



MAPPING THE LANDSCAPE: A BIBLIOMETRIC ANALYSIS OF LEARNING PREFERENCES IN ONLINE EDUCATION

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Abstract: The swift progress of technology and the growing availability of the internet have greatly altered the educational environment, particularly with the emergence of online learning. This bibliometric analysis examines the research patterns regarding the learning preferences of learners in online learning environments between 2014 and 2023. The analysis is based on data obtained from Scopus. Using a methodical approach in accordance with the PRISMA criteria, this study narrowed down an initial dataset of 1,306,768 articles to 1,324 papers that were of high quality and relevance. The analysis found prevailing research patterns, impactful publications, and forthcoming research pathways in the field. The data reveals a rapid and substantial rise in the number of published works and references during the COVID-19 outbreak, emphasizing the need to comprehend the dynamics of online learning in times of crisis. The primary research focuses on incorporating multimedia, promoting learner independence, and utilizing adaptive learning technology to improve engagement and achievement by accommodating various learning preferences. A substantial component of the study is underpinned by theoretical frameworks that emphasize the importance of interactive and networked learning, including constructivism, social constructivism, and connectivism. Although there have been improvements, there are still difficulties, especially in the integration of new technology such as AI and in guaranteeing fair access to online resources. The worldwide dissemination of research contributions, with substantial outputs from nations such as the United States, China, and Australia, underscores the international and cooperative character of this domain. The findings of this study are essential for educators, policymakers, and academics who are committed to enhancing the standard and inclusiveness of online education.

Index Terms: Online learning, learning preferences, e-learning, online learners, e-learning preferences

I. INTRODUCTION

The rapid progress of technology and the growing availability of the internet, especially with the advent of online learning, have greatly changed the field of education (Brohi et al., 2023; Greenhow et al., 2020;). Online education can better cater to learners' needs by providing increased flexibility and access to resources, resulting in enhanced affordability and accessibility of education for a wider range of students (Bhatia et al., 2022; Valtonen et al., 2022). Hence, understanding the learning preferences of students in online settings is crucial for devising successful educational approaches that can enhance engagement (Johnson & Lee, 2021; Tang et al., 2022), motivation (Pohlenz et al., 2023; Rudolph et al., 2023), and academic performance (Gherheş et al., 2021; Reyes-Mercado et al., 2023). In online learning environments, it is essential to have a comprehensive understanding of learners' motivations, the strategies used to engage with content, and the most efficient pedagogical approaches (Cancino & Avila, 2021; Pan, 2023; Tasneem, 2021). The study of learning preferences in online education is intricate, encompassing cognitive processes and individual variations (Baqtayan et al., 2023; Xiao & Li, 2021). The decisions students make in online learning can have a substantial impact on their engagement with digital knowledge. The references used are Alamri et al. (2020), Maini et al. (2021), and Sadegh-Zadeh et al. (2023). For instance, some learners may have a preference for visual materials like infographics and films, while others may be more interested in interactive simulations or text-based resources (Han & Zhong, 2024; Singh & Arya, 2020). By recognizing and adapting to these preferences, we may create learning experiences that are more tailored and impactful (Benfarha & Lamarti, 2023; Moussa et al., 2020; Suliman & Sevnarayan, 2024). Online learning settings are very conducive to fostering autonomy, since they provide learners with the flexibility to study at their own preferred speed (Khaidir et al., 2020; Pondalos et al., 2022). Research has established a definite correlation between enhanced learning results and autonomy (Mammadov & Schroeder, 2023; Sun, 2023). Another factor to consider is the integration of multimedia in online education. Utilizing multimedia resources, such as interactive simulations, digital texts, and videos, can enhance the learning process by increasing engagement and catering to different learning styles (Agisni et al., 2023; Lin & Wu, 2020;). In digital contexts, it is crucial to employ a multimodal approach to learning in order to meet the different needs of learners. The inclusion of multimedia in online courses helps to facilitate this approach (Kumi-Yeboah et al., 2020; Haniya et al., 2019; Xu & Patnao, 2023). The efficacy of multimedia learning highlights the necessity of including a variety of instructional resources to cater to diverse learning

preferences (Agisni et al., 2023; Heo & Toomey, 2019; Lin & Wu, 2020). Ongoing research is needed to identify the most effective methods for integrating developing technology into online learning settings (Ellis & Bliuc, 2019; Kalyani, 2023). Identifying learning preferences in online learning environments is crucial for developing educational techniques that enhance academic performance and engagement (Illescas et al., 2023; Sharif Nia et al., 2023; Wei & Chou, 2020). The rise of learning has introduced new challenges and opportunities in understanding how learners engage with digital platforms & how these platforms can be optimized to meet diverse learner needs. Given the rapid expansion of online education, it is critical to explore the scientific contributions in this area, particularly in terms of how learners preferences shape their educational experiences. As a result the current research aims on conducting a bibliometric analysis of studies focused on learning preferences in education & answering the following questions:

RQ 1. How do writers and countries collaborate in learning preferences in online education?

RQ 2. Regarding learning preferences in education, what are citation patterns and networks, and how do these networks represent this discipline's knowledge structure and multidisciplinary character?

RESEARCH METHODOLOGY

In order to conduct a thorough evaluation and integration of the research, the bibliometric analysis of learning preferences in online education adheres to the PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) guidelines. The process of identifying the most rigorous research from an initial huge dataset involves multiple successive rounds of filtering and refining. The methodology, which elucidates the procedure for choosing articles, is divided into sections that are illustrated by the PRISMA flow diagram. The PRISMA flow diagram is employed to visually depict every step in the methodology, delineating the process of article selection. Bibliometric analysis is a rigorous, systematic, and innovative method used to analyze research trends and publications across time (Erfanmanesh & Abrizah, 2018; de Oliveira et al., 2019). In order to conduct a thorough evaluation and integration of the research, the bibliometric analysis of learning preferences in online education adheres to the PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) guidelines. The process of identifying the most rigorous research from an initial huge dataset involves multiple successive rounds of filtering and refining. The methodology, which elucidates the procedure for choosing articles, is divided into sections that are illustrated by the PRISMA flow diagram. The PRISMA flow diagram is employed to visually depict every step in the methodology, delineating the process of article selection. Bibliometric analysis is a rigorous, systematic, and innovative method used to analyze research trends and publications across time (Erfanmanesh & Abrizah, 2018; de Oliveira et al., 2019). Analyzing articles and documents based on specific criteria, such as authors, journals, institutions, and nations, facilitates the identification of connections between diverse components of the scientific literature (Esen et al., 2020).

SEARCH STRATEGY

In accordance with the PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) guidelines, a systematic search approach was utilized (Moher et al., 2009). A total of 1,306,768 articles were collected for data analysis using Scopus. The subsequent stages illustrate the systematic screening approach employed to narrow down the dataset to 1,324 pertinent publications on the learning preferences of students in online learning environments.

1. **Time Period Limitation (2014-2023):** The initial dataset of 1,306,768 articles was restricted to the time period from 2014 to 2023. This procedure decreased the quantity of articles to 9,69,688.
2. **Subject Area Restriction:** The dataset was further screened to exclude articles that were not classified under the social sciences (including the education subject area) in order to guarantee its relevance to the field of social sciences, particularly education. This restriction led to the publication of 1,59,620 articles.
3. **Document Type Filtering:** The dataset was subsequently restricted to consist solely of journal articles, excluding proceedings, case studies, book chapters, and other non-article formats. Articles in press and finalised articles were both taken into account. The dataset was reduced to 1,15,463 articles as a result of this filtering.
4. **Source Type Limitation:** Further refinement was made by including only articles published in journals, which left 1,15,189 articles in the dataset.
5. **Keyword-Based Screening:** A keyword-based search was conducted using the following terms: "student engagement," "distance learning," "online learning," "students," and "e-learning" This procedure reduced the dataset to 8,609 articles.
6. **Language Restriction:** The dataset was limited to articles that were published only in English. The dataset was reduced to 8,274 articles.
7. **Open Access Limitation:** The dataset was further restricted to include only open access articles. The dataset was reduced to 4,135 articles as a result of this step.
8. **Citation Count Filtering:** Articles with fewer than 10 citations were excluded. This exclusion criterion yielded a dataset of 1,763 articles.
9. **Data Filtration and Quality Check:** A thorough data filtration process was conducted to ensure the quality and relevance of the remaining articles. This step further refined the dataset to 1,528 articles.
10. **Duplicate Removal:** Finally, duplicate articles were identified and removed, resulting in a final dataset of 1,324 articles.

