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1st Decade of E-learning in Mathematics Education: A Bibliometric Analysis

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Abstract: Mathematics education has increasingly focused on e-learning in the past ten years. We conducted a bibliometric analysis to examine the trends, research focus, and advancement in the utilization of e-learning in mathematics education from 2013 to 2023. The objective of this study to provide important assets for the field and offer novel insights to academics who will be investigating this subject. The data obtained from the Scopus database was collected and analyzed. It was subsequently stored in two formats, CSV and RIS, and processed using VOS viewer, Publish or Perish, and Microsoft Excel Software. We conducted an analysis to determine the patterns of publication and citation, the geographic distribution and collaboration between countries, as well as the originality and specific areas of focus in research. The analysis reveals a consistent annual growth in publication related to e-learning in mathematics education. Ini 2020, the number of citations reached 569, surpassing the number of publications in prior years. The research has been organized into five primary areas focus: 1) Environment and students; 2) Education and teaching; 3) Curriculum and technology; 4) STEM and mathematics education. This study offers a comprehensive analysis of the progression of e-learning in the fiels of mathematics education, along with potential avenues for further in investigation a advancement.

Keywords: E-learning, Mathematics education, Bibliometric analysis

Introduction

The evolution of Information and Communication (ICT) has brought about changes in the objectives of societal progress and the obligations placed on individuals. Hence, in the age of digital transformation, it is imperative to establish a society that not only consumes information but also produces it, and a society that can effectively and judiciously employ technology (Suriani & Hadi, 2022). Nations must fully embrace and adjust to the process of digital transformation in order to stay abreast of the constantly evolving technical breakthroughs, particularly in the realms of internet and information accessibility. Furthermore, information technology is gaining popularity and being utilized in several domains. Undoubtedly, ICT is highly popular in the realm of education. The relationship between technology and learning contexts is becoming increasingly robust on daily basis. Technology indispensable in all educational settings (Subroto et al., 2023). While technological advancements have an impact on education, it is crucial to have a resilient and forward-thinking education system. This trategy is highly successful for meeting contemporary needs because knowledge is a highly valuable asset that necessitates constant updates from both individuals and educational institutions.

Holroyd (2022) asserts that numerous nations prioritise the development of individuals with technological proficiencies. The National Council of Teachers of Mathematcs (NCTM) and the Organisation for Economic Co-operation and Development (OECD) have taken initiatives to actively work towards achieving this objective, as demonstrated in the study by González-salamanca et al. (2020). The correlation between education

and technology, as well as the significance of technology, are the primary factors contributing to this issue. The demand for optimal learning environments is consistently growing in response to the increasing requirements or individuals in the 21st century. Consequently, learning approaches that integrate technological resources and equipment are gaining significance (Dakhi et al., 2020). The utilization of information and communication technologies (ICT) has fostered the collaboration between education and technology, as they promote inventive teaching method and enable the establishment of novel learning environments (Rana et al., 2020). Education and technology are highly emphasized by numerous institutions and organizations, both in their curriculum and reporting. According to the OECD's 2023 report, proficiency in technology is crucial for success in the realms of digital business, digital society, and digital learning. Hence, it has been unequivocally stressed that incorporating digital technologies into the learning process is crucial for augmenting the abilities that individuals will require in the future (OECD, 2023). With the advancement of technology, it is necessary to incorporate digital education and utilize technology more efficiently in the classroom environment in order to enhance learning across different subjects (Kiche, 2023).

Presently, the utilization of technology is crucial for the mathematical instruction across different fields. The correlation between mathematics and technology is steadily growing as mathematics plays a crucial role in education and the advancement of nations worldwide (Rasmini & Nofikusumawati Peni, 2024;Richland et al., 2020). Establishing a close link between the discipline and technology is crucial. In response to the recognition of the importance of integrating technology, several countries have implemented significant modifications to their mathematics curricula. These changes involve acknowledging the relevance of technology and aligning their educational programs accordingly (Zhang & Zhang, 2010; MoEC in Istihapsari et al., 2021). Furthermore, they have facilitated a swift revolution in the way younger cohorts comprehend education by incorporating technology into their educational programs. It is worth mentioning that countries are making efforts to enhance the educational setting (Gamage et al., 2022; Qadir et al., 2022; Bahroun et al., 2023). Hence, it is contended that information and communication technology (ICT) serves a utilitarian purpose in enhancing mathematics education. Utilizing technical resources is seen as a highly significant factor (Drozdikova-Zaripova & Sabirova, 2020). According to NCTM, technology plays a vital role in the instruction and acquisition of mathematical knowledge. It impacts the content of mathematical materials and improves student learning (Karim et al., 2023). According to Vlasenko et al. (2020), the implementation of well-executed math e-learning using digital technology can enhance students' interest in and understanding of mathematics. Due to swift advancements in mathematics teaching methods, these educational technologies enhance comprehension more efficiently, while e-learning approaches continuously progress and adapt.

