
RESEARCH ARTICLE

Mapping the Intellectual Landscape of Inclusive Education for Neurodivergent Learners

Kristine Jhoy V. Matias¹✉, Cyclona A. Villanoza², Ronnielyn T. Estabillo³, and Mariner W. Lattao⁴

¹⁻⁴Northeastern College, Villasis, Santiago City, Philippines (3311)

Corresponding Author: Kristine Jhoy V. Matias, **E-mail:** perfecta.bautista@deped.gov.ph

ABSTRACT

This study aims to assist in understanding the ever-growing, constantly changing body of material related to providing inclusive environments for neurodivergent individuals. Although there has been significant growth in material, it is often difficult for professionals to find reliable evidence-based material that supports policies and practices, as research is overly isolated in its silos based on the individual's diagnosis. Using bibliometric analyses over the last decade (2015-2025) within the Scopus database, this study applied Lotka, Bradford, and Zipf's Laws to construct an intellectual landscape of the field. The findings presented, therefore, illustrate a shift from a medical deficit-based model to a socio-cultural model that supports neurodiversity as a legitimate perspective. In addition to identifying the major authors, most highly ranked journal publications, and countries producing significant research, a well-recognized body of international authorship exists, with the USA and UK being the dominant nations in this regard. One notable finding was the identification of an increase in technologically mediated inclusion through technologies such as Artificial Intelligence, Large Language Models (LLMs), and digital accessibility, which serves as the basis for 21st-century teaching and learning. Although traditional core areas of discipline include behavioral (i.e., ASD) intervention and clinical diagnosis, the field continues to expand into areas related to systemic approaches, rights-based pedagogy, and digital equity. Accordingly, this science map provides decision-makers with a greater understanding, supporting the improved allocation of resources to promote neuro-inclusive practices that utilize evidence-based approaches.

KEYWORDS

digital inclusion, inclusive education, neurodiversity, pedagogy

ARTICLE INFORMATION

ACCEPTED: 11 April 2026

PUBLISHED: 29 April 2026

DOI: 10.32996/jlds.2026.6.6.2

1. Introduction

This research study aims to address the significant challenge of keeping up with the voluminous body of knowledge on inclusive education. The Great Acceleration of information this century has changed how educational managers access and evaluate research and subsequently implement research-based practices for neurodivergent learners (e.g., autism, ADHD, dyslexia) across various environments. The sheer volume of research available now poses a dilemma for practitioners — they have access to an abundance of information but increasingly struggle to identify reliable signals to inform practice and policy. As a result, a quantitative science map provides a different lens through which to view the body of available literature and to build a visual landscape for authors, publishers, and nations that informs where the inclusive education research field has been, where it stands now, and where it is headed.

Even though there is a large body of literature on inclusive education, it is generally categorized into silos by type of diagnosis and context; thus, the important cross-cutting patterns required to promote the inclusion of neurodivergent learners are hidden from view (Bölte et al., 2024). Systematic reviews generally include neurodivergent considerations alongside a broader range of disabilities; therefore, the dynamics and outcomes of neurodiversity are diluted across multiple socio-cultural and educational settings (Jenson et al., 2023). Recent studies have highlighted the need for longitudinal, multi-sited studies that reflect changes such as digital inclusion during the pandemic, the application of universal design for learning, and the transitions of neurodivergent

students through educational pipelines (Syharat et al., 2023). Therefore, the aim of this study is to provide a quantitative, decade-long map that connects the macro-trends with micro-implications for policy and practice in inclusive education (Loison, 2024).

The use of bibliometric laws to classify the literature is one important aspect of this study, as Lotka's Law identifies the key authors who are propelling this conversation forward, Bradford's Law identifies the key journals where research and relevant literature can be found, and Zipf's Law reveals the dominant and newly emerging topics in the neurodiversity literature (Loison, 2024). Using these three bibliometric laws in a triangulated methodology, the study synthesizes the intellectual landscape of the field, highlighting how the intellectual evolution of the field from a medical deficit perspective to a socio-cultural-neurodiversity informed perspective has occurred and is evidenced by scholarly output (Bölte et al., 2024). The study also documents areas of differing opinions and differences in emphasis between diagnostic-centered and strength-based, neurodiversity-affirming understandings of neurodiversity, and discusses how this may influence the conduct of research and the implementation of educational practices (Bölte et al., 2024).

The aims of this project are twofold: to create a visual map of the intellectual landscape of inclusive education for neurodivergent learners that includes influential authors, journals, and countries' contributions as well as to identify emerging research fronts related to UDL, neurodiversity in higher education, and inclusive practices in both clinical and informal learning environments (Torralbas-Ortega et al., 2025); and to investigate how global events, including the COVID-19 pandemic, have influenced digital inclusion practices and the readiness of educators globally to support neurodivergent students (Green et al., 2025). The resulting synthesis was situated within the broader movement toward universal design, neuro-affirming pedagogy, and evidence-based policy and resource distribution in inclusive contexts (Elsherif et al., 2024).

