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Articles

Education, training and employment of people with disabilities in the age of AI: a systemic bibliometric analysis

Istruzione, formazione e lavoro delle persone con disabilità nell'era dell'IA: un'analisi bibliometrica sistemica

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Abstract

Including people with disabilities must be a priority in the era of artificial intelligence, in which scientific and social progress are intertwined. Structural and cultural barriers that limit their participation persist. This article presents a bibliometric analysis of the relevant Scopus documents using the VOSviewer software. The focus was on assistive and digital technologies, regulatory policies and inclusive training models, identifying emerging trends. Citation networks, collaborations between authors and co-occurrence of keywords were mapped. The most relevant contributions and emerging themes were thus highlighted. The importance of synergies between technological innovation, inclusive policies and social sensitivity is emphasised so technology becomes a universal and sustainable participation tool.

Keywords: technological innovation; inclusive education; accessibility; equity.

Sintesi

L'inclusione delle persone con disabilità deve essere prioritaria nell'era dell'intelligenza artificiale, nella quale progresso scientifico e sociale si intrecciano. Persistono infatti barriere strutturali e culturali che limitano la loro partecipazione. Questo articolo presenta un'analisi bibliometrica dei documenti Scopus in tema, avvalendosi del software VOSviewer. L'attenzione si è concentrata sulle tecnologie assistive e digitali, sulle politiche normative e sui modelli formativi inclusivi, individuando le tendenze emergenti. Sono state mappate reti di citazioni, collaborazioni tra autori e co-occorrenza di parole chiave. Si sono così evidenziati i contributi più rilevanti e i temi emergenti. Si sottolinea l'importanza di sinergie tra innovazione tecnologica, politiche inclusive e sensibilità sociale, affinché la tecnologia diventi strumento di partecipazione universale e sostenibile.

Parole chiave: innovazione tecnologica; formazione inclusiva; accessibilità; equità.

[1] This article is the result of joint work by the two authors. However, it is possible to attribute the paragraphs 1 and 7 to Tonia De Giuseppe, as she provided the fundamental directions of the research and developed the final reflections. Sabrina Lucilla Barone, on the other hand, outlined the methodology and carried out the bibliographic research, paragraphs 2, 3, 4, 5 and 6 are therefore to be attributed to her.

1. Introduction

We are witnessing a new era in which Artificial Intelligence (AI) is emerging as an epoch-making transformative factor capable of revolutionising educational systems and labour markets globally. However, the impact of such innovations takes on a peculiar complexity when considering people with disabilities. In this context, AI represents an extraordinary opportunity for their empowerment and a potential risk of reinforcing or aggravating existing barriers if not developed according to principles of genuine inclusiveness (Burgstahler, 2020; Goggin & Newell, 2003). In the face of these transformations, inclusive pedagogy is urged to redefine its paradigms, promoting an interdisciplinary approach that integrates education, social justice and the right to work (Florian, 2014; Slee, 2011).

The educational and vocational inclusion of persons with disabilities has long been at the centre of global policies, supported by key normative instruments such as the *United Nations Convention on the Rights of Persons with Disabilities* (United Nations [UN], 2006) and the *Sustainable Development Goals of the 2030 Agenda* (Unesco, 2016). However, the potential of AI introduces unprecedented conceptual and operational challenges. While the technology promises to overcome obstacles through the personalisation of learning, the automation of processes and the processing of complex data, thereby improving access and the educational and work experience of people with disabilities (Alamri & Alshahrani, 2022), the lack of universal design and algorithmic biases raise relevant ethical and regulatory issues. These issues highlight the risk of systemic exclusions and discrimination that are less obvious but no less insidious (Noble, 2018; Veale & Binns, 2017).

This paper stands at the crossroads of educational research and technological innovation, aiming to explore how emerging technologies can contribute to creating more inclusive, adaptable and sustainable learning and working environments. Through a systematic bibliometric review of recent literature, a comprehensive picture of current trends is drawn, highlighting the most effective and consolidated practices and the critical issues and gaps that remain unresolved. The survey is structured around three main objectives: to investigate the potential of AI in promoting greater inclusion in educational and work contexts, to outline the fundamental principles for designing authentically inclusive technologies, and to reflect on the ethical and pedagogical implications that emerge in the construction of innovative systems for education and work. The interdisciplinary approach adopted represents a key methodological choice, as it integrates contributions ranging from unique pedagogy to assistive technology studies and adaptive learning models, highlighting how different perspectives can converge to address the complex challenges of the digital age. The bibliometric method allows the main subject areas to be mapped with scientific rigour, opening new avenues for future research and offering a perspective for further developments (Donthu et al., 2021).

The structure of the research follows three main lines: an analysis of the normative and theoretical framework supporting inclusion, an exploration of the applications of AI in educational and work contexts, and a reflection on the practical and ethical implications, with an eye towards the construction of sustainable and conscious solutions. This contribution goes beyond simply drawing the boundaries of the debate, offering itself as a catalyst for a transformative and forward-looking reflection. It aims to inspire bold pedagogical and technological strategies capable of redefining the paradigms of equity, inclusion and innovation, paving the way for concrete and lasting impact.

2. Methodology

This study adopts a bibliometric analysis to examine the intersection between education, training, employment, disability and technology based on an initial corpus of 110 documents indexed in the Scopus database. These papers, belonging to social sciences, economics, engineering humanities, etc., outline a multidimensional landscape.

The analysis focused on 41 publications relevant to the research objectives, many of which lie at the intersection of several disciplines, contributing cross-disciplinary perspectives. For example, there are 38 contributions in the social sciences, 3 in the arts and humanities and further studies in economics and management. The publications, distributed between 2002 and 2024, reflect the evolution of the scientific debate. The selection, guided by targeted keywords *(education AND training AND employment AND disabilities AND technologies)*, ensured a rigorous and structured field mapping.

The methodological approach, combining quantitative and qualitative analyses, highlighted the temporal and geographical distribution of publications and the main disciplinary trends. The social and economic sciences emerge as pillars of the debate, while analysing publication types confirms an interdisciplinary scientific production, opening new perspectives for innovation.