There are notable distinctions between the abilities needed to excel in digital technologies and those continue to have importance (Cortesi et al., 2020). Today, digital technology has fundamentally altered our understanding of the fundamental nature of human existence (Faye & Gueye, 2022). Algorithms for organization, machine learning, and tools based on artificial intelligence (AI) are currently receiving significant attention during the Industrial Revolution 4.0 (Sarker, 2021). Hence, there is a pressing need to restructure and modernize the existing education system (AlNajdi, 2022). In this regard, the integration of information and communication technology (ICT) has played a significant role in facilitating education, particularly in the midst of the pandemic (Ali, 2020). By comprehending the prevailing study patterns, we can analyze the surge in ICT studies and anticipate future developments. Hence, investigating the application of technological instruments in educational settings yields crucial insights for subsequent study endeavors. To acquire such information from publications pertaining to e-learning in mathematics education, a database is required. The research utilized in this study was derived from the Scopus database. Researchers utilize the Scopus database due to its extensive interdisciplinary range. Scopus is the predominant database for publishing articles. The utilization of e-learning techniques in mathematics education was examined and relevant literature was analyzed. The objectives of this study are to produce important assets for the field and offer novel insights to scholars who will be investigating this subject. The research aimed to investigate the following questions: 1) What are the patterns of publishing and citation in the field of e-learning in mathematics? ;2) How are publications distributed among different affiliations? ;3) What are the unique aspects and main areas of interest in e-learning research within mathematics education?

Method

Research Design and Data Collection Procedure

This study conducts a descriptive bibliometric analysis by reviewing published scientific materials on the use of E-Learning in mathematics education from 2013 to 2023. Bibliometrics is a statistical technology used to examine scientific publications and identify the writers who have contributed to its production. This analytical

approach enables readers and researchers to acquire a thorough comprehension of the research subjects investigated over a specific timeframe, along with a quantitative evaluation of scientific publications (Baas et al., 2020). Furthermore, it serves the function of delineating pertinent domains and is highly efficacious. Bibliometric analysis enables a thorough evaluation of sources and document types through descriptive and performance studies. The research process comprises multiple stages, such as generating research inquiries, identifying pertinent materials, selecting suitable studies, compiling datasets, analyzing data, summarizing findings, and reporting and discussing the conclusions presented in the subsequent chart.