The methodology for this study uses both bibliometric techniques (quantitative analysis) and thematic analysis (qualitative interpretation) to produce a quantitative science map enriched with qualitative interpretations. Specifically, this study applies the bibliometric Laws of Lotka, Bradford, and Zipf to identify the core authors and journals and to extract the predominant themes from the literature (Loison, 2024). The analysis spans a ten-year period from 2015 to 2025 to capture pre-COVID-19 and post-COVID-19 trends and provides a distinct focus on neurodivergent research, allowing for a deep analysis of themes in the literature rather than broader inclusive education research themes (Syharat et al., 2023). Where there are inconsistencies across sources or where authors have placed different emphases on themes (e.g., diagnostic vs. neurodiversity-based theme definitions), it explains these inconsistencies as part of our synthesis and national policy recommendations (Gray et al., 2025; Syharat et al., 2023).

The results of this study provide a macro-level perspective that can improve decision-making by providing structural clarity for policymakers to inform resource allocation and program development for inclusive education programs for neurodivergent learners. The resulting science map helps education leaders prioritize core journals and authors, highlight research trends across countries, and identify emerging trends likely to impact the future of inclusive education standards and practices (Syharat et al., 2023). In so doing, it substantially fills the gap in comprehensive recent quantitative mapping of neuro-inclusive scholarship and brings together local findings and global intellectual trends (Loison, 2024).

This study recognizes limitations, including ongoing deficits in coverage of non-English-language scholars, differences in neurodiversity-specific terms across databases, and potential underrepresentation of library-based knowledge using bibliometric signals (e.g., innovations at the community or classroom level) (Loison, 2024; Syharat et al., 2023). Where bibliographic conflicts do exist (for example, in discussions regarding the breadth of neurodiversity versus disability studies), it provides an open and transparent synthesis that describes where there are points of agreement and disagreement and provides insight into how these things impact the interpretation and downstream recommendations (Gray et al., 2025; Syharat et al., 2023).

This study aims to make a substantial contribution to scholarship on inclusive education for individuals who are neurodivergent and to create a quantitative, internationally informed representation of the intellectual landscape of the scholarship. The goal is to identify major contributors, key venues for dissemination, and emerging areas of need to support the development of more coherent, evidence-based policy and practice in education that furthers inclusive environments where neurodiversity is viewed as a natural human variation rather than a pathology to be addressed (Rollnik-Sadowska & Grabińska, 2024; Syharat et al., 2023).

2. Methodology

The Scopus database has been chosen as the main source for this research project because it is one of the largest databases of peer-reviewed scholarly work in the social sciences and humanities. Compared to other databases, Scopus provides better coverage of high-impact journals in inclusive education and a broader collection of publications in multidisciplinary subjects than Web of Science. In addition, the indexing system used by Scopus produces a highly structured database of metadata (such as citation, affiliation, and keyword data), which is important for the validity of bibliometric studies. In addition, Scopus has advanced export capabilities that work well with bibliometric tools. By using Scopus as the primary data source for this study, the authors can create a map of the intellectual landscape that reflects global research output and provides ample detail for in-depth citation and co-citation analyses. The comprehensive nature of Scopus enables a sophisticated understanding of how neurodiversity has shifted from a pedagogical niche interest to a critical foundation for global educational policy.

The researchers constructed a Boolean search string to capture the full range of the neurodivergent spectrum in relation to inclusive education. The refined query (which was the main tool for our study) was TITLE-ABS-KEY("inclusive education" OR "inclusion") AND (neurodivergent OR neurodiversity OR autism OR ADHD OR dyslexia) AND (pedagog OR learning environment). This query was

specifically created and limited to retrieve documents that predominantly focus on inclusive practices and specific neurodivergent profiles in pedagogy. As such, wildcards and proximity operators were employed to address variation in the linguistic and conceptual use of terms over the last decade. For example, the wildcard "pedagog*" was used to include any variations of the word (i.e. pedagogy, pedagogical, and pedagogue). Additionally, while the phrase "learning environment*" included both physical and online-based educational environments. By nesting specific types of neurominorities (i.e., ADHD and dyslexia) within the more general terms neurodivergent and inclusion, the search strategy framework is presented as transparent and reproducible. This process allows us to develop a very broad and specific thematic overview of the intellectual landscape created by the study, thereby reducing noise from irrelevant data or purely clinical datasets.

Boolean Search String: TITLE-ABS-KEY (("inclusive education" OR "inclusion") AND ("neurodivergent" OR "neurodiversity" OR "autism" OR "ADHD" OR "dyslexia") AND ("pedagog*" OR "learning environment*"))

The inclusion and exclusion criteria used during study selection were in accordance with the PRISMA Guidelines to ensure unbiased filtering and selection of the literature. The stringent inclusion criteria specified the types of articles to be included: peer-reviewed journal articles in English published within the last 10 years. This time frame was chosen to reflect the current trends in the contemporary movement away from the medical model of understanding neurodiversity (neurodevelopmental disorders) toward a more socially based paradigm that supports inclusive education for all people with disabilities. To maintain the academic rigor and relevance of the database to the research areas delineated in this study, the studies chosen for the database were peer-reviewed, original research, books, editorials, conference proceedings, etc. Additionally, only those studies that discussed neurodivergence in a purely medical, clinical context and were clearly located in an educational setting were used to create the bibliometric map. This selection process, including the expanded timeframe for data acquisition and the rigorous screening process described above, was designed to create a bibliometric map of the multiple perspectives on inclusive teaching and learning environments.