VOSviewer software (Van Eck & Waltman, 2010) generated interactive maps that analysed citation networks, author collaborations, and keyword co-occurrence, identifying key contributions and emerging themes. The most influential publications are represented with nodes proportional to the number of citations, and a colour scale shows their evolution over time. The mapping of collaborations revealed the relational dynamics between the leading research groups, while the keyword analysis traced the evolution of topics, distinguishing between established topics and new directions of investigation. Furthermore, the analysis of bibliographic sources identified the most relevant publications regarding impact.

This methodology provided an in-depth view of the scientific debate, highlighting significant contributions, collaborative dynamics and insights for further research, laying a solid foundation for future explorations in the field.

3. Scopus survey results

3.1. The evolution of scientific production

Figure 1 shows the evolution of scientific production from 2002 to 2024, with the number of papers published annually and a growing academic interest in the intersection of education, training, employment, disability and technology.

Between 2002 and 2009, scientific production was sporadic, with a maximum of two papers per year, reflecting an early stage of research that still lacked a strong theoretical and technological basis. From 2010 onwards, gradual growth emerged, with a peak of three publications in 2014 and another in 2016, a sign of increased awareness of the importance of inclusive technologies and their potential to break down educational and occupational barriers.

Between 2017 and 2021, the trend becomes more erratic, fluctuating between two and three publications annually. However, academic interest does not come to a halt, paving the way for a revival in 2023-2024, which marks a marked increase with five publications per year,

reflecting the urgency of responding to post-pandemic challenges and harnessing the transformative potential of inclusive technologies.

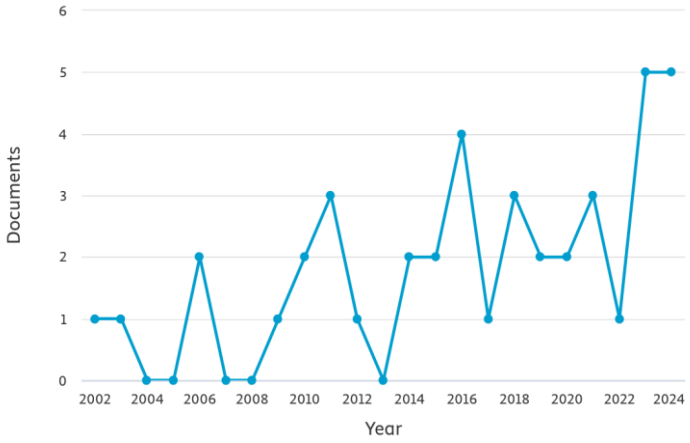

Figure 1. Evolution of scientific production. *Source*: Scopus.

The time analysis shows quantitative growth and the evolution of an increasingly complex and mature field where technological progress and social sensitivity interact. This development consolidates academic interest and opens new opportunities for innovative solutions to the challenges of disability.

3.2. Geography of scientific research

Figure 2 represents the distribution of the analysed documents according to the country or territory they belong to, highlighting the contribution of each geographical context.

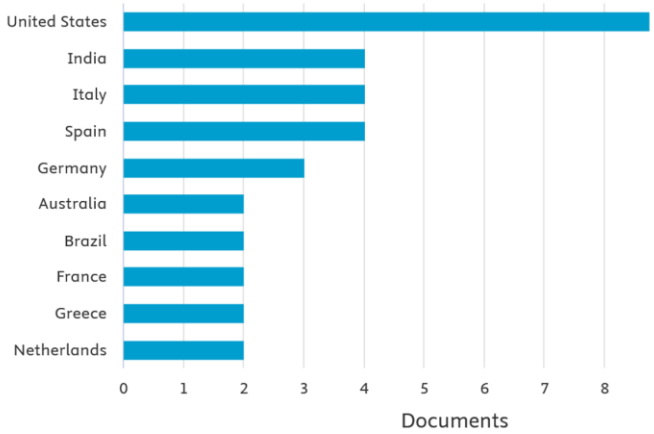

Figure 2. Documents by country or territory. *Source*: Scopus.

The United States emerges as the undisputed leader in scientific production, with 10 papers testifying to a solid combination of academic resources, consistent funding and a well-established interdisciplinary tradition.

They are followed by India, Italy and Spain, each with four publications, albeit with distinct approaches: India responds to demographic challenges and educational access difficulties through inclusive technologies, while Italy and Spain reflect the European academic

tradition's commitment to inclusion and pedagogical innovation. Germany and Australia, with three publications each, contribute significantly: the former focusing on interdisciplinary technological innovation, the latter with strategies to use educational technologies to enhance inclusion.

Countries such as Brazil, France, Greece and the Netherlands, with two papers each, enrich the debate with distinctive perspectives, demonstrating the global interest in these issues.

The heterogeneity of the geographical map underlines the universality of inclusion issues but also highlights the need for adaptable solutions to cultural and socio-economic specificities. Strengthening international collaborations, sharing experiences, and transferring good practices are essential priorities for moving towards a more global and strategic approach. Exploring the impact of local policies, economic contexts, and cultural traditions on research could open new opportunities, enhance national specificities, and foster the development of innovative and shared strategies capable of addressing global inclusion challenges.

3.3. Types of scientific contributions: synergies and perspectives

The pie chart (Figure 3) represents the distribution of the documents analysed according to type, highlighting the different forms of contribution.

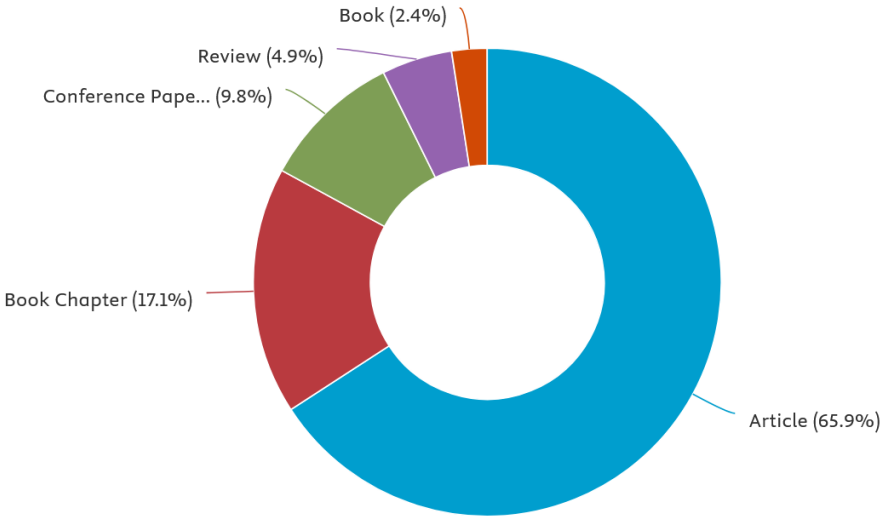

Figure 3. Documents by types. *Source*: Scopus.

