



Research patterns on technological inclusivity and equity in higher education: A bibliometric analysis

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ABSTRACT

This study presents a bibliometric analysis of research trends on technological inclusivity and equity in higher education, leveraging data from the Dimensions academic research database to identify prevailing patterns, emerging trends, and gaps in scholarly discourse. We identified and analysed a total of 1,916 relevant publications spanning the years 2015 to 2024. The study employed VOSviewer, a bibliometric visualisation tool, to map citation networks, co-authorship patterns, and thematic clusters within the literature. The analysis showed a growing focus on digital accessibility, assistive technologies, inclusive teaching methods, and policy-driven efforts to make higher education fairer. The study also highlighted the importance of collaboration among individuals from different fields to enhance technological accessibility. However, apart from South Africa, no research was found in any other African country. These insights provide a foundation for future research and policy development, ensuring that technological advancements in education are accessible to a diverse range of learners.

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INTRODUCTION

In this era of rapid technological advancement, higher education institutions increasingly leverage digital tools to enhance accessibility, teaching methods, and learning outcomes (Alenezi, 2023). This suggests that access in this digital environment relies heavily on technology. To improve student experiences, institutions worldwide integrate technology into their teaching and learning practices (Rashid & Asghar, 2016). However, this transformation may raise critical questions about technological inclusivity and equity. While technology can bridge gaps in access and opportunities, it can also exacerbate existing inequalities if not implemented thoughtfully (Czerniewicz, 2022). Literature suggests that balancing innovation with equitable access can be central to discussions on technological inclusivity in higher education. For instance, over the past decade, advancements in educational technology have reshaped instructional methods and posed challenges in ensuring equitable access for marginalised groups (Aithal, et al., 2024). In a study conducted by Rahman (2023), it was revealed that the COVID-19 pandemic accelerated the adoption of digital learning tools, highlighting disparities in access and digital literacy.

This paper aims to conduct a bibliometric analysis of research patterns in technological inclusivity and equity within higher education, focusing on the period between 2015 and 2024. Bibliometric analysis is a research methodology that employs statistical and quantitative techniques to analyse patterns in published academic literature. It examines bibliographic data, such as citation counts, co-authorship networks, keyword co-occurrence, and journal impact, to provide an overview of research landscapes (Kumar, 2025). Conducting a bibliometric analysis of this study will identify trends in technological inclusivity and equity in higher education, highlighting the most influential authors, articles, journals, and institutions in this field (Suharso et al., 2021).

The analysis provides insights into how technology promotes inclusivity and equity in various educational contexts, maps thematic developments, and helps advance equitable access to technology in learning environments. It underscores the importance of fostering an inclusive academic ecosystem in a technology-driven era.

OBJECTIVES OF THE STUDY

This study focused on the period from 2015 to 2024, intending to encapsulate recent advancements in the sector and provide a contemporary assessment of the research landscape. The bibliometric analysis was conducted in accordance with these specific aims:

- i. Identify and analyse trends in research on technological inclusivity and equity in higher education.
- ii. Investigate notable writers and institutions in the field of technological inclusion and fairness in higher education.
- iii. Evaluate citation impact by juxtaposing countries' publication volumes with their citation counts in research on technological inclusivity and equity in higher education.

LITERATURE REVIEW

Incorporating Industry 4.0 technologies into educational settings may offer adaptable solutions to meet the varying needs of students. It highlights the potential advantages of these technologies in fostering inclusive learning environments for modern education (Ahmad et al., 2024). The authors emphasised that, by leveraging technology, educators can create personalised learning experiences that cater to the unique needs of each student, thereby promoting inclusivity and equity in education. This underscores the importance of adopting a more inclusive model of education that harnesses the potential of technology to improve learning outcomes and support the diverse needs of students in today's educational landscape.

The field of technological inclusivity and equity in higher education appears to have witnessed dynamic growth over the period. The period between 2015 and 2024 saw a significant increase in scholarly publications on technological inclusivity and equity in higher education. This surge aligns with the global focus on integrating

technology to create inclusive educational environments (Wulandari et al., 2024). A study by Memon and Memon (2024) has highlighted the role of online education and digital tools in promoting inclusivity, particularly for students with disabilities and those from marginalised communities. Additionally, the COVID-19 pandemic intensified research on digital equity due to the rapid shift to online learning (Matsieli & Mutula, 2024).

The proliferation of studies highlights the increasing integration of digital tools and inclusive practices aimed at democratising educational opportunities. This review synthesises emerging trends, thematic focuses, and methodological evolutions to provide a cohesive understanding of the domain. The literature highlights a growing interest in technological inclusivity and equity in higher education through bibliometric methodologies. Research in this area has significantly increased over the past decade. Scholars have focused on themes such as bridging digital divides, incorporating artificial intelligence (AI) into learning environments, promoting gender equity, and addressing accessibility for marginalised populations (Cerna et al., 2021; Kisanga, 2020; Raja, 2016). This review explores the evolution of research on technological inclusivity and equity in higher education, examining trends, thematic areas, methodologies, and frameworks.