The bibliometric mapping data retrieval datasets were initially retrieved. After that, the initial dataset underwent thorough data cleaning to improve accuracy. To do this, a thesaurus file was used to combine all synonymous keywords and correct for potential naming inconsistencies, thereby eliminating fragmentation of thematic clusters and accurately representing each concept's "intellectual weight" across the entire network. Along with normalizing keywords, the metadata was examined for duplicate entries and incomplete authorship information. The goal of careful harmonization of author names was to ensure that co-authorships and citations accurately reflected the contributions of all major researchers in the field under analysis. A complete, accurate, and clean data set serves as a reliable basis for mapping activities in subsequent phases of the research; this eliminates the likelihood of statistical artifacts that may influence opinions about the state of the research field.

The study used both VOSviewer and Biblioshiny to develop a dual-tool analysis methodology. The primary purpose of using VOSviewer was to leverage its strong capabilities for distance-based visualization, providing a framework for creating network maps based on co-occurrence, co-citation, and bibliographic coupling. These visualizations help identify "knowledge islands" by showing how well-connected different research themes are (e.g., policy and classroom practice). In addition, VOSviewer enabled descriptive statistical mapping and longitudinal trend analysis. Furthermore, it provided an extensive overview of the development of inclusive education over the past decade, including information on total development by productivity level by country, the most influential journals, and the "thematic evolution" of inclusive education. VOSviewer enabled a complete interpretation of the data, integrating structural insights into the networks and temporal trends in growth.

that concentrate on “treating” or “managing” or maintaining conditions in traditional systems. The interconnectedness of the psychological, educational, and technological clusters represents a more integrated research environment, suggesting that the study of autism and neurodiversity has developed into a broad-based field combining past clinical bases with present, technology-supported inclusion experience.

3.3. Citation Analysis

Table 1. Most Cited Article

Citations	Authors	Year	Title
391	Shaw, Kelly A.; Williams, Susan; Patrick, Mary E.; Valencia-Prado, Miguel ...	2025	Prevalence and Early Identification of Autism Spectrum Disorder Among Children Aged 4 and 8 Years — Autism and Developmental Disabilities Monitoring Network, 16 Sites, United States, 2022
300	Cohen, Howard; Amerine-Dickens, Mila; Smith, Tristram	2006	Early intensive behavioral treatment: Replication of the UCLA model in a community setting
258	Pelham, William E.; Foster, E. Michael; Robb, Jessica A.	2007	The economic impact of attention-deficit/hyperactivity disorder in children and adolescents
257	Shattuck, Paul T.	2006	The contribution of diagnostic substitution to the growing administrative prevalence of autism in US special education
230	Ciesielski, Timothy; Weuve, Jennifer; Bellinger, David C.; Schwartz, Joel; Lanphear, Bruce; Wright, Robert	2012	Cadmium exposure and neurodevelopmental outcomes in U.S. children
209	Reichow, Brian; Hume, Kara; Barton, Erin E.; Boyd, Brian A.	2018	Early intensive behavioral intervention (EIBI) for young children with autism spectrum disorders (ASD)
195	Jacobson, John W.; Mulick, James A.; Green, Gina	1998	Cost-benefit estimates for early intensive behavioral intervention for young children with autism - General model and single state case
181	Shattuck, Paul T.; Orsmond, Gael I.; Wagner, Mary; Cooper, Benjamin P.	2011	Participation in social activities among adolescents with an autism spectrum disorder
170	Samson, Jennifer F.; Lesaux, Nonie K.	2009	Language-minority learners in special education: Rates and predictors of identification for services
170	Shaywitz, B.A.; Fletcher, J.M.; Holahan, J.M.; Shaywitz, S.E.	1992	Discrepancy compared to low achievement definitions of reading disability: results from the Connecticut Longitudinal Study.

Neurodevelopmental disorders, including education, have been subject to an ever-expanding number of major studies that shape the scholarly view. The large number of citations, as indicated in Table 1, shows this trend; the major studies have focused on numerous aspects of ASD and ADHD, such as prevalence, identification, and the long-term economic and behavioral effects of each. A significant academic contribution to this area has come from the study by Shaw et al. (2025), which has received the most mentions so far (391) for its seminal work on the prevalence of ASD and the early identification of children with ASD in the United States. They are closely followed by Cohen et al. (2006) and Reichow et al. (2018), whose studies complement each other’s work in establishing that early intensive behavioral interventions can be replicated and supported in literature. All three of these most-prolific studies demonstrate how strong researchers continue to explore support systems available to young children and how the shift toward moving clinical models into community-based settings benefits more children than staying in clinical settings.

Table 1 shows that some of the best-researched international studies in special education are not limited to primary clinical interventions but also address long-term systemic issues faced by students with disabilities, as well as the economic implications

functional success in an Inclusive Educational Environment. In conclusion, the map represents a well-developed but rapidly evolving research landscape, rooted in specialized support within the field of Education, and actively evolving into Digital Transdisciplinary-Based and Policy-Based frameworks that redefine and expand the concept of Inclusion in the 21st Century.

