres of social, cultural and economic activity, the inclusion of all people, regardless of their abilities, becomes essential to ensuring equitable and equal coexistence (Coronado and Ceballos, 2024).

In this context, higher education institutions play a crucial role in promoting policies and programmes that facilitate not only integration, so that different people can adapt to the existing citizen system, but also inclusion, which enables the urban system to adjust and accommodate the needs of all (Ramos et al., 2024). For this reason, educational inclusion in the university environment represents one of the most significant challenges of the 21st century for cities and the higher education institutions they host, since the university is a decisive social institution for integration and attention to diversity in the city, and therefore today stands as an important agent of change (Sevilla Álvarez et al., 2021).

In this regard, the synergy between cities and higher education institutions has an essential objective: that of strengthening the link between the educational community as part of urban society, in order to make all the necessary adaptations and updates to ensure at all times the rights guaranteed by law within the Spanish legal framework, in line with European regulations, which establish the obligation to guarantee equal opportunities and non-discrimination in access to higher education (Baig et al., 2023).

In fact, this mission of the university makes it an institution that is increasingly connected to urban society (Hernández Lloret, 2022) and to other institutions. Furthermore, since diversity is a fundamental requirement of the institutional culture of today's advanced cities (Hernández Lloret, 2022), this reality is also one of the most important principles of the European Union's framework programme for research and innovation, Horizon 2020, which emphasises the funding of projects aimed at achieving inclusive, innovative and secure societies (European Commission, 2011). This programme is being replaced and continued by Horizon Europe 2021 -2027, whose objective, in line with the previous programme, is to achieve a technological, scientific, economic and social impact of European Union investments in R&D, strengthening the competitiveness of Member States.

This challenge is also represented as one of the United Nations' sustainable development goals, as an integral part of the social inclusion of the 2030 agenda (Márquez and Melero Aguilar, 2020; Márquez et al., 2021). The European Commission also raises a number of additional challenges in relation to inclusive higher education, the most important of which, according to Hernández Lloret (2022), is the achievement of a close relationship with the community (Hernández Lloret, 2022), not only in terms of teaching and research (Rahman et al., 2019), but also in terms of the principles of corporate social responsibility (CSR) and the ethical commitment of cities (Evans et al., 2019; Santos Rego, 2020).

The fact is that the university, as a social agent of interest, has a decisive role to play in achieving an inclusive higher education institution, in line with the social dimension of the European Higher Education Area (EHEA), as established in the II National Plan for Universal Accessibility; inclusion that must be directly related to all stages of the educational process, as stated in the fourth Sustainable Development Goal (SDG), which aims to ensure inclusive, equitable and quality education for all people, promoting lifelong learning opportunities (UN, 2015).

Today, after a long evolution, Spanish universities have integrated the principles of equal treatment and non-discrimination, which are essential to the functioning of any city and the institution itself, both in its functions and in its policies and structures. The detection of particular needs and technological innovation, specific training in inclusion and diversity for teaching and administrative and service staff, and the development of measures for accessibility to services and teaching within the university framework (Moriña, 2021) is the path that Spanish universities are following.

The importance of this issue means that there is currently an inexhaustible wealth of publications, university manuals (Moriña, 2021), conference papers, guides and manuals of good

practice for the correct management and protection of guarantees of access to teaching and services for students affected by different types of diversity (Fundación Universia, 2018). However, there is no study that, based on the principles of universal design for learning (UDL), carries out a doctrinal and practical analysis of the universities of the Community of Madrid as key agents in promoting inclusion and attention to diversity in the cities where their campuses are located.

Consequently, the main objective of this research is to analyse the level of institutionalisation of attention to diversity in Madrid's universities, based on an understanding of the social challenge that university institutions face in complying with the prevailing attention to diversity and its inclusive effect on cities. Likewise, through a multidimensional approach, it seeks to understand how the actions of these institutions not only benefit people with disabilities but also enrich the diversity and social fabric of Madrid's cities.

To achieve this, it has been essential to take into account the role of the diversity units in these centres, because they are the driving force that enables a university to be fully committed to its students and citizens (Hernández Lloret, 2022) and (García-Gutiérrez and Corrales, 2021) that, beyond traditional university issues such as responsible innovation, research or dissemination, it must develop all processes aimed at decisively and increasingly fully integrating vulnerable groups.

Bearing in mind that promoting inclusion in all processes related to access to higher education services and learning, understood as those values that guide action towards achieving equality and quality education, requires university institutions, among other factors, to develop accessible technologies, linked to universal design (UD) (Lugo and Ithurburu, 2019) and universal design for learning (UDL) for learning and teaching programming (Sánchez-Fuentes, 2023), this study also examines the technological tools implemented by these Madrid institutions, which have a direct and indirect impact on the daily lives of people with disabilities, promoting the creation of a more accessible and fair city.

In short, this research aims to analyse the degree of institutionalisation of inclusive education in public and private universities in the Community of Madrid, using a mixed-method approach that includes a descriptive exploration of the literature on social initiatives, institutional policies and educational programmes, combined with interviews with members of the educational community and institutional representatives from the higher education sector, This allows for a deeper understanding of the units dedicated to diversity in each of the Madrid universities analysed, the inclusive technologies implemented, and their collaboration with cities to achieve more equitable and accessible environments.

2. Objectives

The overall objective of this study is to analyse the level of institutionalisation of diversity support in public and private universities in the Community of Madrid and to assess the role of the university as a facilitator of inclusion in collaboration with the city.

To achieve this, the aim is to compile a compendium of the regulations, legislation, policies, programmes, inclusion plans and guidelines most frequently considered in the institutional practices of Madrid's universities and student services for students with functional diversity and, more specifically, to analyse their diversity support units and the actions implemented to align with the UDL. After a doctrinal analysis, which underpins the empirical part of the work, the most applied section of the work aims to compile and describe the assistive technologies designed to contribute to the balance and equalisation of opportunities offered by Madrid's universities to their students in synergy with the cities where their campuses are located.