In terms of the digital divide and access, Gan and Sun (2021) investigated digital barriers and individual coping behaviours in distance education during COVID-19. The findings of the study revealed disparities in technology access, emphasising the challenges faced by students from low-income backgrounds and rural areas. They identified factors such as economic status, gender, and infrastructure as significant contributors to digital inequity. On inclusive online education, a study by Tang et al. (2024) revealed that despite advancements in online education technologies, significant disparities persist in access, digital skills, and educational outcomes, particularly impacting marginalised communities in both urban and rural settings. The study underscores the necessity for improved infrastructure, targeted educational policies, and inclusive teaching practices to bridge these gaps. Research highlighted the importance of institutional policies in promoting technological inclusivity, including strategies to ensure equitable access to digital resources and support services (Tolossa et al., 2023).

Literature suggests a shift toward more comprehensive and interdisciplinary approaches. This research domain is characterised by methodological diversity. Bibliometric reviews, such as those by Terletska (2024), map evolving research trajectories and assess the impact of technology-enhanced learning on engagement and inclusivity. Researchers are increasingly using mixed-method designs that combine quantitative analyses with qualitative insights to capture the complexity of technological inclusivity. Bibliometric techniques enable systematic literature mapping and the identification of research gaps and are commonly used in educational technology research to visualise the development of the research field (Jing et al., 2024).

A study by Ferk Savec and Jedrinović (2024) suggested that frameworks like AI competency models provide theoretical foundations for analysing challenges in equitable technology adoption. Action research methodologies, as employed by Pakhale et al. (2016), focus on participatory approaches to designing inclusive education policies. The shift from descriptive analyses to predictive frameworks signifies a significant methodological change. Studies now utilise advanced analytics and AI-driven insights to model educational inclusivity and equity. Li (2023) emphasised the need to balance technological innovation with ethical considerations to uphold inclusivity.

This bibliometric analysis study on technological inclusivity and equity in higher education, focusing on publications from 2015 to 2024 and employing VOSviewer visualisation, offers a distinctive and thorough methodology for understanding the research landscape in this domain. This study is unique in its use of VOSviewer, which enables the researcher to identify new trends, key authors, and topic clusters related to the issue. This provides valuable insights for future research and policy-making aimed at making higher education more accessible and equitable for all.

MATERIALS AND METHODS

The bibliometric study aimed to identify the most important, significant, and notable papers, research institutes, journals, nations, and authors in the field of technological inclusion and equity in higher education, using

publication counts and citation measures. The process involved collecting articles, processing data, creating networks and overlay visualisations, and conducting analysis.

Data collection

Dimensions is a research database that lets you access multiple types of research data all in one place. It is an international bibliographic database and analytical tool that collects grants, articles, citations, alternative metrics, clinical trials, patents, and policy papers (Herzog et al., 2020). Dimensions may collect data from several sources into one tool and then use that data to provide analytical reports. These reports can have built-in visualisations, like VOSviewer (Hook et al., 2018). Numerous scholars have been using Dimensions for bibliometric analysis (Gaviria-Marin et al., 2019; Hook et al., 2021; Rusydiana, 2021; Singh et al., 2021).

Dimensions have been chosen as the primary database for this bibliometric study because it is a comprehensive academic research platform that indexes peer-reviewed journal articles, conference papers, book chapters, and reviews. It also provides a vast dataset across multiple disciplines, ensuring extensive coverage of research related to technological inclusivity and its applications. To prevent non-research content from affecting the bibliometric analysis, items such as editorial materials, book reviews, and meeting abstracts were excluded. This approach was adopted to preserve the integrity and quality of the dataset.

In this bibliometric analysis, detailed information search steps were undertaken to retrieve relevant publications using the Dimensions database, as indicated in Table 1, to ensure a systematic and reproducible data search process. The search string “Technological inclusivity” OR “technological equity” OR “Assistive technologies” OR “Technology use in Higher Education” was carefully crafted to include relevant keywords related to technological inclusivity and equity. Other specified search criteria included publications related to technological inclusivity and equity in higher education.

The search was conducted within the title and abstract fields to maximise relevance while avoiding unrelated studies that may mention these terms incidentally. Titles not related to the topic were identified and manually deleted. The search was limited to articles published between 2015 and 2024. These years were selected to ensure that only current and relevant research was included, highlighting the most recent changes and trends in assistive technology and technological inclusion. This approach aims to ensure that the analysis is up-to-date and provides a more comprehensive and accurate picture of existing knowledge and the research gaps that still exist.

The search results were filtered to include only publications written in English to ensure consistency in analysis and readability. Non-English papers were excluded to avoid translation inconsistencies and maintain coherence in textual data analysis. The retrieved dataset was exported on 29th January 2025 from the Dimensions database. A total of 1,916 documents met the search criteria and were included in the dataset for further analysis. Each document was checked to confirm that its publication date fell within 2015-2024. Documents with invalid dates (e.g., incomplete or missing metadata) were excluded.

The findings were saved as a CSV format spreadsheet file. After retrieval, the dataset was prepared for bibliometric analysis through data cleaning (removing duplicates and verifying document integrity), field standardisation (ensuring consistency in author names, journal titles, and citation formats), keyword analysis (identifying frequently used terms related to technological inclusivity), and network mapping (visualising citation networks and research trends).

