



WP4: ETHICAL AND INCLUSIVE USE OF AI

Task 3: Inclusive AI in Spanish Education and Training

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Table of Contents

National Context and Key Needs.....	4
AI Tools and Solutions in Education and Training.....	7
Best Practices and Lessons Learned.....	8
References.....	14

National Context and Key Needs

Inclusive education seeks to ensure that all students, regardless of their physical, cognitive, social or cultural abilities, have access to quality education. According to UNESCO, approximately 15% of the world's population lives with some kind of disability, which represents more than one billion people.¹

In the case of the European Union, according to Eurostat data, this percentage rises to 27% of the EU's inhabitants (some 101 million people).²

The rate of early school leavers is twice as high for people with disabilities compared to non-disabled people. Many young people with disabilities attend special schools and have difficulties in accessing mainstream education and training: only 29% obtain a tertiary qualification compared to 44% of non-disabled people (Eurostat).³

In this context, artificial intelligence (AI) has emerged as a powerful tool to improve inclusive education, facilitating access to educational content, personalising learning and promoting equity in the classroom.

Current situation of students with special needs in Spain:

In the last academic year of 2023-2024, Spain has surpassed for the first time the one million mark of students receiving educational support, reaching 1,131,816 students, which represents 14% of the total student body. Of these students, 85% are enrolled in mainstream schools, mainly public schools (75%)⁴. There is an educational law in Spain (Organic Law 3/2020, of 29 December, which amends Organic Law 2/2006, of 3 May, on Education, and in particular the LOMLOE. (<https://www.boe.es/buscar/act.php?id=BOE-A-2020-17264>) **which establishes the integration of pupils with special educational needs (ACNEE) in ordinary schools, prioritising inclusive education.**⁵

Among the causes of support, disabilities and serious disorders stand out (25%), the most frequent being autism spectrum disorder, intellectual disability and communication disorders.

Spain is divided into 17 Autonomous Regions. The most populated one, Andalusia (17.8% of the national population in 2023)⁶, has integrated 89.4% of the 93,106 students with special educational needs into ordinary classrooms,⁷ as mandatory according to the national LOMLOE law mentioned above. The Junta (the Andalusian autonomous government, with Education Dept. competences, as all the rest of Autonomies) has increased by 67% the budget allocated to this group from 2019, reaching 586 million euros. This effort translates into more than 13,000 specialised

professionals, including teachers of Therapeutic Pedagogy and Hearing and Language, Special Education monitors and Social Integration Technicians.

As regards the Basque Country (4.61% of the national population in 2023), there are Decrees issued by the Basque Government to further complement the national law and specify for instance the following:

Complementary measures and support are all the programmes provided for in the regional regulations, including **structural measures:** specific reinforcement programmes, linguistic reinforcement programmes, personalised and group support programmes such as the curricular diversification programmes regulated in Article 25 of Decree 77/2023, of 30 May, on the establishment of the Basic Education curriculum and its implementation in the Autonomous Community of the Basque Country.

Curricular measures: aimed at centres with a high level of educational complexity, complementary schooling programmes regulated, curricular enrichment programmes and other educational support and reinforcement programmes. **Individual measures:** individualised tutorial action regulated in Article 21 of Decree 77/2023, measures to support and reinforce education in the way that the environments, materials, processes and tools, including assessment tools, are understandable, usable and practicable for in-patient, home-based and therapeutic-educational care.

The following are considered to be specific inclusion support professionals:

- a) Therapeutic pedagogy teachers.
- b) Hearing and language teachers.
- c) Itinerant support teachers for visually impaired pupils.
- d) Educational support specialists.
- e) Specialised technical support staff for visually impaired pupils.
- f) Material transcription staff.
- g) Physiotherapists.
- h) Occupational therapists.
- i) Sign language interpreter and/or communicative mediator staff.
- j) Teachers specialising in hearing impairment.