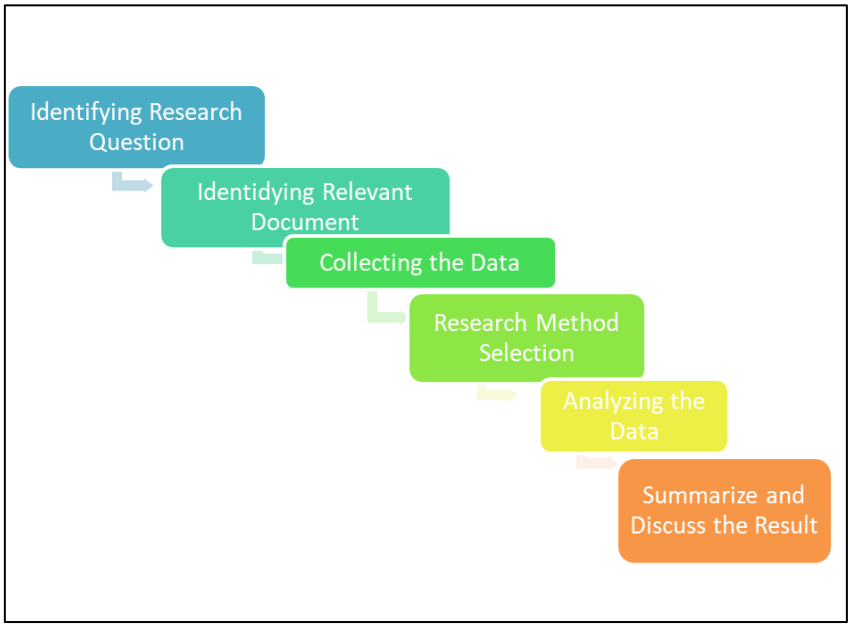

Figure 1. Research design

The data collection process commences with the identification, screening, and determination of eligibility and inclusion criteria (Hajjaji et al., 2021). Identification is achieved by inputting keywords corresponding to the research theme you wish to investigate. This study will examine the studies conducted on E-Learning in mathematics education. To conduct their study, researchers utilized the Scopus database and inputted the keywords "E-learning" and "Mathematics Education". Upon inputting the keywords, a total of 2085 publications were acquired. Subsequently, a thorough examination was conducted to determine the presence of duplicate data. Due to the absence of any obstacles, the 2085 publications proceeded to the subsequent phase. Screening is conducted to choose publications from the initial stage.

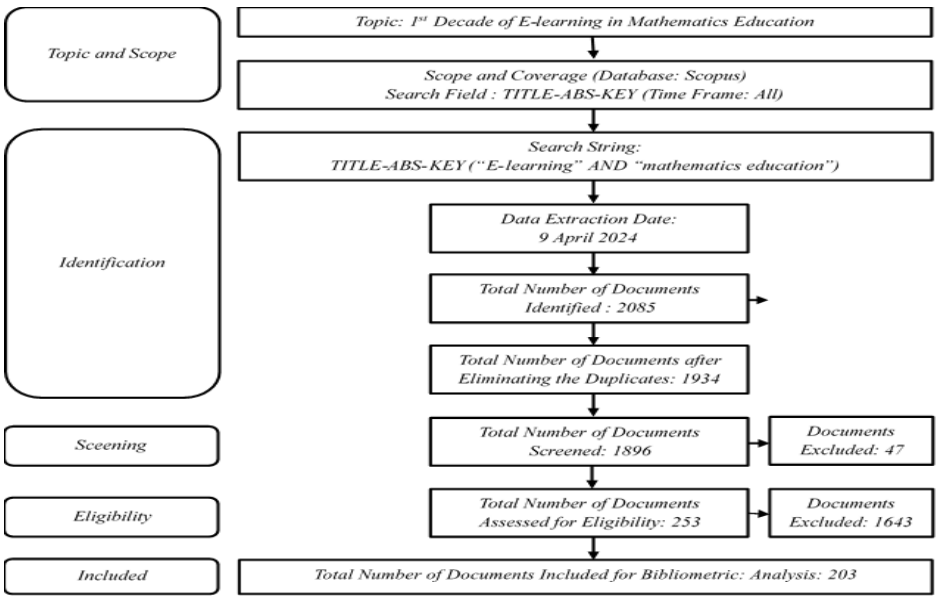

Figure 2. Data collection procedure

Publications must satisfy the following criteria: 1) publications in the form of articles or conference papers; 2) publications written in English; 3) publications related to the field of mathematics education. Following the screening process, a total of 1832 articles were excluded and did not advance to the subsequent round. A total of 253 candidates that fulfill the requirements will then proceed to the eligibility stage. Following the eligibility stage, only 203 out of the initial 253 publications satisfied the criteria to proceed to the inclusion step. The title and abstract of the publications must include the terms "E-learning" and "Mathematics Education". Figure 2 illustrates the sequence or phases of the data collection process.

Data Analysis Methods, Validity and Reliability

There are styles for block quotations, which should be used for quotes that are separated from in-line text. Below is an example. Conventional literature searches typically rely on the subjective judgments, skills, and endeavors of scholars or institutions themselves. Typically, research findings are conveyed using a restricted range of analytical methods (Mohamed Shaffril et al., 2021). Nevertheless, this study places emphasis on bibliometric analysis, a method that facilitates the comprehension of the development of knowledge systems and research topics in written materials (Pereira & Bamel, 2021). Bibliometric analysis facilitates the quantitative and statistical examination of various aspects of documents, including authors, subjects, citations, sources, and publications. Thus, this examination demonstrates the overall framework of certain fields of study. In addition, bibliometric analysis involves the use of descriptive and scientific mapping techniques. Descriptive analysis examines significant attributes of data sets, such as journals, authors, documents. Scientific mapping analysis employs visualizations including network analysis, three-plane plots, and thematic maps.

The study employed VOSviewer 1.6.20 software to visually represent the similarity of data sets in dynamic and structural analysis (Da Fonseca-Soares et al., 2022). The data acquired from the Scopus database was then stored in two distinct formats: CSV (Comma-Separated Values) and RIS (Research Information Systems). The CSV data was inputted and examined using VOSviewer, while the RIS data was inputted into Harzing's Publish or Perish Software. This software was utilized to compute h and g index values, along with other citation data. The global distribution of journal devices was visualized using Microsoft Excel on a globe map.