Table 1. Publication search criteria

Criteria	Description
Source Database	Dimensions
Year	2015-2024
Search string	“Technological inclusivity” OR “technological equity” OR “Assistive technologies” OR “Technology use in Higher Education”
Inclusion criteria	Peer-reviewed journal articles, conference papers, book chapters, and reviews
Publication Language	English
Exclusion criteria	Editorials, book reviews, and meeting abstracts
Export Date	Nan Invalid Date
Documents size	1916
Search in	Title and abstract

Data Analysis

VOSviewer software was used to conduct the bibliometric analysis and create network maps of the articles. We manually compiled themes of interest into tables and displayed their frequencies. The analysis evaluated the selected articles based on citation metrics, author prominence, institutional significance, co-citation analysis, journals, and nations. Bibliographic information from the selected articles was transferred from the saved and downloaded Dimensions CSV file into the VOSviewer program. This was done to identify published works on technological inclusiveness and equality in higher education and to analyse network connections.

Visualisation and interpretation

Using VOSviewer, the findings of the bibliometric study were transformed into maps of co-citation, institutional citation, and author co-citation networks in various forms. Based on citation metrics, publishing statistics, network links, and research trends, the maps and tables were utilised to identify the most important articles, countries, institutions, journals, and authors in higher education that promote technological inclusion and equity. These visualisations were done to enhance the interpretability of bibliometric analyses, making them essential for researchers, policymakers, and institutions seeking to understand complex research landscapes.

RESULTS AND DISCUSSION

Research outputs over the period 2015 to 2024

Addressing research objective one, this study examined research outputs published between 2015 and 2024. This section analyses research outputs by highlighting key trends, contributions, and developments based on a systematic review of relevant publications and data sources. The number of research outputs on “technological inclusivity and equity in higher education” from 2015 to 2024 is illustrated in Figure 1. Publications increased steadily from 64 in 2015 to 155 in 2019. In 2020, a slight dip occurred, possibly due to disruptions from the COVID-19 pandemic. Notably, sharp growth began in 2021, peaking in 2023.

In the year 2024, there was a slight decline compared to 2023, but the numbers remained significantly higher than in previous years. Overall, the trend shows consistent growth, with minor fluctuations in 2020 and 2024. The rise in publications between 2021 and 2023 suggests increased interest in the field. Investigating the factors contributing to the rise after 2020 and the reasons for the decrease in 2024 may provide insights into whether this decline indicates a natural plateau.

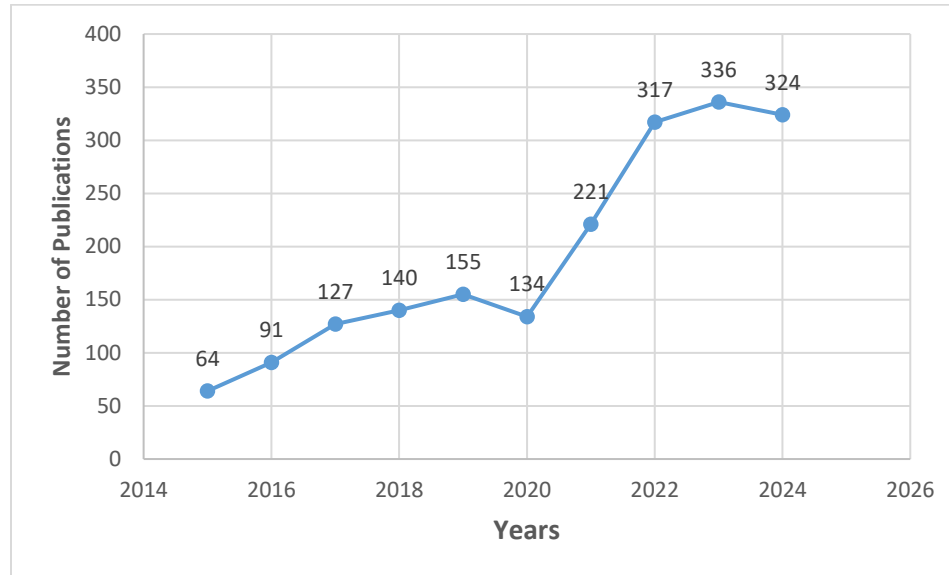


Fig. 1. Number of publications on research related to technological inclusivity and equity in higher education from 2015 to 2024.

Prominent authors

In addressing the second research objective, Table 2 presents the ten most frequently cited authors who have published a minimum of five articles on technological inclusion and equity in higher education. The ranking is based on citation impact, thereby highlighting the leading scholars whose contributions have significantly shaped academic discourse and policy within this domain.

Table 2. The ten authors with the most citations who have published at least five papers on "technological inclusivity and equity in higher education."