The above considerations as regards structured support for ACNEE cover initial, secondary and vocational education. ⁸

The National Institute of Educational Technologies and Teacher Training (INTEF), a body under the Ministry of Education, Vocational Training and Sports (MEFPD), presented on the 4th of July 2024 the “Guide on the use of artificial intelligence in education”. This publication aims to serve as a fundamental resource for the educational community, promoting the effective and ethical integration of artificial intelligence (AI) in non-university educational stages.⁹ And it is aligned with the National Artificial Intelligence Strategy in Spain of November 2020.¹⁰

The Guide states: “The possibilities offered by AI for teaching and learning represent an unprecedented opportunity to create dynamic and stimulating learning environments that inspire our students to be more curious, more creative and more critical in their search for knowledge, as defined by Kai Fu Lee in AI 2041: *Ten Visions for Our Future*.¹¹ Maintaining this perspective and attitude as teachers will allow us to assess technology from a pedagogical perspective, guaranteeing that its implementation in the classroom will provide added value.” It also outlines needs as: “It is therefore essential that the entire school community gains knowledge about AI and understands how it works and its potential applications in order to take advantage of its benefits and mitigate its risks in the educational, social and professional contexts. This includes concerns about the privacy of our students' data, possible biases, or fairness of access to this technology.”

While the Guide is very comprehensive in its content, it does not mention the use of AI for learners with special needs, which we do find in other authors like Oscar Cerdón, in his article *Inteligencia artificial en Educación Superior*¹²: “Inclusive education seeks to guarantee the right to education for all people, regardless of their physical, cognitive, social or cultural conditions. In this context, artificial intelligence has proven to be a technology with great potential to transform teaching and learning, enabling the development of more accessible and equitable education systems.”

Besides teachers' needs to **gain knowledge about AI and how it works**, the implementation of AI in inclusive education also **requires careful planning and well-structured educational policies**. It is essential that technological developments are carried out with an ethical perspective, avoiding biases in algorithms and ensuring the privacy of student data (Lacruz-Pérez et al., 2022).¹³

AI Tools and Solutions in Education and Training

There are many applications of AI tools in inclusive education and training, which can be categorized into the following:

1. Tools to adapt and help personalise learning and training: algorithms that can track and analyse the performance of diverse ability students and therefore adapt syllabus content and teaching methodologies that better match different learning paces. (Rodriguez, 2020).¹⁴

2. Intelligent tutoring systems: to further personalise learning and training, AI-based tutoring systems can offer support to students with learning difficulties, providing tailored explanations and feedback in real time (Castellani et al., 2024).¹⁵

3. Support systems for accessibility: AI has enabled the development of accessibility tools, such as speech recognition, text-to-speech and automatic captioning, which facilitate access to educational content for students with visual, hearing or motor disabilities (Prendes-Espinosa, 2023).¹⁶

4. Educational needs assessment tools: valuable for education professionals, tools that through AI data analysis can identify patterns in students' academic performance and help detect learning difficulties early (Lacruz-Pérez et al., 2022).¹⁷

Some examples of AI tools for accessibility inclusion:

- **Lup' device:** <https://www.lup.es/nosotros> Founded by Apurva San Juan and Eneko Calvo, former Mondragón Unibertsitatea students, this innovative Basque startup device converts any text into audio in less than two seconds, making it easier for people with low vision to read. It uses AI and computer vision to transform text into audio at the touch of a button. The company has sold more than 600 units and plans to expand internationally.
<https://elpais.com/economia/negocios/2024-11-21/lup-el-dispositivo-que-convierte-en-audio-cualquier-texto.html>
- **Voice cloning for speech disorders:** Artificial intelligence has made it possible to clone the voice of Basque musician Kepa Junkera, who lost his ability to speak after a stroke in 2018. This breakthrough has served as a great motivation for him and other patients with speech disorders, improving their rehabilitation and quality of life.
<https://cadenaser.com/euskadi/2024/10/21/volver-a-escuchar-su-voz-le-ha-dado-fuerzas-para-seguir-la-logopedia-de-kepa-junkera-destaca-el-impacto-de-la-ia-en-la-rehabilitacion-de-pacientes-con-trastornos-del-habla-radio-bilbao/>