INCLUSION AND EXCLUSION CRITERIA

The inclusion criteria: Only articles published between 2014 and 2023 were selected based on the inclusion criteria. Only journal articles published in the field of Social Sciences, specifically focusing on Education, were considered. The chosen articles were freely accessible, written in English, and contained the terms "student engagement," "distance learning," "online learning," "e-learning," and

"students." To ensure effectiveness, only papers with a minimum of 10 citations were considered. After removing duplicate articles, a final dataset of 1,324 high-quality and relevant articles was obtained.

The exclusion criteria: It aimed to improve the dataset by removing items that were not relevant. To highlight current progress, publications published prior to 2014 were omitted. Studies unrelated to the topic of Education were rejected. Excluded from consideration were any media other than journals, including as proceedings, case studies, and book chapters. Articles that were not available for public access, not published in the English language, or did not include the necessary keywords were excluded. In addition, we removed duplicates and papers with less than 10 citations to ensure the dataset's relevance and uniqueness.

Table 1.0: The Exclusion and Inclusion Criteria

Criteria Type	Inclusion Criteria	Exclusion Criteria
Time Period	Articles published between 2014-2023	Articles published before 2014
Subject Area	Articles related to Social Sciences, including Education	Articles not related to Social Sciences or Education
Document Type	Journal articles, including final articles and articles in press	Proceedings, case studies, book chapters, and other non-article formats
Source Type	Articles published in journals	Articles not published in journals
Keywords	Articles containing keywords: "e-learning," "student engagement," "distance learning," "online learning," "students"	Articles not containing the specified keywords
Language	Articles published in English	Articles published in languages other than English
Access Type	Open access articles	Non-open access articles
Citation Count	Articles with 10 or more citations	Articles with less than 10 citations