Rank	Author	Publications	Citations
1	Maclachlan, Malcolm	27	743
2	Borg, Johan	8	544
3	Khasnabis, Chapal	8	365
4	Layton, Natasha	15	347
5	De witte, Luc	8	301
6	Desmond, Deirdre	5	298
7	Martin, Suzanne	6	264
8	Hemmingsson, Helena	11	261
9	Bell, Diane	9	253
10	Borgestig, Maria	8	236

Out of 8,201 authors, 81 met the threshold of at least five publications on technological inclusivity and equity in higher education. The data reflects the key contributors to this area of research based on the number of publications and cumulative citations. The top 10 authors highlight the dominance of Malcolm Maclachlan, who leads in both publications (27) and citations (743), demonstrating a significant contribution to the field. Natasha Layton has the second-highest number of publications (15) but lower citations (347) compared to peers like Johan Borg (544 citations with 8 publications). This indicates a moderate citation-per-publication ratio, suggesting consistent contributions but less impact per paper. Johan Borg shows a remarkable influence, with only eight publications achieving 544 citations, translating to an average of 68 citations per publication, making his work highly impactful despite fewer publications. Chapal Khasnabis and Luc De Witte also exhibit similar trends of fewer publications but relatively high citations.

Authors like Helena Hemmingsson and Diane Bell have a balanced contribution, with moderate numbers of publications and citations. Maria Borgestig has the fewest citations among the top 10 (236), although her publication count (8) is comparable to that of higher-cited authors, which might suggest a lower reach or narrower audience for her work. Johan Borg stands out as the most influential based on citation density (average of 68 citations per publication). Malcolm MacLachlan is the standout in productivity and visibility, leading the dataset with the highest number of publications and citations. The publications were further analysed to identify the top five most cited authors with at least publications on technological inclusivity and equity in higher education, and the results are presented in Figure 2.

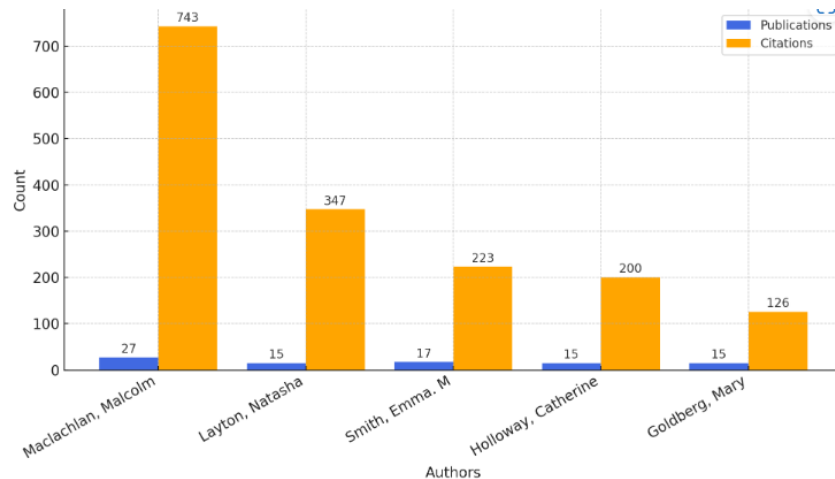


Fig. 2. Top 5 most cited authors in Technological Inclusivity and Equity in Higher Education

Figure 2 presents the top-ranked authors based on the number of publications and citations, highlighting the five most-cited authors who have published at least 15 papers on technological inclusivity and equity in higher education. The blue bars represent the number of publications, while the orange bars represent the number of citations. The ranking is determined by the number of citations received, reflecting each author's influence in the academic community. The results show that MacLachlan leads with 27 publications and 743 citations, indicating a high work volume and a significant citation impact. His research is likely foundational or widely referenced in studies on technological inclusivity in education.

Despite having only 15 publications, Layton ranks second in citations with 347 citations, suggesting that her (the author's) work is highly relevant and frequently cited, potentially focusing on policy frameworks, accessibility technologies, or equity models in higher education, while Emma M. Smith has 17 publications and 223 citations, demonstrating notable intellectual engagement. Catherine Holloway and Mary Goldberg, each with 15 articles, have attracted 200 and 126 citations, respectively, reflecting moderate significance.

Overall, the results revealed that although all five writers have relatively low publication totals, their high citation rates, particularly for MacLachlan and Layton, highlight their strong impact and reputation within the academic community. This suggests that influence in this field depends less on the quantity of publications and more on the relevance and citation of individual contributions. The next section expands on the findings from the contributions of individual authors by examining the research impact and global debate on technological inclusion and equity in higher education at the institutional level. It focuses on the top 10 institutions with at least 10 publications and the most citations, with the results presented in Table 3.

Prominent institutions

Table 2. Top 10 institutions with the highest number of citations, each with a minimum of 10 publications.

