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Research Article

A Bibliometric Assessment of a Decade's Research on Educational Technologies in India, 2014-2023

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ABSTRACT

This study presents the landscape of educational technology research in India from 2014 to 2023, aiming to identify publication trends, influential authors, institutions, key themes, citation impact, and international collaborations. A bibliometric analysis of 1112 was conducted using data extracted from the Scopus database, employing tools Bibliomagika, Bibliometrix and VOSviewer for comprehensive analysis and visualization. The study reveals a growing trend in educational technology research in India, with a significant increase in publications, particularly during the COVID-19 pandemic. Key themes include adaptive learning, artificial intelligence, distance education, and the impact of COVID-19 on teaching and learning. Prominent authors and institutions are identified, highlighting their contributions. International collaborations enhance research impact, especially with countries like the US, the UK, and Australia. The study is limited to publications indexed in Scopus and focuses primarily on research within India. Future research could explore collaborations across disciplines and regions and the impact of specific educational technologies on learning outcomes. This study presents an in-depth assessment of educational technology research in India, providing advantageous feedback to researchers, policymakers, and practitioners. It highlights key trends, identifies influential contributors, and suggests areas for future research that will contribute to developing effective and innovative educational practices in India.

Keywords: Educational Technology, Bibliometric Analysis, Publication Trends, Higher Education.

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INTRODUCTION

Education is learning knowledge, skills, values, attitudes, aptitudes, character, and technological proficiency. Educational technology is the interaction of humans and technology to make education just, equitable, and effective in meeting societal goals.[1,2] Feenberg (2000) has criticized educational technology for its deterministic view, while Floridi (2021) emphasized ethical and integrative approaches in applying digital systems in enhancement of educational quality. It can be utilized to enhance the effectiveness and efficiency of teaching-learning, educational policy-making, curriculum development, evaluation, and implementation.[3,4] While Kaufman *et al.*, (1969) appreciated systematic instructional design using a prescriptive needs-assessment model, later thinkers emphasize on integration of social, ethical, and epistemological dimensions, critiquing reductionist approaches and advocating a more humane approach. The adaptation of technology in education is mainly contingent on learning theories, which can be organized according to various paradigms. Two significant paradigms, behaviorism and constructivism, are discussed by Reisser (2001). Behaviorism is based on stimulus-response theories (S-R theories), which emphasize immediate feedback based on input and output, like quizzes. Constructivism is based on social collaboration among teachers and students using the internet and collaboration-based information technologies to co-create knowledge and understanding, which are owned jointly.[5] These paradigms inform the use of pedagogy and its integration with technology. Understanding their influence is vital for the field of educational technology.

Kimmons and Johnstun, (2019)[6] investigated the paradigms of educational technology, highlighting the pluralistic nature of the educational technology paradigm used by professionals. Multihyphenates are considered the best at harnessing the benefits of educational technology. From the use of illuminated lantern slides by European teachers in the late 19th century, to projectors, computers, online systems, and artificial intelligence, educational technology has evolved and transformed the process of education

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and learning.[7,8] Koschmann (1996) proposes that educational technology has undergone four phases: Computer-Assisted Instruction, Intelligent Tutoring Systems, Logo-as-Latin paradigm, and Computer-Supported Collaborative Learning. Artificial intelligence has changed the scenario after entering the arena of educational technology by providing capabilities for real-time interactive assessments, predicting success, creating personalized learning paths, and managing student progress.[9]

Despite above account of global evolution of educational technology paradigms, a systematic mapping of how these ideas have been reflected in educational research in Indian context, remains underexplored.

Indian Context of Educational Technology

While discussions on global developments in EdTech offer a valuable backdrop for the field, India's trajectory is shaped by its historical, policy, educational, and infrastructural dynamics. In colonial India, the BBC (1930) and All India Radio (1937) aired cultural and educational programs which was an informal introduction to media in the field of education (Bharati, 2014; Agarwal, 2005). Post-independence, India recognised the need for industrialisation and focused on using technology in education. The focus was on utilising mass media, like radio and TV, for education to expand access and introduce distance learning, leading to the establishment of the Center for Educational Technology (CET) in 1973. The Central Institute of Educational Technology (CIET) was established in 1984 as a result of the merger between The Department of Teaching Aids, and The Center for Educational Technology (CET). This institution focused on developing multimedia, ICT, and constructivist models of learning to promote personalized, interactive educational experiences suited to the cultural, linguistic context and diverse needs of Indian learners (Central Institute of Educational Technology, 2024).

Recently, the Indian government has realized the potential of ICT integration as a strategy for harnessing the benefits of educational technology in schools and higher education and has focused on distributing computers, tablets, and laptops to learners. The Government of India's Digital India initiative (2015), launched by the Ministry of Electronics and Information Technology (MeitY), started several key initiatives to provide quality e-content and QR-coded textbooks. Direct-to-Home channels like PM e-Vidya and SWAYAM (the national MOOC platform) have offered thousands of online courses, and millions of students have registered. This is supported by the advent of 4th and 5th-generation mobile networks, offering enormous online connectivity to individual learners on mobiles, tablets, and other handy electronic devices.[10]

Despite the rapid evolution of practice and policy in EdTech, there is little bibliometric work which systematically examines the EdTech scholarship growth, authorship, most influential publishing platforms, and themes dominating the space. By taking up the discourse with a bibliometric approach this study aims to fill a critical gap in Indian EdTech scholarship and maps the evolution of the scholarly landscape.

LITERATURE REVIEW

Price's Law and Bradford's Law have often been employed to understand scientific productivity and the dispersion of knowledge sources.[11,12] These theories provide a backdrop for understanding how Educational Technology research has developed globally, especially in response to socio-technological and educational shifts over the globe. Güneş *et al.*, (2023) conducted a comprehensive bibliometric study in the field, analysing 135,835 Educational Technology publications between 1950 and 2021. Their findings indicate significant growth in areas such as virtual learning, e-learning, and interactive learning environments. The United States, United Kingdom, and Canada emerged as the leading contributors to the global Educational Technology knowledge base.[13] In the same way, Kimmons and Rosenberg (2022) analysed trends using data from Scopus, Web of Science (WoS), and social media to identify emerging research themes.[14] Bharucha (2018) mentions that social media will remain play a significant role in shaping the Indian education sector. The themes included Artificial Intelligence (AI), machine learning, online learning, and social learning in educational contexts.[15]

Rodríguez *et al.*, (2019), in their global bibliometric analysis of Educational Technology in higher education (1972-2018), applied Price's and Bradford's laws and confirmed that research in the field predominantly originates from developed nations in Europe and North America. They pointed out the value of core journals and highlighted the structural inequality in global research output.[16] Hao *et al.*, (2020) further supported this trend in their topic-based analysis of 1,128 articles on technology in classroom dialogue (1999-2018), showing the dominance of the USA, UK, and Taiwan.[17]

Bodily, Leary, and West (2019) analysed instructional design and technology journals, identifying blended learning, digital learning, and instructional environments as key research areas. They found the USA, Taiwan, Australia, and the UK to be the most prolific contributors.[18] Bermúdez Hernández *et al.*, (2018) took a thematic approach to ICT-based learning communities (1996-2015), where China, the US, and Taiwan led in research production. Lecture Notes in Computer Science was the top publishing outlet in this domain.[19]

In a more recent effort, Mitha and Omarsaib (2024) investigated emerging technologies in higher education through a bibliometric lens. Drawing data from both WoS and Scopus (1994-2024), they reported a steady growth in publications since 2000, with the USA, UK, and China emerging as central nodes in the global

research network. Game-based learning, AR/VR, and adaptive learning technologies were cited as key innovations.[19]

Shi *et al.*, (2023) focused on Chinese education's digitalisation (2012-2022), using CNKI and WoS. They identified four dominant research areas: lifelong education, digital resources in vocational education, AI-driven transformation, and rural digital integration. Likewise, Djeki, Dégila, Bondiombouy, and Alhassan (2022) analysed 12,272 WoS-indexed documents on e-learning (2015-2020) and found the USA, Spain, England, and China to be the leading nations. "Computers in Human Behavior" emerged as the most influential journal.[20]

Scanlon (2021) explored the evolution of Educational Technology research by tracking trends such as AI, personalisation, and social learning, asserting that the COVID-19 pandemic accelerated the diversification of research themes.[21]

Although most global studies emphasize developed countries, Educational Technology research in India has also seen a remarkable surge, particularly during the COVID-19 pandemic. Aradhi and Chakraborty (2024) conducted a 20-year bibliometric study (2003-2023) using Scopus data, covering 8,301 documents. Their findings revealed that India ranked second globally after the USA, with dominant themes such as e-learning, blended learning, and technology adaptation.[22] The pandemic significantly heightened research activity. Complementing this, Raturi *et al.*, (2024) studied Educational Technology adaptation in India from 2000-2024 using 530 publications from Scopus and WoS. They emphasized constructs such as user acceptance, behavioural intention, and the Technology Acceptance Model (TAM). "Education and Information Technologies" and "Sustainability" were identified as the leading journals.[23]

In a pandemic-specific context, Levidze (2024)[24] analysed 10,881 e-learning publications (2020-2022) from Scopus, showing a rapid spike during COVID-19. India, alongside the USA and China, was among the top contributors. Frequent keywords included "higher education," "gamification," and "pandemic."