PRISMA FLOW DIAGRAM

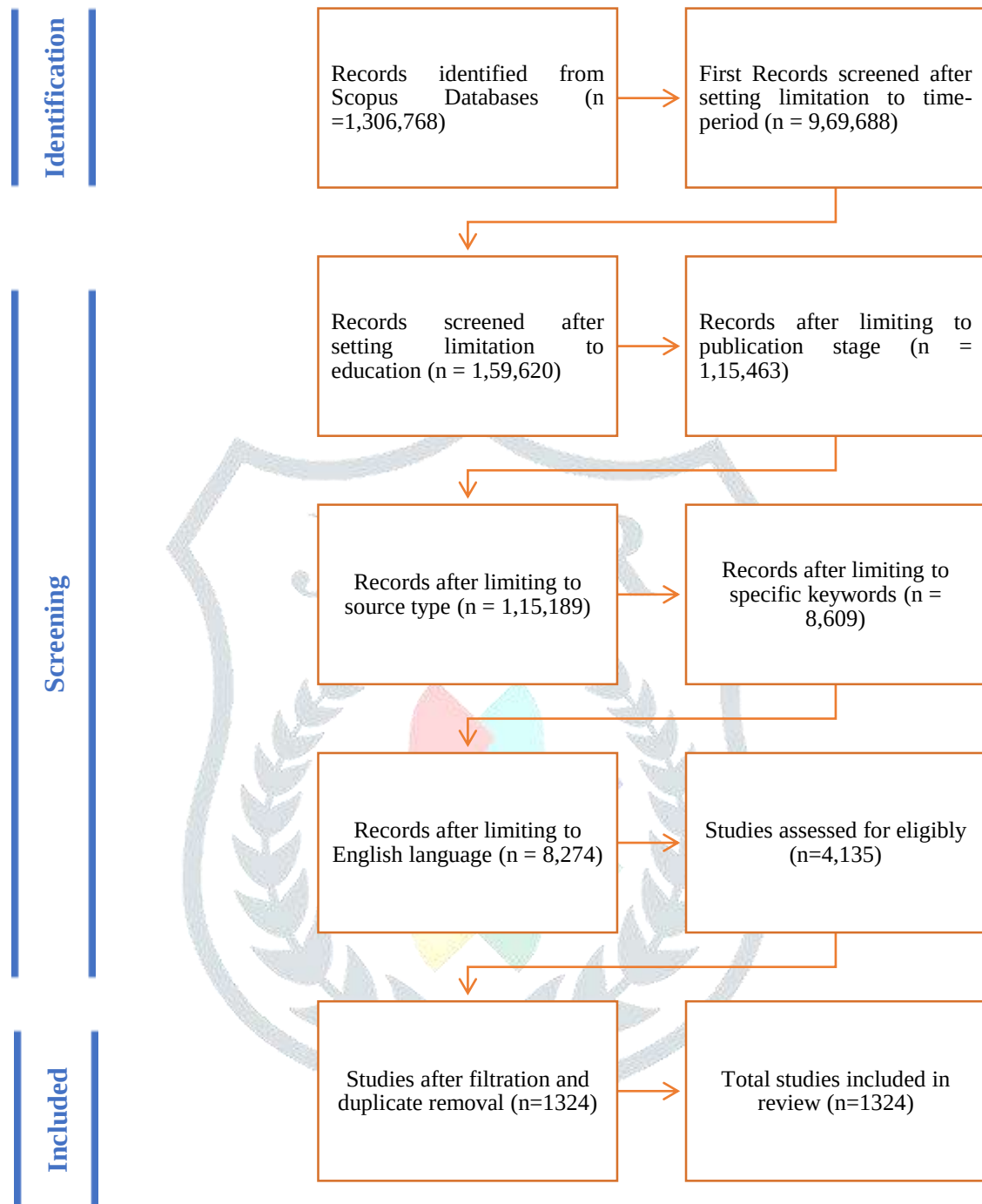


Figure 1.0: PRISMA Flow-Diagram

FINDINGS

1. How do writers and countries collaborate in learning preferences in online education?

Most active writers in the specific area-

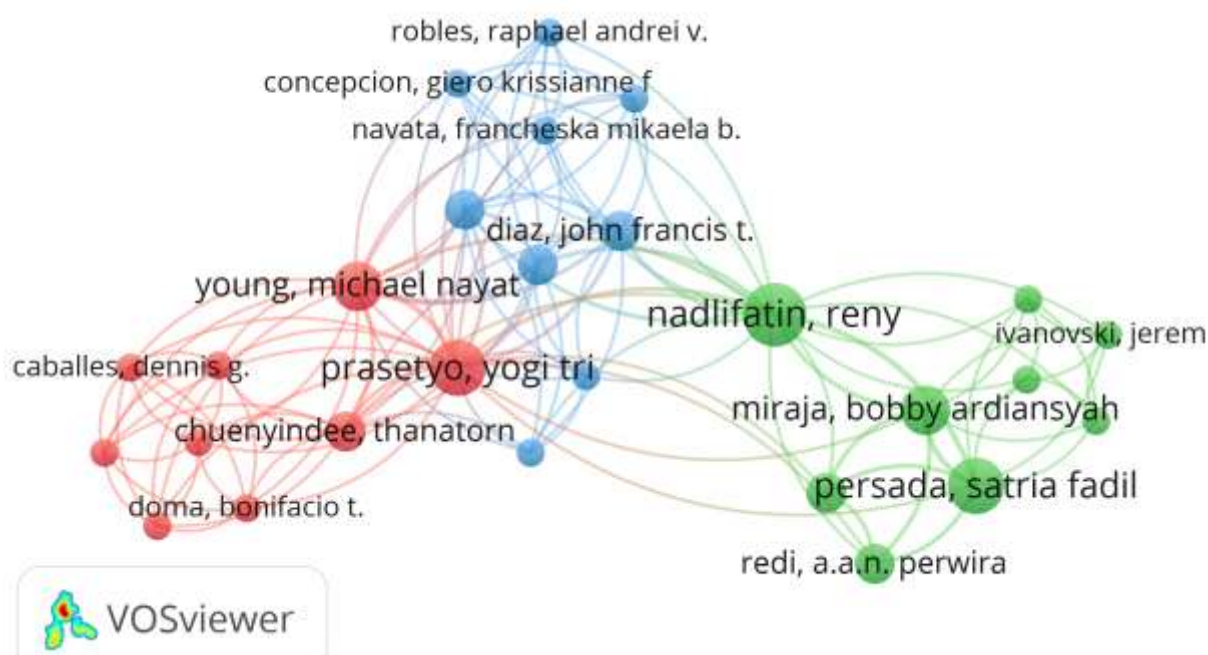


Figure 1.2 Most active writers

A close and intricate link between the terms was discovered, as seen in the above figure. The VOSviewer diagram shows the collaborative network of researchers investigating the learning preferences of individuals in online learning environments. Within this scholarly community, the size of each node corresponds to the amount of links or partnerships that a researcher has, with the nodes representing individual researchers. The colors in the visualization represent clusters of researchers, signifying their affiliation with closely linked subfields or research teams. The clusters that are most conspicuous are the red, blue, and green clusters. The red cluster symbolizes a tightly-knit network of researchers who collaborate regularly, with notable figures such as Yogi Tri Prasetyo and Michael Nayat Young. Raphael Andrei V. Robles and John Francis T. Diaz are researchers who belong to the blue cluster, which represents a notable collaboration network. Reny Nadlifatin and Satria Fadil Persada belong to the green cluster, which signifies an additional interconnected research group. The connections between nodes in the network represent the collaborative relationships among researchers, with longer lines indicating greater partnerships. These organizations showcase the scholars' endeavors across several fields and their capacity to collaborate.

PUBLICATIONS OVER THE YEARS

The graph gives details about a consistent and overall increasing pattern in the quantity of articles regarding learning preferences in online learning environments from 2014 to 2023 in the MS-Excel after data cleaning. The number of publications started at 51 in 2014 and consistently rose to 82 in 2016. After seeing a slight decrease to 76 in 2017, there was a significant rise to 143 in 2018 and further climb to 149 in 2019. The COVID-19 epidemic led to a significant increase in online learning, with 215 publications in 2020 and 304 publications in 2021. Despite the R^2 value indicating substantial year-to-year fluctuations, the trendline equation $y=66.581e0.0955x$ and $R^2=0.1889$ imply a general pattern of exponential growth. The considerable fall in the number of publications in the post-pandemic years, from 170 in 2022 to 55 in 2023, may suggest the conclusion of pandemic-driven investigations or a shift in research focus. Overall, the data shows a significant rise in research activity during the epidemic, suggesting the importance of comprehending the intricacies of online learning. This trend in online learning is driven by global events and technical breakthroughs, showcasing the dynamic character of research.

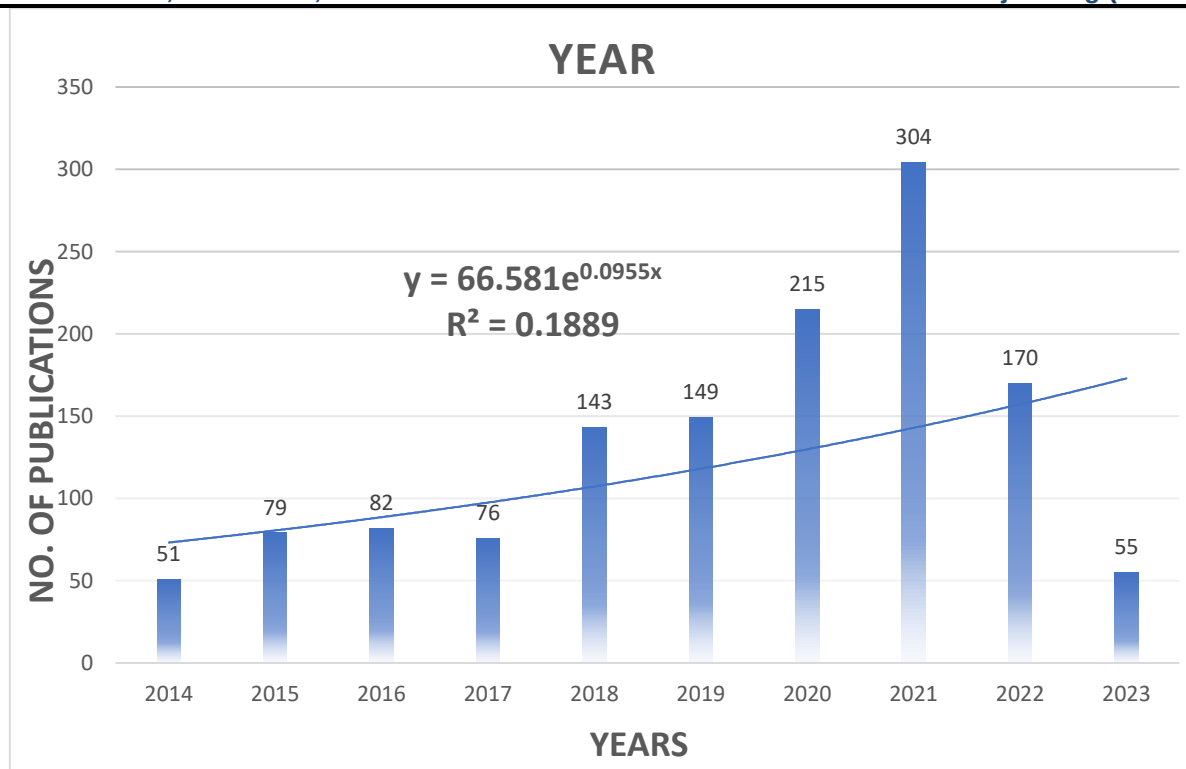


Figure 1.2: Year-wise Publications

Countries

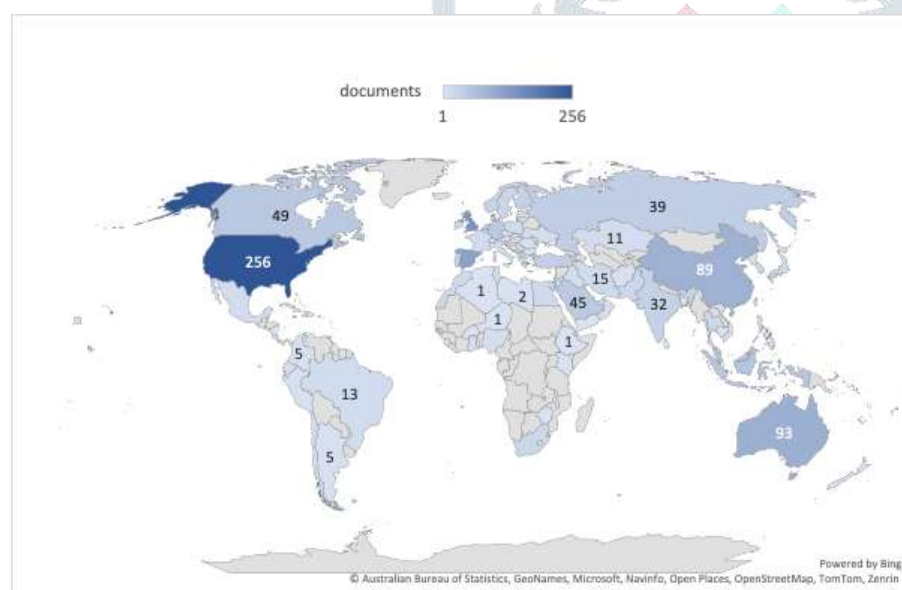


Figure 1.3: countries which contributed most

The map showcases the contributions of various nations and displays the worldwide distribution of research articles on learning preferences in online learning environments. The United States has the highest number of 256 papers, establishing its dominance in this field of study. The significant magnitude of this figure can be attributed to the extensive proliferation of online educational institutions throughout the country. Australia ranks second with 93 documents, suggesting an increasing emphasis on educational technology and online learning research. China, with a total of 89 documents, has a robust commitment to this topic, emphasizing its vibrant research community. The European countries of Germany, Spain, and the United Kingdom are exemplified by their noteworthy contributions. Out of all the countries in the Middle East, Saudi Arabia is notable for its publication of 45 papers. This suggests that the country actively participates in substantial regional research endeavours, particularly those carried out by institutions like as King Abdulaziz University. The significant involvement of Asian nations, such as India (32 documents), Malaysia (13 documents), and Indonesia (5 documents), underscores their increasing focus on incorporating technology into the process of education. South Africa leads in African