3.5. Co-authorship Network

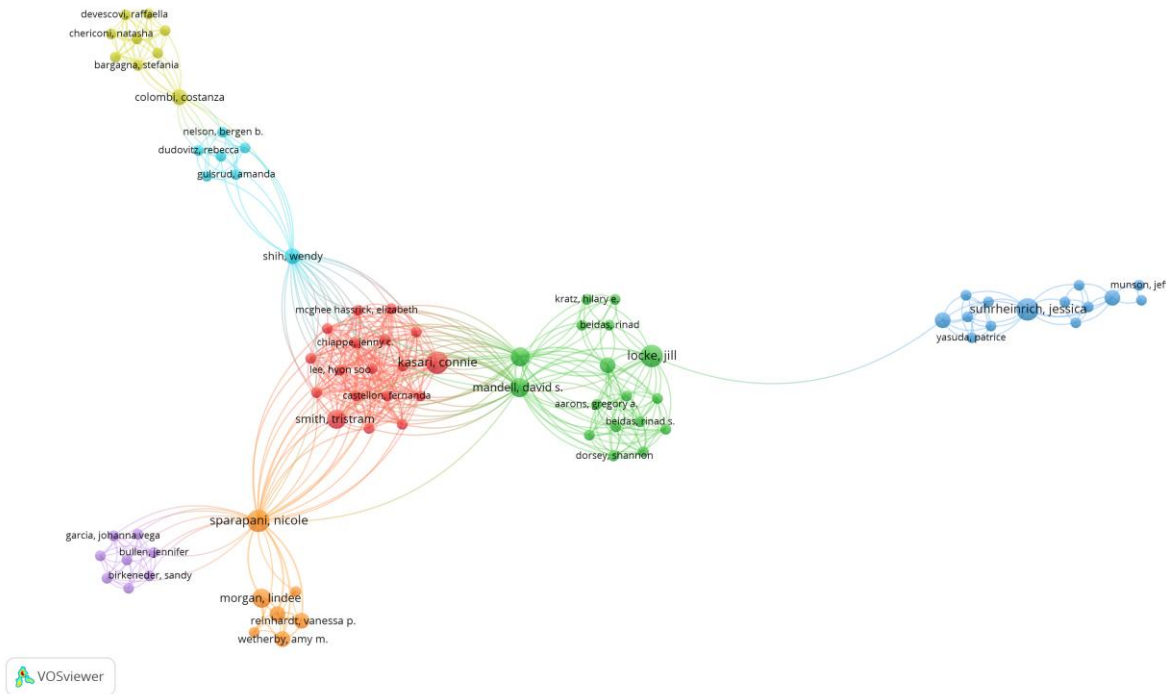


Figure 4. Author Visualization

Figure 4 shows the VOSviewer visualization of co-authorship, which illustrates a networked, integrated approach to collaboration that creates a more cohesive intellectual framework for the study of Autism intervention/implementation science. A dense network of red and green clusters represents the center of this vast network and is among the most productive in terms of published research output. The red cluster includes well-known researchers such as Connie Kasari, Tristram Smith, and Elizabeth McGhie Hassrick, who have developed extensive partnerships to conduct research and implement school-based interventions for children with Autism. This group also has an extensive number of links to the green cluster made up of David S. Mandell, Jill Locke, and Rinad S. Beidas, who continue to maintain an active collaboration to develop research focused on implementation science and the dissemination of evidence-based practices within the community. The closeness of this interaction, together with the number and width of the links between these two clusters, suggests that they share the same themes and a very high level of co-authorship in developing research, forming the primary engine of this vast network.

The orange and purple clusters at the bottom of the figure include researchers such as Nicole Sparapani, Lindee Morgan, and Jennifer Bullen, demonstrating a well-defined collaborative network focused on teacher-student interactions and classroom environments. Nicole serves as an important link between this specialized expertise and the larger Kasari-Mandell network. The yellow and teal clusters to the upper left, comprising researchers such as Wendy Shih and Costanza Colombi, represent a well-defined research pipeline on early intervention and long-term developmental outcomes.

Conversely, the blue cluster on the far right, led by Jessica Suhrheinrich, Patrice Yasuda, and Jeff Munson, represents a less defined but focused collaborative network. The singular and weak connection between Jill Locke and this cluster illustrates the relatively weak yet essential relationship between them, likely stemming from cross-institutional collaboration to disseminate interventions across multiple geographic areas. Overall, this visualization emphasizes the emergence of a large, multidisciplinary author network; although the central clusters are primarily focused on large-scale implementation and behavioral intervention, the peripheral networks help support the depth of study into both early developmental screenings and classroom dynamics, collectively demonstrating the growing maturity of contemporary autism research.