- **Paediatric exoskeleton:** a Galician Autonomy province, Pontevedra, has received the world's first paediatric exoskeleton for children with cerebral palsy. This device combines robotics and AI to help children walk, adapting to various neuromuscular pathologies and significantly improving their rehabilitation.
<https://cadenaser.com/galicia/2024/10/25/pontevedra-tiene-el-primer-exoesqueleto-pediatrico-del-mundo-gracias-a-una-donacion-anonima-radio-pontevedra/>
- **OrCam MyEye' device:** This wearable device uses AI to help people with visual impairment. It mounts on glasses and can read text aloud, recognise faces and objects, and provide auditory descriptions of the environment, improving users' autonomy.. With the help of AI it can provide translations of the texts it reads in 140 languages.
<https://www.orcam.com/es-es/orcam-myeve?srsId=AfmBOqgdRHOqbgS5e50NDrv3FfcZJxr9L3CmflxKS0UuU5lehDLb5Ln>
- **Read it Easy:** The Spanish Confederation of Organisations for People with Intellectual or Developmental Disabilities has created a new app to make reading easier for people with intellectual or developmental disabilities, or any disability that makes reading difficult. For iOS and Android.
- **JAWS** (Job Access With Speech): Screen-reading system that uses AI to recognize and read on-screen text aloud for people with visual impairments.
- **AVA:** Automatic sign language translation tools for people who are deaf or hard of hearing.
- **3DTHINKS' application:** <https://leitat.org/>. This project improves an inclusive mobile application based on iconography and sign language, where pictograms replace words. It is aimed at facilitating communication for the general public with reading or writing difficulties or disabilities, allowing them to chat and communicate more effectively. This tool could also be adopted for learning and training purposes.
- **Atenxia:** The pioneering Spanish artificial intelligence that simultaneously treats dyslexia and Attention-Deficit/Hyperactivity Disorder (ADHD) in

school-aged children. It uses scientific evidence to address these learning disorders, which occur in combination in one in three affected children and hinder their attention and literacy development.

Some examples of AI tools for personalisation of learning and training:

- [Knewton](#): Machine learning systems that use AI to adapt content and teaching methodology based on the individual needs of students with disabilities, such as learning through reading, learning through listening, and learning through manipulation.
- [ALEKS](#) (Assessment and Learning in Knowledge Spaces): Automatic adaptation systems that use AI to customize the difficulty level of exercises and tasks based on the academic performance of students with disabilities.
- **Robot dog 'Perrete'**: this tool is more aimed at older population with cognitive deterioration. It was introduced in the Ballesol residence, a robot dog called 'Perrete', which uses AI and sensors to interact and show emotions, helping residents with moderate or severe dementia. This robot improves the emotional, social, motor and cognitive well-being of the elderly, becoming an essential tool in their care. Other uses of robots for educational purposes in younger population have also been explored (Papadopoulou)¹⁸: "There has been significant recent interest in the potential role of social robots (SRs) in special education. Specific Learning Disorders (SpLDs) have a high prevalence in the student population, and early intervention with personalized special educational programs is crucial for optimal academic achievement."
- [ChatGPT Let's Talk](#): This Chrome extension that adds keyboard shortcuts to the interface, which allows users to talk to and hear AI-generated responses in the site.

Some examples of AI tools for educational needs assessment:

- [Cognii](#): Disability detection systems that use AI to analyze data on academic performance, reading, writing, and math skills to detect problems early and improve the academic performance of students with disabilities.
- [Dystech app](#): This app uses speech recognition, natural language processing, and machine learning to evaluate behavioral and linguistic patterns in individuals who may have dyslexia or dysgraphia.

Best Practices and Lessons Learned

In recent years, the integration of AI-based tools in education has opened up new possibilities for improving attention to diversity. In Spain, various experiences in educational centers have demonstrated the potential of these technologies to support students with special educational needs, promoting more inclusive, personalized, and accessible education. Below are some best practices and lessons learned that reflect how AI can significantly contribute to the development of more equitable and adaptive school environments:

Personalized learning adaptation through smart platforms:

The [Prodis360 Project](#), developed by the Institute for Inclusive Training (i360), uses AI to adapt teaching and learning processes to the diverse needs of students, especially those with disabilities or special educational needs. This project focuses on personalizing learning through the use of AI algorithms that analyze each student's performance and needs. The data collected allows content and teaching methods to be adjusted in real time, ensuring that each student receives the necessary support to reach their full potential. The project has been replicated in several educational institutions, expanding its positive impact.

Some schools in Madrid and Catalonia have implemented AI-based platforms (such as [Smile and Learn](#) or [GNOSS](#)) that adjust educational content to the pace and learning style of students with special educational needs (SEN). These platforms use algorithms to detect student progress, provide automatically adapted activities and offer accessible visual and auditory feedback.

School [Tres Olivos](#), in Madrid, specialises in the inclusion of students with hearing impairments, uses advanced technologies to adapt teaching to individual needs. It offers training in areas such as microcomputer systems and networks, facilitating access to the labor market for students with hearing impairments.