contributions with 12 papers, demonstrating the continent's recent progress in online learning research. The map emphasizes the global interest in and diverse geographical contributions to the study of learning preferences in online contexts, with significant concentrations in North America, Asia, and Europe. The distribution emphasize on the collaborative and global nature of educational research, which is influenced by various regional objectives and resources.

2. Regarding learning preferences in education, what are citation patterns and networks, and how do these networks represent this discipline's knowledge structure and multidisciplinary character?

CITATIONS OVER THE YEARS

The graph displays the citation trends for works on learning preferences in online learning environments from 2014 to 2023. The number of citations increased from 2,412 in 2014 to 3,857 in 2015 and further to 4,555 in 2016. However, there were a total of 3,278 citations in 2017, which is a little decrease compared to the previous year. The number of citations experienced a temporary decline before rebounding, reaching a peak of 5,524 in 2018 and 5,685 in 2019, which suggests an increasing level of awareness and interest among researchers. The number of citations in 2020 reached a remarkable total of 11,851. This growth is likely attributed to the escalating focus on online learning due to the COVID-19 pandemic. In 2021, the epidemic resulted in a significant number of published papers, and there was a sustained level of attention. This was evident from the relatively higher number of citations, which amounted to 11,931. Nevertheless, the number of citations has experienced a substantial decline in the years following the epidemic, dropping to 4,264 in 2022 and further decreasing to 1,020 in 2023. Although there was a notable surge in research and citations during the pandemic, the current pattern suggests a potential decrease in interest thereafter. The fluctuation in citation counts demonstrates the dynamic character of academic focus, which is heavily influenced by world events and evolving curricula.

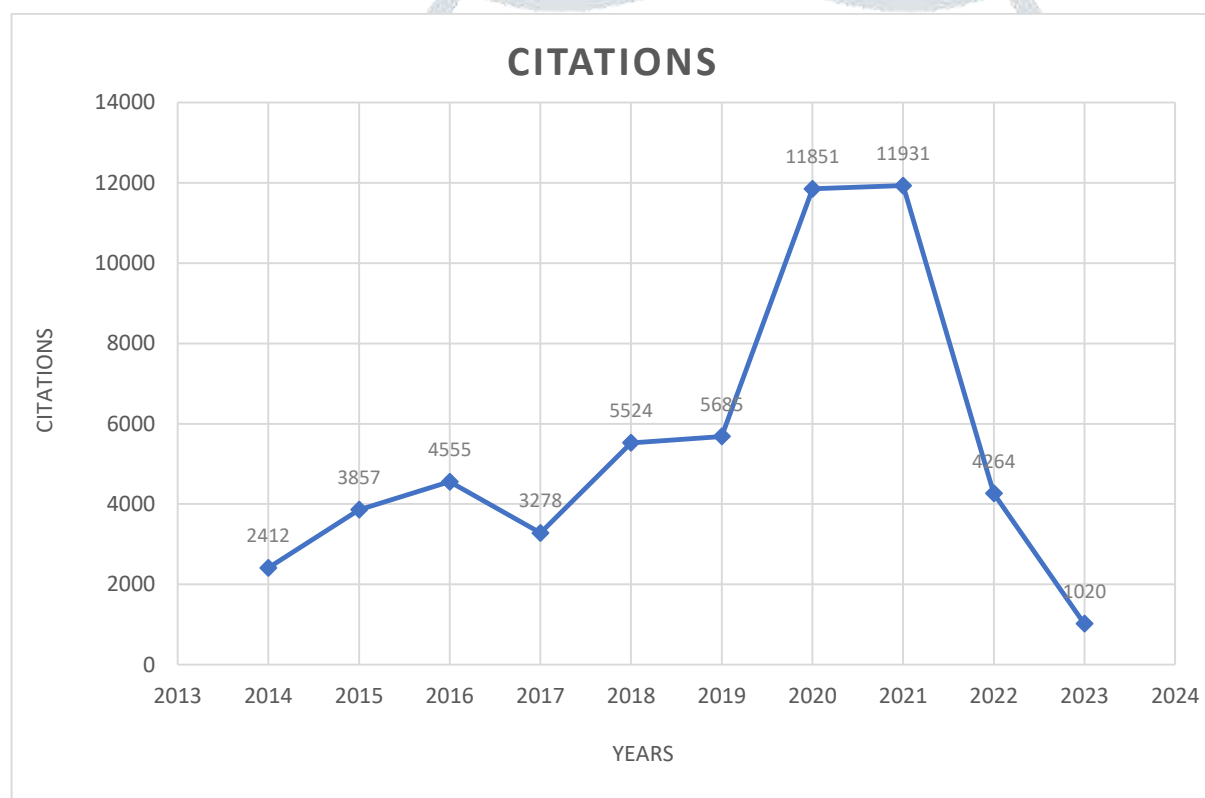


Figure 1.4: Year-wise Citations

TOP CITED ARTICLES AND JOURNALS

The table displays the top 10 publications regarding learning preferences in online learning settings. "A systematic review" (2020) is the article that has received the highest number of citations, with a total of 1,226. This indicates its significant influence and importance, particularly in relation to the COVID-19 pandemic. The article titled "Impact of COVID-19" is the second most cited article of 2020, with 626 citations. It offers substantial evidence of the consequences of the pandemic. Publications such as "Digital Transformation" (2020) and "Students' Perceptions" (2021) are similarly highly regarded, suggesting a notable surge in research and interest during the epidemic. The prominent position of publications such as "Computers and Education" and "International Journal of Educational Technology in Higher Education" underscores their importance in disseminating key research discoveries. The data illustrates the significance of comprehending the dynamics of e-learning, as seen by the increasing number of highly referenced publications. This trend began in 2014 with the publication "Is FLIP enough?" and continued in 2018 with "E-learning success," which received 396 citations and subsequently rose to 399 citations.

Table 2.0: The most globally cited Articles

Rank	Title	Journal	Year	Citations
1	A systematic review of immersive virtual reality applications for higher education: Design elements, lessons learned, and research agenda	Computers and Education	2020	1226
2	Impact of COVID-19 pandemic on information management research and practice: Transforming education, work and life	International Journal of Information Management	2020	626
3	Digital transformation of everyday life – How COVID-19 pandemic transformed the basic education of the young generation and why information management research should care?	International Journal of Information Management	2020	524
4	Improvements from a flipped classroom may simply be the fruits of active learning	CBE Life Sciences Education	2015	494
5	Exploring the factors affecting MOOC retention: A survey study	Computers and Education	2016	489
6	Students' perception and preference for online education in India during COVID -19 pandemic	Social Sciences and Humanities Open	2021	473
7	Learning analytics should not promote one size fits all: The effects of instructional conditions in predicting academic success	Internet and Higher Education	2016	467
8	The sudden transition to synchronized online learning during the COVID-19 pandemic in Saudi Arabia: A qualitative study exploring medical students' perspectives	BMC Medical Education	2020	460
9	Is FLIP enough? or should we use the FLIPPED model instead?	Computers and Education	2014	399
10	E-learning success determinants: Brazilian empirical study	Computers and Education	2018	396

Here is a brief description of some of the most cited articles.