The purpose of providing a detailed description of this approach is to enhance the credibility of the research and to provide a clear explanation of how the data was collected. Furthermore, the dataset includes a description of the date on which the data was collected, the specific modules that should be utilized in the Scopus database, any restrictions that have been imposed, and the methodologies employed for evaluating the data during the analytic process. The data collection and analysis process also incorporate many methodologies. Research findings are presented without any accompanying commentary in order to maintain the integrity and reliability of the research. The obtained data is coherent, and the pertinent literature addresses it. This research provides a comprehensive description of all the procedures involved in the writing process. Additionally, it includes specific instructions on how to access the data set, including the internet address. Since this study relied on papers sourced from the Scopus database, it did not necessitate permission from an ethics committee.

Results and Discussion

Result

The expanded data search yielded a total of 203 publications. The publications will be subjected to bibliometric analysis using VOS viewer, Publish or Perish, and Microsoft Excel applications. This analysis will cover publication trends, citations, journal distribution, country rankings, as well as the novelty and focus of research on E-learning in mathematics learning. The diagram presented illustrates the yearly publications on e-learning in mathematics education from 2013 to 2023. The graph below illustrates the annual production based on data taken from the Scopus database.

The graph depicted in Figure 3 displays statistics regarding the production of published scientific material in the field of E-learning in mathematics education. There was a yearly rise in the number of publications throughout the observed timeframe, namely in 2020 and 2021, with the peak number reaching 31 articles. Conversely, the number of publications in 2013 was relatively small, with an only three articles being published. Additionally, in the years 2014, 2015, and 2018, there were a limited number of publications, specifically seven, ten, and twelve articles correspondingly. Despite a decline in the number of publications in 2022 (25 articles) and 2023 (27 articles), there will be a sustained upward trend in the number of published articles in the future.

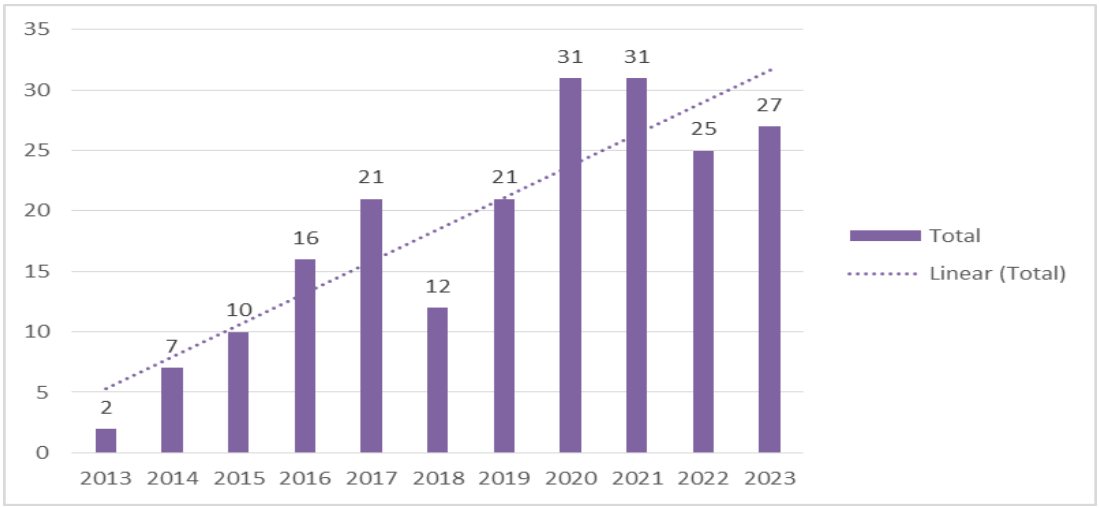

Figure 3. Publication trends

Table 1. Citation trends

Year	TP	NCP	IC	C/P	C/Y	H	G
2023	27	9	35	1.30	35.00	3	5
2022	25	13	29	1.16	14.50	3	4
2021	31	25	247	7.97	82.33	6	15
2020	32	26	569	18.35	142.25	9	23
2019	21	18	248	11.81	49.60	7	15
2018	12	10	93	7.75	15.50	5	9
2017	21	17	152	7.24	21.71	7	12
2016	16	13	210	13.13	26.25	6	14
2015	10	7	111	11.10	12.33	4	10
2014	7	7	51	7.29	5.10	5	7
2013	2	2	19	9.50	1.73	2	2