3.6. Organization/Affiliation Network

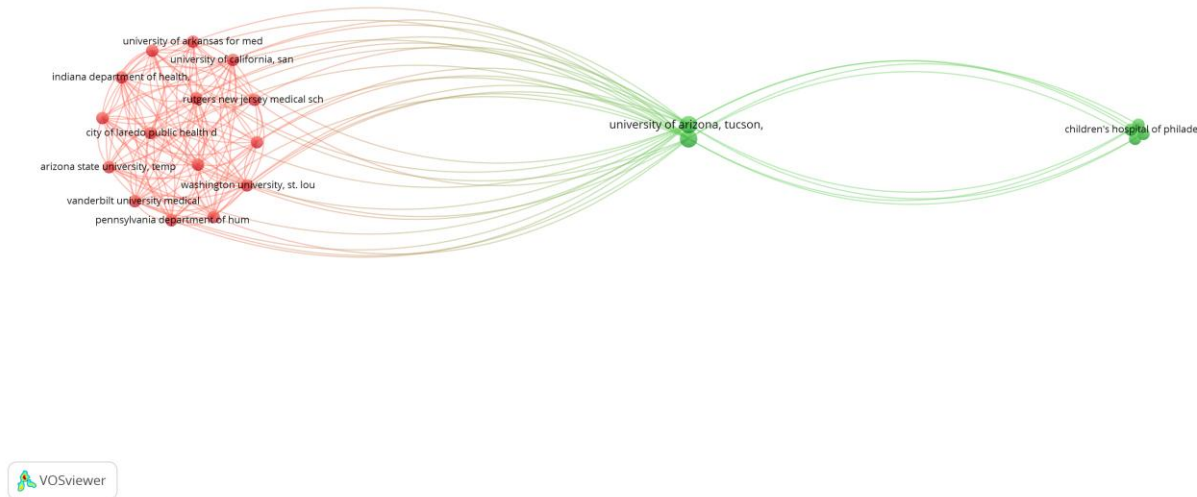


Figure 5. Affiliation Visualization

Figure 5 presents the institutional collaboration map, which represents an exclusive research network that is focused on public health and academic medicine. Within this research network are two main clusters of institutions that are hubs of scientific output. The predominant institution in this network is the University of Arizona in Tucson, which, along with other institutions, serves as a major intermediary. The University of Arizona serves as a link to a dense, well-connected cluster of institutions on the left of the map and to another cluster on the right of the map, which represents only one research institution, the Children's Hospital of Philadelphia. Because the University of Arizona is in the center of the map, it is an essential collaborator with various regional health departments/medical schools, facilitating information exchange and co-authorship among those institutions.

This large, close-knit research organization resembles a highly productive research ecosystem with a high level of internal collaboration and includes institutions such as the University of Arkansas for Medical Sciences, Washington University in St. Louis, and the University of California, San Francisco (UCSF). Public health organizations like the Indiana State Department of Health, the City of Laredo (Texas) Health Department, and the Pennsylvania Department of Human Services are also present in this dense cluster. The strong linkages within the members of this research group suggest significant coordination for multi-site studies and/or state-supported health initiatives. The proximity of Vanderbilt University Medical Center and New Jersey Medical School in this collaborative environment further illustrates the integration of academic clinical research and governmental oversight in health care.

Conversely, the green cluster on the right side of this map has fewer ties in common with other clusters that represent state health departments compared to other clusters and shows more evidence of being a specialized unit, such as an example of a research partnership and research area that matches the scope of what these two clusters have to offer. The evidence for this is that almost all the ties between the green cluster and the other part of the map appear to be routed through the University of Arizona in Tucson. In general, the map shows a collaborative structure that is both hierarchically organized and closely bonded. The Western and Midwest medical centers are closely tied in their publishing activities, while the University of Arizona serves as a central point through which they can expand their network of specialty pediatric efficacy clinical trials.