Tua (2023) analysed global Educational Technology research (2019-2023) and concluded that the USA, Russia, Brazil, and China were the leading nations. Game-based learning emerged as a high-growth area, particularly during the pandemic, highlighting a global pedagogical shift.[25]

Despite the vastness of international research, India-specific bibliometric contributions remain limited. Although we can refer to Khan and Gupta (2021) who analysed Indian Educational Technology publications in Scopus and found a strong rise in mobile learning and ICT integration research post-2016.[26]

Knowledge Gap

The global scholarship on EdTech examines global trends in educational technology research, focusing on high output countries. Güneş *et al.*, (2023) conducted a global analysis of educational technology research from 1950-2021.[27] Rodríguez *et al.*, (2019) provided a global bibliometric overview with theoretical insights (e.g., Price's Law)[28] and Kimmons *et al.*, (2021) examined trends in online/social earning and AI. These studies mainly highlight productivity of EdTech research in developed countries. There remains a lack of focus on developing countries, especially India. These global studies give little attention to the specific contributions of research trends of EdTech research in Indian perspective.[29] Aradhi and Chakraborty (2024) examined Indian edtech adaptation trends from a behavioural or policy-driven perspective. Raturi *et al.*, (2024) lack focus on educational technology domain holistically, and apply specific technology acceptance model related keywords, making its focus too narrow. Researchers have not yet examined evolution of EdTech with a comprehensive set of keywords and with a focus on Indian perspective.

The present study is based on comprehensive search keywords, research questions related to the educational technology domain, with a focus on the Indian scenario. The reviewed studies are either focused on the global landscape, covering different educational technology segments, or concentrating on different temporal time periods. In contrast, our study proposes a comprehensive investigation of publication trends, prolific authors, influential institutions, key themes, citation impact, co-authorship patterns, and keyword evolution in educational technologies research in India from 2014 to 2023 while comparing these trends with global counterparts. Bibliometric analysis is particularly suitable for mapping these domains to understand the trends, patterns, intellectual structure, and research dynamics of a field.[30-32]

Research Questions

i. What are the publication trends in educational technologies in India from 2014 to 2023?

ii. Who are the most prolific authors contributing to research on educational technologies in India?

iii. What are the most influential institutions in India's educational technologies field?

iv. How does India compare to other countries in EdTech research output and collaboration?

v. What are the most highly cited documents in the field of educational technologies in India?

vi. What are the most common keywords and themes in the literature on educational technologies in India, and how have they evolved?

vii. What themes emerge from keyword co-occurrence analysis in Indian EdTech research landscape?

METHODOLOGY

The data was extracted from a global SCOPUS multidisciplinary database. SCOPUS database is a crucial resource for literature review and bibliometric analysis across different fields (Figure 1).

Search Strategy

The literature on education technologies has been retrieved from the SCOPUS database by searching the Title, Abstract and Keywords with a compressive 41 keywords. Results are further refined to affiliating county India and timeframe 2014-2023. The PRISMA flow has been used to collect data (Moher *et al.*, 2009). The following search string has been framed to perform the search query:

TITLE-ABS-KEY ("educational technolog*" OR "technology in education" OR Educational Technology OR "digital learning" OR "digital education" OR "e-learning" OR elearning OR "online learning" OR "online education" OR "web-based learning" OR "learning technolog*" OR "instructional technolog*" OR "computer-based instruction" OR "computer-assisted instruction" OR "e-teaching" OR "electronic learning" OR "educational software" OR "educational tool*" OR "technology-enhanced learning" OR "virtual learning environment*" OR "virtual education" OR VLE OR "learning management system*" OR lms OR "mobile learning" OR "blended learning" OR "distance education" OR "multimedia learning" OR "ICT in education" OR ("information and communication technolog*" AND education*) OR "technology integration in education" OR "massive open online course*" OR mooc* OR "gamification in education" OR "educational gam*" OR "adaptive learning" OR "personalized learning" OR ("augmented reality" AND education*) OR ("virtual reality" AND education*) OR ("mixed reality" AND education*) OR ("artificial intelligence" AND education*)

Only the articles have been included. We have excluded reviews, conference papers, book chapters, editorials, letters, notes, retracted papers and studies published in languages other than English.

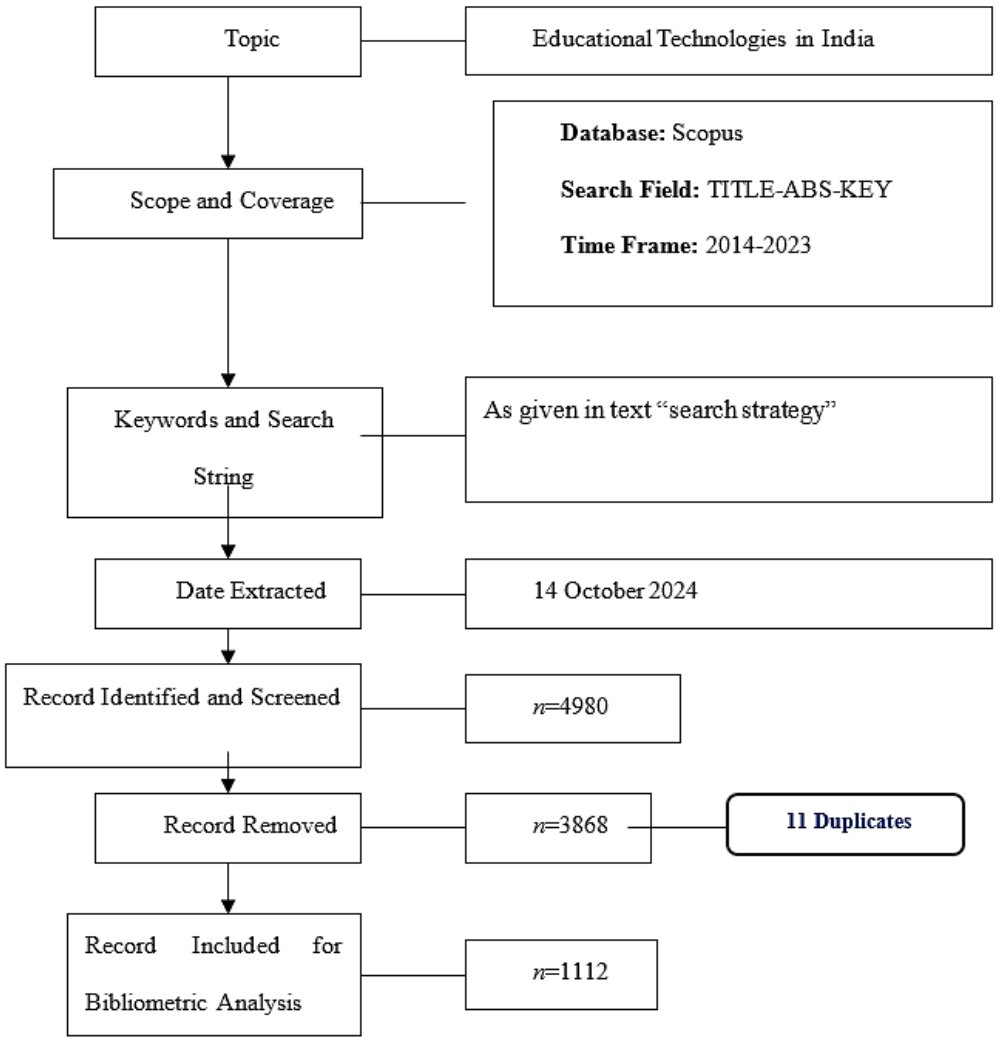

Figure 1: Flow diagram of the search strategy. Source: Moher *et al.*, (2009)[46].

Data Collection, Cleaning and Harmonisation

The search string described above resulted in 4980 records, spread over ten years (2014-2023). Many records after extraction lacked uniformity and consistency, so these records were properly cleaned and harmonised.

4980 records were screened for duplicates and relevancy. 11 duplicates were removed from the database. 4,969 papers were rated by three researchers for their relevance or irrelevance. Fleiss' Kappa (κ = 0.789) indicated substantial agreement, with 85% (4,224 papers) consistent across all three raters. The 15% (745 papers) disagreements were resolved through majority voting (60%, or 447 papers) and consensus discussion (40%, or 298 papers). After resolving disagreements, a total of 1,112 papers were ultimately retained as relevant and 3857 papers were removed. A sample of 10% (111 papers) of retained records showed 96% (106 papers) relevance confirmation by independent raters, indicating the validity of the process. McNemar's test value had p-value <0.05, which confirmed the reliable agreement beyond chance.

Each record was thoroughly checked for complete metadata elements and consistency, an essential requirement for bibliometric analysis. Bibliomagika v2.9 (Ahmi, 2024) and Open Refine (Ahmi, 2023) tools were used for the purpose, ensuring each record had complete metadata elements. Erratum, corrections, and retracted document types were excluded from the data analysis.[33]

Bibliometric Measures

The bibliometric analysis comprises performance analysis of authors, institutions, and countries. It includes the productivity analysis of journals, descriptive qualitative analysis comprising citation metrics, and bibliometric mapping covering the relationships between different domains. In this study, the bibliometric analysis includes annual productivity, prolific authors, institutions, country, journals, most cited articles, and thematic analysis using Bibliometrix,[34] and VoSViewer tools.[35]

RESULTS

Documents Profiles

Table 1 provides key insights into research productivity and impact from 2014-2023. A total of 1,112 publications were produced by 3,589 authors, resulting in an average of 3.23 authors per paper. Of these, 855 papers were cited, with a total of 12,026 citations. The average citation per paper stands at 10.81, while cited papers average 14.07 citations each. The citation trend is significant, with an annual average of 1,336 citations. The h-index of 49 indicates that 49 papers were cited at least 49 times, reflecting strong research influence, while the g-index of 79 shows a broader impact. The m-index of 4.455 indicates strong scholarly productivity and citation impact, reflecting that this author or research group achieved an impressive h-index of 49 within only 11 years since their initial publication, emphasizing sustained academic influence. The citation sum within the h-core (8,240) further reinforces the significance of the highly cited works. The data suggests robust and consistent research output, with a solid citation performance indicating the work's substantial scholarly influence.

