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EXPLORATIONS OF SCIENTIFIC PRODUCTION RELATED TO THE DIGITAL DIVIDE AND ITS EFFECTS ON LEARNING OUTCOMES

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Abstract
The bibliometric analysis presented uses Scopus data from 2015 to 2024 to examine the development, major contributions, and thematic focus of digital divide and its effects on learning outcomes. The results show an annual growth rate of 23.54% in publications between 2015 and 2024. Leading the top three countries ranking with 731 papers is the United States; next are the United Kingdom (301), then China (205). With 11 items, JOURNAL OF MEDICAL INTERNET RESEARCH is the top source in the field; followed by the ACM INTERNATIONAL CONFERENCE PROCEEDING SERIES with 10 items, an the most important institution is UNIVERSITY OF OXFORD with 23. Among the most productive authors, is highlighted ZHANG Y's leadership stated with six (6) publications.

Keywords: digital divide, education, learning outcomes, internet, bibliometric analysis.

Introduction

Over the past several years, the idea of the digital divide has changed greatly to reflect the fast technology developments transforming civilizations all around. Information availability has historically varied for millennia; early markers of knowledge disparity were print media and literacy (Hauser et al., 2025). With access to computers and connection becoming necessary for communication, economic development, and education, the internet and digital technologies of the late 20th century heralded a new chapter in this gap. Policymakers and academics started to notice disparities in access to digital technologies across various demographic groups, especially along socioeconomic, regional, and racial lines, therefore sparking the creation of the digital divide as a major societal issue in the 1990s (Chee, 2024).

The digital divide was first mostly characterized in terms of hardware and internet connectivity—that is, the physical availability of computers, cellphones, and broadband infrastructure (Ogbo et al., 2021). But as digital technologies have grown more entwined with daily life, the idea has evolved to incorporate skills, digital literacy, and the capacity to make good use of technology for civic involvement, education, and business. Although significant progress has been achieved in decreasing the fundamental access gap, large disparities still exist, especially in low-income areas and rural towns where technology infrastructure is still poor (Cabrera-Castellanos & Castañón-Ávila, 2021).

The digital gap shows itself globally as sharp differences between developed and underdeveloped countries. While low- and middle-income nations struggle with inadequate infrastructure, high costs of digital devices, and insufficient investment in digital literacy initiatives, high-income countries usually show great web penetration and access to innovative educational tools (Masatoshi, 2023). The COVID-19 epidemic widened these gaps as limited access to online learning environments caused interruptions in schooling for millions of pupils all over; governments in nations including Germany and the United States quickly coordinated

resources to give underprivileged pupils computers and internet access (Catalano et al., 2021). Lack of digital access caused ongoing educational disruptions for students in sub-Saharan Africa, South Asia, and areas of Latin America as well (Iacovidou & Sharma, 2022). The epidemic highlighted the truth that the digital gap is a profoundly ingrained social and economic barrier influencing social mobility, career possibilities, and educational performance rather than only a technical one.

A significant indicator of how well policies and educational systems work is learning results. They include a wide spectrum of cognitive, behavioral, and skill-based skills that kids pick up from both official and unofficial instruction (Aly, 2021). Learning results have long been assessed using graduation rates, academic achievement, and standardized test results. Modern education, however, acknowledges the value of 21st-century skills—critical thinking, problem-solving, digital literacy, and teamwork—which are ever more important in the globally technologically advanced society of today (Kalyani, 2024).

Learning results are greatly shaped by the socioeconomic surroundings as differences in resources and educational possibilities usually lead to appreciable differences in student performance. Students usually gain from well-funded universities, access to seasoned lecturers, and exposure to digital learning technologies improving engagement and information retention in high-income nations (Balogun, 2022). In low-income areas and underdeveloped countries, on the other hand, pupils can have difficulties including packed classrooms, inadequate competent teachers, and limited access to current teaching tools (Rodríguez-Segura, 2022). These differences hinder social and financial mobility for underprivileged groups, therefore contributing to ongoing learning gaps.

Furthermore influencing learning results in different areas is cultural and language diversity. For example, multilingual students might find it difficult to access digital learning materials mostly available in dominant languages such English, Spanish, and Mandarin by means of language barriers (Zhang-Wu, 2022). The efforts made to achieve fair education are affected by the distance of the digital language because students who cannot reach resources in their original language may be educated and participants. In addition, the gender gap is still present, especially in conservative countries where women find it difficult to use the Internet due to cultural standards and the lack of security over the Internet (Zarezadeh & Rastegar, 2023).

The results of knowledge today include new elements brought about by technological development, opportunities, and difficulties. Through individualized learning experiences and expanding access to resources beyond traditional class boundaries, digital learning technologies such as online learning platforms, family programs, and various tools provided by AI and virtual classes, have completely transformed education (Yekollu et al., 2024). But by depriving millions of students access to these innovations, the digital divide helps to explain why present educational inequalities persist. Students who lack frequent access to the internet or possess digital literacy skills usually fall behind their peers, according to Yuan et al. (2024), which has a long-lasting effect on their academic performance and job prospects.

There are several complex effects from education and the digital divide. Academic achievement depends on access to digital resources, which influences students' capacity to participate in a technologically changing market as well as how they study (Mohamed Hashim et al., 2022). Regular access to digital learning tools has been connected in research to higher student involvement, improved information retention, and improved problem-solving abilities. Conversely, students without internet access usually learn more slowly, perform poorly in class, and lack motivation (Ozer & Badem, 2022).