Scientific articles, accounting for 65.9% of production, have established themselves as the core of academic communication. They are founded on rigour, peer review and in-depth analysis and constitute the primary vehicle for disseminating and enriching scientific debate. Book chapters, with 17.1% following them, offer scope for interdisciplinarity, delving into specific topics and interweaving theory and practice in a collaborative context.

Conference proceedings, with a share of 9.8%, embody the vitality of evolving knowledge, fostering meetings and comparisons between researchers, especially for work in the preliminary stages. Reviews, at 4.9%, play a crucial role by synthesising past literature and illuminating future paths, while monographs, although limited to 2.4%, remain fundamental pillars in offering systematic analyses and integrated perspectives that traverse time with depth and vision.

This distribution highlights a synergy between different types of production: articles provide timely and rigorous knowledge, while book chapters and conference proceedings enrich the landscape with interdisciplinary perspectives and collaborative dynamics. Reviews and monographs, on the other hand, consolidate knowledge, charting new routes for research. One can easily deduce the importance of intensifying the integration between these forms of production, encouraging interdisciplinary dialogue. Increased reviews would systematise knowledge and guide new explorations, while innovative monographs could offer fundamental references capable of combining theory and application. It is in the variety of approaches and the continuous dialogue between past, present and future that research finds its strength, helping to build knowledge capable of responding to academic and societal needs.

3.4. Subject areas and academic contributions

Figure 4 represents the distribution of the analysed papers according to their disciplinary areas, highlighting the breadth and diversity of academic perspectives that contributed to the research.

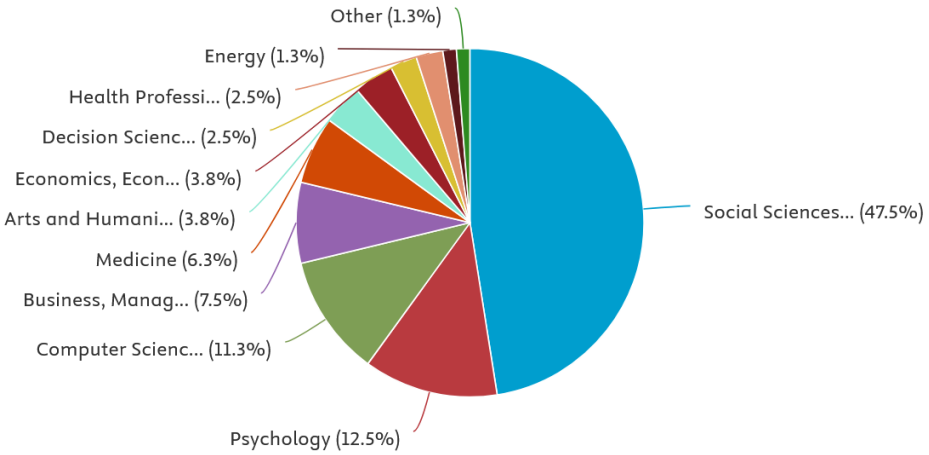

Figure 4. Documents by subject area. *Source*: Scopus.

With 47.5% of the output, social sciences remain central in studying the interactions analysed, offering tools to examine cultural barriers, structural dynamics and intervention strategies for more inclusive environments. Psychology, with 12.5%, provides insights into the impact of technologies on human behaviour and mental well-being, while computer science, with 11.3%, focuses on designing innovative tools, such as assistive and educational technologies.

Business and management, with 7.5%, explore inclusive practices in the organisational context, while medicine (6.3%) focuses on the well-being of people with disabilities through rehabilitation and health care. Disciplines such as the arts, humanities (3.8%), economics (3.8%), decision sciences (2.5%) and health professions (2.5%) bring complementary perspectives, while residual categories (1.3% each) enrich the interdisciplinary analysis.

The distribution of contributions confirms the importance of an integrated approach between social sciences, psychology and technologies, combining the human and technological dimensions to generate sustainable solutions. Strengthening synergies between disciplinary fields and enhancing the role of less represented fields, such as arts

and economics, could stimulate innovations and enrich the academic debate. In the future, the link between applied sciences, such as computer science and medicine, and real-life contexts appears crucial to transform theories into concrete practices, improving the quality of life of people with disabilities and fostering a tangible and positive impact.

4. Bibliometric mapping

Figure 5 illustrates the most impactful papers, selecting from the 41 analysed by authors with at least 20 citations.

id	Document	Citations
1	Lattimore et al. (2006)	59
2	Alnahdi (2014)	50
3	Stodden et al. (2003)	28
4	Schartz et al. (2002)	28
5	Morales et al. (2016)	26
6	Drigas et al. (2006)	23
7	Smith et al. (2021)	22

Figure 5. Documents in order of citation.

Some contributions are pivotal in innovation and impact, while others reflect a persistent interest in exploring emerging technologies. Established works and nascent perspectives enrich the debate, highlighting the vitality and diversity of the field.

The map of the most cited papers (Figure 6) represents the weight and relevance of the contributions, highlighting interdisciplinary growth and the potential for new collaborations and innovations.