Table 1: Citation Metrics.

Main Information	Data
Publication Years	2014 - 2023
Total Publications	1112
Citable Year	11
Number of Contributing Authors	3589
Number of Cited Papers	855
Total Citations	12,026
Citation per Paper	10.81
Citation per Cited Paper	14.07
Citation per Year	1336.22
Citation per Author	3.35
Author per Paper	3.23
Citation sum within *h*-Core	8,240
h-index	49
g-index	79
m-index	4.455

Source: Generated by the author(s) using biblioMagika.

Table 2 reveals an interdisciplinary nature. This shows that Social Sciences are leading with 51.80% of publications. Computer Science and Engineering contribute 33.45% and 30.94%, respectively. This gives emphasis on technology-related fields. Business, Management, and accounting holds 13.76%, indicating economic and organizational interest. Other fields such as Arts and Humanities, Medicine, and Mathematics contribute smaller shares. Niche fields such as Decision Sciences and Environmental Science play roles in the research landscape. Multidisciplinary research (2.79%) indicates collaboration across various domains.

Publication Trends

Table 3 indicates that 1112 publications were published in the area of educational technology from 2014 to 2023, indicating a crucial trend. The total number of publications were 43 in 2014 with a 16.6% growth rate. Although, there were some fluctuations between 2014 and 2023, with a 48.84% increase in 2015 and a -29.69% drop in 2016. The year 2017 saw a 15.56% growth which reached to 52 publications and further 69 in 2018, with a 32.69% growth rate. The trend shifted significantly in the second half of 2019, with 151 papers and a 118.84% growth. Although the number dropped to 103 publications in 2020.

The educational technology research industry experienced a positive growth trend in 2021 with 213 publications. It was a 106.8% increase year-on-year. It remained stable with 195 publications and a slight negative growth rate of -8.45% in 2022 whereas in 2023, it continued to decline, indicating a return to pre-pandemic levels.

Table 3 summarizes annual bibliometric trends from 2014 to 2023, showing growth in research output and impact. Total Publications, Citations, and Cited Publications peaked in 2021, indicating a highly productive year. Citation averages (C/P, C/CP) were highest in 2014 and 2021, reflecting strong influence. Impact indices (h, g, m) also reached their peak during 2021-2022, highlighting sustained academic relevance. Overall, the data illustrate a significant rise in research performance, particularly between 2019 and 2022.

Figure 2 represents a comprehensive visualization of bibliometric variables from 2014 to 2023, including total publications, citations, and author indices, highlighting annual trends and growth.

Publications by Authors

Table 4 indicates that Ahmed Tlili, K. Nirmala, and Ramesh Chander Sharma have made significant contributions to the educational technology research field in India. Rakesh Garg from Amity University, Noida has the highest number of citations (165) with an average of 33 per publication. Subrata Kumar Panda and Nitin Sharma have the highest h-index of 5. Early career researchers Fahriye Altinay and Zehra Altinay from Near East University have a rapid and sustained contribution in the field.

Publications by Institutions

Table 4 and Figure 3 reveals that the top 5 institutions have contributed an average of 21.40 publications with most contributing 31 in the area of educational technology. The Vellore Institute of Technology published 31 publications. Symbiosis International (Deemed University) published 24. The University of Delhi ranks third with 18 publications followed by SRM University in Chennai and Anna University with 17 publications each. These institutions demonstrate strong performances, showcasing their prominence and excellence in the academic landscape of educational technology research. These institutions demonstrate strong performances, highlighting their prominence and excellence in the academic landscape of educational technology research.

The Number of Contributing Authors (NCA) varies between 61 to 11. The top 5 institutions on this criterion were Vellore Institute of Technology, Vellore (61), Symbiosis International (Deemed University) (54), Amrita Vishwa Vidyapeetham, Kollam (43), Chitkara University (42), and Manipal Academy of Higher Education (41).

Table 2: Subject wise distributions.

Subject Area	Total Publications	Percentage (%)
Social Sciences	576	51.80
Computer Science	372	33.45
Engineering	344	30.94
Business, Management and Accounting	153	13.76
Arts and Humanities	77	6.92
Medicine	67	6.03
Mathematics	54	4.86
Decision Sciences	35	3.15
Environmental Science	35	3.15
Psychology	34	3.06
Biochemistry, Genetics and Molecular Biology	31	2.79
Multidisciplinary	31	2.79
Materials Science	28	2.52
Energy	24	2.16
Pharmacology, Toxicology and Pharmaceutics	22	1.98
Physics and Astronomy	21	1.89
Economics, Econometrics and Finance	18	1.62
Chemical Engineering	15	1.35
Agricultural and Biological Sciences	14	1.26

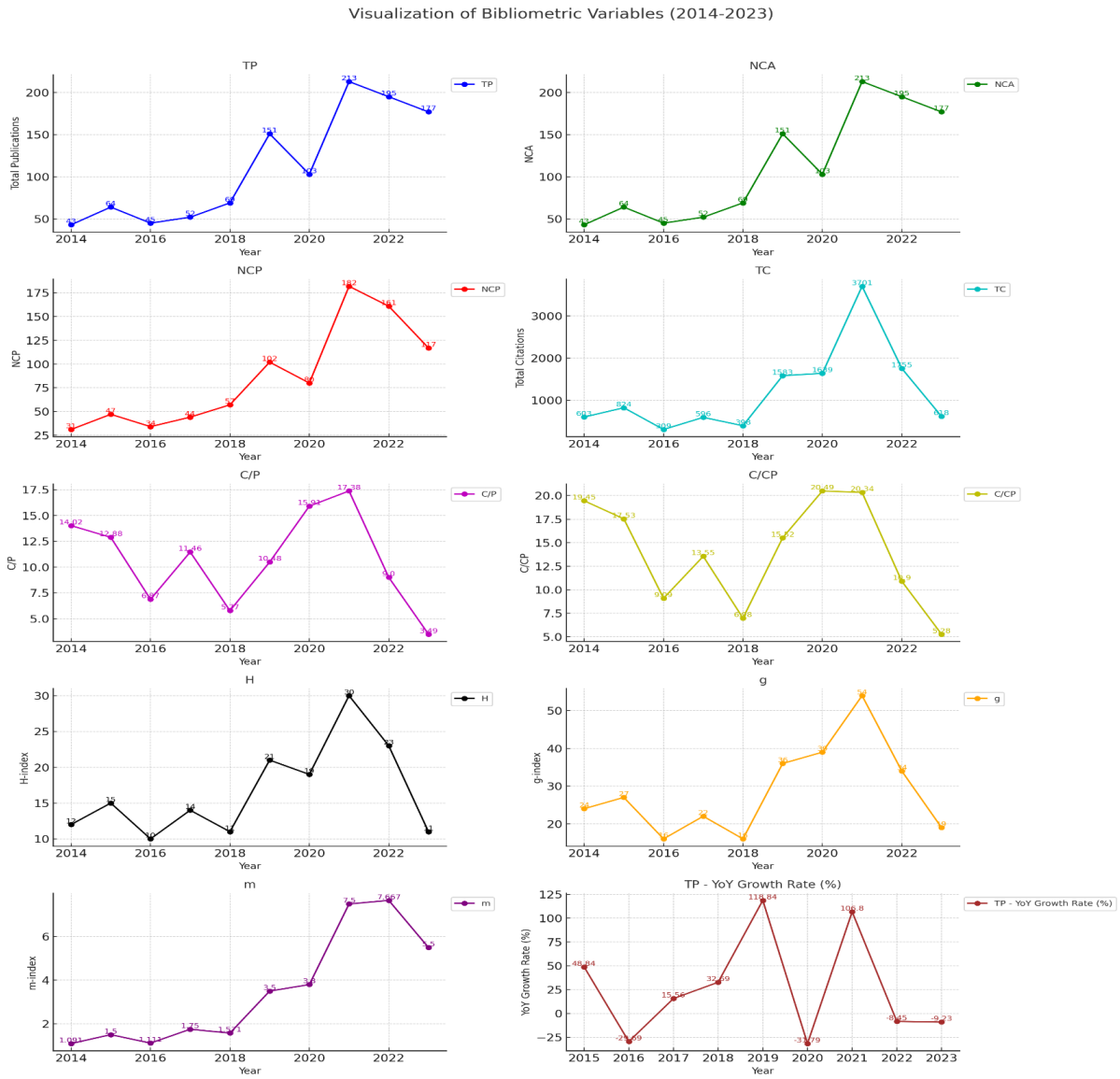

Figure 2: Visualization of Bibliometric Variables (2014-2023).

Table 3: Publications by Year.