3. Methodology

The methodological framework of this research is mixed and is based on a qualitative sociological approach and quantitative analysis, with an exploratory and descriptive design. Its initial purpose is to examine the visibility of inclusive policies and strategies in Madrid's higher education system, using available institutional information to subsequently compare the diversity support units of

the universities in the Community of Madrid, determine the technological resources used and establish the influence of these institutions on the integrative progress of the cities in which they are located.

Following this methodological framework, this research aims to carry out a general analysis of private and public universities in the Community of Madrid, based on a detailed content analysis of the information published through documentary exploration using a qualitative approach combined with interviews with members of the educational community and institutional representatives from all the Madrid universities included in this study. The information is collected using a registration form designed and developed for this purpose, which forms the basis for the analysis of services for students with functional diversity and, more specifically, allows for the monitoring of the actions and measures necessary for the UDL provided by the functional diversity unit of each university.

Based on the proposal by Márquez Ramírez and Angulo Armenta (2024), preliminary documentary research was carried out in two phases. The first phase was heuristic, due to its great capacity to establish trends, and the second was hermeneutic, in order to acquire an in-depth study context and then be able to correctly interpret the results (Londoño Palacio et al., 2014).

Subsequently, in the next stage of this research, which had as its main objective to analyse the level of institutionalisation of attention to diversity in public and private universities in the Community of Madrid and to assess the role they play as facilitators of inclusion in different municipalities, a systematic search and analysis of published institutional documentation was carried out, complemented by a structured interview consisting of 10 questions that mainly dealt with the diversity support units at their universities and the impact of technological resources on educational inclusion at universities in Madrid. The interviews were conducted individually in person or by telephone and validated by experts in the field of study (Almenara and Cejudo, 2013). The average duration of the interviews was approximately 25 minutes.

To organise the information and perform the quantitative analysis, an ad hoc record sheet was used and an analysis matrix was created in a spreadsheet, organised on the basis of essential variables that were defined previously: type (regulations, legislation, policies, programmes, plans), scope (international, European, national and regional), specific support units and technological resources(specific and general). To ensure the validity of the content of the collection tool, a peer review of the analysis table was carried out, which made it possible to refine the indicators, ensure their clarity and relevance, and adapt the format to simplify the systematic collection of data. The variables were coded and divided, using "yes" or "no" values to note whether each indicator was present or not in the information evaluated. This enabled the consistent systematisation of the information and simplified comparisons between universities. Although no complex statistical methods were used, the descriptive analysis was useful for identifying areas for improvement in the information studied, as well as general trends and levels of institutional visibility.

The sample analysed comprises 20 universities in Madrid chosen through non-probabilistic convenience sampling, based on geographical area as the selection criterion and in accordance with the list published in the Register of Universities, Centres and Qualifications (RUCT). The universe initially considered in the city of Madrid was expanded to include the entire Madrid community, which made it possible to narrow down a more relevant and accessible sample for the proposed documentary analysis. Centres affiliated with universities were not taken into account because, despite offering official degrees, they are not an integral part of the university and have a different legal or management status from the university's own centres.

The proposed methodological design aims to assess the level of institutionalisation of the tools and procedures used by the universities in the Community of Madrid under study, both public and private, to meet the criteria for inclusion and diversity.

4. Results

According to data published by the Madrid University System Education Services (2024), the Community of Madrid has the highest concentration of students in Spain and one of the highest

concentrations in Europe. For the 2024-2025 academic year, it had 7 public and 13 private universities (see Table 1).

Table 1. Universities in the Community of Madrid (C.M.)

	Name	Acronym
Public	*Alcalá de Henares*	*UAH*
	Autónoma de Madrid	*UAM*
	Carlos III de Madrid	*UC3M*
	Complutense de Madrid	*UCM*
	Nacional de Educación a Distancia	*UNED*
	Politécnica de Madrid	*UPM*
	Rey Juan Carlos	*URJC*
Private	*Alfonso X el Sabio*	*UAX*
	Antonio de Nebrija	-
	Camilo José Cela	*UCJC*
	Colegio Universitario de Estudios Financieros	*CUNEF*
	Escuela Superior de Ingenieros Comerciales	*ESIC*
	Europea de Madrid	*UEM*
	Francisco de Vitoria	*UFV*
	Diseño, Innovación y Tecnología	*UDIT*
	Distancia de Madrid	*UDIMA*
	Internacional de la Empresa	*UNIE*
	Internacional Villanueva	-
	Pontificia de Comillas	-
	San Pablo CEU	-

Source: Prepared internally based on the Education Services of the Madrid University System (2024)

4.1. Regulations, Legislation, Policies, Programmes, Inclusion Plans and Diversity Guidelines referenced in the Universities of the Community of Madrid

Firstly, following the review and analysis of information on inclusion and diversity established at the international, European, national and regional levels, the legislation, regulations, policies, programmes, guidelines and plans most frequently referenced in the documentation analysed from the Madrid universities covered by this study are summarised below.

At the international level, the most frequently cited reference is Article 24 of the Convention on the Rights of Persons with Disabilities (CRPD) (United Nations, 2008), which has the same inspirational tone as the fourth Sustainable Development Goal mentioned in the introduction. Article 24 of the CRPD states that States must ensure an inclusive education system at all levels for persons with disabilities, as this is a fundamental right within the education system. This system must recognise the value of difference as an added value. Consequently, Article 24.5 of the CRPD states that States must work to ensure that persons with disabilities, without discrimination and on an equal basis with others, have full access to higher education, vocational training, adult education and lifelong learning (United Nations, 2008). To this end, university institutions must make all necessary adjustments to reinforce this model or paradigm of an inclusive university.