Notes: TP = total publications, NCP = number of publications cited, TC = total citations, C/P = average citations per publication, C/Y = average citations per year, h = h-index, g = g-index

The citation patterns are observable in the table provided as Table 1 above. The NCP parameter (Number of Citations per Publication) in Table 1 allows for the observation of citation trends that demonstrate the impact of a publication. In terms of the number of confirmed cases, the year 2020 recorded the highest number of NCP cases, with a total of 26 cases. This was followed by the year 2021, which had a little lower number of NCP cases, reaching a total of 25. Nevertheless, when examining the total citations (IC) in 2020, it becomes evident that there were 569 citations, making it the most significant year in comparison to previous years. This suggests that publications in 2020 have a noteworthy influence within that particular setting. Furthermore, the C/P (Citation per Publication) value in 2020 exhibits the highest figure, indicating a substantial number of citations during that year. The examination of citation trends can be further enhanced by considering the h-index and g-index values, which indicate a notable increase in 2020. This suggests that the papers in that particular year had a significant influence on research pertaining to the use of electronic learning methods in the field of mathematics education.

A compilation of articles on the subject of E-learning in mathematics education from 2013 to 2023 has been assembled by researchers. The collection has contributions from 51 distinct countries. To accurately depict this variety, we delineate the dispersion of participating nations in Figure 4. Figure 4 indicates that the United States is a prominent producer of publications, with 28 documents especially focusing on the topic of E-learning in mathematics education. China ranks second with 10 publications, when compared. The data illustrates the extent to which publications from other continents contribute to this topic, emphasizing the widespread international involvement. The European continent is the leading region with 89 publications, representing over 40% of all materials pertaining to E-learning in Mathematics education.

Figure 5 depicts the network of collaboration among nations in the field of research on E-learning in mathematics education. It is evident that the United States has numerous links with other countries, namely 9 linkages. This occurrence demonstrates that the United States not only surpasses other countries in terms of the quantity of publications, but also exhibits a noteworthy degree of collaboration.