Among the main issues the digital gap generates is the worsening of pre-existing educational inequalities. Research shows that children from wealthy backgrounds often have better access to high-speed internet, individual coaching, and advanced digital learning tools, while children from low-income homes are more likely to depend on antiquated technology, shared devices, or limited connectivity (Qutoshi et al., 2023). This disparity produces a two-tiered educational system whereby digital access shapes the character of learning possibilities (Jin et al., 2022). Apart from their academic performance, pupils without digital skills have less career choices in a labor market where digital competency is under more and more importance.

Teacher effectiveness and instructional methods are likewise influenced by the digital divide. Using interactive learning technology, online tests, and data-driven teaching approaches (Tofel-Grehl & Schanzer, 2024), teachers at well-funded institutions may customize their courses to fit the particular needs of every student. Conversely, because of poor digital infrastructure, teachers in developing institutions might find it challenging to include technology into their courses. This disparity highlights the need of thorough digital inclusion rules ensuring teachers with the tools and knowledge required to enable fair learning possibilities (Khreisat et al., 2024).

Given the important effect of the digital divide on learning outcomes, a thorough bibliometric analysis of the corpus of current research on this important intersection is required. This paper attempts to offer insightful analysis of the breadth, evolution, and thematic focus of digital divide research within the educational domain by means of academic publications, trends, and research collaborations in this subject (Barik, 2025). Knowing the main trends and information gaps in this field will let researchers, teachers, and legislators create focused treatments to close digital gaps and improve learning results for every kid.

This bibliometric review aims to address important issues including: How has study on the digital divide and learning outcomes changed with time? Which prevalent themes and approaches apply in this field? Leading the research initiatives on digital fairness in education are which nations and organizations? Through answering these issues, this study hopes to add to the current conversation on digital inclusion and how it could support educational fairness in a society going more and more technologically advanced.

Methodology

The present bibliometric analysis is based on an empirical model developed to investigate the frequency and relevance of publications concerning the suggested issue. The formulation of the study was based on a methodical assessment of the literature utilizing Scopus as the main information source since its dependability and coverage are so highlighting (Jing et al., 2024); January 2025 was the month of the search.

The bibliographic data taken from the previously indicated source was managed, processed, and analyzed using RStudio and VOSviewer, statistical and visualization softwares. Examining information in domains such coauthor networks, important phrases, and references (Zárate-Rueda & Murallas-Sánchez, 2021) these instruments are well-known for their ability to The analysis encompassed publication trends, prominent authors, geographical distribution of the research, and main institutions involved in it (Ramírez et al., 2023). This focus helped one to assess important factors such the diversity of sources and the speed of publication increase.

On the other hand, author productivity was investigated using the Law of Lotka and which articles fit this field of research using the Law of Bradford (Gupt & Singh, 2023). Examined additionally were basic indicators such page citations, co-citation networks, and most often used key phrases.

Variables, descriptors and search equation

The primary variables and their corresponding descriptions applied in this bibliometric research are listed in Table 1: Digital Divide and Learning Outcomes, together with specific descriptions reflecting widely used phrases in scholarly literature on these disciplines. These words ensure a careful review of relevant papers and assist to define the scope of research.

First variable, digital divide, shows variations in information and communication technologies (ICT), digital literacy, and internet access among other digital technologies (Wang et al., 2021). Discussions on social and educational inequality rely on this concept as the access to and effective use of digital resources significantly influences both professional and educational possibilities.

The descriptions for this variable help one to grasp its several facets in a more complex way. "Technological inequality" draws attention to how differently various groups access and use technology. "Digital access" emphasizes on the availability and cost of digital tools and services. The "Connectivity gap" is the variation in internet availability throughout demographic groupings, socioeconomic levels, or geographical areas. Particularly in underdeveloped or rural locations, "Internet accessibility" stresses the availability of online services. The "ICT divide" descriptor addresses the disparities in the utilization and distribution of information and communication technology. Ultimately, "Gap" refers to a broader concept encompassing disparities in knowledge, application, and digital infrastructure.

The second variable, learning outcomes, encompasses many aspects of students' academic achievement, skill enhancement, and instructional advancement (Asim et al., 2021). The text addresses the measurable results of the educational process, encompassing knowledge acquisition, competencies, and overall academic performance.

The terms associated with this variable encompass multiple dimensions of educational performance. "Skills development" highlights the potential of education to enhance students' abilities and competencies. "Learning outcomes" denote the final results of educational endeavors, usually assessed through tests and evaluations. "Academic achievement" is frequently evaluated based on students' effectiveness in fulfilling learning objectives, commonly reflected by grades, standardized assessments, or coursework performance. Examining criteria like as engagement, interest, and comprehension, "Student performance" demonstrates the degree to which students achieve academic objectives. "Educational progress" catches pupils' ongoing development in their educational path over time. The wide word "Academic success" refers to both long-term educational accomplishment and transient performance criteria. As a term, "Learning" describes the general process of gaining information and abilities. Included as a term to guarantee that study centers on people in learning environments is "Students". Finally, "Results" in the context of educational interventions, policies, and instructional strategies denotes the quantifiable results.