Speech recognition to improve communication for students with disabilities:

In pilot programs in Andalusia, AI-based voice assistants (such as Google Speech-to-Text or Microsoft tools) have been integrated to assist students with motor or speech difficulties. They are used to transcribe spoken words, facilitate class participation and create augmentative and alternative communication (AAC) environments. [Centro de Educación Especial Miguel de Unamuno](#) (Móstoles, Madrid) has launched its school radio station, *Unamuno en la Onda*, as part of its educational program. Students have used AI tools to create the station's theme song and logo, fostering communication and teamwork skills in an inclusive environment.¹⁹

Early Detection of Learning Difficulties or Gifted Students:

Some schools have begun using AI to analyze patterns in assessments and digital activities to detect early signs of dyslexia, ADHD, or other conditions. Tools such as Dytective for Schools (from Change Dyslexia) allow to conduct assessments in just a few minutes and issue reports that guide specific pedagogical interventions.

[CEIP Maestro Román Baíllo](#) (Valdemoro, Madrid): This school has developed the "T.O.D. Hidden Talents to Discover" project to serve gifted students. They use digital and AI tools, such as Bee-Bot® and LEGO® Education WeDo, to stimulate logical thinking and creativity, adapting teaching to individual needs. Likewise, [Colegio Corazón de María](#) (Gijón, Asturias), with its "[Dynamis](#)" project, seeks to identify and develop its students' talents from an early age. They use innovative methodologies and digital technologies to personalize learning and address individual differences, especially among gifted students.

Support for teachers through virtual tutors and predictive analytics:

In experiences in the Basque Country and the Valencian Community, AI systems have been used to suggest adapted pedagogical resources and inclusive strategies based on the student's profile. Additionally, some smart learning environments allow to predict the risk of school exclusion and recommend methodological changes.

The University of the Basque Country is programming a summer course for June 2025 on [Inclusive Artificial Intelligence: Rights and Opportunities for People with Disabilities](#). It is not specifically aimed at teachers or trainers but it is a first step in efforts to divulge the potential that this complex technology promises. The Down Syndrome

and Other Intellectual Disabilities Foundation of the Basque Country collaborates with educational centres and with [TECNALIA](#) (TECNALIA is Spain's largest center for applied research and technological development, a benchmark in Europe, and a member of the Basque Research and Technology Alliance) for the implementation of technological tools that help people with intellectual and/or developmental disabilities to practice everyday tasks in a safe environment, to learn to cope with setbacks that may arise.

However, we must not forget that AI is not a replacement for professional diagnosis or for teachers and trainers tuition, but rather a tool that can assist educators and professionals in the process. It is crucial to ensure that AI systems are used ethically and responsibly, with appropriate data privacy and security measures in place.

All in all, despite these examples, **it is difficult to find a recent study on the current level of use and impact of AI application in the teaching and training of non-tertiary students with special needs.** An article published on 26 April 2025 described an international project that has created an open, accessible digital platform for developing adaptive skills in students with intellectual disabilities (ID) titled [PILOT EXPERIENCE IN THE IMPLEMENTATION OF A DIGITAL PLATFORM FOR THE DEVELOPMENT OF ADAPTIVE BEHAVIOR IN STUDENTS WITH DISABILITIES](#)²⁰ The experience was implemented in 3 schools in the Basque Country. The authors stated the following:

“The greatest difficulty was finding studies focused on students with special educational needs, which ultimately required streamlining the search and expanding it to include experiences with any profile of primary school students. **The search yielded five indexed articles and conference papers** (Askar et al., 2016; Bocconi et al., 2020; Panesi et al., 2020; Ramírez-Verdugo and Sáez, 2012; Saridaki et al., 2007). **Only one of these (Saridaki et al., 2007) focuses specifically on students with special educational needs,** and in fact, **the lack of academic literature on the development of digital resources for students with special educational needs in general and, specifically, for students with intellectual disabilities is notable.**

There exist some sources to the effect of AI use at University level, though not specifically for ACNEE learners and trainees, such as the 563-page report on [“Artificial Intelligence and Higher Education.”](#) and [“Summary Report: The Impact of Artificial Intelligence on Learning, Teaching and Education.”](#)

On 8th May 2025, [an international online Forum](#) attended by numerous educational professionals was organised by the online University [UNIR](#) to address the topic of **how to personalise learning and drive inclusion**. The way artificial intelligence can adapt to different learning styles and special needs was highlighted, enabling more equitable teaching. Among many others, tools such as Microsoft Immersive Reader and ClassVR were cited as examples of accessibility. Let us wrap this brief report on the use of AI tools for inclusive education with the words of José Gabriel Aguilera, one of the speakers: “Teachers must be aware that they must attend to each and every one of their students. Artificial intelligence can help, but the teacher's willingness is key.”

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