Year	TP	NCA	NCP	TC	C/P	C/CP	h	G	m
2014	43	43	31	603	14.02	19.45	12	24	1.091
2015	64	64	47	824	12.88	17.53	15	27	1.500
2016	45	45	34	309	6.87	9.09	10	16	1.111
2017	52	52	44	596	11.46	13.55	14	22	1.750
2018	69	69	57	398	5.77	6.98	11	16	1.571
2019	151	151	102	1583	10.48	15.52	21	36	3.500
2020	103	103	80	1639	15.91	20.49	19	39	3.800
2021	213	213	182	3701	17.38	20.34	30	54	7.500
2022	195	195	161	1755	9.00	10.90	23	34	7.667
2023	177	177	117	618	3.49	5.28	11	19	5.500
Total	1112	1112	855	12026	10.81	14.07	49	79	4.455

Notes: TP=total number of publications; NCA=Number of contributing authors; NCP=number of cited publications; TC=total citations; C/P=average citations per publication; C/CP=average citations per cited publication; h=h-index; g=g-index; m=m-index.

Table 4: Top Highlights from Various Data Sources.

Category	Key Highlights
Top 5 Subject Areas	Social Sciences (51.80%), Computer Science (33.45%), Engineering (30.94%), Business (13.76%), Arts and Humanities (6.92%).
Most Productive Authors	Rakesh Garg (165 citations, 33.00 C/P, Amity University Noida), Achuthan Krishnashree (161 citations, 40.25 C/P, Amrita Vishwa Vidyapeetham), Ahmed Tlili (31 citations, 6.20 C/P, Beijing Normal University).
Top 5 Institutions	Vellore Institute of Technology (31 publications, 451 citations), Symbiosis International University (24 publications, 182 citations), University of Delhi (18 publications, 203 citations), SRM University (17 publications, 37 citations), Anna University (17 publications, 253 citations).
Top Contributing Countries	India (1110 publications, 12012 citations), United States (30 publications, 474 citations), Saudi Arabia (25 publications, 550 citations), Australia (16 publications, 469 citations), China (16 publications, 380 citations).
Active Source Titles	Journal of Engineering Education Transformations (64 publications, 190 citations), Library Philosophy and Practice (43 publications, 118 citations), Education and Information Technologies (33 publications, 935 citations).

On average, these top 5 institutions garnered 225.20 citations. Vellore Institute of Technology, Vellore secured 451 citations with top place in the list, and Alagappa University was in 25th position with 25 citations. Vellore Institute of Technology, Vellore (451), Manipal Academy of Higher Education (394), Anna University (253), Amrita Vishwa Vidyapeetham, Kollam (238), and Kalinga Institute of Industrial Technology, Bhubaneswar (230) were the top institutions based on total citations.

The citation per publication values for these top 25 institutions range from 2.18 to 24.63, with a mean of 9.94, a median of 7.94, a mode of 6.22, and a total range of 22.45. Manipal Academy of Higher Education (24.63), Jamia Millia Islamia, New Delhi (23.78), Amrita Vishwa Vidyapeetham, Kollam (18.31), Indian Institute of Technology (17.67), and Anna University (14.88) were found to be the top institutions based on their C/P values.

H-index for these top 5 institutions varies from 2 to 9 with a range of 7, a mean of 5.04, a median of 5, and a mode of 4. Symbiosis International (Deemed University) (9), Vellore Institute of Technology, Vellore (8), Narsee Monjee Institute of Management Studies, Mumbai (8), Manipal Academy of Higher Education (7), and Kalinga Institute of Industrial Technology, Bhubaneswar (7) have the highest h-index values. Saveetha University is at the 25th position with an h-index of 2.

The g-index for these institutions has a mean of 10.0, a median of 9.0, a mode of 9, and a range of 16. Vellore Institute of Technology, Vellore (21), Manipal Academy of Higher Education (16), Kalinga Institute of Industrial Technology, Bhubaneswar (15), Anna University (15) and University of Delhi (14) were top 5 institutions based on g-index. Manipal Academy of Higher Education (1.167), CHRIST University (1.0), and Symbiosis International (Deemed University) (0.9) have higher m-index values, suggesting these institutions have rapidly emerged on the research landscape of educational technology.

Publications by Countries

Apart from India dominating the research landscape within the scope of educational technology-related research in the Indian scenario with 1110 publications and 12,012 citations, countries like the United States (30 publications, 474 citations), Australia (16 publications, 469 citations), Saudi Arabia (25 publications, 550 citations), China (16 publications, 380 citations), and Brazil (6 publications, 301 citations) are making high-impact contributions in collaboration with Indian authors.

A pattern could be seen in the contribution of developed countries such as the US (C/P = 15.80), Australia (C/P = 29.31), and the UK (C/P = 20.38) with higher citations per publication. Indian single authored researches have fewer citations per publication, with a value of 10.82, indicating relatively lower impact compared to collaborative or internationally co-authored works. Even countries from the Middle East and Asia, such as Saudi Arabia (C/P = 22.00), China (C/P = 23.75), and Malaysia (18 publications, C/P = 7.17), are contributing impactfully in collaboration with Indian researchers, signifying the importance of collaboration for research.

The Figure 4 visualises the geographic distribution of publications, as indicated by country-wise counts. The data shows a clear dominance by India, with 1,110 publications, significantly outpacing all other nations. This is visually emphasized using a dark blue gradient, representing the highest value. The USA follows distantly with 30 publications, while Canada, Saudi Arabia, and China contribute 8, 25, and 4 respectively. Other countries, including the UK, Australia, Brazil, and Russia, show minimal contributions ranging from 1 to 8 publications. The color gradient bar at the top helps indicates the intensity of contributions, from light blue (low output) to dark blue (high output). This distribution clarifies a highly India-centric research contribution, suggesting either a national focus or the location

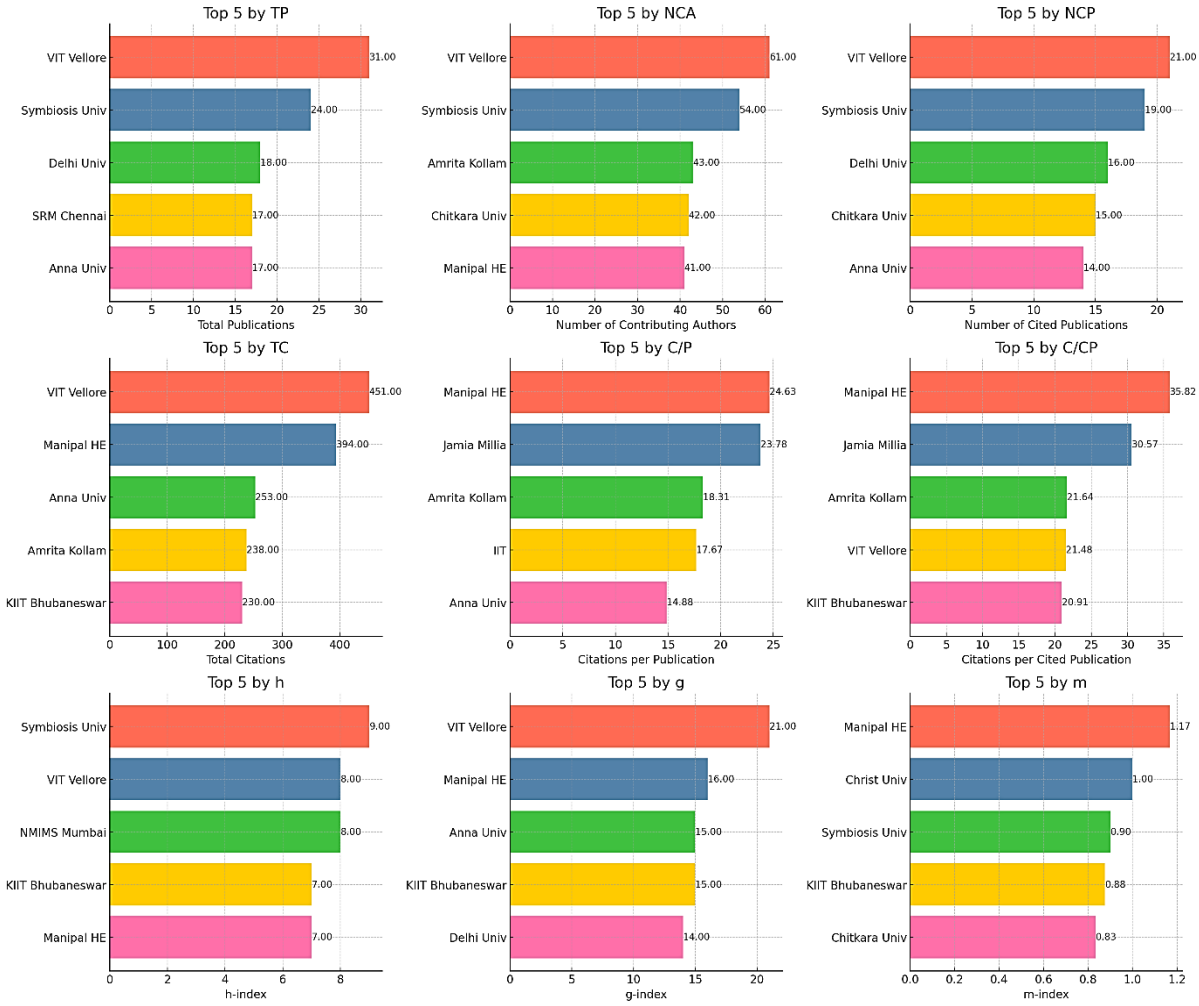

Figure 3: Top five most productive institutions on different indicators.

of leading research institutions in India. The map offers a clear visual summary of global engagement with the subject, revealing limited international participation beyond a few key countries.