Structured basis for bibliometric study is given by arranging these variables and descriptions in table 1. It makes it possible to identify important phrases that will direct research efforts, therefore guaranteeing that the study covers the whole spectrum of pertinent articles. This method aids in trend analysis, research gap identification, and comprehension of the links between emotional intelligence and academic context student achievement.

In this way, it was possible to identify documents such that, in their titles, summaries or keywords, they addressed the study topics related to the digital divide and its effects on learning results through the following search equation “(TITLE-ABS-KEY ("technological inequality") OR TITLE-ABS-KEY ("digital access") OR TITLE-ABS-KEY ("connectivity gap") OR TITLE-ABS-KEY ("internet accessibility") OR TITLE-ABS-KEY ("ICT divide") AND TITLE-ABS-KEY ("skills development") OR TITLE-ABS-KEY ("learning outcomes") OR

TITLE-ABS-KEY ("academic achievement") OR TITLE-ABS-KEY ("student performance") OR TITLE-ABS-KEY ("educational progress") OR TITLE-ABS-KEY (“academic success”) OR TITLE-ABS-KEY (“learning”) OR TITLE-ABS-KEY (“students”) OR TITLE-ABS-KEY (“gap”) OR TITLE-ABS-KEY (“results”)) AND PUBYEAR > 2014 AND PUBYEAR < 2025.” The analysis was carried out on documents published between 2015 and 2024, covering a period of 9 years.

Results

Comprising 799 papers from 649 sources (revistas, books, etc.), Table 2 identifies the worldwide traits connected to scientific production in the field of the given theory, found by the bibliometric analysis performed. The investigated papers are arranged as follows: scientific articles (522), conference articles (147), and book chapters (56); 2886 authors were thus found with an annual growth rate of 23.54%. For its part, Figure 1 shows more specifically the increase in scientific output; the year with the largest scientific production, 2024 with 182 papers, while the year with the lowest contribution, 2015 with 27 documents.

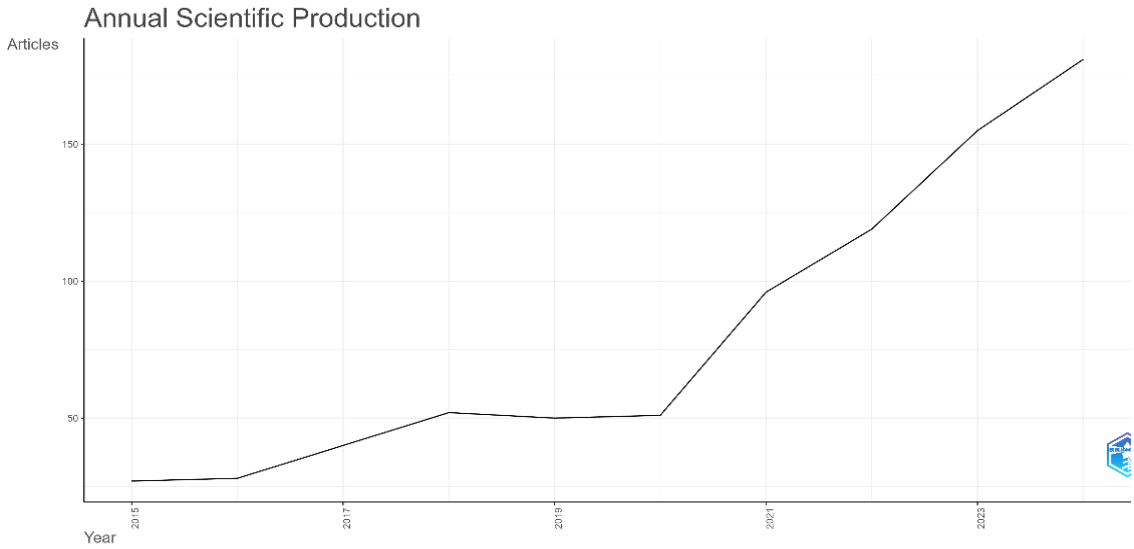

Figure 1. **Annual scientific production.**

Laws of bibliometric productivity

Thanks to the Lotka law, which simplifies the evaluation of the production distribution of authors, may be followed a curve indicating the number of author publications (Sharma et al., 2023); this vividly shows how the writers changed knowledge. Table 3 shows that less than 1% of authors have published four or more, 2.9% have published two or less, and 96.2% of writers have published one work—that is, one related to the subject of this bibliographic study. Further showing these results are Table 3 and Figure 2.