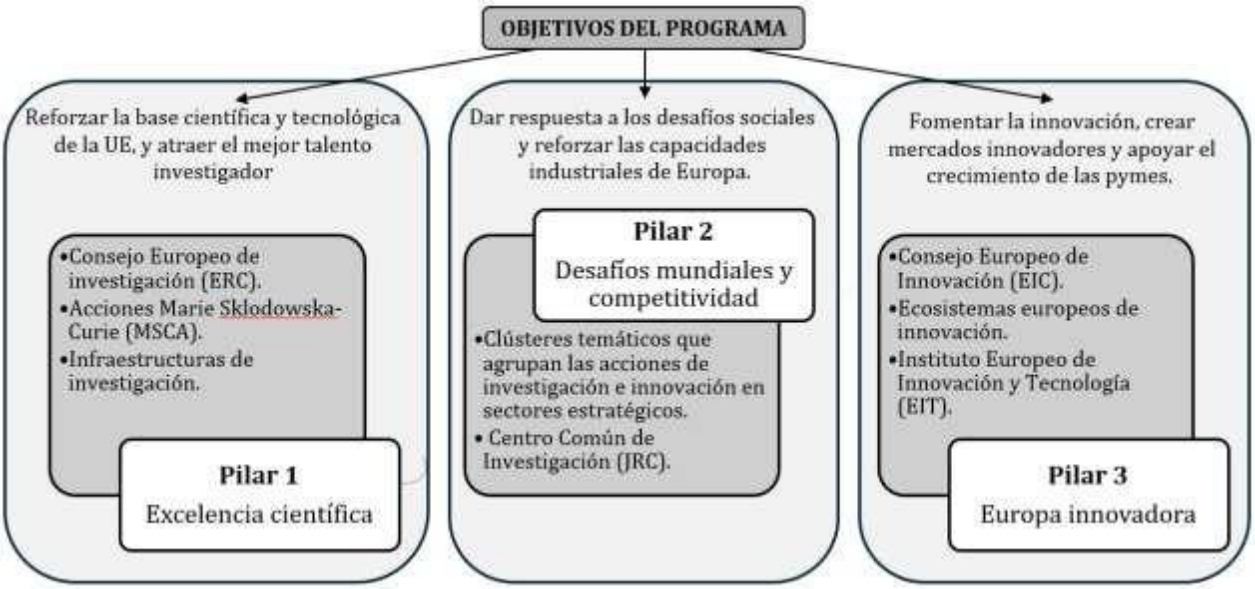
Also, in relation to the international commitment reached by world leaders in 2015 at the UN headquarters to adopt a series of common goals called the SDGs of the 2030 Agenda, SDG number 4 is dedicated to quality education as a means to eradicate poverty and achieve upward socioeconomic mobility. Among the goals established in this SDG are equal access for men and women and vulnerable people to all levels of education and a significant increase in the number of people with the skills necessary to perform skilled work (UN, 2015).

At the European level, Madrid's universities and higher education institutions, like others, are guided by the principles that articulate the social dimension of higher education within the framework of the EHEA (Buenestado-Fernández et al., 2019) and are mentioned in all documents. Mainly, as pointed out at the EHEA ministerial conference held in Rome in 2020, the part that refers to the university as a decisive social institution with an important commitment to the community, not only from the paradigm of service-learning, but also from the significance of its leading role in setting an example for other social agents. Consequently, at the aforementioned conference, the postulates that progressively strengthen the principles of the social dimension of the university were adopted. Specifically, it refers to the fact that universities have an obligation to provide students with lifelong learning opportunities and prepare them to be active, critical and responsible citizens who exercise their social function (European Conference of Ministers of Higher Education, 2020).

Within the framework of the conference, a document on higher education in the EHEA was adopted on the principles and guidelines for strengthening the social dimension, which refers to the guarantees that, through social engagement, higher education institutions must provide to ensure that social engagement in higher education promotes diversity, equity and inclusion (Advisory on Social Dimension, 2020). This slogan emphasises and reinforces the important contribution of Madrid's universities to the community, establishing synergies and joint actions with other institutions. This commitment is the stimulus through which the universities of the Community of Madrid address the different needs of socially disadvantaged or under-represented groups. As the doctrine points out, it is precisely through these actions that the university enriches its work and gives it content, complementing this reality with an ethical and civic commitment open to all social partners, with the aim of strengthening an open and full dialogue that allows us to face major social challenges.

In addition, consideration is given to the European Union (EU) framework programme for research and innovation Horizon Europe , in force from 2021 to 2027, which strengthens the scientific and technological base of Madrid's universities and promotes their competitiveness, seeking a scientific, technological, economic and social impact from investments in research. In this way, Horizon Europe promotes university inclusion in Spain and more specifically in Madrid, through the funding of collaborative research projects that enhance the transfer of knowledge and joint work between entities. The Horizon Europe Programme is based on three pillars, considered by Madrid's universities, which are: excellent science, global challenges and European industrial competitiveness, and innovative Europe, directly related to the social challenges referred to above. These pillars are based on a horizontal axis, which aims to progressively increase the participation of Member States and their higher education institutions in the challenges posed by Horizon Europe (see Figure 1).

Figure 1. Pillars of the Horizon Europe Programme.



Source: Prepared internally based on European Commission (2021).

At the national level, Spanish participation in the various framework programmes has been steadily increasing in recent years, with the involvement of both public and private universities and higher education institutions being particularly decisive, contributing in a special way to the achievement of the objectives initially set. In fact, at the legislative level, it is worth highlighting the repeated reference made in Article 73 of the Organic Law amending the Organic Law on Education (LOMLOE) to students with special educational needs as those who face obstacles that restrict their access, attendance, participation or learning and who, in order to achieve the learning goals appropriate for their development, they need certain specific educational support and care (LOMLOE, 2020). And the Organic Law on the University System (LOSU), which came into force in 2023 to regulate the Spanish university system, which in its Article 62, requires universities to develop and implement plans for inclusion and care for disabilities in order to eliminate physical, technological, communicative and attitudinal barriers (LOSU, 2023).

With regard to regional regulations on diversity care referred to by universities in the Community of Madrid, Decree 23/2023 of 22 March stands out, regulating educational care for individual differences among students, seeking an inclusive education system and guaranteeing school places for students with disabilities.

Furthermore, in order to guarantee balance and equal opportunities for students at all times during the transition to university, during the entrance exams, it is necessary to focus on the necessary adaptations for the different exams and on the correct implementation of support measures, which must be designed in accordance with current regulations. To this end, reference is made to the ANEAE (students with specific educational support needs) transition, access and reception guide used at the University, in accordance with the establishment of methodological protocols and a procedure that aims to make access to university as organic and inclusive as possible (Conference of Rectors of Spanish Universities, 2020).