Publications by Source Titles

Table 4 highlights the most active source titles publishing research on educational technologies. The Journal of Engineering Education Transformations leads in volume with 64 publications, but its C/P (citations per publication) of 2.97 indicates a moderate impact. Similarly, Library Philosophy and Practice has 43 publications with a C/P of 2.74, reflecting its focus on quantity over high citation impact. In contrast, Education and Information Technologies stands out with 33 publications and a significant 935 total citations, yielding a C/P of 28.33, an h-index of 20 and a g-index of 30, making it one of the most influential journals in the field. Other high-impact journals include the Asian Association of Open Universities Journal and Sustainability (Switzerland), with C/P values exceeding 20, indicating strong influence despite fewer publications. Indian Journal of Science and Technology and Turkish Online Journal of Distance Education also demonstrate strong citation performance with C/P values of 11.27 and 9.00, respectively.

Highly Cited Documents

Table 5 presents the top highly cited articles in educational technology during the COVID-19 pandemic. These highly cited papers from top educational technology journals include T. Muthuprasad, *et al.*, (2021)[36] in Social Sciences and Humanities Open (511 citations, 127.75/year) on "Students' perception and preference for online education in India during COVID-19 pandemic", Nanigopal Kapasia, *et al.*, (2020) in Children and Youth Services Review (467 citations, 93.40/year) on "Impact of lockdown on learning status in West Bengal", and Amit Joshi, *et al.*, (2020) in Interactive Technology and Smart Education (194 citations, 38.80/year) on "Perspectives of teachers on online teaching". After these three top-cited articles, Hai Liu, *et al.*, (2022) in IEEE Transactions on Industrial Informatics (166 citations, 55.33/year) on "ARHPE for Head Pose Estimation in Human-Computer Interaction" is at 4th position.

7th and 8th positions ontology-based recommender systems and adaptive models using structured knowledge systems are key

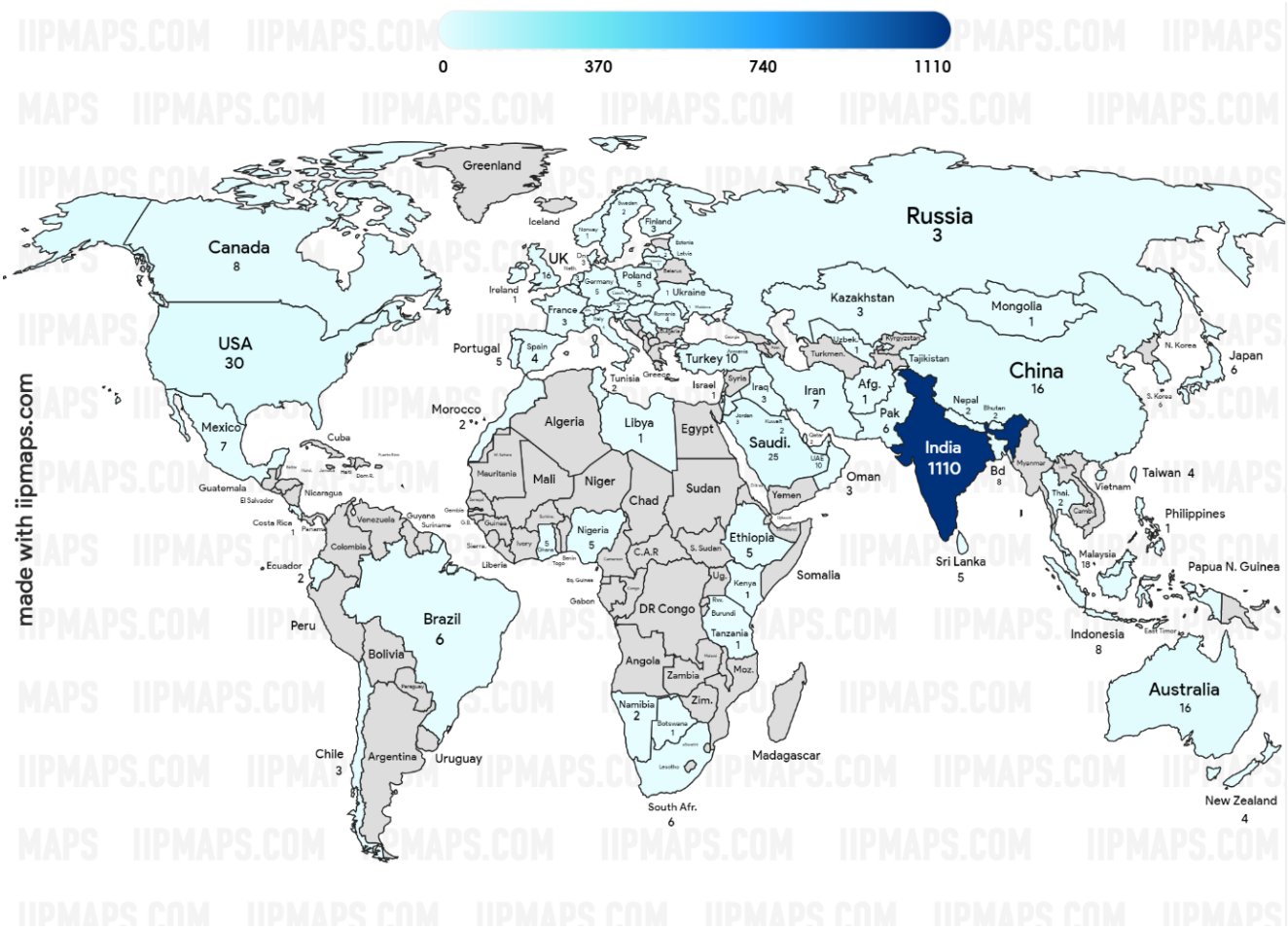

Figure 4: Worldwide scientific production indexed by Scopus on educational technologies, Generated using iipmaps.com/.

themes of two influential publications by Gina George, Anisha M. Lal (2019) in Computers and Education (143 citations, 23.83/year) on "Review of ontology-based recommender systems in e-learning", and Monika Rani, Riju Nayak, O.P. Vyas (2015) in Knowledge-Based Systems (137 citations, 13.70/year) on "An ontology-based adaptive personalised e-learning system.

Language learning models like ChatGPT also have an influential footprint in area of educational technology research, as highlighted in a paper by Tareq Rasul, Sumesh Nair, et al., (2023) in the Journal of Applied Learning and Teaching (118 citations, 59.00/year) which discusses "The role of ChatGPT in higher education: Benefits, challenges, and future research directions."

Keywords Co-occurrence Analysis

Authors keywords are considered as the central theme of any article.[37] The thematic analysis approach is based on the co-occurrence of the author's keyword in educational technologies. A bibliometric software, VOSviewer, creates a co-occurrence network with a threshold value of 5. The software draws a graphical network depicting the strength between two keywords. The network visualisation in Figure 5 is based on 112 keywords meeting the criteria. To maintain the quality, keywords were cleaned and harmonized using OpenRefine Software.[38]

The Network visualization created using VoSviewer software has nine clusters. The circle represents the keywords, and lines represent the occurrence of the keywords together. The size of the circle represents the frequency, while the thickness of the line represents the strength of the pairing of words together. The network's colour (red, green, blue, yellow, and purple, sky-blue, saffron, grey, pink) represents the grouping of the keywords within the theme given in Table 6.

The keywords analysis reveals that Adaptive learning and AI is the most relevant themes with 25 number of keywords used in the publications related to educational technology research in India in recent decade. This signifies the importance of personalized learning paths, real-time feedback, data-driven adjustments, learning analytics, and diverse learning styles for learners in an e-learning environment. Adaptive learning can dynamically personalize educational content and experiences by leveraging AI for analyzing learner data, cloud computing for scalability, intelligent tutoring systems and LMS for delivery of educational content, and meanwhile, fuzzy logic and cognitive modelling can adapt to learner's styles, motivation and progress.

The second cluster shows the impact of the COVID-19 pandemic on educational technology research, with the theme of

Table 5: Top 15 highly cited articles.