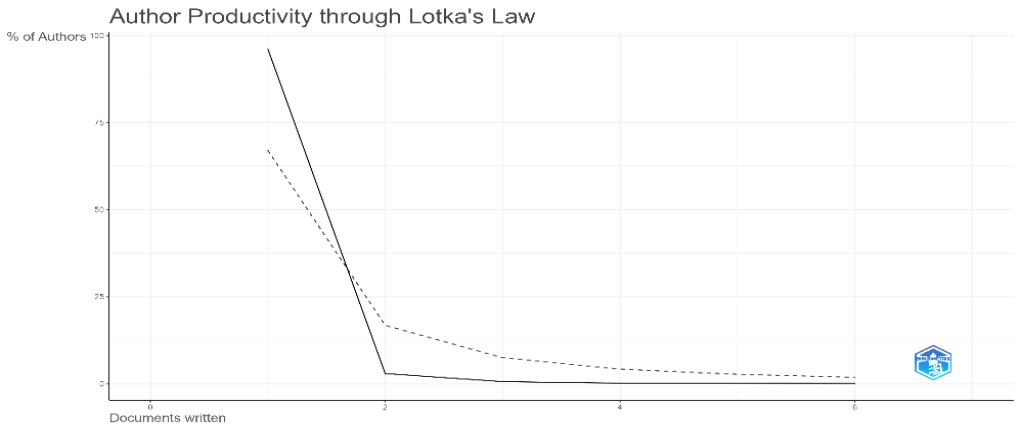

Figure 2. **Lotka's Law.**

The most pertinent sources are the frequency of publications on the subject and the percentiles offered by the Bradford Law, which helps to divide journals into three performance zones each with an increase in the number of journals and a corresponding percentage of articles (Cetin et al., 2022). Table 4 lists the percentages corresponding to every zone defined under Bradford Law. Especially zone 2 has a higher concentration, or more participation than zone 1 and zone 3, which follow with zone 3 with a 32.92%.

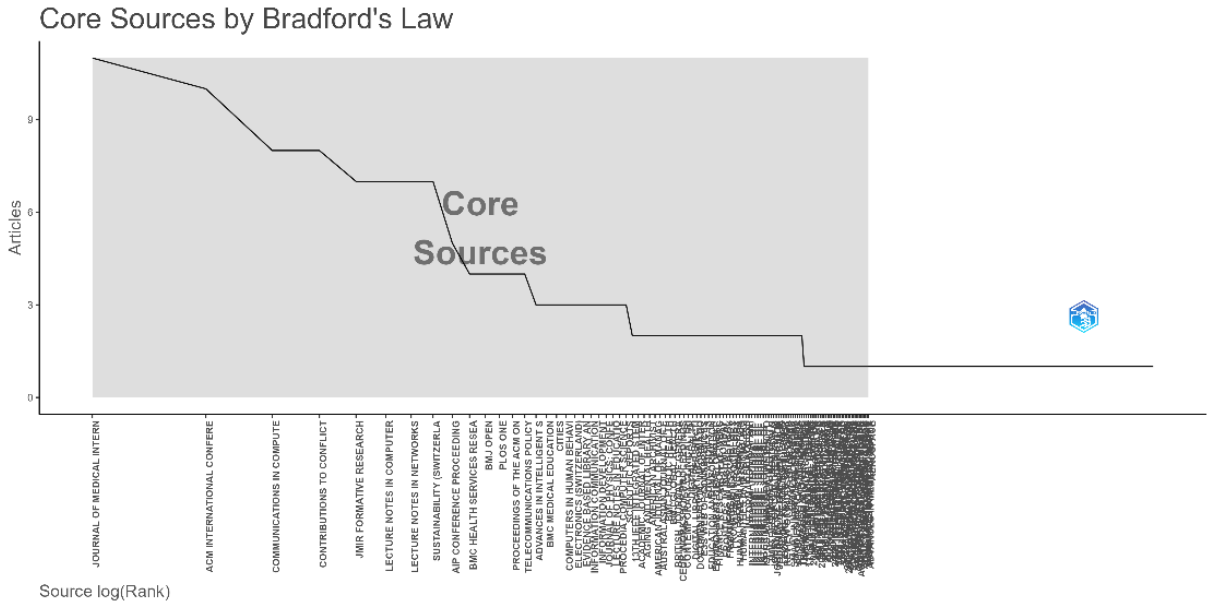

Figure 3. **Bradford's Law.**

Bibliometric indicators

Beginning with most relevant sources, with 11 items, JOURNAL OF MEDICAL INTERNET RESEARCH is the top source in the field; followed by the ACM INTERNATIONAL CONFERENCE PROCEEDING SERIES with 10 items and COMMUNICATIONS IN COMPUTER AND INFORMATION SCIENCE and CONTRIBUTIONS TO CONFLICT MANAGEMENT, PEACE ECONOMICS AND DEVELOPMENT with 8 publications each one. Table 5 clearly shows this.

In line with national production, a geographical study contrasting the output of scientific publications worldwide might help to simplify the results of the bibliometric research. Leading this ranking with 731 papers generated overall is the United States; next are the United Kingdom (301), then China (205).