Rank	Institution	Publications	Citations
1	National University of Ireland, Maynooth	37	1,136
2	Stellenbosch University	30	987
3	University College, London	51	966
4	University of Toronto	45	911
5	University of Sheffield	26	883
6	Lund University	19	845
7	University of Pittsburgh	55	729
8	University of British Columbia	39	720
9	University of Montreal	44	669
10	Trinity College, Dublin	18	645

Table 3 lists the ten institutions that have been cited the most in research on technological inclusivity and equity in higher education. Only institutions with at least ten publications were included. These schools represent various types of academic institutions and have made significant contributions to the field. Their research is well-known and frequently referenced by other researchers. In the institutional collaboration network for this research, Vosviewer identified 85 out of the 2,630 selected academic institutions that met the minimum threshold of having at least 10 publications. From the results (see Table 3), the total number of citations across the top 10 institutions is 8,491. The National University of Ireland, Maynooth is top, with 37 publications and 1,136 citations, demonstrating both production and great intellectual influence in the field of technological inclusivity and equity in higher education. Stellenbosch University follows closely, with 30 publications and 987 citations, but University College London stands out for its high research volume (51 publications) and roughly equivalent impact (966 citations). Similarly, the University of Toronto (45 papers, 911 citations) and the University of Sheffield (26 publications, 883 citations) both make significant contributions.

Notably, Lund University has a lesser output (19 publications) yet a high citation count (845), indicating that fewer publications do not mean less relevant research. North American institutions such as the University of Pittsburgh (55 publications, 729 citations), the University of British Columbia (39 publications, 720 citations), and the University of Montreal (44 publications, 669 citations) are also heavily represented, emphasising the region's role in shaping global discourse. The last-ranked institution, Trinity College, Dublin, has 645 citations from 18 publications, which is lower in comparison, but demonstrates Ireland's strong presence in this sector. The University of Pittsburgh has the highest number of publications (55) but ranks 7th in citations (729), suggesting lower research impact per paper.

Table 3 indicates that while more publications make research more visible, universities like Lund and Stellenbosch have citation impacts that are much higher than their production, which shows that the quality of the research is important. But citation numbers alone don't give a whole picture of comparative influence. Table 4 shows citations per publication (CPP) to help with this. This is a clearer way to quantify the effect of institutional research.

Table 3. Citation Impact per Publication (CPP)

Rank	Institution	Publications	Citations	CPP
1	Lund University	19	845	44.47
2	Trinity College, Dublin	18	645	35.83
3	University of Sheffield	26	883	33.96
4	Stellenbosch University	30	987	32.90

5	National University of Ireland, Maynooth	37	1136	30.70
6	University of Toronto	45	911	20.24
7	University College, London	51	966	18.94
8	University of British Columbia	39	720	18.46
9	University of Montreal	44	669	15.20
10	University of Pittsburgh	55	729	13.25

Table 4 revealed the ten leading institutions ranked by Citation Impact per Publication (CPP), providing a more balanced assessment of research influence. Unlike total citation counts, which often favour institutions with higher research output, CPP emphasises the relative impact of each publication. For example, although the National University of Ireland, Maynooth has the most citations (1,136), it ranks fifth in CPP (30.70), indicating that its overall influence is high, but its impact per paper is lower than that of others.

The results show that some institutions with fewer outputs achieve higher CPP values, indicating that their work attracts proportionally greater scholarly attention. This suggests that research quality, visibility, and relevance to global debates are key factors in shaping institutional influence. By comparing CPP alongside publication and citation counts, the analysis provides a more profound understanding of how different institutions contribute to the discourse on technological inclusivity and equity in higher education. Thus, while citation count is essential, CPP provides a more nuanced measure of institutional research influence. Institutions with higher CPP are likely to publish in influential journals and produce groundbreaking research, making them key players in this field.

Overall, the statistics indicate that European institutions, particularly those from Sweden, Ireland, and the United Kingdom, predominate in terms of citation efficiency. In contrast, North American colleges produce a higher number of publications but have a lower relative impact. This highlights the discrepancy between productivity and citation influence in the global research environment concerning technological inclusion and equity.

Network of Co-Citations for Institutions

Figure 3 provides a network visualisation of prominent academic institutions based on their collaborative research publications. In the network visualisation, nodes represent academic institutions, and edges represent collaborations or co-authorships. Different colours indicate clusters, likely grouped by geographical regions or research disciplines. The size of the nodes reflects each institution's prominence, possibly in terms of the number of publications or citations.

The University of Toronto, the University of Montreal, the University College of London, the University of British Columbia, and the University of Pittsburgh appeared as highly connected nodes, indicating numerous research collaborations. Their central placement suggests a significant role in disseminating academic knowledge. The network is divided into multiple colour-coded clusters. The green cluster includes the University of Toronto, McGill University, and other Canadian institutions, indicating strong regional collaboration in North America. The red cluster consists of University College London, the University of British Columbia, the University of Queensland, and other global research leaders.

The blue cluster features the University of Pittsburgh, Stellenbosch University, and the National University of Ireland, highlighting collaboration in specific research domains. The yellow cluster includes Linköping University, Uppsala University, and Queen's University, representing European collaboration networks. The purple cluster contains the University of Manchester and the London School of Hygiene & Tropical Medicine, suggesting a focus on medical or public health research.