4.2. Diversity Support Units

Diversity support units (DSUs) are configured, in accordance with the scenario outlined above, as an element of great importance for the development of the principles on which Madrid's university institutions are based, as mentioned above (remember, equal treatment and non-discrimination), establishing the necessary foundations for raising awareness within the entire university community and involving all citizens through its processes. The main objective of these units is to foster an inclusive environment that supports diverse and r student populations and improves the educational experience. They are structured to address various aspects of diversity, including socioeconomic, functional and educational diversity (Bran, 2024).

As is well known, these units are intended to recognise multiple and diverse abilities, making universities more robust and inclusive (Torres Veliz, 2024). Therefore, the development of these units must go hand in hand with the design and adaptation of curricula and be linked, as mentioned at the beginning of this paper, to the perspective of diversity and Universal Design for Accessibility (UD) (see Table 2).

Table 2. Main characteristics of Universal Design for Accessibility.

Personas beneficiadas	Toda la ciudadanía
Objetivo	Promover la igualdad de oportunidades de todas las personas en el ejercicio de sus derechos
Ámbito de actuación	Transversal: espacios, productos, equipamientos y servicios.
Estrategia	Diseño para todos y supresión de barreras ya sea referida a la movilidad, a los sentidos o al conocimiento.
Medidas de aplicación	Aplicación de la normativa. Medidas de gestión, control y seguimiento. Concienciación ciudadana. Formación. Y participación ciudadana.
Instrumentos	Planificación estratégica a largo plazo mediante la puesta en marcha de medidas integrales.
Agentes responsables	Administración pública. Ejecutores de proyectos. Propietarios, comerciantes, etc.

Source: Prepared by the author based on Cortés Díaz et al (2021).

More specifically, diversity units have been configured as a decisive element for the development and proper functioning of the principles outlined above, which aim to eliminate barriers, promote the full and effective participation of the entire academic community, and create an inclusive environment through Universal Design for Learning (UDL), which applies these UD principles to the educational sphere, ensuring that all students have access to learning materials and activities and can demonstrate what they know, creating a more inclusive and flexible learning experience (Torres, 2024).

Based on the context of analysis described above, we have reviewed how diversity support services at universities in the Community of Madrid articulate measures aimed at diverse students, in accordance with a cross-cutting approach, and whether they do so in a comprehensive and consistent manner. It is essential to involve not only the various governing bodies, but also the teaching staff and personnel responsible for the different areas (Márquez and Marimón Méndez, 2021) in order for this to occur systematically.

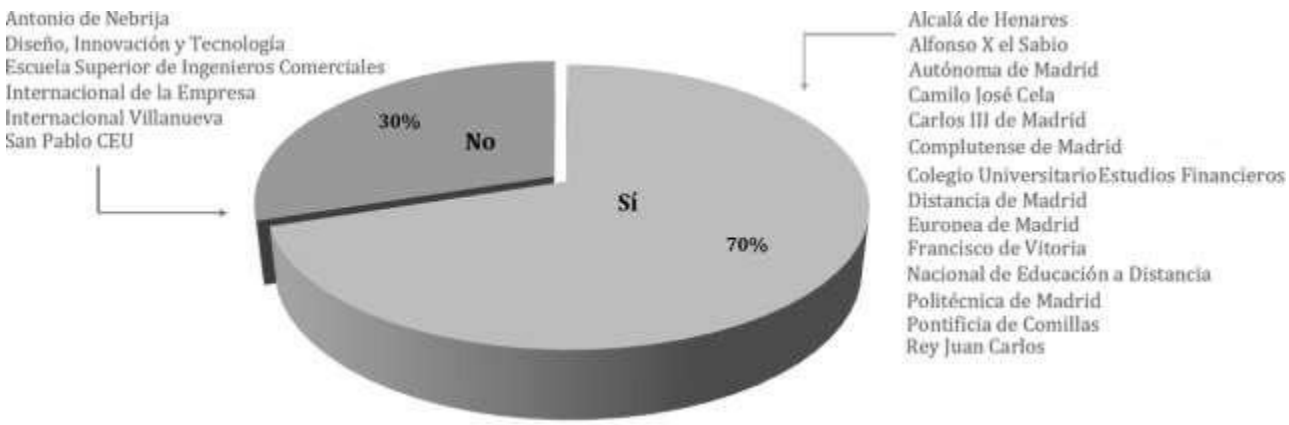
After exploring how they are structured in their operation, and based on the fact that direct collaboration with the various administrations, entities related to diversity, public and private organisations, through collaboration mechanisms such as agreements, research and innovation projects, the organisation of meetings, seminars and conferences, the preparation of reports and the systematisation of protocols, are essential to highlight the importance of catering to diverse students (Fuentes Paz, 2024), it is clear that the first differences appear between Madrid's universities and, more specifically, between public and private universities.

In this regard, and in order to contextualise this disparity, it is necessary to refer to the Network of Support Services for People with Disabilities at University (SAPDU), which was created in the early 1990s by Spanish universities through the sectoral commission of the Conference of Rectors of Spanish Universities on student affairs (CRUE-AE) and whose main objective is to promote the inclusion of persons with disabilities in universities, guaranteeing their equal access, permanence and progress in teaching, research and management activities through the exchange of good practices, collaboration between university services and the promotion of measures for a more inclusive and accessible university, for which working groups are organised (Sapdu, 2017).

Once this has been done, it should be mentioned that of the total of 20 universities in Madrid, only 14 are part of the SAPDU Network, as can be seen in Figure 2, which means that only 70% coordinate with other universities in the adoption of measures for the effective compliance with disability regulations within their university policies. Furthermore, it can be seen that 100% of

Madrid's public universities are affiliated with the SAPDU Network, but only 54% of Madrid's private universities are.

Figure 2. Madrid universities affiliated with the SAPDU Network.



Source: Own elaboration based on the SAPDU Network (2024).

With regard to the names of the DSUs (see Table 3) in the universities of the Community of Madrid, it has been observed that the differences are related to different institutional approaches, which are reflected in the names used.

Table 3. Names of the areas responsible for inclusion and diversity at universities in the Community of Madrid (C.M.).