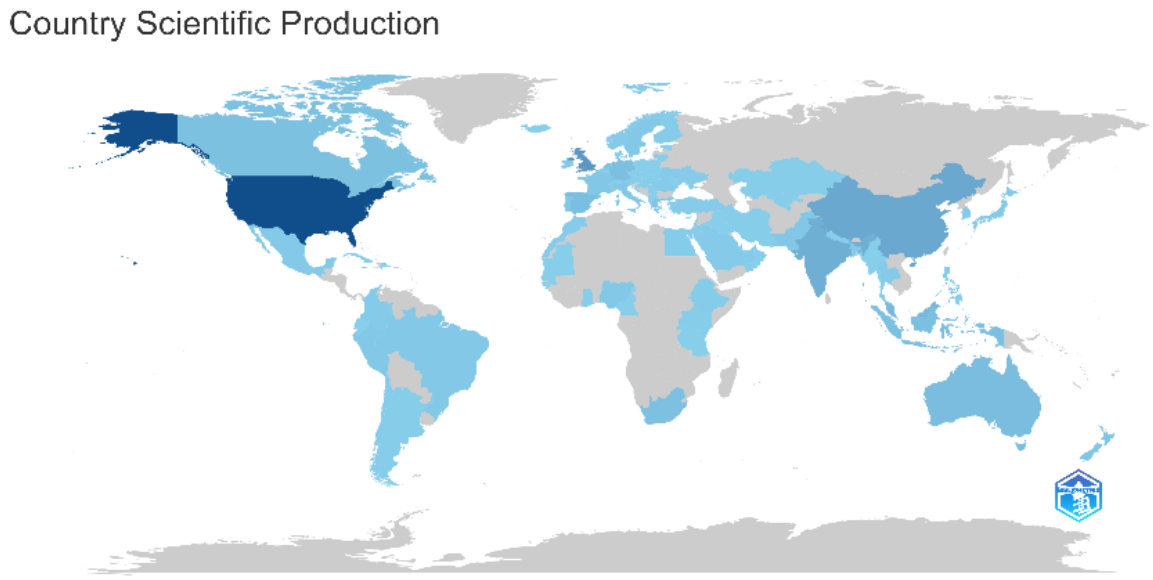

Figure 4. **Scientific production between countries.**

Based on the study's common theme, Figure 5 displays the institutions most helping the subject matter. MAYO CLINIC has made 14; UNIVERSITY OF OXFORD has produced 23; UNIVERSITY OF CALIFORNIA SAN FRANCISCO has made 13. These institutions make up 8.4% of all the papers.

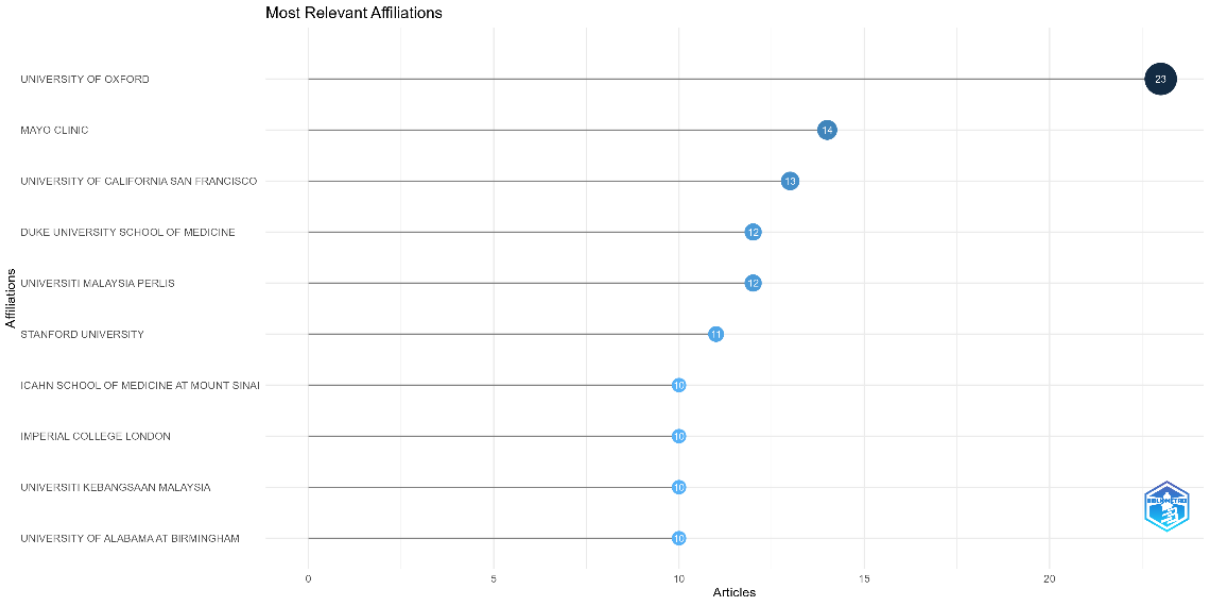

Figure 5. **Most relevant affiliations.**

Regarding the most productive authors, is highlighted ZHANG Y's leadership stated with six (6) publications, followed by MATHRANI A and ZHANG H, each with five (5). The frequency index is then utilized as a reference to quantify productivity per researcher as shown in figure 6.