1. “A systematic review of immersive virtual reality applications for higher education: Design elements, lessons learned, and research agenda (2020)” published in ‘Computers and Education’ has 1,226 citations, making it the most cited paper in this list. The systematic review focuses on the role of immersive virtual reality (VR) in higher education, exploring its design elements, lessons learned from its use, and proposing a research agenda for future applications. The high citation count reflects the increasing interest in the use of VR in education, especially in light of technological advancements that have made immersive experiences more accessible. The COVID-19 pandemic has also accelerated interest in alternative forms of education, contributing to the article's relevance and wide recognition.

2. “Impact of COVID-19 pandemic on information management research and practice: Transforming education, work and life (2020)” in the ‘International Journal of Information Management’ with 626 citations, this article examines the profound impact of the COVID-19 pandemic on information management and how it has transformed education, work, and everyday life. The research addresses the rapid shift to digital platforms, with particular emphasis on how the pandemic forced educational institutions and workplaces to adapt to new digital tools and practices. The paper's high citation count highlights the growing academic interest in understanding the long-term effects of the pandemic on digital transformation.

3. “Digital transformation of everyday life – How COVID-19 pandemic transformed the basic education of the young generation and why information management research should care? (2020)” published in the ‘International Journal of Information Management’ and cited 524 times, focuses on the impact of the COVID-19 pandemic on the digital transformation of primary and secondary education. It explores how the pandemic accelerated the integration of digital tools into basic education and calls for information management researchers to pay closer attention to this shift. The article's relevance lies in its timely analysis of the pandemic's effects on young learners and its contribution to the broader discourse on digital education.

4. “Improvements from a flipped classroom may simply be the fruits of active learning (2015)” with 494 citations, this paper in ‘CBE Life Sciences Education’ questions whether the benefits of flipped classrooms are truly due to the flipped model or simply a result of the active learning strategies often employed in flipped environments. The study suggests that active learning, rather than the flipping itself, may be the key driver of improved student outcomes. This article is frequently cited in discussions around pedagogical techniques, as it challenges the assumption that the flipped classroom model is inherently superior, prompting further investigation into the underlying mechanisms that enhance learning.

5. "Exploring the factors affecting MOOC retention: A survey study (2016)" in 'Computers and Education' is cited 489 times, this article investigates the factors that influence retention rates in Massive Open Online Courses (MOOCs). The study uses survey data to identify key factors such as course design, student motivation, and support mechanisms that affect whether students complete MOOCs. The paper's high citation count reflects the growing body of research into online education, particularly MOOCs, which have become an important part of global education systems, especially during and after the COVID-19 pandemic.

CONCLUSION

A bibliometric examination of studies conducted on learning preferences in online contexts has discovered some significant attributes of the scientific terminology employed. The VOS-viewer diagram displays the terms that appear most frequently in these publications. The size of the terms corresponds to their frequency of occurrence, and the clusters are color-coded to indicate correlations. The term "students" is the most prevalent in online education, as it specifically refers to the learners' preferences and behaviors. The phrases "human," "adult," and "adolescent" are interconnected and indicate a research focus on different population groups. The increase in research investigating the consequences of the COVID-19 pandemic is seen in the widespread use of the phrase "COVID-19," which emphasizes the influence of the epidemic on online education. The terms "machine learning," "digital devices," and "mobile learning" highlight the technological and instructional elements. Furthermore, the inclusion of terms such as "interaction," "perception," and "cyberbullying" indicates a focus on the social and psychological aspects of online education. The various categorizations, such as "physiology," "school," and "data analysis," demonstrate the multifaceted nature of the study in this discipline. The bibliometric investigation reveals notable progressions in research patterns throughout time. From 2014 to 2023, there is a notable surge of publications, reaching its peak during the COVID-19 pandemic. These findings indicate that there was a greater global interest in online learning methods during this time period. The integration of multimedia and learner autonomy is designed to enhance engagement and achievement by considering various learning preferences. Theoretical frameworks like as constructivism, social constructivism, and connectivism are frequently employed to emphasize the significance of networked learning, social connection, and active engagement. The study emphasizes the necessity of ongoing research to include advanced technologies such as machine learning and artificial intelligence in order to customize learning experiences. Additionally, it acknowledges the challenge of ensuring equitable access to internet resources. The global dissemination of research contributions, which encompasses substantial outputs from countries such as the United States, China, and Australia, underscores the extensive and collaborative character of this field. The bibliometric analysis of studies on learning preferences in online education uncovers several noteworthy findings and their implications for educational practice and future study. The urgent need to comprehend online learning methods during a crisis is emphasized by the significant rise in the number of publications and citations that has occurred during the COVID-19 pandemic. Enhancing academic achievement and engagement can be achieved by including multimedia integration, promoting learner autonomy, and utilizing adaptive learning technology. These characteristics are crucial as they cater to diverse learning preferences. Theoretical frameworks such as constructivism, social constructivism, and connectivism provide essential understanding by highlighting the importance of networked learning, social connection, and active involvement. Despite advancements, there are still challenges that remain, such as the incorporation of emerging technologies like AI and machine learning, as well as ensuring fair access to online resources. To ensure the effectiveness and inclusivity of online learning environments, it is crucial to tackle these concerns. The extensive and cooperative nature of this subject is highlighted by the worldwide dispersion of research contributions, which encompasses significant outputs from the United States, China, and Australia. Further study should focus on exploring personalized learning methodologies, leveraging technology improvements to meet the evolving needs of learners globally. The findings obtained from this study are crucial for educators, policymakers, and academics who are working towards improving the standard of online education and its results.

Acknowledgement:

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Declaration of Interest Statement: The authors declare no conflicts of interest.

APPENDICES:

Appendix A: PRISMA Flow diagram

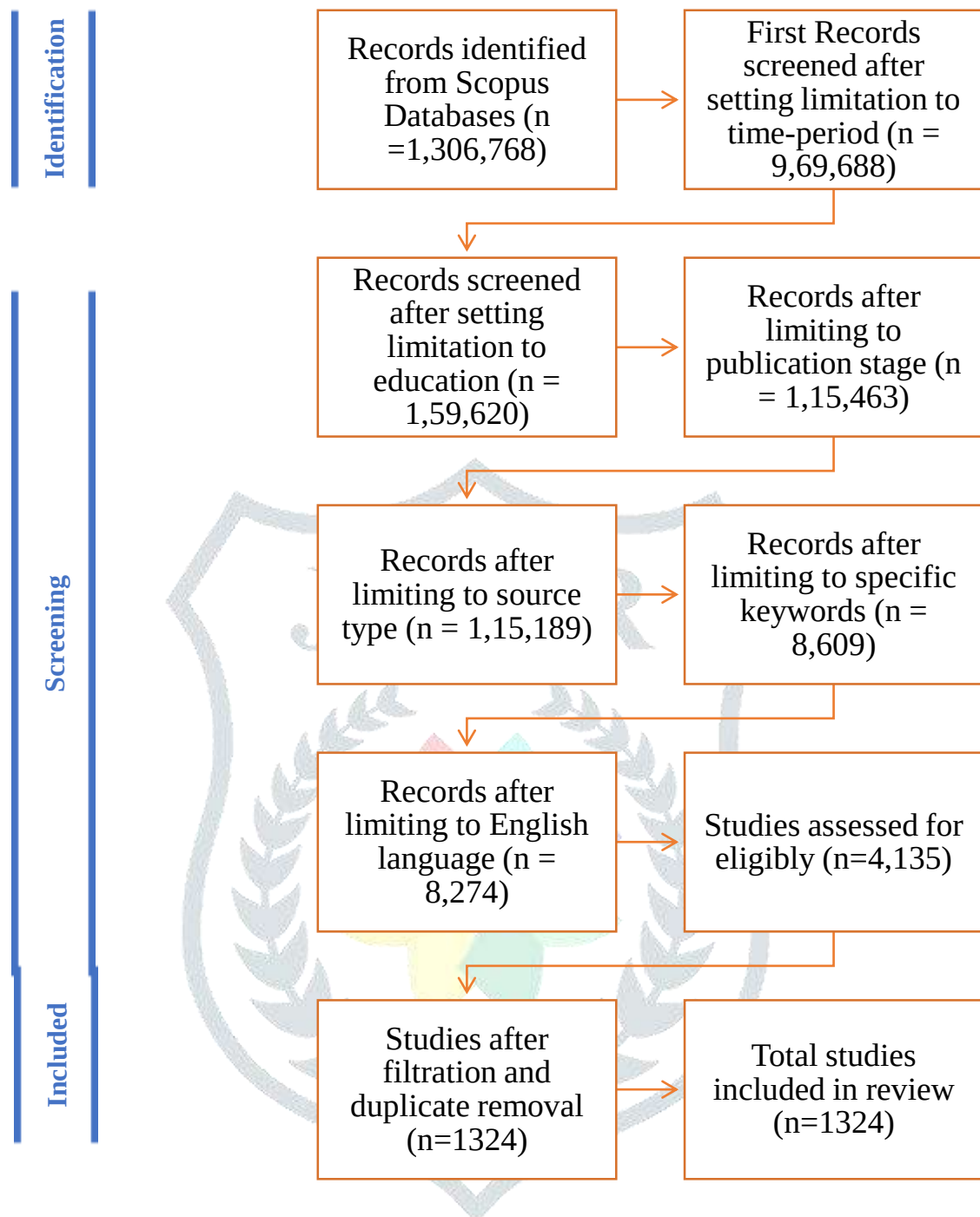
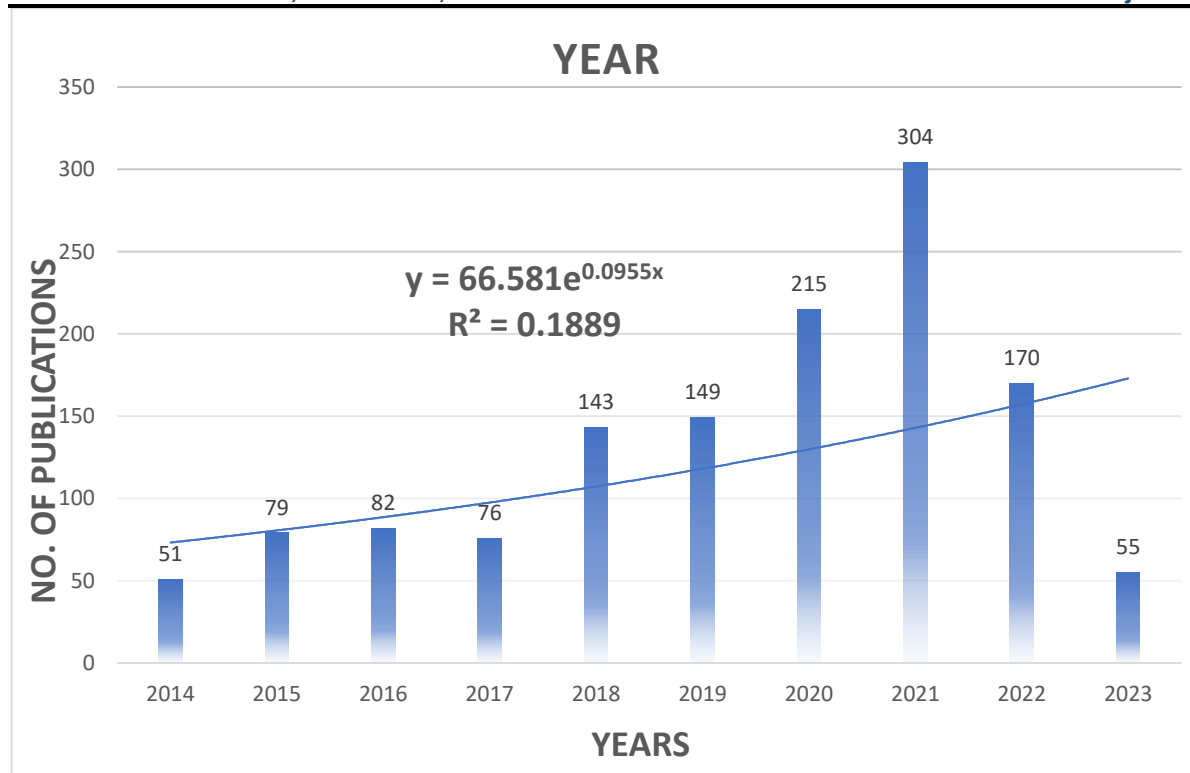
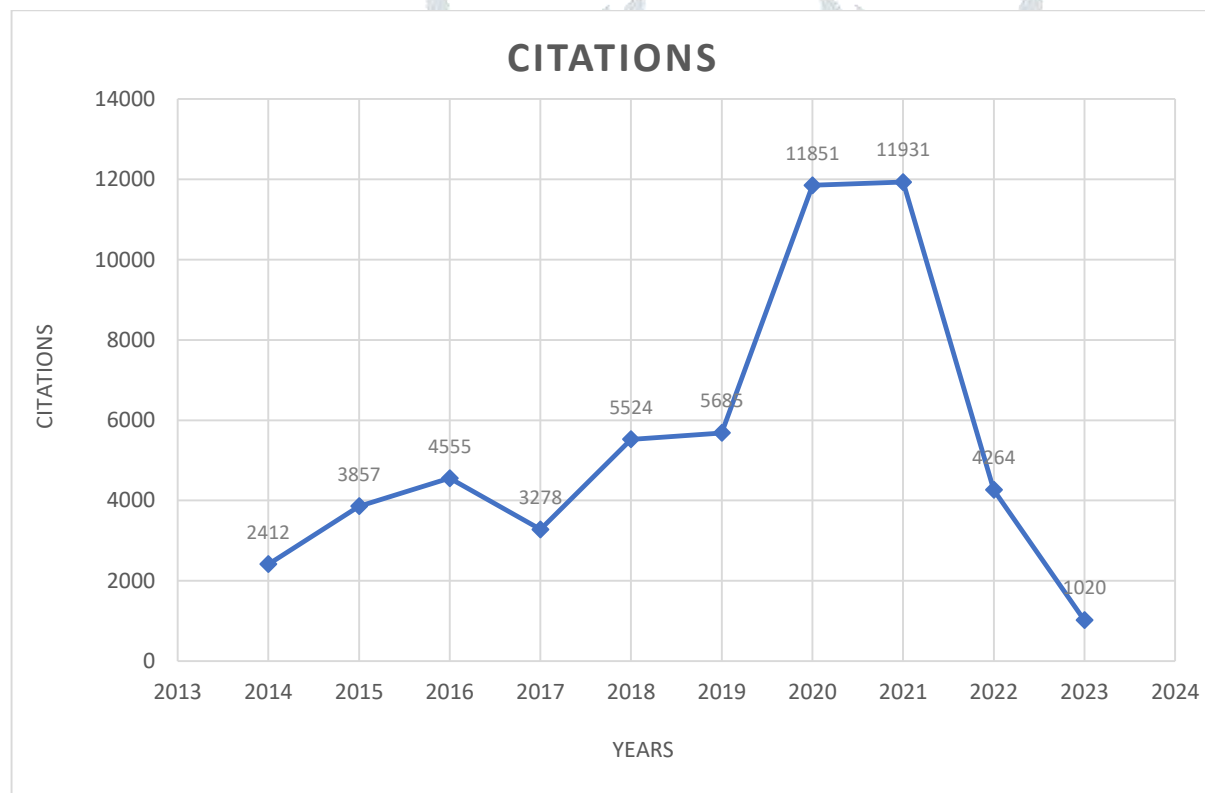