Sl. No.	Authors	Title	Source Title	Cites	Cites per Year
1	T. Muthuprasad., S. Aiswarya., K.S. Aditya., Girish K. Jha. (2021).	Students' perception and preference for online education in India during COVID -19 pandemic.	Social Sciences and Humanities Open	511	127.75
2	Nanigopal Kapasia., Pintu Paul., *et al*., (2020)	Impact of lockdown on learning status of undergraduate and postgraduate students during COVID-19 pandemic in West Bengal, India.	Children and Youth Services Review	467	93.40
3	Amit Joshi., Muddu Vinay., Preeti Bhaskar. (2020)	Impact of coronavirus pandemic on the Indian education sector: perspectives of teachers on online teaching and assessments.	Interactive Technology and Smart Education	194	38.80
4	Hai Liu., Tingting Liu., Zhaoli Zhang., Arun Kumar Sangaiah., Bing Yang., Youfu Li. (2022)	ARHPE: Asymmetric Relation-Aware Representation Learning for Head Pose Estimation in Industrial Human-Computer Interaction.	IEEE Transactions on Industrial Informatics	166	55.33
5	Ambika Selvaraj., Vishnu Radhin., Nithin KA., Noel Benson., Arun Jo Mathew. (2021)	Effect of pandemic based online education on teaching and learning system.	International Journal of Educational Development	159	39.75
6	Mohammed Arshad Khan., V Vivek., Mohammed Kamalun Nabi., Maysoon Khojah., Muhammad Tahir. (2021)	Students' perception towards e-learning during COVID-19 pandemic in India: An empirical study.	Sustainability (Switzerland)	145	36.25
7	Gina George., Anisha M. Lal. (2019)	Review of ontology-based recommender systems in e-learning.	Computers and Education	143	23.83
8	Monika Rani., Riju Nayak., O.P. Vyas. (2015)	An ontology-based adaptive personalized e-learning system, assisted by software agents on cloud storage.	Knowledge-Based Systems	137	13.70
9	Snigdha Choudhury., Snigdha Pattnaik. (2020)	Emerging themes in e-learning: A review from the stakeholders' perspective.	Computers and Education	132	26.40
10	Amit Mohan., Pradhnya Sen., Chintan Shah., Elesh Jain., Swapnil Jain. (2021)	Prevalence and risk factor assessment of digital eye strain among children using online e-learning during the COVID-19 pandemic: Digital eye strain among kids (DESK study-1).	Indian Journal of Ophthalmology	121	30.25
11	Tareq Rasul., Sumesh Nair., *et al*., (2023)	The role of ChatGPT in higher education: Benefits, challenges, and future research directions.	Journal of Applied Learning and Teaching	118	59.00
12	Manav R. Bhatnagar., M.K. Arti. (2014)	On the closed-form performance analysis of maximal ratio combining in shadowed-rician fading LMS channels.	IEEE Communications Letters	118	10.73
13	Debajyoti Pal., Syamal Patra. (2021)	University Students' Perception of Video-Based Learning in Times of COVID-19: A TAM/TTF Perspective.	International Journal of Human-Computer Interaction	116	29.00
14	Gaurav Chopra., Pankaj Madan., Piyush Jaisingh., Preeti Bhaskar. (2019)	Effectiveness of e-learning portal from students' perspective: A Structural Equation Model (SEM) approach.	Interactive Technology and Smart Education	100	16.67

Sl. No.	Authors	Title	Source Title	Cites	Cites per Year
15	Ritimoni Bordoloi., Prasenjit Das., Kandarpa Das. (2021)	Perception towards online/blended learning at the time of COVID-19 pandemic: academic analytics in the Indian context.	Asian Association of Open Universities Journal	96	24.00

"Assessment and COVID-19 Impact" with 15 keywords consistent with the pandemic's impact on global research. These keywords can be better understood in terms of how the pandemic forced a rapid shift to online platforms, including professional, medical, and general stream educational systems, relying on educational technology to connect with students for teaching, assessment, and student satisfaction, with feedback and perceptions playing a pivotal role in adapting to new challenges in learning and evaluation.

The third cluster, themed "Distance and E-learning," with keywords such as 'distance education,' 'distance learning,' 'e-resources,' 'information and communication technology,' 'internet,' 'LIS education,' 'massive open online courses,' 'online courses,' 'open and distance learning,' 'open educational resources,' 'students,' 'SWAYAM,' and 'visualization,' signifies the increasing importance of distance and e-learning in the Indian context.

The fourth cluster relates to the barriers and perceptions of blended learning, while the fifth cluster focuses on engagement and digital literacy. With the increased importance of e-learning in higher education, the rise of big data has necessitated data management systems and information literacy, reflected in the sixth cluster. It is evident that technological progress in education is creating a void in training and awareness, as signified by the seventh cluster, themed "Teacher Training and Online Training." Other important clusters include “cognitive processing and instructional design” and competency-based and lifelong learning.

Thematic Evolution

The thematic evolution analysis shows theme of a given field evolving and matured in terms of its application. The thematic evolution in Figure 6 demonstrates that during 2014-16, key themes like MOOCs, Distance Education, LMS, Cloud Computing, E-learning, and Blended Learning are focused on establishing online education infrastructure and accessibility, which indicates early reliance on cloud computing and LMS, and supporting blended learning.

The 2017-2019 period has key themes related to E-learning, Learning Style, Internet, M-learning, Technology, Motivation, Flipped Classroom, and ICT, indicating a shift towards learner-centric approaches, mobile learning and innovative teaching methods. The period of 2020-23 has key themes related to E-learning, LMS, COVID-19, Adaptive Learning, Machine Learning, Recommendation Systems, Educational Technologies, Motivation, Learning Style, which indicate the impact of COVID-19 shift towards LMS and adaptive learning to suit the challenges of pandemic with focus on engagement and individual preferences during that period. This period also saw a growth in AI and other language learning models based on machine learning and intelligent recommendation systems with heavy reliance on LMS during the pandemic.

FINDINGS AND DISCUSSION

The overall growth rate of publication of papers was 16.6%, and during the first half of the period, 2014-2018, the growth rate of research productivity varied between 29.69% and 48.84%. The most significant year-on-year growth was observed in 2019, with a 118.84% increase and 151 papers. However, the highest number of papers was published in 2021, with 213 publications reflecting the impact of COVID-19. The post-pandemic period saw a slight decline in educational technology research, approaching the levels in 2019, with 177 papers. This trend highlights that the impact of COVID-19 on educational technology research was positive due to the increased need for e-learning methodologies and delivery channels. However, the field had already grown significantly in 2019, even before the arrival of the pandemic. It was found in several global researches that the COVID-19 pandemic fuelled the growth of educational technology research as institutions worldwide explored innovative solutions for remote learning.[39] Muthuprasad *et al.*, (2021)[36] also observed this trend, supporting the finding.

The main institutional contributors to educational technology research in India were the Vellore Institute of Technology, Symbiosis International, and University of Delhi. Vellore Institute was the leading institution in total publications and citations. Based on average citations per publication, the highest-ranking institutions were the Manipal Academy of Higher Education, Jamia Millia Islamia, and Amrita Vishwa Vidyapeetham. These institutions demonstrated their strong research impact in educational technology in India. Manipal Academy, CHRIST University, and Symbiosis International had high m-index values, indicating their rapid emergence and importance in contributing to the educational technology research landscape.

Collaboration with other countries was a key factor in the impact of the research. When Indian researchers collaborated with researchers from Australia, the USA and U.K, their publications

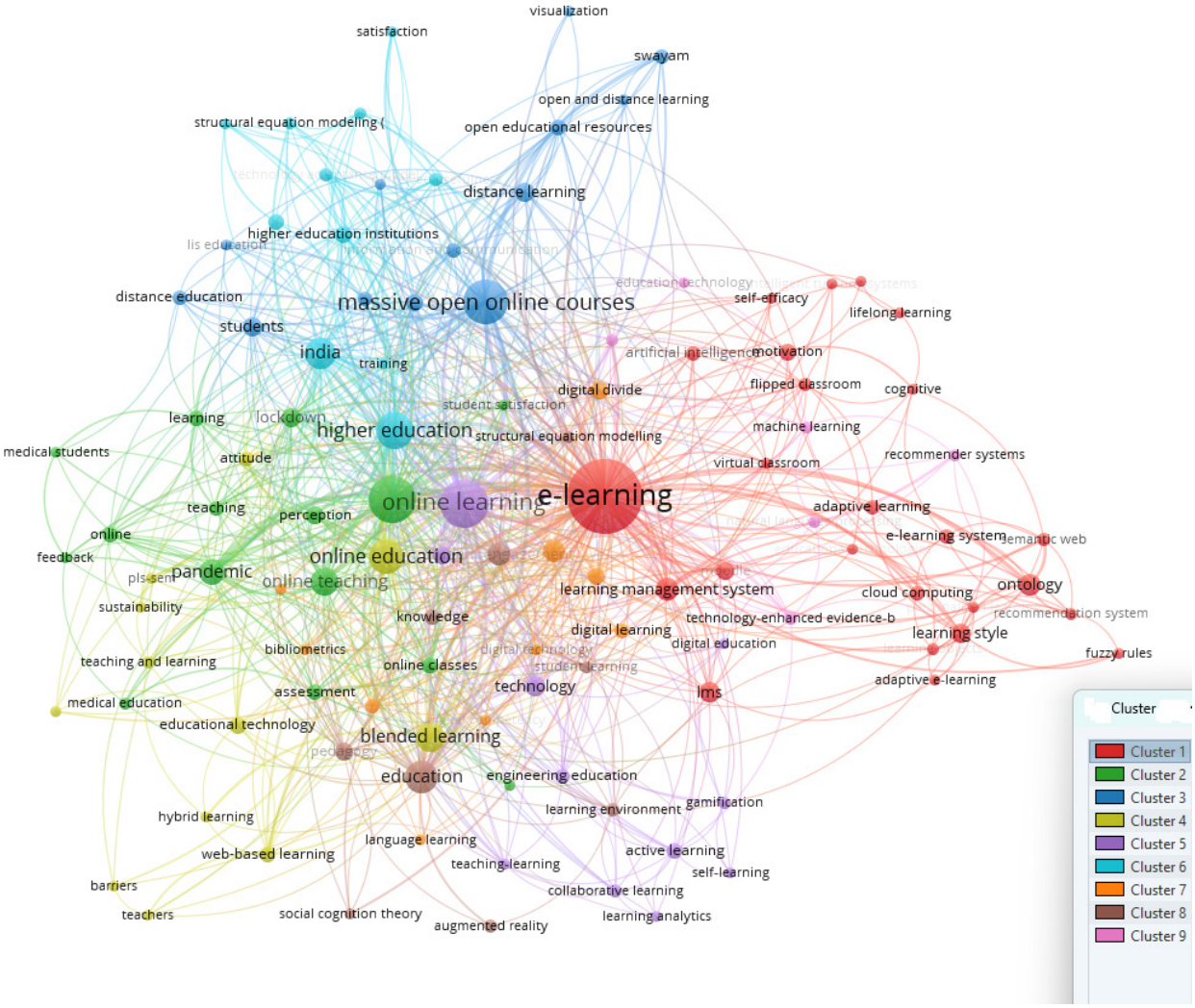

Figure 5: Keyword Co-occurrence Network Visualization using VOSviewer.