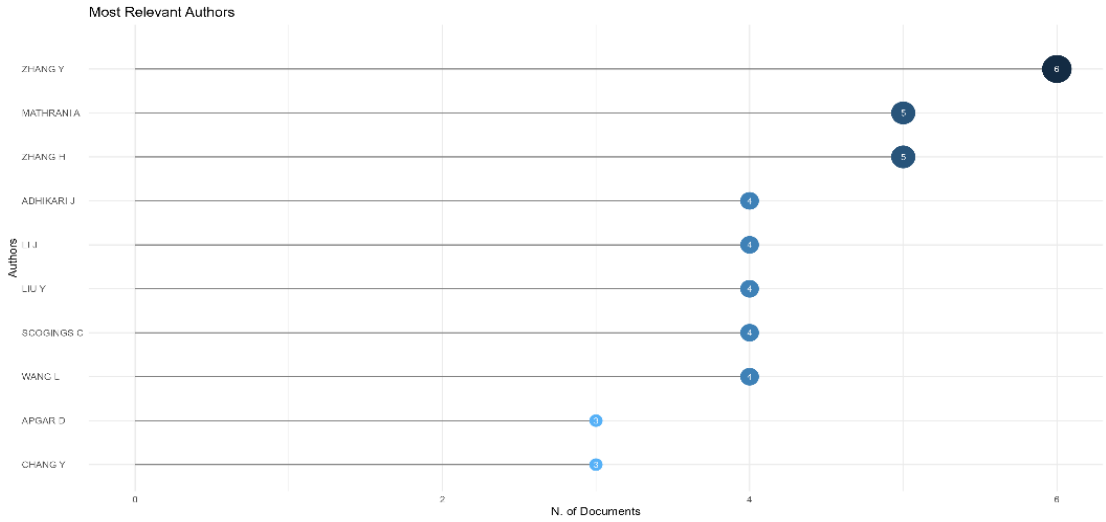

Figure 6. **Most relevant authors.**

Finally, there were listed the most cited articles,with a list of twenty papers related to the subject under study is shown in Table 6. ABU HATAB A, 2019, CITIES, with 176 citations overall, JARADEH MY, 2019, K-CAP - PROC INT CONF KNOWL CAPTURE, with 171 citations, and AALBERS S, 2017, COCHRANE DATABASE SYST REV, with 158 citations overall, were determined to have the most citations.

Analysis of relationships and co-occurrences

To conclude, the cluster analysis carried out through VOS VIEWER is provided (figure 7), this last element reveals the terms that have the greatest impact grouped by co-occurrence, where keywords such as “Human”, “Digital Divide”, “Covid-19”, “Internet”, “Female”, among others, are observed.

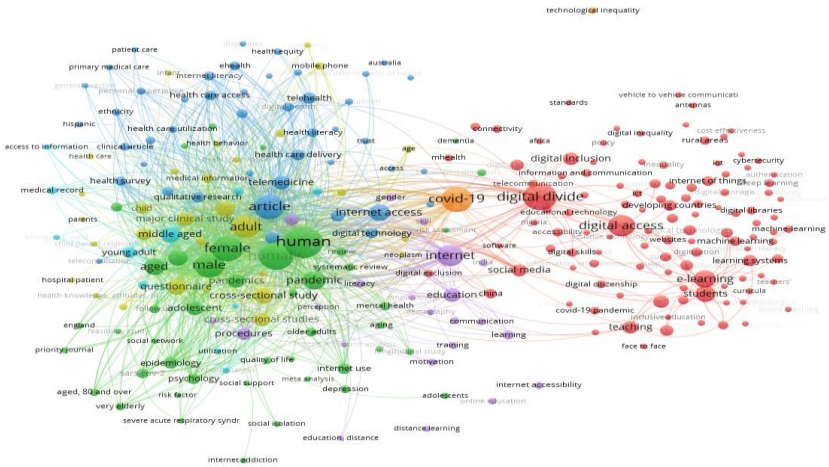

Figure 7. **Co-occurrence of keywords.**

Discussion and Conclusion

The bibliometric study carried out on scientific output connected to the digital divide and its consequences for learning outcomes offers insightful analysis of the development and spread of research on this issue. The acquired data show important trends including increase in scientific output, author productivity, journal importance, and cooperation dynamics. We examine each of these elements in great detail in this part and explore their consequences for the variables stated in the section on the methodology: the digital divide and learning outcomes.

The 799 papers the analysis found published between 2015 and 2024 show a notable rise in scientific production throughout this span. With an annual growth rate of 23.54%, this issue is becoming more and more important for academic study. Especially, 2024 had the greatest (182) publishing count while 2015 had the lowest (27). Especially in reaction to global technology developments and educational issues presented by the COVID-19 epidemic, this increasing tendency points to a rising curiosity in the consequences of the digital divide and how it affects learning results.

The increasing collection of studies fits the rising acceptance of digital technology in the classroom and the understanding of digital inequality as a main determinant of academic performance. The epidemic, which widened the connectivity divide and compelled many educational institutions to turn to online learning, thereby emphasizing the differences in access to digital resources and might be responsible for the acceleration in research production post-2020.

Lotka's Law analysis of author contributions shows that although a small minority (less than 1%) published four or more papers, the bulk of researchers (96.2%) just produced one document. This distribution implies that studies on the digital divide and learning outcomes are scattered and that many of the participants conduct one-time studies instead of continuous research. Although a wide spectrum of scholars enhances the area with different points of view, the absence of ongoing contributions from particular writers could restrict the growth of specialized knowledge. Average co-authors per document are shown by collaboration patterns to be 3.79, with an international co-authorship rate of 18.27%.

These results point to a modest degree of cooperation as research teams usually include several individuals. The somewhat low percentage of international partnerships, however, points to studies in this field being often locally oriented, therefore restricting the cross-cultural relevance of results. Given that digital inequality differs greatly between nations and

socioeconomic settings, more international research collaborations might improve the generalizability and effect of next studies. Bradford's Law divided publications into three performance zones and helped to evaluate their distribution throughout journals. Following closely zones 1 (33.041%) and 3 (32.92%), the second zone had the largest concentration of pertinent papers (34.042%). These results show a somewhat equal distribution of research throughout several sources, with no one journal clearly controlling the area.

Out of all the most pertinent sources, the Journal of Medical Internet Research came first with 11 articles followed by the ACM International Conference Proceeding Series (10 articles). The existence of publications aimed on medical internet research and computer science suggests that the digital divide is being investigation not just from an educational standpoint but also with respect to more general technology and health-related issues. This multidisciplinary approach is helpful as it helps one to fully grasp how digital disparities interact with many spheres of life, including education, healthcare, and economic possibilities.