3.7. Countries Network

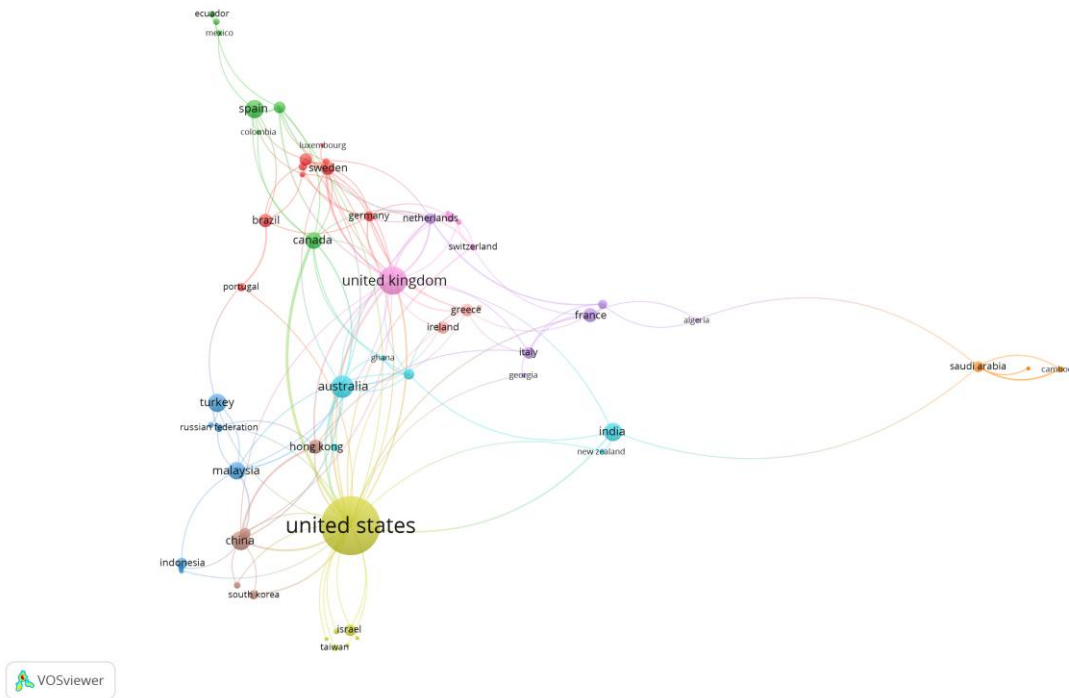


Figure 6. Country Visualization

The VOSviewer map of international collaboration related to inclusive education is presented. The size of each node represents the amount of research output, and the strength of the lines between nodes reflects the degree and number of collaborative links. The USA is the largest node in the network and has the greatest influence on the entire network, as well as the widest extent of collaborative links across multiple continents (i.e., research conducted on all continents). The UK is also an important node in the overall network and serves as an anchor for collaboration between Western-based research institutions and international research institutions.

The network also includes additional distinct clustered networks that represent clusters of countries working together, either by area of interest (e.g., research) or by physical location. One cluster is the North American and East Asian Partnership Cluster, which includes the United States and other countries such as China, Australia, and India. Another cluster comprises Western European countries, where there appears to be a high level of interaction among the United Kingdom, Sweden, Germany, and the Netherlands, as they share similar policies and comparative research agendas. Further examination also reveals smaller clusters or nodes linked to countries in Latin America and those located in Southern Europe, which may indicate the presence of collaborative research networks formed by mutual cultural and language ties. Overall, this visual representation demonstrates the highly connected global research community and the stark difference in the number of articles published in the global north compared to the emerging small research nodes in the global south.

3.8. Discussions

a. Practical Implication

Bibliometric mapping reveals multiple, interdependent clusters of research on neurodiversity and inclusive education, highlighting the direction of policy and practice. Professional development is essential for educational leaders, as it provides an opportunity to integrate inclusive pedagogy, digital literacy, and Universal Design for Learning (UDL), enabling instructors to create accessible and equitable learning environments in both physical and virtual classrooms. Additionally, adaptive learning technologies as well as accessible platforms should be made available through financial investment by institutions in recognition of the prominent role that AI tools, e-learning, and digital accessibility are deemed to play in the area of Inclusive Education (Gray et al., 2025; Jenson et al., 2023; Rollnik-Sadowska & Grabińska, 2024; Syharat et al., 2023). By ensuring that training, curriculum reform, and resource allocation align with these evidence-informed priorities, the Philippine educational system can facilitate the implementation of practices consistent with neurodivergent-friendly approaches across diverse settings.

The findings suggest an increased emphasis on cross-border/cross-institutional collaboration as an important means of scaling up inclusive education reforms. Policymakers should support the creation of strategic partnerships with international partners while also focusing on local relevance, fostering knowledge-sharing, joint research, and shared capacity for policy development that address the realities of the Philippines, including multilingual classrooms, other regional disparities, and differences in infrastructure levels. By investing in regional inclusive teacher education programs, digital inclusion programs, and assistive technology programs, national and local governments can build on global best practices while also developing locally relevant solutions to meet community needs and cultural values (Green et al., 2025; Loison et al., 2024; Torralbas-Ortega et al., 2024).

A third important practical implication is a systemic shift from diagnosis-based models of disability to rights-based, neurodiversity affirming models of pedagogy. Government policies and local practices should incorporate neurodiversity as a basic principle of pedagogy; thus, providing for a continuum of supports for children and their families, encompassing (1) accommodations to facilitate access to educational programs, (2) flexible assessments, and (3) input from multiple stakeholders throughout the process of designing inclusive educational programs. To achieve continual inclusion through ongoing collaborative efforts, culturally and contextually appropriate assessment practices, and participatory decision-making processes, teacher preparation programs, school administration responsibilities, and family/school partnerships must be re-envisioned (Goodman-Scott et al., 2025; Jaffal, 2022; Leiser et al., 2024).

Accessing digital tools and infrastructure in the Philippines requires continuous effort and vigilance to ensure equitable distribution of data and resources. Practical application of the Philippine implementation strategies for AI, E-Learning, and Digital Inclusion should include increasing the reach of broadband, providing low-cost devices for students, and providing professional development for teachers to utilize AI-Inclusive teaching methods. Additionally, policymakers must create procurement budgets that prioritize scalable, maintainable, and equitable access to digital resources in urban and rural public schools alike, thereby enabling the intended outcomes of digital inclusion for all learners, including neurodiverse learners. To ensure that the strategies implemented are continually effective in meeting the needs of Filipino learners and adjusting based on the availability of emerging technology, there needs to be ongoing monitoring and locally driven evaluation of implementation and effectiveness of the strategies in place (Almakrob et al., 2024; Galleto et al., 2023; Manalili, 2021; Nunes et al., 2024).

b. Theoretical Contribution

This theoretical contribution shows how inclusive education can be viewed as an evolving, dynamic, and interdisciplinary framework by analyzing the field's structure over time using bibliometric and scientometric methods. Using this analysis, we move away from narrative synthesis, which presents an understanding of inclusiveness based on the idea of a disability-centered framing to support more comprehensive views of equity, participation, and movement toward systemic change in the field by showing the interconnectedness of three major structures (pedagogical practices, digital accessibility, and policy ecosystems) across evolving theories (Gray et al., 2025; Loison, 2024; Rollnik-Sadowska & Grabińska, 2024; Syharat et al., 2023).