UNIVERSIDAD	DENOMINACIÓN
UAH, ESIC, UEM,UDIMA,	*Unidad de Atención a la Diversidad*
UAM	*Unidad de Igualdad de Género (UIG) y la Unidad de Equidad Social*
UC3M	*Atención a Estudiantes con Discapacidad y Necesidades Específicas de Apoyo Educativo*
UCM	*Unidad de Apoyo a la Diversidad e Inclusión*
UNED	*Centro de Atención a Universitarios con Discapacidad*
UPM	*Unidad de Accesibilidad y Atención a la Discapacidad*
URJC	*Unidad de Atención a Personas con Discapacidad y Necesidades Educativas Especiales*
UAX, UDIT, Pontificia de Comillas	*Gabinete/ Orientación Psicopedagógico/a*
Antonio de Nebrija, San Pablo CEU, CUNEF	*No dispone de un área especializada*
UCJC	*Departamento de Orientación Universitaria. Orientación y Asesoramiento Psicológico*
UFV	*Servicio de Apoyo a Personas con Necesidades Especiales (SAPNE)*
UNIE	*Unidad de Diversidad e Inclusión (UDI)*
Internacional Villanueva	*Servicio de Atención a Estudiantes con Discapacidad y otras Necesidades Educativas (SAEDYNE)*

Source: Prepared by the author based on information obtained from Madrid universities (2025).

As can be seen in Table 3, some universities in Madrid adopt broader names that reflect a comprehensive approach to diversity, including not only disability, but also gender, ethnicity, cultural diversity, etc. (45%). Others, however, specialise in caring for people with intellectual disabilities and other disabilities, promoting adapted studies and access to university (25%). On the other hand, there are other universities, which are privately managed that do not have a DSU as such (15%), but rather integrate support for students with specific needs into their general

student guidance programme, which offers accompaniment and support in various dimensions, including in some cases personalised attention from a psycho-pedagogical and/or psychological perspective (15%).

It can also be seen that within the university itself, as in the case of the UAM (Autonomous University of Madrid), two types of units coexist in the area of Social Commitment and Sustainability: The Gender Equality Unit (UIG) and the Social Equity Unit. The former is responsible for promoting gender equality and preventing and combating harassment, violence and discrimination at the UAM, as well as promoting the integration of gender and intersectionality in all university activities. The second is responsible for safeguarding the rights of people with functional diversity who belong to LGTBIQ+ groups, an acronym that represents the diversity of gender identities and sexual orientations, including Lesbians, Gays, Bisexuals, Transgender, Intersex, and Queer/Cuir (or questioning) and/or diversity of origin and culture, promoting an inclusive environment at the university.

With regard to the educational resources and support provided by universities, it should be noted that 100% of Madrid's universities provide some form of educational support, and most claim to have made adjustments to their curricula, such as adaptations to assessment tests in terms of format and time availability. Noteworthy are the tutoring and guidance services offered by more than 80% of institutions and the psycho-pedagogical counselling offered by 45%. Figure 3 presents an overview of the classification of diversity measures implemented by the UAD of Madrid universities.

Figure 3. General classification of diversity measures at universities in the Community of Madrid (C.M.)

Source: Prepared by the author based on information obtained from Madrid universities (2025).

4.3. Specific Technological Resources for Functional Diversity

Technology plays a fundamental role in the implementation of the UDL, as it facilitates the diversification of educational resources and forms of participation. There are multiple tools and platforms that can support teachers in creating more inclusive learning environments (Jacho et al., 2024).

Research highlights the development and evaluation of platforms such as Moodle and MOOC within the framework of the UDL, and shows improvements in usability and accessibility features, such as alternative text and colour contrast, which positively influence student outcomes

(Montes-Soldado et al., 2024). The use of assistive technologies integrated into mainstream platforms reduces stigma and promotes inclusion (Fovet, 2022).

In line with this, Madrid's current universities, both public and private, have decisively integrated the principles of equal treatment and non-discrimination, not only in their functions, but also in their policies and structures, making universities increasingly inclusive, as noted in the section introducing the article. Thus, attention to diversity is an essential priority, firmly established in the social dimensions of higher education within the framework of the European Higher Education Area, as endorsed in the Rome Document (López Melero, 2018).

Promoting inclusive processes in learning and in all processes requires universities and higher education institutions to develop accessible technologies that are integrated into Universal Accessibility Design (Barletta, 2023). This is because technological resources enable the development of different individualised practices, i.e. adapted to each person within the framework of the learning process and access to services. Thus, the different technological tools are the basis of this design and have undergone a significant social and technical evolution in recent decades.

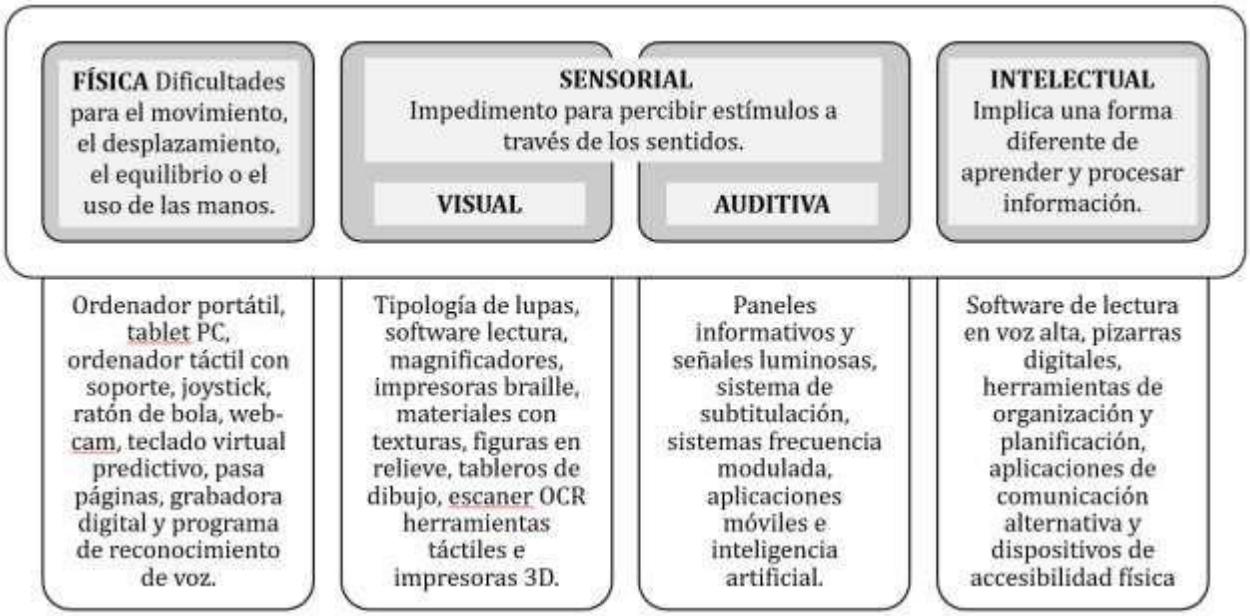
It is not surprising that technological resources managed within the general framework of teaching and attention to diversity involve individualised practices, i.e. adapted to each person/student, and fall within the scope of ordinary measures (organisational, access adaptation and methodological) and extraordinary measures, mainly through the creation of information and communication technology (ICT) programmes, the use of ICT and alternative communication systems for students and teachers. This study is based on the premise that different technological tools are the basis of this design and, in line with social evolution, they have been transformed into their current form. Therefore, special consideration must be given to the technological element (Azorín Abellán et al., 2017).