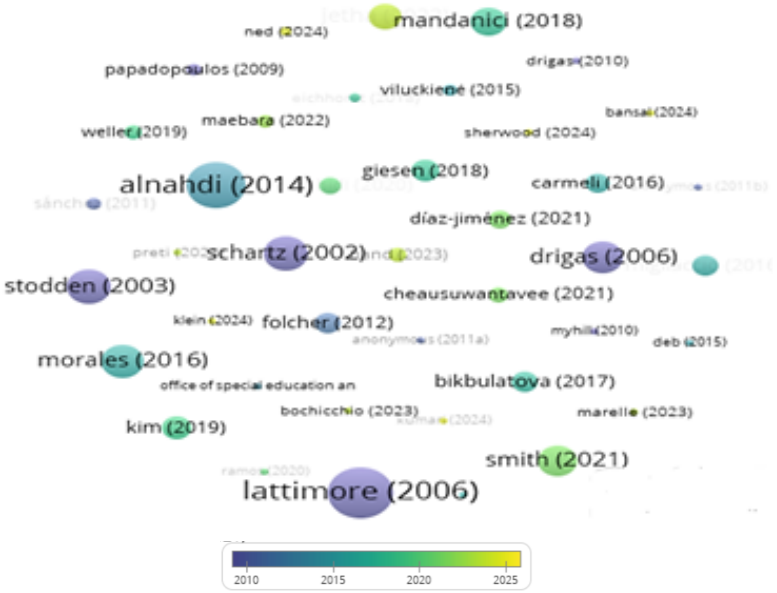

Figure 6. Map of most cited documents. *Source*: VOSviewer elaboration.

The arrangement and size of the nodes reflect the number of citations, highlighting the

impact of central works such as those by Lattimore (2006), Alnahdi (2014) and Stodden (2003). The legend in the bottom uses a colour scale to represent chronology: blue tints indicate older papers, while green and yellow tints identify more recent contributions. This temporal coding makes it possible to quickly identify publications' chronological distribution and distinguish historically influential works from emerging ones. For instance, dark blue nodes, such as Schartz et al. (2002) and Stodden et al. (2003), highlight contributions that laid the foundations of the field, while lighter nodes, such as Ned et al. (2024), reflect recent works that are beginning to make their way into the scientific landscape. The map, therefore, not only offers an immediate and intuitive representation of the network of citations and connections between the main contributions but, through its chromatic and dimensional legibility, allows one to follow the evolution of the research field and to identify papers that have led or are emerging in the scientific debate.

Figure 7 presents a selection of 23 authors from the 135 most cited, most of whom contributed a single paper but recorded a significant number of citations. The variety of authors highlights the richness of perspectives that broaden the understanding of the topic, emphasising the multifaceted and collaborative nature of research.

id	Author	Documents	Citations
1	Lattimore, L. Perry	1	59
2	Parsons, Marsha B.	1	59
3	Reid, Dennis H.	1	59
4	Alnahdi, Ghaleb	1	50
5	Blanck, Peter	2	28
6	Chang, Kelly B.T.	1	28
7	Conway, Megan A.	1	28
8	Schartz, Helen A.	1	28
9	Schartz, Kevin	1	28
10	Stodden, Robert A.	1	28
11	Del Carmen Llorente Cejudo, María	1	26
12	Morales, Purificación Toledo	1	26
13	Drigas, Athanasios	2	24
14	Koukianakis, Leyteris	1	23
15	Papagerasimou, Yannis	1	23
16	Ross, Brittany	2	23
17	Sherwood, Kari	2	23
18	Smith, Matthew J.	2	23
19	Atkins, Marc	1	22
20	Jordan, Neil	1	22
21	Mcrobert, Erin	1	22
22	Oulvey, Eugene A.	1	22
23	Smith, Justin D.	1	22

Figure 7. Most cited authors.

Some authors establish themselves as reference figures, having shaped the main lines of enquiry, while others distinguish themselves through a continuous and diverse production that enriches the debate. This selection highlights the most influential contributions and the crucial role of academic collaborations in promoting knowledge and guiding future research trajectories.

Figure 8, generated with VOSviewer, enriches these observations by offering an immediate

and intuitive visual representation of the network of the most cited authors, making the academic landscape more precise and accessible.

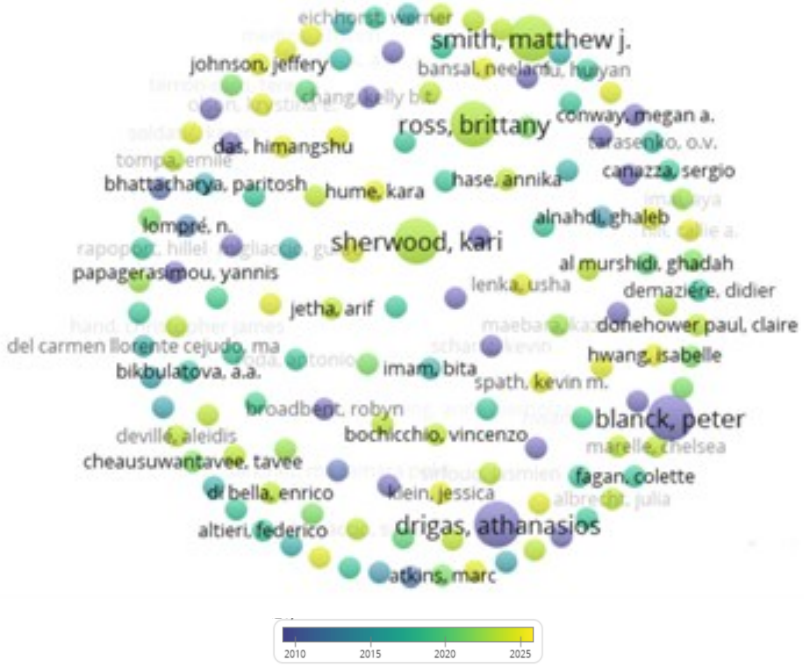

Figure 8. Network of most cited authors. *Source*: VOSviewer elaboration.

The size of the nodes, proportional to the number of citations, and the chromatic variation, from blue to yellow to indicate the chronology of publications, highlight both the most significant contributions and the temporal evolution of the debate. The most significant nodes, positioned in the centre of the map, represent the authors with the most significant impact, true pillars of the field of study that have laid down the guidelines for subsequent research. In contrast, the smaller, evenly distributed nodes reflect various perspectives.