Strong interconnectivity among institutions across North America, Europe, and Australia suggests a global knowledge exchange. Some nodes are more peripheral, indicating institutions with fewer but significant collaborations. The visualisation highlights a robust international academic network where top universities collaborate extensively on research publications. Institutions from different regions and disciplines were well-connected, suggesting a multidisciplinary research approach. The larger and more central nodes likely represent institutions with high publication output and citations, significantly contributing to academic discourse. This network graph visually represents research collaboration among leading institutions worldwide. Centralised and well-connected universities play key roles in global academic knowledge sharing. Different clusters represent regional and thematic collaborations, offering insights into research partnerships and institutional influence.

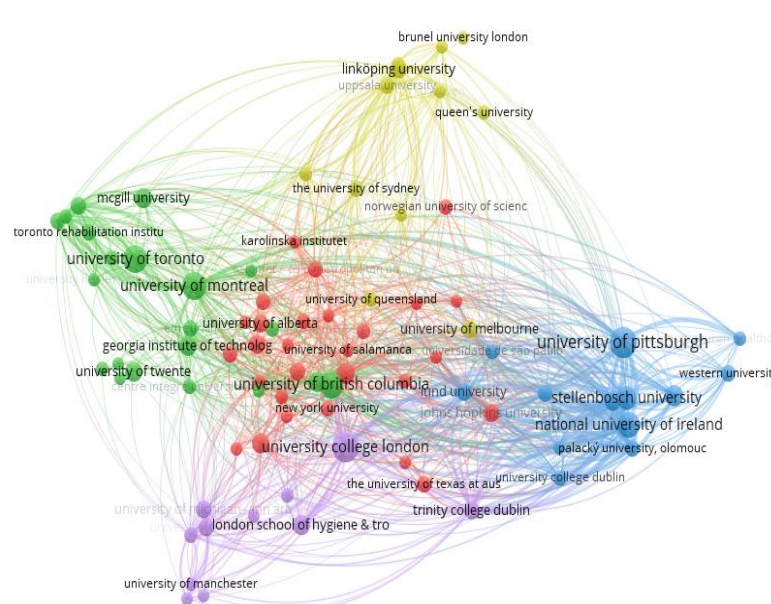


Fig. 3. Network visualisation of prominent academic institutions and their publications

Prominent Countries

Countries with the Most Citations

To address research objective three, countries were ranked according to their number of publications and citations. A Vosviewer analysis reveals that 21 out of 92 countries selected met the threshold. The 15 most prominent countries with at least 25 publications on technological inclusivity and equity in higher education from 2015 to 2024 are presented in Table 5.

Table 4. Top 15 countries ranked according to number of citations.

Rank	Country	Publications	Citations
1	United Kingdom	336	6573
2	United States	496	6454
3	Canada	240	3535
4	Australia	138	2543
5	Ireland	80	2256
6	Sweden	92	2043
7	Italy	85	2040
8	Netherlands	95	1870
9	Germany	98	1758

10	Switzerland	54	1521
11	South Africa	49	1179
12	Norway	62	979
13	Spain	70	969
14	Brazil	50	893
15	Denmark	38	676

Table 5 ranked the top 15 countries by citations in research on technological inclusivity and equity in higher education from 2015 to 2024. The United Kingdom leads with 6,573 citations from 336 publications, closely followed by the United States with 6,454 citations from 496 publications, indicating high productivity but slightly lower citation impact. Canada (240 publications, 3,535 citations) and Australia (138 publications, 2,543 citations) also demonstrate strong contributions. Ireland stands out with 2,256 citations from just 80 publications, reflecting a high citation-per-publication ratio.

The data indicate European dominance, with seven out of the top ten countries from Europe (UK, Ireland, Sweden, Italy, Netherlands, Germany, Switzerland). Ireland, with 80 publications and 2,256 citations, stands out with a high citation-per-publication ratio. South Africa, with 49 publications and 1,179 citations, and the only African country, appears as an emerging contributor, indicating regional research interest. Similarly, Brazil, with 50 publications and 893 citations, represents South America, showing growing participation.

Overall, the results suggest a concentration of research influence in the United Kingdom, United States, and Canada, with notable contributions from European nations, while emerging voices from Africa and South America indicate expanding geographical diversity in the field. Figure 4 presents a network visualisation created by VOSviewer.

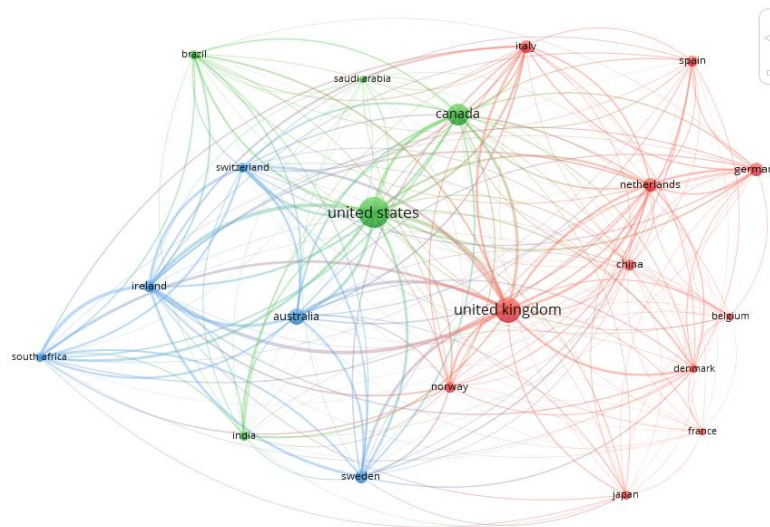


Fig. 3. Network visualisation of prominent academic institutions and their publications