The bibliometric indicators support the importance of digital access and technological disparity in forming learning results. The primary topics of study in this field are highlighted by the keywords analysis, which found 2,525 phrases under "Author's Keywords" and 3,333 phrases under "Keywords Plus". Common words like "Digital access," "Connectivity gap," and "ICT Divide" highlight the ongoing obstacles pupils must overcome to get digital resources. These results complement earlier research showing how differences in internet access and technology availability harm kids' academic performance and skill development.

Recurrent phrases like "Skills development," "Academic achievement," and "Student performance" clearly show the emphasis on learning outcomes. These terms imply that studies on how digital inequalities affect quantifiable educational attainment have always been somewhat concentrated. Research looking at coursework performance, standardized test results, and engagement levels in digital learning contexts offer important new perspectives on how the digital divide sustains educational disparities.

Although the study does not specifically show geographic patterns, the observed international cooperation rate (18.27%) points to generally region-specific research in this discipline. Often context-dependent, digital inequality varies greatly depending on urban and rural environments, developed and underdeveloped countries, and different socioeconomic classes. Future studies should try to enlarge cross-national comparisons to find policy initiatives and best practices able to address digital disparities in various educational environments.

Another very important aspect is institutional participation in this field of study. Although the data do not specifically show certain institutions, the presence of highly ranked publications and conference events points to active participation of top universities and research institutes in this conversation. By means of strengthening alliances among academic institutions, legislators, and technology companies, research results might be practically used, thereby guaranteeing that digital access programs target the most vulnerable groups.

Policymakers, teachers, and academics could all benefit much from the results of this bibliometric study. Improving internet accessibility, lowering the cost of digital tools, and running digital literacy initiatives can help to close the digital divide—a major problem. Particularly underprivileged groups with more obstacles to digital participation should get more attention in these initiatives. Research cooperation is still another vital field. More worldwide alliances might provide a better knowledge of the digital divide and result in the creation of scalable solutions applicable throughout several areas.

Future study should use an interdisciplinary strategy to generate more complete answers as digital inequality is related to disciplines like economics, social sciences, and health. To grasp long-term learning results also further study is required. Though much of the present

research concentrates on short-term academic success, there is a tremendous demand for longitudinal studies looking at how digital access influences professional performance and lifetime learning possibilities. Scholars are paying greater attention to the bibliometric study results showing how the digital gap and its consequences on academic performance are getting.

Digital equality is clearly important in modern learning shown by the growing corpus of research, the breadth of subjects treated, and the emphasis on digital access in educational discourse. Over the past 10 years, research output has been rising to show academics' continuous commitment to understanding the challenges and implications of digital inequality in education. Growing intellectual curiosity indicates a general growth in awareness of how children's access to digital resources affects their academic performance, skill development, and long-term prospects.

Despite the growing body of research, there are still a number of limitations, particularly in regards to knowledge integration and collaborative research. The prevalence of single-authored studies suggests that a large portion of the research in this field is fragmented, which may be impeding the development of comprehensive empirical investigations and cogent theoretical frameworks. Additionally, the relatively low levels of international cooperation imply that research on the digital divide is occasionally focused on local issues, which might hinder the identification of global best practices. Given the varying levels of digital inequality across different socioeconomic and geographic contexts, strengthening international partnerships is essential to gaining a more thorough understanding of this subject.

One of the key insights from this study is the significance of promoting interdisciplinary approaches that connect the social sciences, technology, and education. Beyond its own educational challenges, the digital divide intersects with public policy, economic concerns, infrastructure development, and even health disparities. Restricting access to digital technology, for instance, may limit opportunities for online education, career training, and job readiness, perpetuating cycles of social exclusion and poverty. Multidisciplinary collaboration is necessary to address this complexity and produce comprehensive solutions, such as socioeconomic policies, technological advancements, and educational reforms.

In addition to interdisciplinary research, the findings highlight the significance of focused policies that support digital inclusion. By collaborating, governments, corporations, educational institutions, and other governmental actors may guarantee that all students, regardless of socioeconomic status, have equitable access to digital learning resources. This includes investing in infrastructure to increase internet access in underserved communities, financing digital literacy initiatives that provide children with the skills they need to successfully navigate online learning, and providing digital devices for low-income pupils. Absence of such initiatives might worsen already existing educational inequalities, hence widening the gap between those having and without internet access.

Furthermore, future research should focus on finding out over time how digital inclusion influences academic and professional performance. While many present studies concentrate on ephemeral outcomes—such as student participation and test results—there is a great need for longitudinal studies monitoring how digital access influences career trajectories, lifelong learning, and economic mobility. Understanding these long-term effects can assist to direct resources and make policy decisions thus maximizing the benefits of digital learning.

Encouragement of interdisciplinary, cross-cultural research partnerships and targeted digital inclusion policies would allow stakeholders to reduce educational disparities stemming from technological inequality. By means of a determined effort to close these disparities, digital learning possibilities will become an accessible resource for everyone rather than a privilege for a few, therefore fostering a more fair and inclusive educational environment.

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Tables

Table 1

Variables and descriptors

Variable	Descriptor
Digital Divide	"Technological inequality", "Digital access", "Connectivity gap", "Internet accessibility", "ICT divide", "Gap".
Learning Outcomes	"Skills development", "Learning outcomes", "Academic achievement", "Student performance", "Educational progress", "Academic success", "Learning", "Students", "Results".