Figure 1.0: PRISMA Flow-Diagram

Appendix B: Publications over the years



Appendix C: Citations over the years

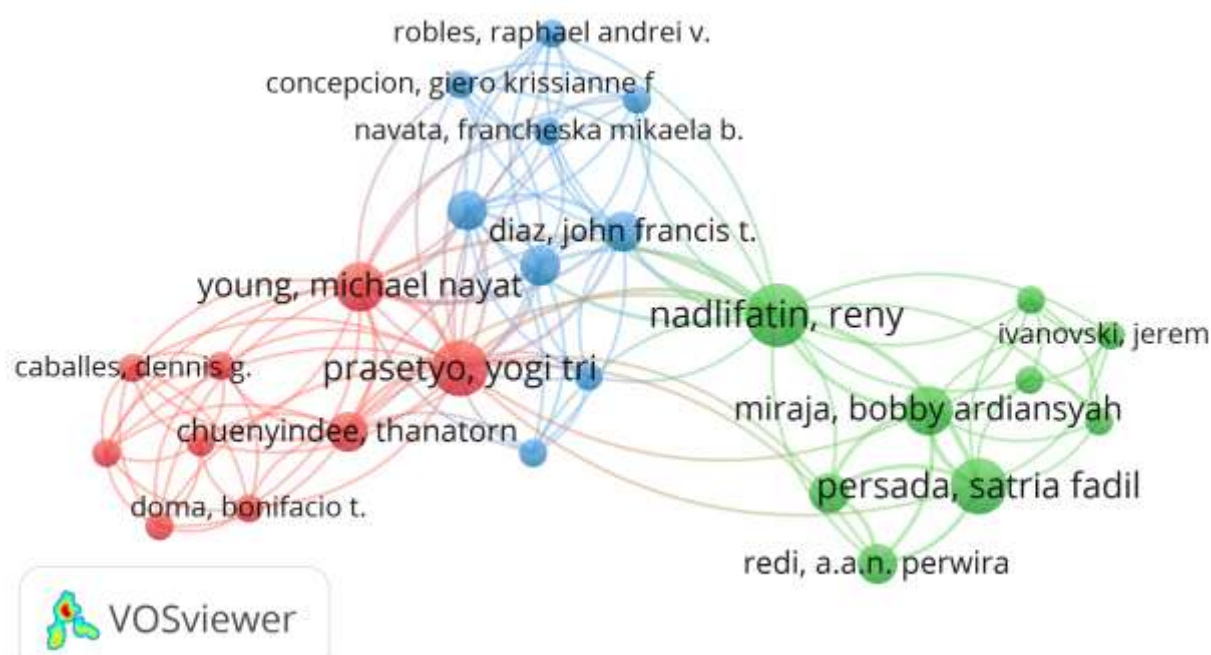


Appendix D: Top Cited Articles & Journals

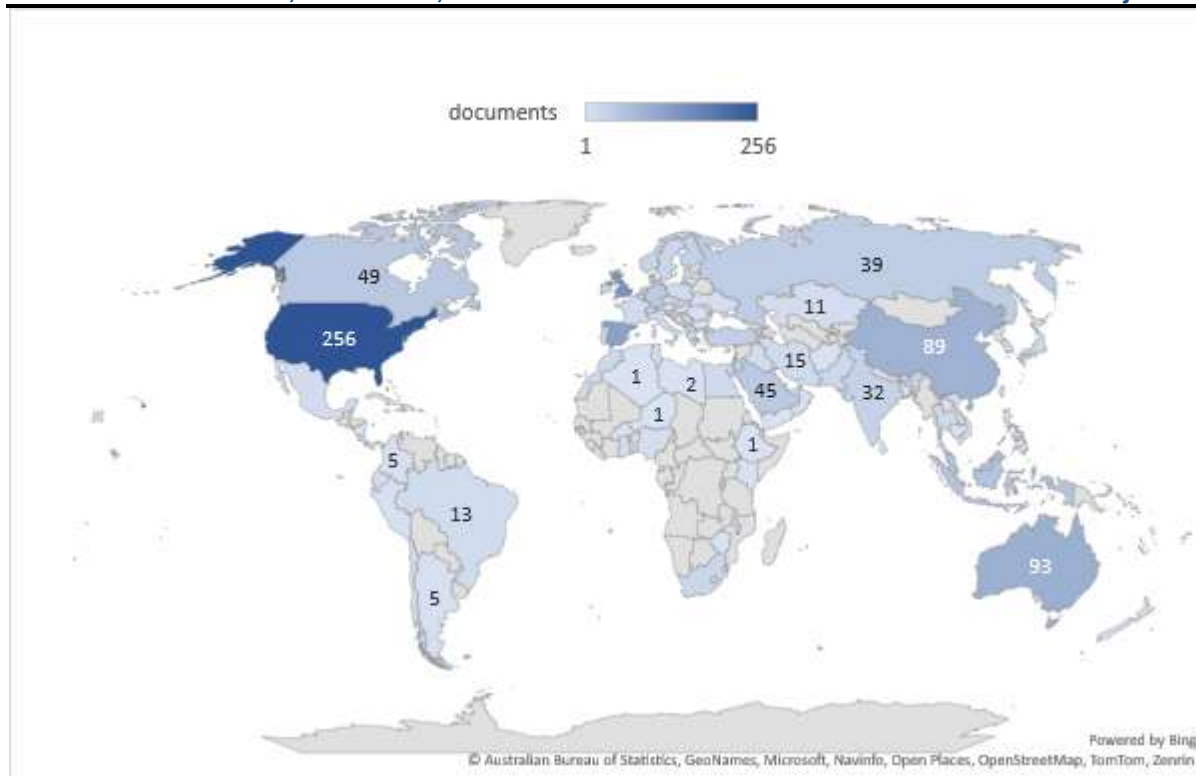
Rank	Title	Journal	Year	Citations
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9	Is FLIP enough? or should we use the FLIPPED model instead?	Computers and Education	2014	399
10	E-learning success determinants: Brazilian empirical study	Computers and Education	2018	396

Appendix E: Authors who contributed more in the research area



Appendix F: Countries having more studies



TABLES:

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Subject Area	Articles related to Social Sciences, including Education	Articles not related to Social Sciences or Education
Document Type	Journal articles, including final articles and articles in press	Proceedings, case studies, book chapters, and other non-article formats
Source Type	Articles published in journals	Articles not published in journals
Keywords	Articles containing keywords: "e-learning," "student engagement," "distance learning," "online learning," "students"	Articles not containing the specified keywords
Language	Articles published in English	Articles published in languages other than English
Access Type	Open access articles	Non-open access articles
Citation Count	Articles with 10 or more citations	Articles with less than 10 citations

Table 2.0: The Top -10 Cited Articles

Rank	Title	Journal	Year	Citations
1	A systematic review of immersive virtual reality applications for higher education: Design elements, lessons learned, and research agenda	Computers and Education	2020	1226
2	Impact of COVID-19 pandemic on information management research and practice: Transforming education, work and life	International Journal of Information Management	2020	626
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FIGURES:**Figure 1.0:** PRISMA Flow diagram