Figure 4 presents a network visualisation created by VOSviewer, illustrating academic collaboration among 21 of the 92 different countries based on research publications. In network visualisation, the size of the nodes, colours, and connecting edges provide insights into the strength of research ties and geographical collaboration trends. Notably, the United States (green) and the United Kingdom (red) are the most central nodes, indicating that they are the most influential countries in academic research, with the highest number of collaborations compared to other countries like Canada, Germany, China, and Australia, which also play significant roles in international research collaborations.

The different colour clusters signify regional or thematic research collaborations among the various countries. For example, the green cluster (North America & South America) includes the United States, Canada, Brazil, and

Saudi Arabia, demonstrating strong internal research connections. The red cluster (Europe & Asia) comprises the United Kingdom, Germany, the Netherlands, Italy, Spain, China, and Japan, reflecting European and Asian research collaborations. The blue cluster (Australia, South Africa, and India) indicates robust research collaborations among countries in the Global South and with Europe and North America.

Countries with the Most Publications

The following analysis examines the top 15 countries leading in research on technological inclusivity and equity in higher education. These countries are ranked based on their publication output to highlight their global contributions and trends in this critical area and are presented in Table 6.

Table 5. Top 15 countries ranked according to the number of publications in technological inclusivity and equity in higher education

Rank	Country	Publications	Citations
1	United States	496	6454
2	United Kingdom	336	6573
3	Canada	240	3535
4	Australia	138	2543
5	Germany	98	1758
6	Netherlands	95	1870
7	Sweden	92	2043
8	Italy	85	2040
9	Ireland	80	2256
10	Spain	70	969
11	Norway	62	979
12	Switzerland	54	1521
13	Brazil	50	893
14	South Africa	49	1179
15	Denmark	38	676

The dataset provided insights into various nations' research output and impact in the field of technological inclusivity and equity in higher education. From the data (see Table 6), the United States leads with 496 publications and 6,454 citations. The United Kingdom ranks second with 336 publications but has the highest citation count of 6,573, indicating a greater research impact per publication. Canada (240 publications, 3,535 citations) and Australia (138 publications, 2,543 citations) follow, demonstrating strong research contributions from English-speaking nations.

European countries, including Germany, the Netherlands, Sweden, Italy, Ireland, and Spain, feature prominently, reflecting their significant academic engagement in this domain. Brazil and South Africa are the only non-Western nations represented, highlighting some diversity but also potential gaps in global representation. The United States, the United Kingdom, Canada, and Australia account for over 60% of global research output in this field. The high levels of research collaboration among these nations may contribute to their strong representation. In contrast, countries like Germany, the Netherlands, Sweden, and Switzerland demonstrate a high research impact per paper, suggesting rigorous academic quality.

The only two non-Western countries, Brazil and South Africa, shown in Table 6, made it to the top 15, indicating a significant research gap in developing regions and highlighting the need for increased global collaboration. Non-Western participation is minimal, suggesting potential gaps in research accessibility and equity.

Number of Publications and Citations per Journal

Out of the 449 journals identified, 60 met the minimum requirement of five articles and three citations. VOSviewer selected these 60 journals to create an overlay visualisation of the journal co-occurrence network of citations, as illustrated in Figure 4.

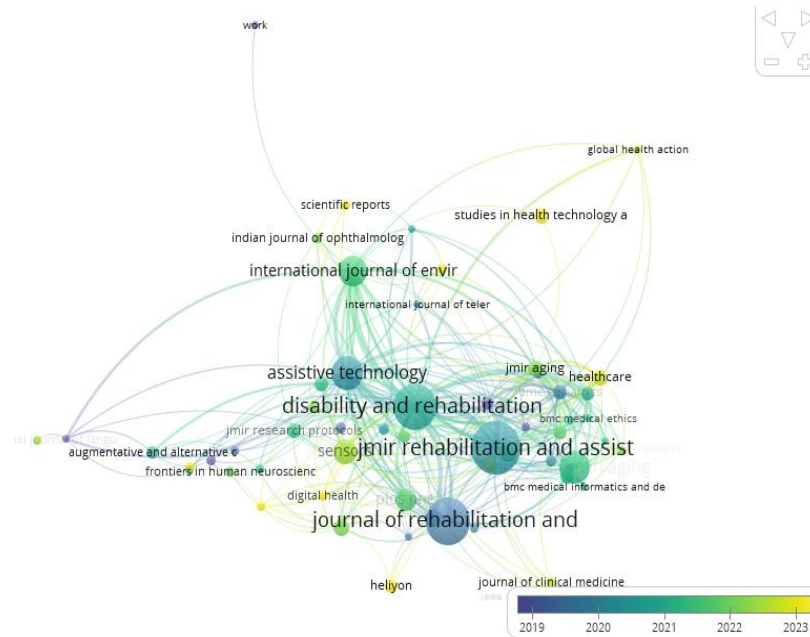


Fig. 4. Overlay visualisation of the journal co-occurrence network, illustrating the number of citations per publication.