Note: own elaboration using R software based on information from Scopus (2025).

Table 2

Description of main information

MAIN INFORMATION ABOUT DATA	
Timespan	2015:2024
Sources (Journals, Books, etc)	649
Documents	799
Annual Growth Rate %	23,54
Document Average Age	3,75

Average citations per doc	8,528
References	33935
DOCUMENT CONTENTS	
Keywords Plus (ID)	3333
Author's Keywords (DE)	2525
AUTHORS	
Authors	2886
Authors of single-authored docs	119
AUTHORS COLLABORATION	
Single-authored docs	124
Co-Authors per Doc	3,79
International co-authorships %	18,27
DOCUMENT TYPES	
article	522
book	42
book chapter	56
conference paper	147
conference review	3
editorial	2
erratum	1
note	3
review	23

Note: own elaboration using R software based on information from Scopus (2025).

Table 3
Lotka's Law

Documents written	N. of Authors	Proportion of Authors
1	2777	0,962
2	84	0,029
3	17	0,006
4	5	0,002
5	2	0,001
6	1	0

Note: own elaboration using R software based on information from Scopus (2025).

Table 4
Bradford's Law

Zone	No. Magazines	No. Titles	Percentages
Zone 1	114	264	33.041%
Zone 2	272	272	34.042%

Zone 3	263	263	32.92%

Note: own elaboration using R software based on information from Scopus (2025).

Table 5
Most relevant sources

Sources	Articles
JOURNAL OF MEDICAL INTERNET RESEARCH	11
ACM INTERNATIONAL CONFERENCE PROCEEDING SERIES	10
COMMUNICATIONS IN COMPUTER AND INFORMATION SCIENCE	8
CONTRIBUTIONS TO CONFLICT MANAGEMENT, PEACE ECONOMICS AND DEVELOPMENT	8
JMIR FORMATIVE RESEARCH	7
LECTURE NOTES IN COMPUTER SCIENCE (INCLUDING SUBSERIES LECTURE NOTES IN ARTIFICIAL INTELLIGENCE AND LECTURE NOTES IN BIOINFORMATICS)	7
LECTURE NOTES IN NETWORKS AND SYSTEMS	7
SUSTAINABILITY (SWITZERLAND)	7
AIP CONFERENCE PROCEEDINGS	5
BMC HEALTH SERVICES RESEARCH	4
BMJ OPEN	4
PLOS ONE	4
PROCEEDINGS OF THE ACM ON HUMAN-COMPUTER INTERACTION	4
TELECOMMUNICATIONS POLICY	4
ADVANCES IN INTELLIGENT SYSTEMS AND COMPUTING	3

Note: own elaboration using R software based on information from Scopus (2025).

Table 6
Most cited articles

Articles	DOI	Total Citations	TC per Year	Normalized TC
ABU HATAB A, 2019, CITIES	10.1016/j.cities.2019.06.001	176	25,14	8,27
JARADEH MY, 2019, K-CAP - PROC INT CONF KNOWL CAPTURE	10.1145/3360901.3364435	171	24,43	8,04
AALBERS S, 2017, COCHRANE DATABASE SYST REV	10.1002/14651858.CD004517.pub3	158	17,56	11,01
SOLEIMANI-NASAB E, 2016, IEEE TRANS WIRELESS COMMUN	10.1109/TWC.2015.2477400	157	15,70	8,08

LITCHFIELD I, 2021, BMJ OPEN	10.1136/bmjopen-2021-053440	150	30,00	9,49
AGU CF, 2021, INT NURS REV	10.1111/inr.12663	138	27,60	8,73
GORDON NP, 2018, BMC HEALTH SERV RES	10.1186/s12913-018-2986-0	138	17,25	12,18
HILBERT M, 2016, TELECOMMUN POLICY	10.1016/j.telpol.2016.01.006	112	11,20	5,76
MARISCAL J, 2019, ECONOMICS	10.5018/economics-ejournal.ja.2019-9	105	15,00	4,93
GALLE A, 2021, BMJ GLOB HEALTH	10.1136/bmjgh-2020-004575	100	20,00	6,32
GONZALES AL, 2020, COMMUN RES	10.1177/0093650218796366	95	15,83	5,84
GOHDES AR, 2020, AM J POLIT SCI	10.1111/ajps.12509	80	13,33	4,92
NCHANJI EB, 2021, GLOBAL FOOD SECUR	10.1016/j.gfs.2021.100524	79	15,80	5,00
TAO J, 2019, REG SCI URBAN ECON	10.1016/j.regsciurbeco.2019.04.002	70	10,00	3,29
GARAD A, 2021, CAKRAWALA PENDIDIK	10.21831/cp.v40i1.33474	61	12,20	3,86
XU X, 2019, GROWTH CHANGE	10.1111/grow.12334	61	8,71	2,87
GARSTKI K, 2017, J ARCHAEOL METHOD AND THEORY	10.1007/s10816-016-9285-z	60	6,67	4,18
LI Y, 2020, TRANSP RES PART C EMERG TECHNOL	10.1016/j.trc.2020.01.001	59	9,83	3,63
TELLER J, 2021, BUILD CITIES	10.5334/bc.89	57	11,40	3,60
KAESS M, 2016, J ADOLESC HEALTH	10.1016/j.jadohealth.2016.04.009	56	5,60	2,88

Note: own elaboration using R software based on information from Scopus (2025).