The colour scale adds a distinctive interpretative level, separating historical contributions, represented by blue tones, from emerging work, highlighted by warm green and yellow tones. This visual element emphasises the continuity of the academic dialogue, where pioneering studies maintain their influence and new ideas gain space in the scientific landscape. The spatial arrangement of the nodes reflects thematic connections and collaborations between authors, with central nodes serving as crucial hubs for different research strands. The map does not merely visualise quantitative data but offers a visual account of the complexity, vitality and interdisciplinarity that animate the scientific debate.

4.2. Most cited authors

Figures 9 and 10 offer an in-depth analysis of author collaborations, highlighting the intensity of academic relationships through the column Total Link Strength (TLS), flanked by data on the number of citations and published papers. Although similar in structure, the two tables differ in the sorting criterion: the first (Figure 9) is organised in descending order according to the number of citations, while the second (Figure 10) adopts the importance of academic connections, represented by TLS, as a reference.

Only the top 20 positions are reported, although the complete datasets include 135 authors.

id	Author	Documents	Citations	TLS
1	Lattimore, L. Perry	1	59	2
2	Parsons, Marsha B.	1	59	2
3	Reid, Dennis H.	1	59	2
4	Alnahdi, Ghaleb	1	50	0
5	Blanck, Peter	2	28	7
6	Chang, Kelly B.T.	1	28	2
7	Conway, Megan A.	1	28	2
8	Schartz, Helen A.	1	28	2
9	Schartz, Kevin	1	28	2
10	Stodden, Robert A.	1	28	2
11	Del Carmen Llorente Cejudo, María	1	26	1
12	Morales, Purificación Toledo	1	26	1
13	Drigas, Athanasios	2	24	4
14	Koukianakis, Leyteris	1	23	2
15	Papagerasimou, Yannis	1	23	2
16	Ross, Brittany	2	23	13
17	Sherwood, Kari	2	23	13
18	Smith, Matthew J.	2	23	13
19	Atkins, Marc	1	22	7
20	Jordan, Neil	1	22	7

Figure 9. Correlations between authors in order of citation. *Source*: VOSviewer elaboration.

id	Author	Documents	Citations	TLS
1	Cahuc, Pierre	1	2	15
2	Demaziére, Didier	1	2	15
3	Eichhorst, Werner	1	2	15
4	Fagan, Colette	1	2	15
5	Fu, Huiyan	1	2	15
6	Guimarães, Nadya Araujo	1	2	15
7	Kalleberg, Arne	1	2	15
8	Manning, Alan	1	2	15
9	Mcginnity, Frances	1	2	15
10	Rapoport, Hillel	1	2	15
11	Scranton, Phil	1	2	15
12	Siegrist, Johannes	1	2	15
13	Souza, André Portela	1	2	15
14	Thelen, Kathleen	1	2	15
15	Valfort, Marie-Anne	1	2	15
16	Visser, Jelle	1	2	15
17	Ross, Brittany	2	23	13
18	Sherwood, Kari	2	23	13
19	Smith, Matthew J.	2	23	13
20	Banks, Cristina G.	1	15	9

Figure 10. Correlations between authors in order of TLS. *Source*: VOSviewer elaboration.

A comparison of the lists shows significant differences between the most cited authors and those with the strongest collaborative connections. Authors who dominate the number of citations, such as Lattimore, Parsons and Reid, show a modest TLS, indicating a significant

individual impact but limited collaborative participation. In contrast, figures such as Cahuc, Demaziére and Eichhorst, despite having a low number of citations, stand out with a high TLS, underlining their key role in the academic collaborative fabric.

This duality between citations and connections emphasises two complementary dimensions of research: on the one hand, the theoretical and individual impact of academic contributions, on the other, the influence in building interdisciplinary and collaborative networks.

The synthesis of the two tables, illustrated in Figure 11, allows us to visualise the most influential contributions and the relational dynamics that define the academic landscape, offering an in-depth and articulate perspective on the evolution of the field of study.

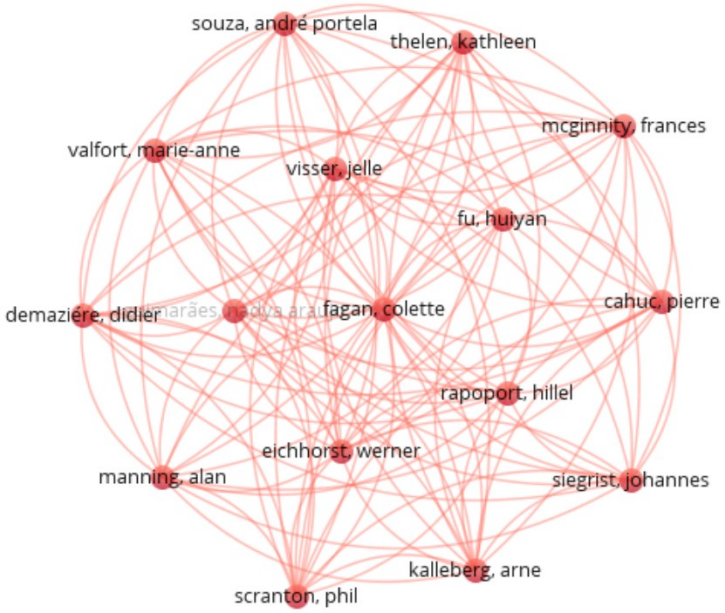

Figure 11. Most influential contributions and citation networks. *Source*: VOSviewer elaboration.

The mapping of connections between authors, based on the 16 most collaborative papers among the 135 analysed, offers an incisive picture of academic dynamics.

Central figures such as Colette Fagan, Pierre Cahuc and Didier Demazière emerge as 'academic hubs', capable of catalysing interdisciplinary connections and uniting heterogeneous thematic clusters in a dynamic, collaborative network. Connecting lines highlight the intensity of interactions, while authors such as Frances McGinnity and Hillel Rapoport act as secondary hubs, expanding the collaborative fabric.

However, isolated papers signal a field in which strongly interconnected contributions and fragmented production coexist. The primary nodes act as interdisciplinary bridges, enriching the academic landscape, while less connected authors, such as Souza or Valfort, represent potential expansion areas. Enhancing these contributions could strengthen the network and foster greater synergy between actors and sectors.