Maps connections between inclusion and current frameworks (e.g., neurodiversity and AI-assisted Learning). The analysis shows significant connections among inclusion, accessibility, and digital technologies, such as artificial intelligence and large language models, indicating that an emerging interdisciplinary paradigm is emerging by combining theories related to human-computer interfaces, ethics, and educational equity. The articulation of these connections provides a new perspective for the development of new theories that are not based solely within a single discipline; instead, inclusive education is, as such, a co-construction developed across disciplines, cultures and digital platforms, providing insight into the capacity for technology to transform the experience of students with disability(s) by realigning the power dynamics and levels of participation within the learning environment (Bölte et al., 2024; Jenson et al., 2023; Rolls et al.).

As a result of this research, new insights have emerged into collaborative networks for generating inclusive education and other scholarly resources. Collaborative networks have created hubs of scholarship across national boundaries; much of this scholarly activity has been led by scholars from the USA or UK. Newer perspectives on theorizing and practicing inclusion suggest that inclusion is not simply a static ideal, but rather a dynamic, internationally situated quest, defined through cross-national collaborations, multiple research methodologies, and the rapid development in technology today. Theoretical frameworks that produce inclusive education, therefore, must consider dynamics of North-South, multilingualism, and cross-cultural validity, in order to develop a theory that can better support equitable education and develop contextualized, theoretically driven policies and practices (Green et al, 2025; Leiser et al, 2024; Torralbas-Ortega et al, 2024).

3.9. Limitations and Future Directions

Although this study employed rigorous methodological procedures, its findings are limited by several fundamental characteristics of bibliometric and scientometric analyses. First, the data included in this study were drawn exclusively from a small number of well-respected databases. These databases, while highly regarded, contain only a small portion of all published work by authors

working in non-English speaking countries or by those who publish in regional journals; therefore, there is likely to be some language and indexing bias present in the data that have prevented the inclusion of many significant contributions from emerging economies. Second, bibliometric methods of analysis place greater value on quantitative metrics than on qualitative analysis. Thus, qualitative aspects of inclusion research have generally been overlooked in favor of more easily quantifiable relationships, such as the number of co-authors, the number of times an article or author has been cited, and/or the number of times an article has been assigned a given keyword or phrase. For example, while the network could illustrate that "artificial intelligence" and "inclusive education" are related to one another, it does not provide any detail on how and/or whether artificial intelligence, as a technology, affects (i.e., pedagogically or ethically) the way teachers work with inclusive classrooms. Finally, examining the number of publications by established research centers in the Global North compared to those by smaller research nodes in the Global South reveals a marked difference. This leads to speculation that the current publication landscape is predominantly controlled by Western-driven institutional and systemic perspectives.

To gain deeper interpretive insight into instructional frameworks and the learner experience, future research should use a combination of bibliometric mapping methods and systematic qualitative assessment (or meta-synthesis). Additionally, expanding data sources beyond scholarly journals to include publicly available databases, national repositories, and literature written in other languages enhances the representation of findings, especially regarding the lived experiences of people from different sociocultural backgrounds. Given the growing importance of technology in supporting inclusion (e.g., large language models such as ChatGPT), future research should focus on the long-term socio-emotional impacts and ethical considerations of this digital transformation. In addition to these limitations, this research provides a solid, clear foundation for understanding global trends; identifying research gaps; and offering direction for future theoretical and empirical work in inclusive education within the context of an ongoing digital transition.

4. Conclusions

The research concludes that the intellectual landscape of inclusive education for neurodivergent learners has undergone a significant paradigmatic shift, moving from a medical deficit-centered perspective toward a socio-cultural, neurodiversity-affirming framework. This evolution is characterized by a transition from traditional school-based interventions and diagnostic management toward systemic, rights-based, and technology-enhanced models of inclusion. Bibliometric mapping reveals that while fundamental conditions such as autism, ADHD, and dyslexia remain the core pillars of scholarly inquiry, the field has increasingly integrated interdisciplinary perspectives from education, psychology, and social sciences. Central to this transformation is the burgeoning role of digital innovation, with artificial intelligence, large language models, and e-learning now critical to creating equitable and accessible learning environments.

The conclusion reached by this research is that there has been a significant shift in how we think about inclusive education for neurodivergent students; it has moved from a medical deficit model to a socio-culturally oriented, neurodiversity-affirming model/frames. The shift has moved from traditional school-based interventions and diagnostic methods of management to systems-oriented, rights-based, technology-enhanced models of inclusion, as well as to evidence-based practice models for inclusion. A bibliometric analysis reveals that while the primary focus remains on the three foundational conditions of research on inclusive education (i.e., autism, ADHD, dyslexia), a growing number of researchers have begun to incorporate interdisciplinary perspectives (i.e., education, psychology, social sciences) into this field. As such, one of the most significant contributions of digital innovation to the inclusive education movement has been the use of digital technologies (e.g., AI/large language models, e-learning) as critical components in creating fair, equitable, and responsive learning environments for all students, including neurodivergent students.