PRISMA Flow Diagram

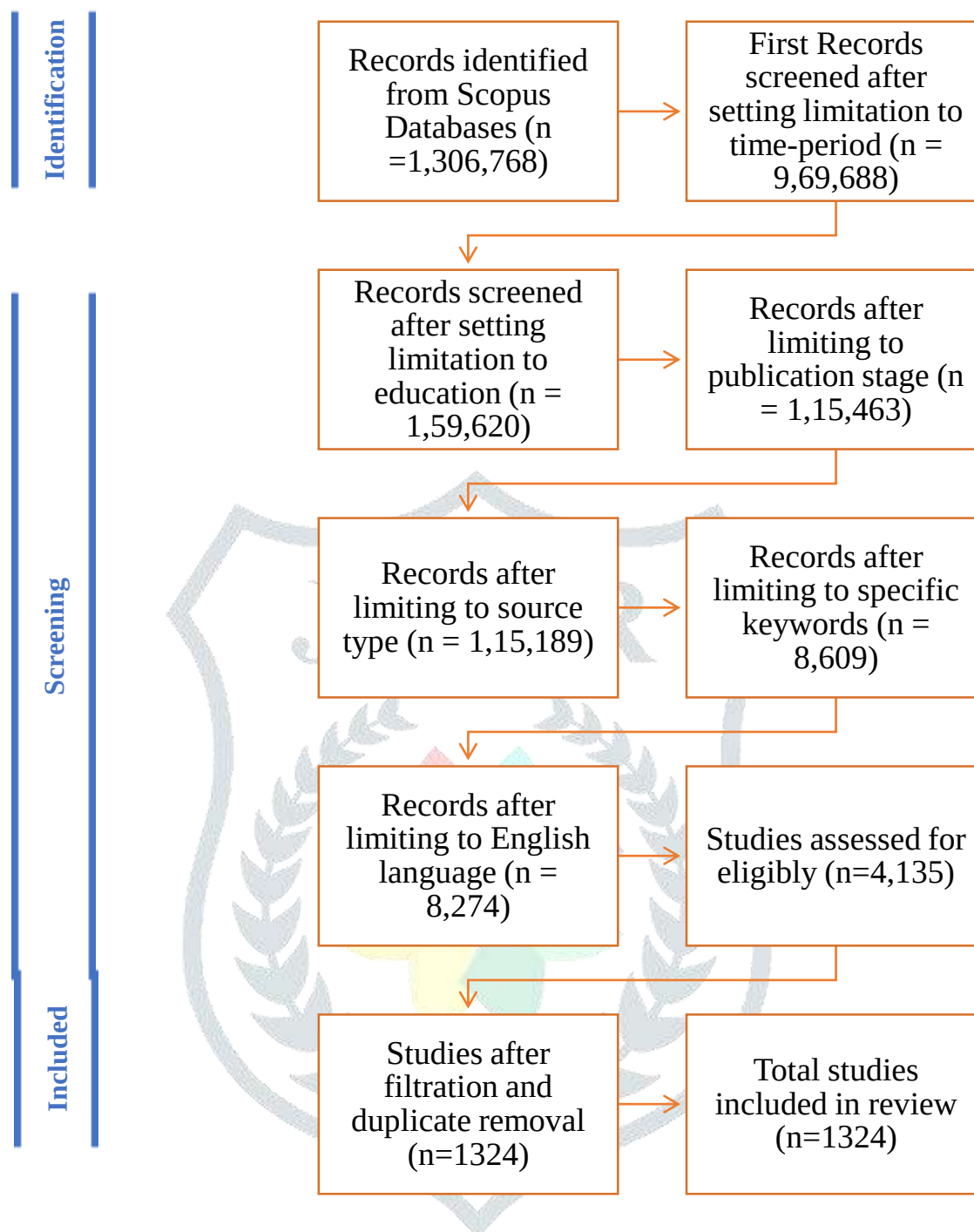
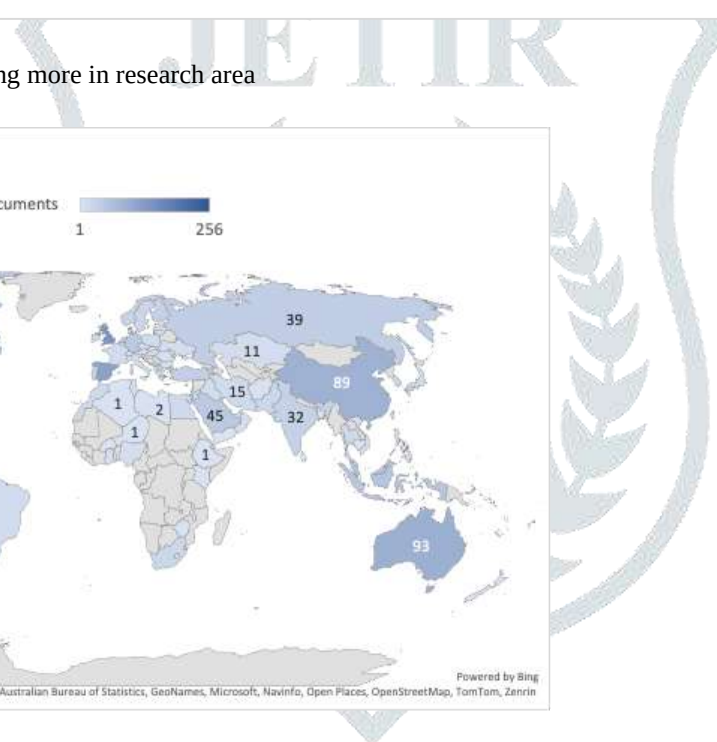


Figure 1.2: Year-wise Publications



documents

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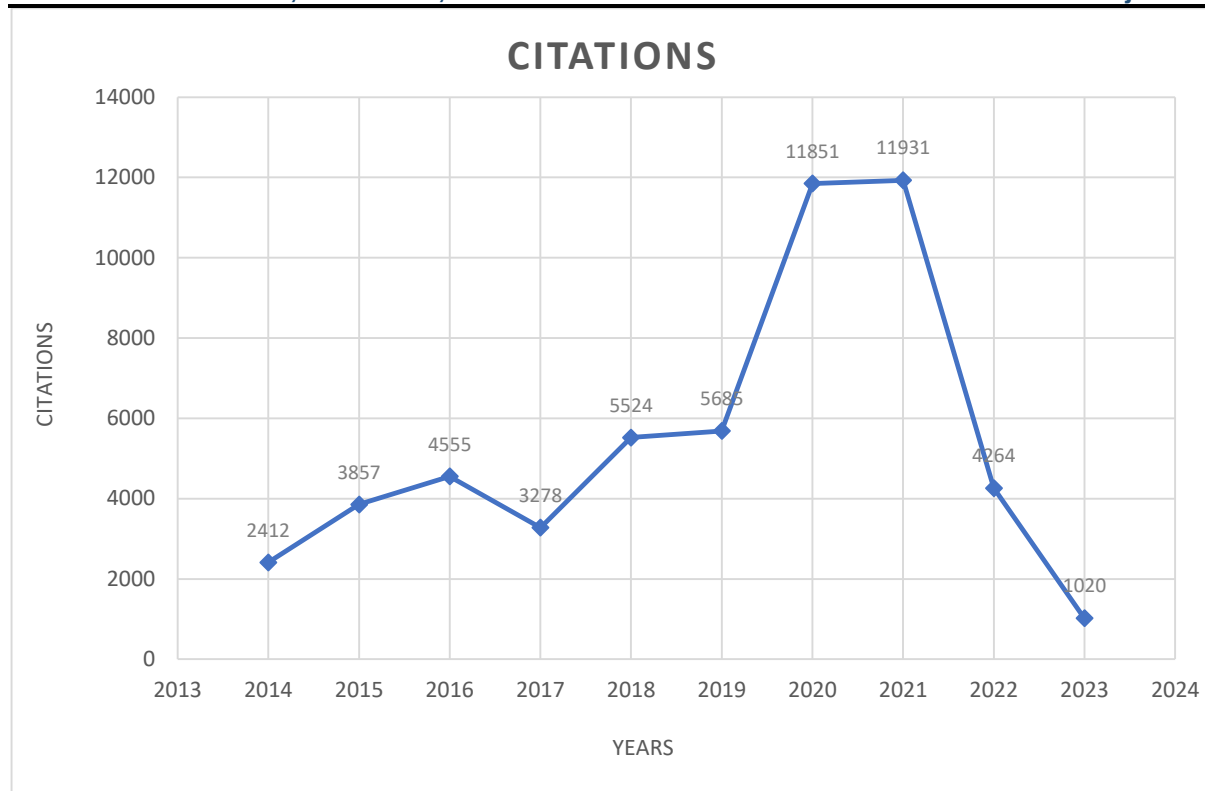


Figure 1.4: Countries contributing more in research area

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