Promoting inclusive processes in learning and in all processes requires universities and higher education institutions to develop accessible technologies that are integrated into the UDL (Benet-Gil, 2020). This is because technological resources enable the development of different individualised practices, i.e. practices adapted to each person within the framework of the learning process and access to services. Thus, the different technological tools are the basis of this design, and in Madrid's universities they have undergone a significant social and technical evolution in recent decades.

In accordance with the above sections, this applied part of the study will analyse the technological resources that the universities selected for the study make available to students with functional diversity, that is, those who have different abilities and ways of interacting with their environment than most people (Toboso-Martín, 2018) and take into account the variety of human abilities that require an inclusive environment that removes barriers to ensure equal opportunities for all.

The findings show that universities in Madrid use different technological resources specifically designed to support functional diversity (see Figure 4) in order to optimise learning for university students with disabilities. Furthermore, the use of these technological tools in and outside the classroom enables students with special educational needs (SEN) to access content in a way that is adaptable and flexible to their personal needs. These results are consistent with previous research indicating that the use of technological resources in the classroom promotes educational equity and equality and helps to significantly increase access to knowledge and student participation in class (Agudelo, 2012; Plaza et al, 2025).

Figure 4. Classification of technological resources providing specific support for functional diversity used by universities in the Community of Madrid.



Source: Prepared by the author based on information obtained from Madrid universities (2025).

After studying and interpreting the assistive technologies designed to contribute to balance and equal opportunities offered by each of the universities selected for students, it has been found that these tools are used as work tools, for educational purposes, as communication tools and for personal mobility. In fact, the technological resources for inclusion are varied and sometimes specific to each university, ranging from adaptive devices such as special keyboards and Braille displays to inclusive software such as dictation, read-aloud and translation tools.

In addition to the use of these technological tools specifically designed to support functional diversity used by the universities of the Community of Madrid, others are also used which, in combination with the former, facilitate inclusion and attention to diversity in learning (Abarca et al., 2023). Table 4 details the most commonly used ones.

Table 4. Other technological resources used by universities in the Community of Madrid that facilitate inclusion and attention to diversity in learning.

Plataformas educativas	Moodle, Canvas y Blackboard	Sistema de Gestión del Aprendizaje (LMS) que posibilita la creación de cursos, tareas y foros en línea personalizados, lo cual facilita el monitoreo del avance de los alumnos.
	Google Classroom	Integra herramientas de Google como Docs, Drive, Calendar, Chat, Forms, etc. que simplifican la colaboración, la evaluación y la administración de tareas.
	Flipgrid	Plataforma de aprendizaje social creada por Microsoft que permite a profesores y estudiantes interactuar mediante vídeos cortos.
	MOOCs	Cursos Masivos Online Abierto.
	ClassDojo	Comunidad en línea para conectar a profesores, estudiantes y familias, permitiendo compartir el progreso académico y de comportamiento de los alumnos mediante un sistema de puntos y comunicación directa.
	LinkedIn Learning	Ofrece cursos online en video para el desarrollo profesional y la adquisición de nuevas habilidades.
	Ágora	Pataforma educativa basada en OpenLMS.

Herramientas de pizarra digital	Google Jamboard	Aplicación web y móvil de Google, que ofrece un lienzo interactivo y colaborativo en la nube.
	Microsoft Whiteboard	Pizarra digital que se integra con otras herramientas de Microsoft, proporcionando un espacio de trabajo colaborativo y flexible.
	Miro	Alternativa a Jamboard que ofrece un espacio de trabajo digital de fácil acceso para la colaboración en equipo.
	Openboard	Pizarra digital interactiva (PDI) de código abierto, libre y gratuita que permite a los educadores y usuarios crear contenido educativo de manera interactiva en un lienzo digital.
Redes Sociales	Instagram	Utilizada para mostrar la vida universitaria, eventos y logros académicos.
	TikTok	Empleada para publicar contenido más dinámico y cercano a la comunidad estudiantil.
	X (Twitter)	Difundir noticias urgentes, logros, y fomentar debates y la comunicación directa a través de mensajes breves y en tiempo real.
	WhatsApp	Mensajería instantánea que, a través de grupos y canales, sirve para la comunicación interna, para informar a los estudiantes sobre eventos, plazos y notificaciones importantes.
	YouTube	Utilizado para compartir lecciones en video, conferencias y recursos educativos para estudiantes, así como para crear canales de comunicación y aprendizaje.
	Edmodo	Red social educativa global que interconecta a profesores, padres y alumnos en un entorno cerrado seguro en el que interactuar y trabajar.
	Bluesky	Publicar información de interés y se propicia un entorno adecuado para el intercambio de ideas y la generación de debate respetuoso.