Although limited to 16 interconnected papers, the map suggests strategies to consolidate collaborations, integrating isolated contributions into a more cohesive system. Such consolidation would strengthen existing dynamics and amplify the impact of research, opening new horizons for a more integrated and innovative scientific debate.

4.3. The most used keywords

Figures 12 and 13 summarise the 201 keywords of the corpus, highlighting main themes and scholarly connections. Figure 12 organises them by citations (minimum three), focusing on the most recurrent concepts, while Figure 13 classifies them according to the TLS, revealing thematic relationships. Together, they provide a clear overview of the most relevant terms, outlining the analysis's key points and the dataset's overall contribution.

id	Keyword	Occurrences	TLS
1	Disability	8	64
2	Employment	7	70
3	Article	4	62
4	Assistive Technology	4	23
5	Education	4	63
6	Inclusion	4	52
7	Technology	4	23
8	Digital Divide	3	34
9	Human	3	41
10	Humans	3	41
11	Inclusive Education	3	9
12	Intellectual Disability	3	10
13	Workplace	3	50

Figure 12. Keywords in descending order of citation. Source: VOSviewer processing.

id	Keyword	Occurrences	TLS
1	Employment	7	70
2	Disability	8	64
3	Education	4	63
4	Article	4	62
5	Inclusion	4	52
6	Workplace	3	50
7	Human	3	41
8	Humans	3	41
9	Learning	2	40
10	Teaching	2	40
11	Economic And Social Effects	2	38
12	Personnel Training	2	38
13	Computer Aided Instruction	2	36
14	Engineering Education	2	36
15	Students	2	36
16	Digital Divide	3	34

Figure 13. Keywords based on TLS. Source: VOSviewer processing.

Figures 12 and 13 highlight key terms such as *employment* (seven occurrences, TLS 70), *disability* (eight occurrences, TLS 64) and *education* (four occurrences, TLS 63), which represent the primary nuclei of the academic debate on the intersection of disability, work and education. Words such as *inclusion* (TLS 52) and *workplace* (TLS 50) underline the commitment to inclusive strategies while *learning*, *teaching* (TLS 40 each), and the *digital divide* (TLS 34) draw attention to inequalities in access to technology.

It is necessary to mention terms do not present in the proposed selection, such as *assistive technology* and *technology* (TLS 23 each), which highlight the role of technological solutions to overcome barriers related to disability, while *e-learning* and *engineering education* (TLS 26 and 36) signal emerging application sectors. Other concepts, including *teleworking*, *neurodiversity*, *robotics* and *digital transformation*, outline innovative themes related to the changes in work and education.

The comparison reveals complementary perspectives: Figure 12, organised by citations, reflects academic priorities, while Figure 13, based on TLS, reveals a more nuanced network of thematic connections. Integrated analysis offers a dynamic vision where established themes coexist with emerging areas, promoting innovative solutions and a closer dialogue between theory and practice.

The keyword map (Figure 14) represents the interrelationships between 182 total 201 terms, outlining a structured overview of the corpus. The nodes, proportional to the frequency of the keywords, and the links, indicative of the relational density, illustrate the thematic connections. The chromatic scale, from blue to yellow, adds a temporal dimension, highlighting the evolution of the debate.

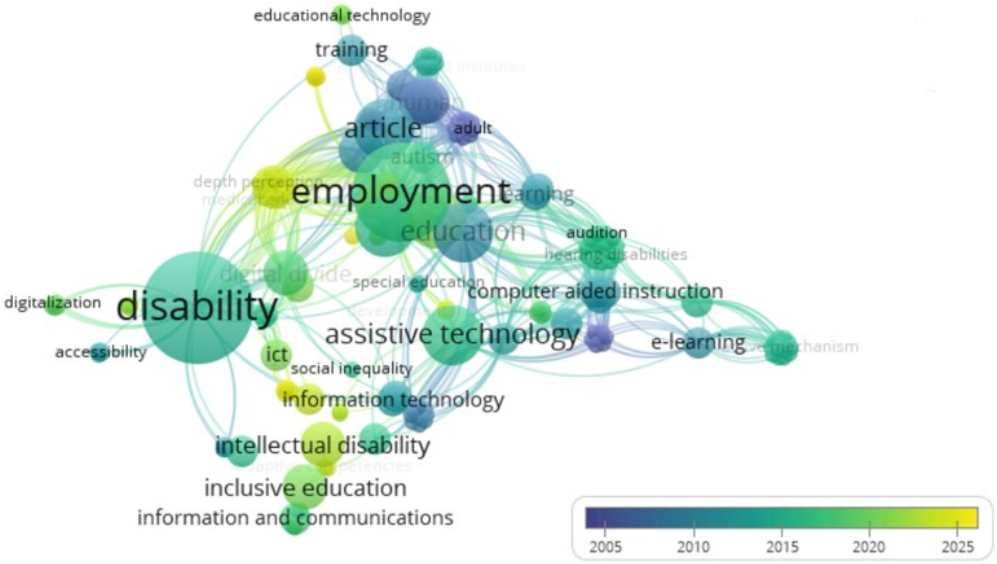

Figure 14. Keyword links. *Source*: VOSviewer processing.

The mapping of connections highlights *disability*, *employment*, and education as central pillars of the corpus, with disability as the primary node and a symbol of the issue's centrality. Key concepts such as *assistive technology*, *inclusive education* and *e-learning* revolve around these terms, emphasising the role of assistive technologies and inclusive educational practices in accessibility and participation.

Peripheral terms such as *digital divide* and *accessibility* offer crucial perspectives on technological inequalities, while more sectoral concepts, such as *intellectual disability* and *computer-aided instruction*, enrich the landscape with specialised research paths. The temporal chromatic scale highlights the evolution of the debate: blue nodes, such as the *digital divide*, represent the initial themes, while yellow nodes, such as *e-learning* and *training*, indicate priorities that have emerged in post-pandemic contexts.

The 19 isolated terms, excluded from the central representation, suggest niche concepts

potentially relevant to specific areas of study, offering research ideas that are still unexplored. The map, interweaving established and emerging themes, offers a dynamic and interdisciplinary framework that opens new research trajectories.