Funding: This research received no external funding

Conflicts of Interest: The authors declare no conflict of interest.

Publisher's Note: All claims expressed in this article are solely those of the authors and do not necessarily represent those of their affiliated organizations, or those of the publisher, the editors, and the reviewers.

References

- [1] Almakrob, A. Y., Alduais, A., Mhone, A. S. M., & Be, B. (2024). Neurodiversity in Saudi Arabia: Towards quality education and reduced inequalities. *F1000research*, 13, 1062. <https://doi.org/10.12688/f1000research.155002.2>
- [2] Bölte, S., Carpini, J. A., Black, M. H., Toomingas, A., Jansson, F., Marschik, P. B., Girdler, S., & Jonsson, M. (2024). Career Guidance and Employment Issues for Neurodivergent Individuals: A Scoping Review and Stakeholder Consultation. *Human Resource Management*, 64(1), 201–227. <https://doi.org/10.1002/hrm.22259>
- [3] Elsherif, M. M., Middleton, S. L., Phan, J., Azevedo, F., Iley, B. J., Grose-Hodge, M., Tyler, S. L., Kapp, S. K., Gourdon-Kanhukamwe, A., Grafton-Clarke, D., Yeung, S. K., Shaw, J. J., Hartmann, H., & Dokovova, M. (2022). Bridging Neurodiversity

- and Open Scholarship: How Shared Values Can Guide Best Practices for Research Integrity, Social Justice, and Principled Education. <https://doi.org/10.31222/osf.io/k7a9p>
- [4] Galleto, F. A., Africa, A. D. M., Leon, F. D., & Culaba, A. B. (2023). Fifth-generation networks: The adoption of technology in a developing country. *Scienggj*, 16(2), 310–320. <https://doi.org/10.54645/2023162mih-35>
- [5] Goodman-Scott, E., Alvarez, J. M., Boulden, R., Daines, E., Perez, B. M., & Shirley, S. (2025). Neurodiversity and Neuro-Affirming School Counseling: Practical Strategies Across the Three Tiers. *Professional School Counseling*, 29(1). <https://doi.org/10.1177/2156759x251375333>
- [6] Gray, L., McNeill, B. A., Pecora, L., Macfarlane, S., Hayley, A., Hitch, D., & Evans, S. (2025). Navigating neurodivergence: A scoping review to guide health professions educators. *Academic Medicine*, 59(10), 1037–1048. <https://doi.org/10.1111/medu.15676>
- [7] Green, E., Brown, M. E. L., Vance, G., & Keenan, I. D. (2025). Undergraduate medical education for neurodivergent students: A scoping review. <https://doi.org/10.21203/rs.3.rs-7415903/v1>
- [8] Jaffal, M. A. (2022). Barriers general education teachers face regarding the inclusion of students with autism. *Frontiers in Psychology*, 13. <https://doi.org/10.3389/fpsyg.2022.873248>
- [9] Jenson, R. J., Lee, M. S., Day, A. D., Hughes, A. E., Maroushek, E. E., & Roberts, K. (2023). Effective inclusion practices for neurodiverse children and adolescents in informal STEM learning: a systematic review protocol. *Systematic Reviews*, 12(1). <https://doi.org/10.1186/s13643-023-02278-2>
- [10] Leiser, R., Flowers, P., & Miyake, E. (2024). Temporal trends in online practices relating to autism and/or ADHD: a scoping review protocol. <https://doi.org/10.1101/2024.05.01.24306633>
- [11] Loison, A. (2024). Literature Review on High-functioning Autistic Employees. *DBS Appl Res Theor.*, 1, 77–105. <https://doi.org/10.22375/dbs.v1i1.120>
- [12] Manalili, M. A. R. (2021a). Ableist Ideologies Stifle Neurodiversity and Hinder Inclusive Education. <https://doi.org/10.35542/osf.io/c9mx3>
- [13] Manalili, M. A. R. (2025). Decolonizing Theory Reveals Psycholinguistic Injustice in the Field of Speech/Language Pathology. <https://doi.org/10.31234/osf.io/xe2rv>
- [14] Rollnik-Sadowska, E., & Grabińska, V. (2024). Managing Neurodiversity in Workplaces: A Review and Future Research Agenda for Sustainable Human Resource Management. *Sustainability*, 16(15), 6594. <https://doi.org/10.3390/su16156594>
- [15] Syharat, C., Hain, A., Zaghi, A. E., Gabriel, R., & Berdanier, C. (2023). Experiences of neurodivergent students in graduate STEM programs. *Frontiers in Psychology*, 14. <https://doi.org/10.3389/fpsyg.2023.1149068>
- [16] Torralbas-Ortega, J., Valls-Ibáñez, V., Roca, J., Campoy, C., Sastre-Rus, M., & García-Expósito, J. (2024). Sexual Affectivity in Autism Spectrum Disorder: Bibliometric Profile of Scientific Production. *Archives of Sexual Behavior*, 54(2), 673–684. <https://doi.org/10.1007/s10508-024-02996-1>