Otras plataformas/ aplicaciones de comunicación	Google Meet	Utiliza para videoconferencias y se puede integrar como un recurso dentro del campus virtual.
	Microsoft Teams	Aplicación de comunicación y colaboración que permite chatear, hacer videollamadas, compartir archivos y crear grupos de trabajo.
	Zoom	Utilizada para realizar videoconferencias, reuniones virtuales y comunicación en línea a través de internet.
Creación recursos interactivos	Mentimeter y Genial.ly	Imágenes, módulos y presentaciones interactivas.
	ExeLearning	Contenidos educativos en SCORM.
	Anki Teachermade	Tarjetas de memorización.
	Teachermade y Wizer.me	Fichas interactivas.
	Quizlet	Actividades interactivas.
	Kahoot y Socrative	Quizzes gamificados en tiempo real.
	Educandy y Educaplay	Juegos interactivos.
	Kaltura	Se utiliza para crear y gestionar vídeos interactivos e incorporarlos en las plataformas de los cursos.
	Wooclap	Crear cuestionarios, encuestas y actividades en tiempo real para dinamizar las clases, tanto presenciales como a distancia
Herramientas de imagen y vídeo	Mmhmm y OBS Studio	Videollamadas enriquecidas, editor de fondo de webcam
	Gimp, Photopea y Adobe Spark	Edición de imágenes
	Canva, Desygner e Infogram	Diseño de infografías
Tecnología inmersiva/ Realidad	Aumentada	Superpone información digital, como modelos 3D o datos, en el mundo real, mejorando la comprensión de conceptos y permitiendo experimentos seguros y realistas en laboratorios virtuales.
	Virtual	Permite a los estudiantes sumergirse en entornos tridimensionales para explorar conceptos, interactuar con objetos virtuales y realizar experimentos en laboratorios virtuales.
	Mixta	Combina elementos del mundo físico y digital, permitiendo una interacción más profunda entre el usuario y los contenidos virtuales.

Source: Prepared by the authors based on information obtained from Madrid universities (2025).

In summary, among the technological tools used, there are various computer applications designed, among other things, to facilitate learning in the context of diversity, such as Classcraft, Kahoot, Socrative, etc. Also included are platforms such as virtual classrooms adapted in Moodle and Canvas, and systems designed to facilitate access to information and participation for all students, such as customised corporate websites, as well as interactive tools that enrich the learning experience, such as digital whiteboards, computers, and projectors. In addition, there are information and communication technologies such as social networks like X, Instagram, WhatsApp, YouTube, and TikTok, which are sometimes combined with other technologies such as virtual reality, augmented reality, and mixed reality to offer immersive experiences (Pérez, 2020), all aimed at removing barriers and promoting personalised learning.

In Madrid's universities, augmented reality (AR) and virtual reality (VR) are being applied to diversity in various ways, although still in an incipient manner. This immersive technology is used for advanced simulations, visualisation of complex concepts, practical training in safe environments and virtual visits to places that are difficult to access. They offer 3D experiences for better understanding and encourage interaction, positioning them as tools with great potential for inclusion and attention to diversity in learning at Madrid's universities . Noteworthy

developments include technologies such as e-Glance for blind people at the UPM and the creation of immersive environments that improve accessibility and engagement for students with special needs. Universities such as the Complutense and the Polytechnic are incorporating these technologies into their curricula and offering training in VR, while also seeking solutions for accessibility in technological infrastructure and for teaching staff, paving the way for more inclusive and effective higher education.

In line with the analysis of the applied part of the study on the technological resources made available to students with functional diversity by the universities selected for the study, it should be noted that, although these units are directly aligned with their strategic plans and, therefore, with their commitment to their values, there are certain differences in the levels of provision of these units, which contrasts with the tangible reality, verified by the Universia Foundation (2023), according to which the number of students with functional diversity is increasing in Spanish universities (Universia Foundation, 2023).Therefore, it is essential to design technological adaptation processes (Carreras Casanovas, 2021) and address this social issue in the broadest possible way (Cotán and Orozco, 2025).

4.4. Accessibility and Equity in Cities in Synergy with the University

The universities of Madrid play an important role in promoting inclusion and attention to diversity in the cities where their campuses are located. These institutions are fundamental in shaping educational practices and policies that address diversity and inclusion, thus influencing the community at large (Becerra, 2021). Table 5 details the municipalities where Madrid's university campuses are located.

Table 5. Cities with campuses of the Universities of the Community of Madrid (C.M.).

	Denominación	Ciudad C.M.
Públicas	*Alcalá de Henares*	*Alcalá de Henares*
	Autónoma de Madrid	*Madrid*
	Carlos III de Madrid	*Colmenarejo, Getafe, Leganés, y Madrid*
	Complutense de Madrid	*Madrid y Pozuelo de Alarcón*
	Nacional de Educación a Distancia	*Boadilla del Monte y Madrid*
	Politécnica de Madrid	*Boadilla del Monte y Madrid*
	Rey Juan Carlos	*Aranjuez, Alcorcón, Fuenlabrada, Madrid y Móstoles*
Privadas	*Alfonso X el Sabio*	*Madrid y Villanueva de la Cañada*
	Antonio de Nebrija	*Hoyos de Manzanares y Madrid*
	Camilo José Cela	*Madrid y Villanueva de la Cañada*
	Colegio Universitario de Estudios Financieros	*Madrid*
	Escuela Superior de Ingenieros Comerciales	*Pozuelo de Alarcón*
	Europea de Madrid	*Alcobendas, Madrid y Villaviciosa de Odón*
	Francisco de Vitoria	*Pozuelo de Alarcón*
	Diseño, Innovación y Tecnología	*Madrid*
	Distancia de Madrid	*Collado Villalba y Madrid*
	Internacional de la Empresa	*Tres Cantos y Madrid*
	Internacional Villanueva	*Madrid y Pozuelo de Alarcón*
	Pontificia de Comillas	*Ciempozuelos y Madrid*
	San Pablo CEU	*Alcorcón y Madrid*

Source: Prepared internally based on data from the Madrid University System Education Services (2024).