4.4. The most cited sources

The analysis of the most cited sources (Figure 15) is a detailed cross-section of the importance and influence of publications.

id	Source	Documents	Citations	TLS
1	Journal of Applied Behavior Analysis	1	59	0
2	Journal of Special Education Technology	4	51	9
3	Turkish Online Journal of Educational Technology	1	50	2
4	Behavioral Sciences and the Law	1	28	0
5	Digital Education Review	1	26	0
6	Proceedings – Frontiers in Education Conference, FIE	1	23	2
7	British Journal of Educational Technology	1	19	0
8	SSM – Qualitative Research in Health	1	15	2
9	Information Communication and Society	1	12	5
10	Journal of Disability Policy Studies	1	11	0

Figure 15. The 10 most cited sources in order of citation. *Source*: VOSviewer processing.

These journals represent key references in the field due to their academic reputation and the wide dissemination of contributions. However, many sources have a value of zero in the TLS column, demonstrating limited influence in interdisciplinary connections or collaborations between publications such as, for example, the *Journal of Applied Behavior Analysis* and *Behavioral Sciences and the Law*, which, despite the high number of citations, show little connection with other sources.

Few sources present significant connections, revealing a fragmentation between isolated contributions and strategic nodes with high TLS capable of integrating interdisciplinary perspectives. The most cited sources, although recognised, are not always central in academic networks, while those with high TLS, even less cited, weave relationships between research areas, enriching and making the academic debate more cohesive.

5. Critical synthesis of scientific contributions

From the analysis of the documents extracted from the Scopus database, a rich and varied mosaic is outlined, where each tile represents a segment of knowledge that reflects the complexity and breadth of the academic landscape. The contents emerge as distinct thematic clusters, intertwined by conceptual threads that explore in depth the intersection of disability, inclusion, technology and innovation. Each group illuminates a specific perspective and reveals the deep connections between theoretical approaches, normative policies, and practical applications, creating an interdisciplinary dialogue that crosses disciplinary and geographical boundaries. Such an approach makes it possible to accurately map an ever-evolving field of study, where emerging technologies, educational models and inclusive strategies meet to respond to contemporary challenges. Below is a critical summary of the sources, organised by key themes, to offer an overview of the dynamics

shaping the academic debate.

5.1. Assistive and digital technologies: Empowerment tools

Technologies have proven to be essential in fostering inclusion between individuals with disabilities and otherwise inaccessible environments. E-learning platforms designed according to the principles of Universal Design effectively reduce educational barriers and promote behaviour learning pathways through tools such as audio navigation and adaptive supports (Drigas et al., 2006; Drigas et al., 2011).

Notably, serious games implemented in responsive environments have demonstrated efficacy in developing musical and spatial skills in blind children, while also enhancing the emotional dimension of learning (Mandanici et al., 2018).

In the workplace context, virtual reality emerges as a tangible exercise in possibility, offering immersive training experiences that enhance employability (Smith et al., 2021). Technologies such as depth vision and speech recognition, meanwhile, foster autonomy and motivation among individuals with cognitive disabilities (Deb et al., 2015). This perspective aligns with the experiences described by Carruba (2023), in which the use of head-mounted displays and augmented reality allowed students with disabilities to explore professional environments within safe, simulated settings — akin to an imagined yet realistic internship experience.

Artificial Intelligence (AI) further expands assistive capabilities: adaptive platforms, voice assistants, and predictive systems not only remove barriers but also personalize the user experience, particularly for individuals with sensory and motor impairments (Alamri & Alshahrani, 2022). International organizations such as Assistive Technology Industry Association (ATIA), along with strategic documents like the *AI Seoul Summit Declaration* (2024), are currently guiding the development of technology toward an ethical vision that embraces human diversity (Unesco, 2021).

Nonetheless, significant risks remain, particularly algorithmic biases stemming from partial datasets, which can undermine the equity of inclusive technologies (Noble, 2018; Veale & Binns, 2017). In response, participatory AI projects are proliferating, involving individuals with disabilities as co-creators of technological solutions throughout the development process (Every Learner Everywhere, 2025).

The integration of AI and assistive technologies constitutes a transformative act that redefines the boundaries of the human experience, opening new spaces where possibility and difference coexist in novel forms of inhabiting the world.

5.2. Structural barriers and strategies for overcoming

Despite technological advances, structural barriers continue to hinder job opportunities for people with disabilities. The impact of digitalisation on work tasks shows marginal differences in the adaptation to technologies between employees with and without disabilities, but the absence of inclusive design remains a significant limitation, as highlighted in the German context (Weller, 2019). In Thailand, on the other hand, the low employment rate among people with disabilities is attributable to systemic inequalities and cultural biases, which require targeted interventions.

Among the proposed solutions, the adoption of assistive technologies, supportive policies and outreach programs for employers stand out (Cheausuwantavee & Keeratiphanthawong,

2021). The integration of accessible technologies is also crucial in vocational rehabilitation programs.

5.3. Educational and regulatory policies

Well-structured policies promote inclusion, fostering active participation and reducing inequalities. Ramos and Kanaane (2020) highlight how assistive technologies are linked to the Sustainable Development Goals of the 2030 Agenda, demonstrating that technical education supported by accessible tools can significantly enhance employment and sustainably support economic growth.

A significant aspect also emerges in the context of school-to-work transition policies. Stodden et al. (2003) show that access to post-secondary education and adequate technological support are determining factors in expanding employment opportunities. In parallel, the importance of accessible platforms in distance education is underlined by Myhill et al. (2010), who highlight their essential role in ensuring equal participation by reducing barriers.

On the global health policy front, Ned et al. (2024) draw attention to the urgency of integrating disability into international development agendas. The absence of inclusive strategies increases the risk of exclusion, especially in crisis contexts. Their analysis highlights the importance of holistic approaches that address inequalities and foster the inclusion of persons with disabilities in global decision-making processes.

5.4. New training and work models

Vocational training and teleworking are important tools for social and work inclusion. Thanks to its flexibility and the support provided by information and communication technologies (ICTs), teleworking redefines how we participate in the world of work, especially following the transformations accelerated by the COVID-19 pandemic (Kumari & Lenka, 2024).