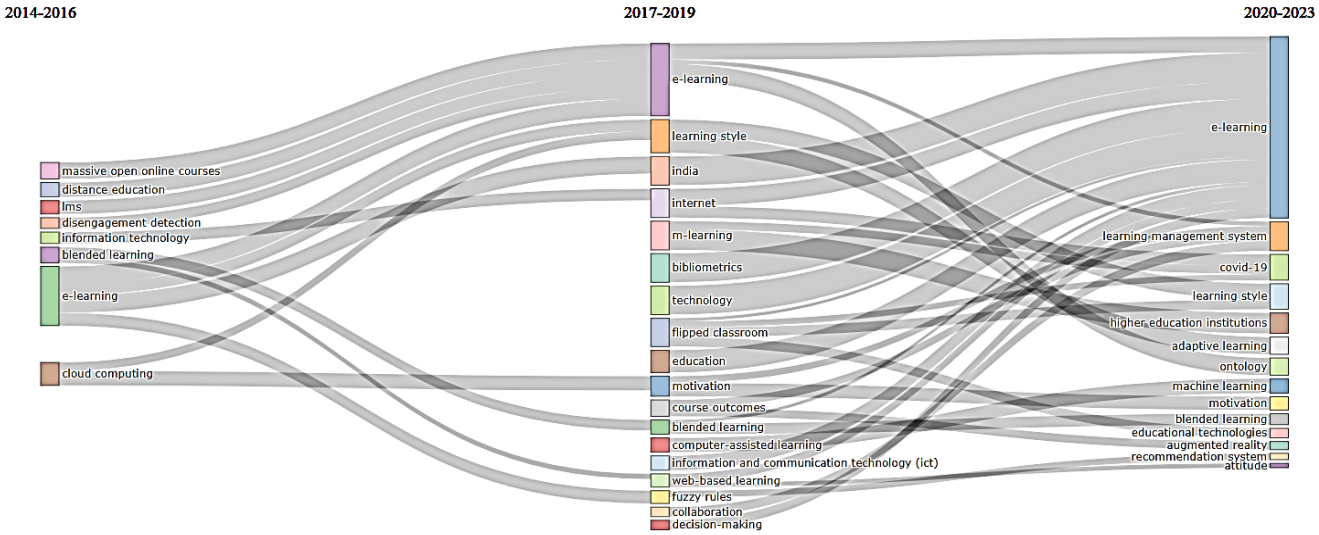

Figure 6: Thematic Evolution of Author's Keywords using Biblioshiny.

Table 6: Keywords Clusters.

Cluster #	Keywords	Cluster Focus Theme	Number of Keywords
1	adaptive e-learning', 'adaptive learning', 'artificial intelligence', 'cloud computing', 'cognitive', 'e-learning', 'e-learning system', 'educational technologies', 'flipped classroom', 'fuzzy rules', 'intelligent tutoring systems', 'interactive learning environments', 'learning management system', 'learning objects', 'learning style', 'lifelong learning', 'lms', 'moodle', 'motivation', 'ontology', 'personalized learning', 'recommendation system', 'self-efficacy', 'semantic web', 'virtual classroom'.	Adaptive Learning and AI	25
2	assessment', 'covid-19', 'feedback', 'learning', 'lockdown', 'medical education', 'medical students', 'online', 'online assessment', 'online classes', 'online teaching', 'pandemic', 'perception', 'student satisfaction', 'teaching'.	Assessment and COVID-19 Impact	15
3	distance education', 'distance learning', 'e-resources', 'information and communication technology', 'internet', 'lis education', 'massive open online courses', 'online courses', 'open and distance learning', 'open educational resources', 'students', 'swayam', 'visualization'.	Distance and E-Learning	13
4	attitude', 'barriers', 'blended learning', 'educational technology', 'hybrid learning', 'online education', 'pls-sem', 'social networking', 'sustainability', 'teachers', 'teaching and learning', 'web-based learning'.	Barriers and Perceptions of Blended Learning	12
5	active learning', 'collaborative learning', 'digital education', 'engineering education', 'gamification', 'learning analytics', 'online learning', 'self-learning', 'social media', 'teaching-learning', 'technology'.	Engagement and Digital Literacy	11
6	higher education', 'higher education institutions', 'india', 'm-learning', 'perceived usefulness', 'satisfaction', 'structural equation modeling (sem)', 'tam', 'technology acceptance model', 'training', 'utaut'.	Data Management and Information Literacy	11
7	bibliometrics', 'digital competency', 'digital divide', 'digital learning', 'digital technology', 'electronic learning', 'ict', 'language learning', 'mobile learning', 'virtual learning'.	Teacher Training and Online Teaching	10
8	augmented reality', 'education', 'knowledge', 'learning environment', 'pedagogy', 'social cognition theory', 'structural equation modelling', 'student engagement', 'student learning'.	Cognitive Processes and Instructional Design	9
9	education technology', 'information and communication technology (ict)', 'machine learning', 'natural language processing', 'recommender systems', 'technology-enhanced evidence-based education and learning (teel)'.	Competency-Based and Lifelong Learning	6

Source: Generated by the author(s).

had higher citations per count. Researchers from Saudi Arabia, China and Malaysia collaborated with Indian researchers in educational technology research. On average, the citation per publication doubled in collaborative research with developed countries. US, Australia, Saudi Arabia, China and Brazil were main contributors collaborating with Indian researchers. The leading countries in educational technology research, such as, US, U.K, China are collaborating with Indian researchers to enhance the impact of Indian research in this field. There are several reasons for why collaborative researches attract more citations, including diverse expertise, tacit knowledge transfer, enhanced visibility through more extensive networks, complementary resources, mentoring relationships, rigorous quality control, and broader multidisciplinary appeal.[40-42]

Journal of Engineering Education Transformations is the topmost journal with the highest number of publications while, Education and Information Technologies journal demonstrates a high citation rate with a citation per publication of 28.33. Other influential titles include the Asian Association of Open Universities Journal and Sustainability (Switzerland), both with strong citation performance.

Top highly cited articles in educational technology are based on themes related to e-learning perceptions and challenges during COVID-19. Three top-cited papers from the top 15 list are related to the e-learning theme during the pandemic. The fourth top-cited paper is related to a niche area of Head pose estimation technique in online education by Liu *et al.*, (2022).[37] indicating that engagement monitoring is becoming a significant concern in online teaching-learning. Ontology-based recommender systems

are related to personalized and adaptive learning technologies, and two of the most cited papers from this theme have secured their place in the top 15 most-cited publications by Lal (2015)[43] and Rani *et al.*, (2019).[44] Role of ChatGPT in higher education is also gaining importance in highly cited publications. The analysis of top publications demonstrated that COVID-19, head-pose estimation technology, ontology-based recommender, adaptive models and ChatGPT are key themes in the decade of 2014-23.

The keyword analysis reveals that adaptive learning and AI is the most crucial themes with 25 keywords signifying its importance in customized learning and efficient delivery of educational content. Assessment and COVID-19 Impact is the second important theme with 15 keywords related to perceptions and challenges during a pandemic. Distance and E-learning, blended learning, engagement and digital literacy, data management and information literacy, teacher training and online training, cognitive processing and instructional design and competency-based lifelong learning were other important themes. The evolution of themes reflects that during 2014-2016, the main focus was on building infrastructure and accessibility related to educational technologies in India, with focus on themes like MOOCs, Distance Education, LMS, Cloud Computing, E-learning, and Blended Learning. Riahi (2015) has found similar results regarding this shift in global contexts. The period of 2017-2019 indicates that this trend shifted from infrastructure to learner-centric approaches with themes such as E-learning, Learning Style, M-learning, Technology, and Motivation. Joshi and Vaidya (2013) predicted this trend in their research on personalised and recommender-based systems in India. Further, this trend was influenced significantly during 2019-2023 due to the COVID-19 pandemic and this era witnessed a growth of publications related to the themes of adaptive learning, LMS, and recommendation systems to cope with remote education challenges. This trend has become a global phenomenon.[45]

Indian EdTech research often lacks focus on actual learning outcomes, relying heavily on adoption metrics. Rural, marginalized, and linguistically diverse populations are underrepresented. Studies rarely integrate pedagogy or assess long-term impact. Teacher perspectives and professional development needs are overlooked. Ethical concerns like data privacy and digital well-being receive minimal attention. The Future research on educational technologies in India may focus on AI-driven personalized learning and digital inclusion for marginalized groups. Key areas include immersive learning (AR/VR), educational data analytics, ethical use of Educational Technology, and the influence of startups. There is possibility that cross-disciplinary collaborations and scalable, context-specific innovations will shape the next decade of educational technology research in India.