The Madrid metropolitan area, which includes its universities, is functionally and socioeconomically diverse, with peripheral and central areas having distinct characteristics. This diversity is reflected in urban variety and mobility patterns, which influence the university

environment (De la Cruz, 2022). However, there is consensus in all the municipalities where these university campuses have been established on the positive effect they have had on their cities.

Cases such as the URJC (Rey Juan Carlos University) in the cities of Alcorcón, Aranjuez, Fuenlabrada, Madrid and Móstoles, and the UC3M (Carlos III University of Madrid) in the municipalities of Getafe, Leganés, Colmenarejo and Madrid, have promoted various elements, from the specific and concrete development of the urban area where the campuses are located (residences, facilities, transport network, communications, commerce, etc.) to the promotion of cultural activities, the positioning of the localities on the national and international stage, community and cultural life, citizen participation, the rehabilitation of buildings and urban spaces, and the stimulation of areas with urban imbalances.

This has also been achieved through collaboration agreements and partnerships with municipal institutions, such as the one signed by Madrid City Council with 10 Madrid universities to contribute their knowledge to the future General Urban Development Plan for Madrid (PGOUM), which is adapted to the current urban socio-economic reality. Therefore, the Complutense University of Madrid, the Autonomous University of Madrid, the Polytechnic University of Madrid, Rey Juan Carlos University, CEU San Pablo University, Antonio Nebrija University, the European University of Madrid, IE University, the Pontifical University of Comillas and the Carlos III University of Madrid are collaborating in the development of this plan, which aims to strike a balance between economic development, social integration and sustainability (Madrid City Council, 2024). In this regard, it is also worth highlighting the case of the Vicálvaro neighbourhood (Madrid), where years ago the URJC and the local government established a business incubator that has had a major impact in terms of employment and innovation (Núñez de Prado Clavell et al., 2023).

In addition, the councils of the different municipalities and Madrid's universities contribute to citizen inclusion through agreements, scholarships and grants, including those for students with disabilities and socio-economic scholarships to guarantee access to education. One example is the agreement signed by the Community of Madrid, through the Spanish Committee of Representatives of Persons with Disabilities (CERMI), a private organisation that represents persons with disabilities and their families in Spain, seeking to guarantee their rights and promote their full inclusion and citizenship (De Personas, 2021), with public universities such as the Complutense and the Autónoma to promote the inclusion of students with disabilities and improve their quality of life. They also organise universal accessibility conferences and promote strategic plans to create accessible environments, collaborating on projects with universities to improve the inclusion and quality of life of university students with disabilities (Romeo Delgado et al., 2025).

In addition, collaboration programmes are established between local councils and universities, as seen in the participation in the Cities Mission for Climate Neutrality project, which promotes inclusive municipal policy design within the European Mission (European Commission, 2020).

It seeks to address universal accessibility in various areas and promote it among the university community through tools such as the Strategic Plan for Universal Accessibility for the City of Madrid (PEAUM) (Santiago, 2022). As explained by the Madrid City Council's accessibility office, it is worth noting that it participates in several European Union (EU) initiatives that promote inclusion and diversity, including the European project for innovative and inclusive democratic spaces for deliberation and participation (IDEM), which promotes easy reading. In addition, in 2023, Madrid was a candidate for the European Capital of Inclusion and Diversity award given by the European Commission to recognise the work of cities that promote diverse and inclusive environments, for which it had the collaboration of its universities (Romero, 2025).

In short, collaboration between universities and cities focuses on promoting equal opportunities, providing direct support to students with disabilities, and developing universal accessibility strategies and policies that address the improvement of educational environments, services, and processes in the university setting. However, if we refer to the Madrid Network of University Cities, which is part of the UNInMadrid 2022 Plan, an initiative that seeks to make cities more accessible and friendly for students, promoted by the Madrimasd Knowledge Foundation (Madri+d) and the Federation of Municipalities of Madrid, and made up of the 28 cities in Madrid

that have a campus or hospital linked to a university academic institution, it should be noted that it makes no mention of inclusion or any joint measures to address diversity, although its objectives include creating agreements to offer advantages to the university community in terms of products, services, and cultural and leisure activities, as well as recognising the value of the university, highlighting the social and economic contribution of universities and their members to cities.

5. Conclusions

Universal accessibility is a condition that all products, goods, services and environments, such as cities, must meet so that they can be used and enjoyed by all citizens. More specifically, the UDL, which represents a significant transformation in the way education is understood, focusing its efforts on inclusion, equity and personalisation of learning, requires adequate planning, ongoing training and the use of technological tools that facilitate access to learning through different channels. In this regard, its implementation in public and private universities in the Community of Madrid shows differences, mainly in the scope and execution of accessibility initiatives.

Public universities have a strong commitment to inclusion, driven by legal frameworks and social policies that promote equal opportunities and non-discrimination for students with disabilities. In contrast, there has been greater variability in the adoption and implementation of accessibility measures in the case of private universities. All public universities have comprehensive accessibility plans and have established digital infrastructures and platforms that meet the needs of students with disabilities, reducing barriers to education. In the case of private universities in the Community of Madrid, the level of institutionalisation of diversity support is lower. In fact, 30% of universities that do not have diversity support units are private.

With regard to the educational resources and support provided by universities in general, it should be noted that 100% of Madrid's university institutions provide some form of educational support and most have made adaptations to their curricula, mainly in assessment tests. In terms of technological tools, there are numerous tools and resources that facilitate the implementation of the UDL in Madrid's universities. These tools allow for diversification in teaching and assessment methods and promote more inclusive and accessible learning. Learning platforms, accessibility hardware and software, multimedia content creation tools, applications, communication and immersion technologies are available, but there is still a long way to go because their implementation in the teaching-learning process varies greatly.

The conclusion of this study is that, although Madrid's universities are moving towards inclusion, challenges remain. It highlights the ongoing need for universities to refine their approaches and ensure that their efforts to facilitate diversity and inclusion are effectively translated into practice. It also highlights the need to implement policies and practices that promote collaboration between universities in terms of experiences related to the design and dissemination of methodological tools to address diversity and ensure inclusive, fair and high-quality education, as well as to promote lifelong learning opportunities for all citizens.

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