At the same time, integrating e-skills into vocational training courses improves access to the labour market. Digital technologies not only increase employment opportunities but also bridge the gap that penalises people with disabilities, helping to reduce the structural barriers that limit their full participation (Bansal et al., 2024). To this regard, Sherwood et al. (2024) propose practical strategies for implementing virtual training for job interviews for young people with disabilities.

Their recommendations include integration into school curricula and individualisation of support, highlighting the potential of technology to improve transitions to work.

5.5. Digital divide and social inclusion

The digital divide represents a significant form of social inequality that affects multiple dimensions of daily life, including access to education, employment opportunities, and civic participation. According to Papadopoulos and Broadbent (2009), the mere provision of ICTs infrastructure is insufficient to bridge this gap; rather, it is essential to implement customized technological solutions that respond to the specific needs of local communities, thereby fostering positive social and economic outcomes. Furthermore, Ragnedda and Muschert (2013) highlight how demographic and socio-economic factors – such as income, education, age, and gender – influence both access to and use of the internet, thereby exacerbating existing inequalities.

Addressing the digital divide thus requires a holistic approach that goes beyond mere access to technology. It must also encompass the development of digital competencies and the creation of contextually relevant content, with the aim of fostering effective and sustainable social inclusion.

6. A brief mention of the contribution of Italian academic literature

Although often overlooked in international indexed circuits, Italian scholarship on disability, technology, and inclusion is distinguished by its interdisciplinary approach, which weaves together pedagogy, law, ethics, and design. This body of work is deeply rooted in the specific cultural and Italian regulatory context, offering valuable insights grounded in a tradition of integrative educational thinking. A decisive turning point in pedagogical orientation was marked by Canevaro (2006), who advocates for a vision of disability not as a deficit to be compensated, but as a difference to be valued. In this perspective, technologies assume the role of educational mediators, capable of fostering personalized and participatory learning paths.

This approach has been further elaborated by various scholars — most notably Ianes (2015) — through inclusive models that integrate digital environments and assistive tools, and by De Giuseppe and Corona (2017), who emphasize the importance of systemic, flexible methodologies grounded in the interaction between corporeality, affectivity, and the learning environment.

Educational design is thus conceived as a participatory process aimed at autonomy and co-creation. Learning environments become dynamic spaces, capable of real-time adaptation to students' needs (d'Alonzo, 2017). In this vein, Federighi (2023) advocates for an experiential education aimed at developing authentic competencies, deeply rooted in everyday life and guided by awareness and responsibility.

The introduction of Artificial Intelligence into the work environment compels a critical reflection on citizenship and social justice. Several problematic aspects emerge algorithmic discrimination, invisible exclusion, and selective drifts (Dovigo, 2023; Gaudio, 2024; Molaschi, 2022). From a legal standpoint, there is an urgent need for governance frameworks to reconcile innovation with the protection of fundamental rights, avoiding what Fasan (2024) calls "unconstitutional automatisms" and reasserting the primacy of human oversight.

Meanwhile, the academic debate is gaining momentum, outlining the contours of an educational innovation that is not merely technical, but genuinely inclusive and transformative. Italian pedagogical research thus emerges as a multidimensional field that brings together diverse epistemologies, acknowledging that quality of life cannot be investigated in fragmented or solipsistic terms. As Mortari (2007) eloquently observes, the good does not express itself in the singular; rather, it takes shape in the plurality of human relationships – thus orienting research toward a shared, generative, and deeply interconnected praxis.

7. Conclusions

The analysis carefully explored emerging technologies' role, particularly AI, in creating more inclusive, flexible and sustainable educational and working environments. The

objectives set at the beginning of the course have been fully respected, offering an in-depth overview of trends, virtuous practices and gaps still present in the literature.

One of the most significant results that emerged in promoting inclusion concerns the potential of AI, which can break down physical, cognitive, and social barriers and support people with disabilities in learning and job placement paths. However, significant risks have been highlighted alongside these opportunities, such as the perpetuation of algorithmic biases or the lack of a genuinely accessible universal design. It became clear that technological progress must be guided by equity and inclusion principles to ensure that AI's benefits are distributed evenly.

Another key analysis point concerned the fundamental principles for developing inclusive technologies. The mapped studies underlined the importance of an interdisciplinary approach, integrating contributions from special needs education, assistive technology and adaptive learning models. Key principles highlighted include user-centricity, flexibility of solutions and interconnectedness between different research areas. The systematic and bibliometric approach made it possible to outline the main thematic areas, clearly mapping existing conceptual connections and future perspectives.

Finally, the ethical and pedagogical implications proved to be one of the most complex aspects of the research. Clear guidelines are needed to prevent discrimination and ensure that technologies are designed responsibly and respectfully for human values to emerge. At the pedagogical level, it emerged that AI could be integrated into education systems to foster personalised and student-centred learning while requiring greater critical awareness on the part of educators.

Overall, the research results enrich the forge of knowledge (Eco, 1980) of the contemporary debate on the coevolution between education and work in the digital age. Systematic mapping of sources and keywords provided a comprehensive picture of central themes and emerging trends, highlighting the need for policies and practices that promote technological innovation and human and equitable progress. This research aims to stimulate critical and constructive reflection, encouraging the adoption of strategies that combine technology and social justice to build a future where inclusion and innovation can coexist harmoniously. It became clear that the inclusion of people with disabilities is like a bridge suspended between technological innovation, inclusive policies and targeted training: solid only if each pillar supports the weight of the other. However, on the path towards equitable access, gaps are to be filled, like shadows between the planks. It takes the courage of research and investment strength to transform possibilities into reality because an incomplete bridge never leads to its destination.

The primary limitation of this study is its almost exclusive reliance on indexed international literature, which results in only a cursory treatment of the rich and multifaceted national debate. This is a dimension that warrants more in-depth exploration in future research. Similarly, the growing relevance of AI deployment in the field of inclusive policies and assistive technologies is only briefly outlined here, despite its strong potential for future developments, especially considering the rapid advancement of technical tools and the increasing diffusion of digital competencies.

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