CONCLUSION

The study analysed the educational technology research landscape in India from 2014-23. For this purpose, research articles indexed at SCOPUS database has been considered. This study found that 1112 publications had 12,026 citations, with social sciences, computer science, engineering, business management, accounting, arts and humanities, and medicine being significant and crucial disciplines. The Vellore Institute of Technology, Symbiosis International, and the University of Delhi were found to be the main contributors in the area. The pandemic influenced the research production for two continuous years. Later on, it returned to its average level in 2019 and 2023. US, UK, Australia, China, and Middle East are the major collaborating countries. Collaborative research was found to be most effective in increasing citations. The present study underscores the significance of international collaborations and interdisciplinary in enhancing the quality and influence of educational technology research in India. This study has also highlighted the need and requirement for futuristic research and responsive, effective, and efficient educational system. Together, these patterns reveal a maturing field in which interdisciplinary linkages-spanning social sciences, computer science, engineering, management is included. Robust international partnerships not only drove citation impact but also positioned India's educational technology research to rapidly adapt to emergent challenges. Looking ahead, leveraging such cross-sectoral collaboration and data-informed agility will be key for building a future-ready, resilient educational ecosystem capable of responding to pedagogical disruptions and evolving learner needs.

CONFLICT OF INTEREST

The authors declare that there is no conflict of interest.

REFERENCES

1. Feenberg A. From essentialism to constructivism: philosophy of technology at the crossroads. In: Higgs E, editor. Technology and the good life? Chicago: University of Chicago Press; 2000. p. 294-315. doi: 10.7208/chicago/9780226333885.003.0017.
2. Floridi L. The European legislation on AI: A brief analysis of its philosophical approach. Philos Technol. 2021;34(2):215-22. doi: 10.1007/S13347-021-00460-9, PMID 34104628.
3. UNESCO. Rethinking education: towards a global common good? Paris: United Nations Educational, Scientific and Cultural Organization; 2015. Available from: https://unesdoc.unesco.org/ark:/48223/pf0000243975.
4. Kaufman RA, Corrigan RE, Johnson DW. Towards educational responsiveness to society's needs: A tentative utility model. Socio-Econ Plann Sci. 1969;3(2):151-7. doi: 10.1016/0038-0121(69)90006-8.
5. Reiser RA. A history of instructional design and technology: Part I: A history of instructional media. Educ Technol Res Dev. 2001;49(1):53-64. doi: 10.1007/BF02504506.
6. Kimmons R, Johnstun K. Navigating paradigms in educational technology. TechTrends. 2019;63(5):631-41. doi: 10.1007/s11528-019-00407-0.
7. Lu W, Liu Z, Huang Y, Bu Y, Li X, Cheng Q. How do authors select keywords? A preliminary study of author keyword selection behavior. J Inf. 2020;14(4):101066. doi: 10.1016/j.joi.2020.101066.
8. Crompton H, Burke D. Artificial intelligence in higher education: the state of the field. Int J Educ Technol High Educ. 2023;20(1):22. doi: 10.1186/s41239-023-00392-8.
9. Ministry of Education. Digital India initiative of Government has revolutionized education access in rural areas. Press Information Bureau, Government of India; 2023. Available from: https://pib.gov.in/Pressreleaseshare.aspx?PRID=1945057.
10. Price DJ. Little science, big science. Columbia University Press; 1963. doi: 10.7312/pric91844.
11. Bradford SC. Sources of information on specific subjects. Engineering. 1934;137:85-6.

12. Güneş Ü, Tonbuloğlu B, Tonbuloğlu İ, Yıldırım K, Karataş İH. Educational technology: A bibliometric approach (Eric Document ED627516). Institute of Education Sciences, United States Department of Education; 2023. Available from: https://files.eric.ed.gov/fulltext/ED627516.pdf.
13. Kimmons R, Rosenberg JM. Trends and topics in educational technology, 2022 edition. TechTrends. 2022;66(2):134-40. doi: 10.1007/s11528-022-00713-0, PMID 35229085.
14. Bharucha J. Exploring education-related use of social media: business students' perspectives in a changing India. Educ Train. 2018;60(2):198-212. doi: 10.1108/ET-07-2017-0105.
15. Rodríguez Jiménez C, Sanz Prieto M, Alonso García S. Technology and higher education: a bibliometric analysis. Educ Sci. 2019;9(3):169. doi: 10.3390/educsci9030169.
16. Hao T, Chen X, Song Y. A topic-based bibliometric analysis of two decades of research on the application of technology in classroom dialogue. J Educ Comput Res. 2020;58(7):1311-41. doi: 10.1177/0735633120940956.
17. Bodily R, Leary H, West RE. Research trends in instructional design and technology journals. Br J Educ Technol. 2019;50(1):64-79. doi: 10.1111/bjet.12712.
18. Mitha SB, Omarsaib M. Emerging technologies in higher education libraries: A bibliometric analysis of the global literature. Libr Hi Tech. 2025;43(2-3):1248-70. doi: 10.1108/LHT-02-2024-0105.
19. Shi R, Wan X. A bibliometric analysis of knowledge mapping in Chinese education digitalization research from 2012 to 2022. Humanit Soc Sci Commun. 2024;11(1):505. doi: 10.1057/s41599-024-03010-8.
20. Scanlon E. Educational technology research: contexts, complexity and challenges [editorial]. J Interact Media Educ. 2021;2021(1):Article 2. doi: 10.5334/jime.580.
21. Aaradhi V, Chakraborty D. Educational Technology applications and their adoption in Indian education sector-a bibliometric analysis and systematic literature review. Higher Educ Skills Work-Based Learn. 2024;14(2):510-28. doi: 10.1108/HESWBL-09-2022-0192.
22. Raturi S, Gupta PK, Bhandari M. Trends and insights in educational technology adoption: A bibliometric analysis. Afr J Biol Sci. 2024;6(7):2610-6.
23. Levidze M. Mapping the research landscape: A bibliometric analysis of e-learning during the COVID-19 pandemic. Heliyon. 2024;10(13):e33875. doi: 10.1016/j.heliyon.2024.e33875, PMID 39027537.
24. Tua S. Exploring global trends and innovations in educational technology: a bibliometric analysis of emerging paradigms and key contributions. QALAMUNA J Pendidikan Sosial Agama. 2024;16(1):507-18. doi: 10.37680/qalamuna.v16i1.4697.
25. Khan FM, Gupta Y. A bibliometric analysis of mobile learning in the education sector. Interact Technol Smart Educ. 2021;19(3):338-59. doi: 10.1108/ITSE-03-2021-0048.
26. Rodríguez E, *et al*. A global bibliometric analysis of technology in higher education. Scientometrics. 2019;121(2):863-85.
27. Kimmons R, Rosenberg J, Allman B. Trends in educational technology: what Facebook, Twitter, and Scopus can tell us about current research and practice. TechTrends. 2021;65(2):125-36. doi: 10.1007/s11528-021-00589-6, PMID 33644781.
28. Aria M, Cuccurullo C. bibliometrix: an R-tool for comprehensive science mapping analysis. J Inf. 2017;11(4):959-75. doi: 10.1016/j.joi.2017.08.007.
29. Donthu N, Kumar S, Mukherjee D, Pandey N, Lim WM. How to conduct a bibliometric analysis: an overview and guidelines. J Bus Res. 2021;133:285-96. doi: 10.1016/j.jbusres.2021.04.070.
30. Moral-Muñoz JA, Herrera-Viedma E, Santisteban-Espejo A, Cobo MJ. Software tools for conducting bibliometric analysis in science: an up-to-date review. El Prof Inf. 2020;29(1):e290103. doi: 10.3145/epi.2020.ene.03.
31. Ahmi A. biblioMagika®. version 2.9; 2024. Available from: https://bibliomagika.com.
32. Muthuprasad T, Aiswarya S, Aditya KS, Jha GK. Students' perception and preference for online education in India during COVID-19 pandemic. Soc Sci Humanit Open. 2021;3(1):100101. doi: 10.1016/j.ssaho.2020.100101, PMID 34173507.
33. Ahmi A. Open Refine: an approachable tool for cleaning and harmonizing bibliographical data. AIP Conf Proc (11th ICAST 2022). 2023;2827:030006. doi: 10.1063/5.0164724.
34. Rasul T, Nair S, Kalendra D, Robin M, Santini FO, Ladeira WJ, *et al*. The role of ChatGPT in higher education: benefits, challenges, and future research directions. J Appl Learn Teach. 2023;6(1):41-56. doi: 10.37074/jalt.2023.6.1.29.
35. Beaver DD. Does collaborative research have greater epistemic authority? Scientometrics. 2004;60(3):399-408. doi: 10.1023/B:SCIE.0000034382.85360.cd.
36. Frenken K, Ponds R, van Oort F. The citation impact of research collaboration in science-based industries: a spatial-institutional analysis. Pap Reg Sci. 2010;89(2):351-72. doi: 10.1111/j.1435-5957.2010.00309.x.
37. Vieira ES. The influence of research collaboration on citation impact: the countries in the European Innovation Scoreboard. Scientometrics. 2023;128(6):3555-79. doi: 10.1007/s11192-023-04715-4.
38. George G, Lal AM. Review of ontology-based recommender systems in e-learning. Comput Educ. 2019;142:103642. doi: 10.1016/j.compedu.2019.103642.
39. Rani M, Nayak R, Vyas OP. An ontology-based adaptive personalized e-learning system, assisted by software agents on cloud storage. Knowl-Based Syst. 2015;90:33-48. doi: 10.1016/j.knosys.2015.10.002.
40. iyon.2024.e33875Figure 1, Moher, *et al*. Source. Vol. 46; 2009: Flow diagram of the search strategy.
41. Moher D, Liberati A, Tetzlaff J, Altman DG. Preferred Reporting Items for Systematic Reviews and Meta-Analyses: the PRISMA statement. BMJ. 2009;339(jul21 1): b2535–b2535:b2535. doi: 10.1136/bmj.b2535, PMID 19622551.

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