The overlay visualisation in Fig. 4 illustrates the publication time zones of journal articles, represented by a colour gradient from blue (2019) to yellow (2023). The size of the nodes corresponds to the influence of the journals, likely based on citation counts, while the edges depict the citation relationships among them. The colour bar at the bottom represents this timeline, with journals in yellow or green indicating recent publications (2022–2023) and journals in blue representing older publications (2019–2020).

The data in Table 7 highlights the top 10 journals with the most citations related to technological inclusivity and equity in higher education, filtered for journals with at least 5 publications and 3 citations.

Table 6. Top 10 journals with the most citations (with at least 5 publications and 3 citations) on technological inclusivity in education.

Rank	Journal	Publications	Citations
1	JMIR Rehabilitation and Assistive Technology	204	3,961
2	Disability and Rehabilitation Assistive Technology	151	2,593
3	Journal of Rehabilitation and Assistive Technology	161	1,825
4	Assistive Technology	83	1,122
5	International Journal of Environmental	69	926
6	BMC Geriatrics	17	487
7	JMIR Aging	19	387
8	Journal of Neuroengineering and Rehabilitation	20	384
9	Dementia	12	367
10	BMC Medical Ethics	5	302

From Table 7, the top-ranked journal, JMIR Rehabilitation and Assistive Technology, has 204 publications and 3,961 citations, indicating a significant impact. The next two journals, Disability and Rehabilitation Assistive Technology and the Journal of Rehabilitation and Assistive Technology, have citation counts of 2,593 and 1,825, respectively. The citation count gradually declines across the rankings, with the 10th-ranked journal, BMC Medical Ethics, having 302 citations. This suggests that the leading journals are highly cited and influential in assistive and rehabilitation technology, while others contribute meaningfully but have a lower reach.

The top four journals, JMIR Rehabilitation and Assistive Technology, Disability and Rehabilitation: Assistive Technology, Journal of Rehabilitation and Assistive Technology, and Assistive Technology, focus on technology supporting people with disabilities. These journals have high publication volumes and strong citation counts, demonstrating that technological inclusivity in education is closely linked to rehabilitation technology and assistive solutions. The analysis suggests that assistive technology remains the core driver of technological inclusivity. The dominance of rehabilitation and assistive technology journals (Ranks 1-4) underscores the importance of hardware and software solutions for disabled learners.

CONCLUSION AND RECOMMENDATION

The bibliometric analysis of 1,916 relevant publications from the Dimensions database (2015–2024) highlights the evolving research landscape regarding technological inclusivity and equity in higher education. The study identified key authors, institutional contributions, and country-level involvement, along with citation metrics, highlighting the main contributors to research and policy discussions on inclusive and equitable technology integration in higher education. Findings suggest that while technological inclusivity is a growing field, research themes have shifted from initial concerns about the digital divide to policy-driven interventions, assistive technologies, and equitable digital pedagogies.

The United States, the United Kingdom, and China have emerged as prominent contributors, with substantial participation from leading universities and research institutions. However, regional disparities in publication and citation trends highlight the need for diverse, global perspectives in shaping inclusive educational technologies. Despite progress, the study underscores persistent challenges in bridging accessibility gaps, particularly for marginalised communities, students with disabilities, and institutions in low-resource settings. The bibliometric analysis also reveals a growing intersection between AI-driven solutions, digital literacy frameworks, and policy implementations, which could shape future research directions.

While this study provides a comprehensive bibliometric overview, it has several limitations. It relied exclusively on the Dimensions database, which may not capture all relevant publications from other databases such as Scopus, Web of Science, or Google Scholar. The analysis is limited to quantitative trends (publication and citation metrics) and does not assess the qualitative depth of research contributions. A systematic literature review could complement this by evaluating the actual content and impact of studies. Additionally, English-language publications dominated the dataset, potentially overlooking significant contributions in non-English literature. As this analysis covers 2015–2024, emerging trends beyond this period remain speculative. Future analyses should incorporate longitudinal assessments to track sustained research impact.

Given the limitations and evolving research landscape, future research can focus on expanding database coverage by incorporating multiple academic databases (e.g., Scopus, Web of Science, IEEE Xplore) to ensure a broader reach and capture interdisciplinary contributions. Mixed-methods approaches can bridge the gap between quantitative bibliometric findings and real-world educational experiences. A qualitative synthesis of existing studies can provide deeper insights into best practices, challenges, and impacts beyond publication metrics.

Furthermore, future studies should explore how these technologies enhance or hinder inclusivity in higher education with the rise of AI-driven learning platforms, adaptive technologies, and personalised learning approaches. Research should also examine how factors such as gender, disability, socio-economic status, and racial identity interact with technological access and equity in higher education. While many studies focus on access and adoption, research should address the policy-to-practice gap, ensuring that technological advancements translate into genuine inclusion for underrepresented groups.

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