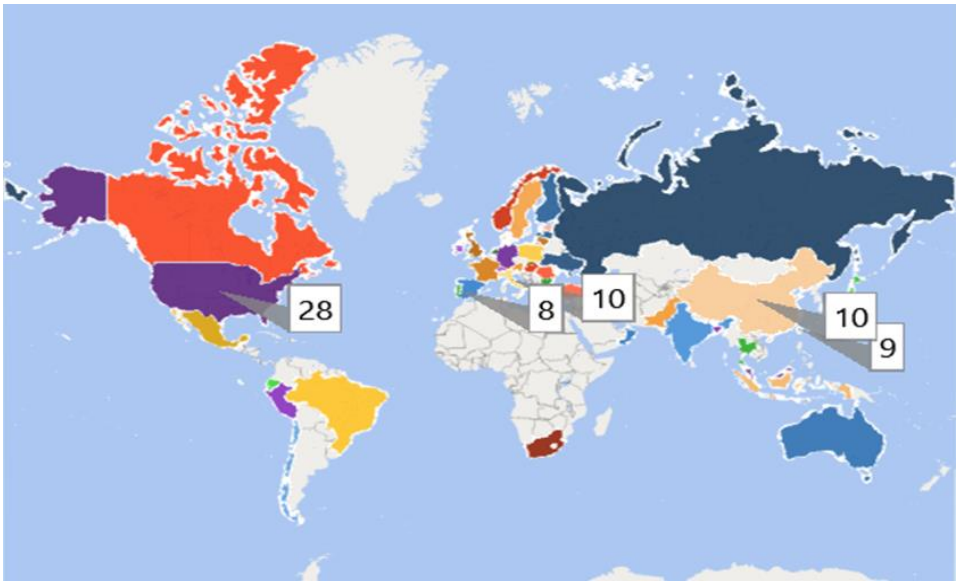

Figure 4. Geographic distribution

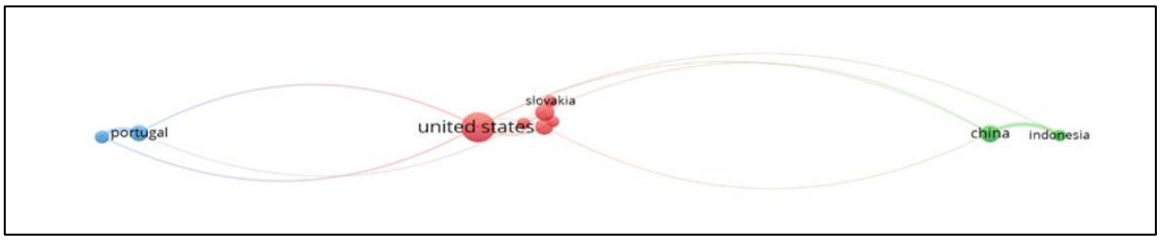

Figure 5. Patterns of cooperation between countries

Research on E-learning in mathematics education conducted between 2013 and 2023 has been categorized into five distinct clusters using VOSviewer software. These categories emphasize the important characteristics of the research in the field over the stated time frame.

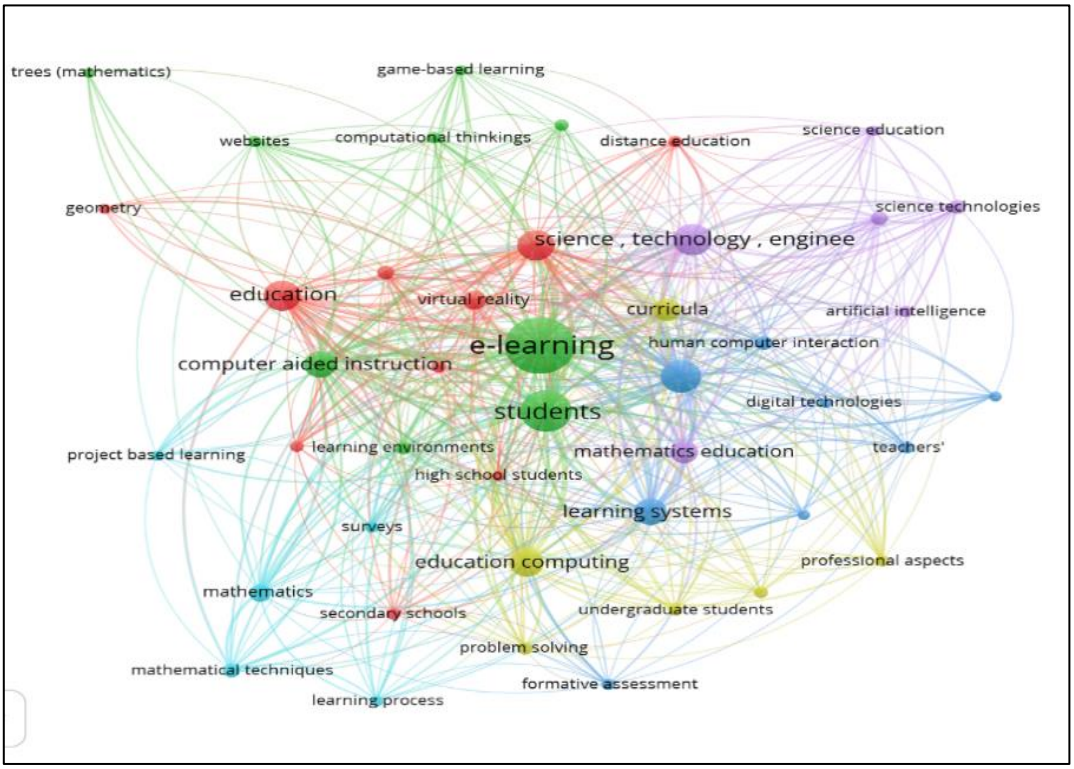

Figure 6. Network visualization

Figure 6 in the VOS viewer application displays a collection of 44 items categorized into five distinct hues. The colors represent the division of research focus on E-learning in mathematics education from 2013 to 2023. The initial cluster, indicated by green circles, represents a total of 9 elements. Within this cluster, the terms E-learning and students have the biggest circle size, indicating that the primary emphasis is on E-learning, learning environments, and student factors. The second cluster, shown by the color red, comprises a total of 10 elements. The cluster prominently features Education and teaching, as indicated by their huge circle diameters, highlighting their central importance within this cluster. The third cluster is distinguished by its blue and yellow coloring. It has 13 and 6 items, respectively. Notably, the subjects of curriculum and technology are represented by huge circles, indicating their importance within this cluster. The research priority area is denoted by the color purple and comprises a total of 6 items. Within this category, math education and STEM are particularly prominent, as indicated by their considerable circle diameters. This emphasizes the crucial significance that STEM and math education play in the study focus area or cluster five.

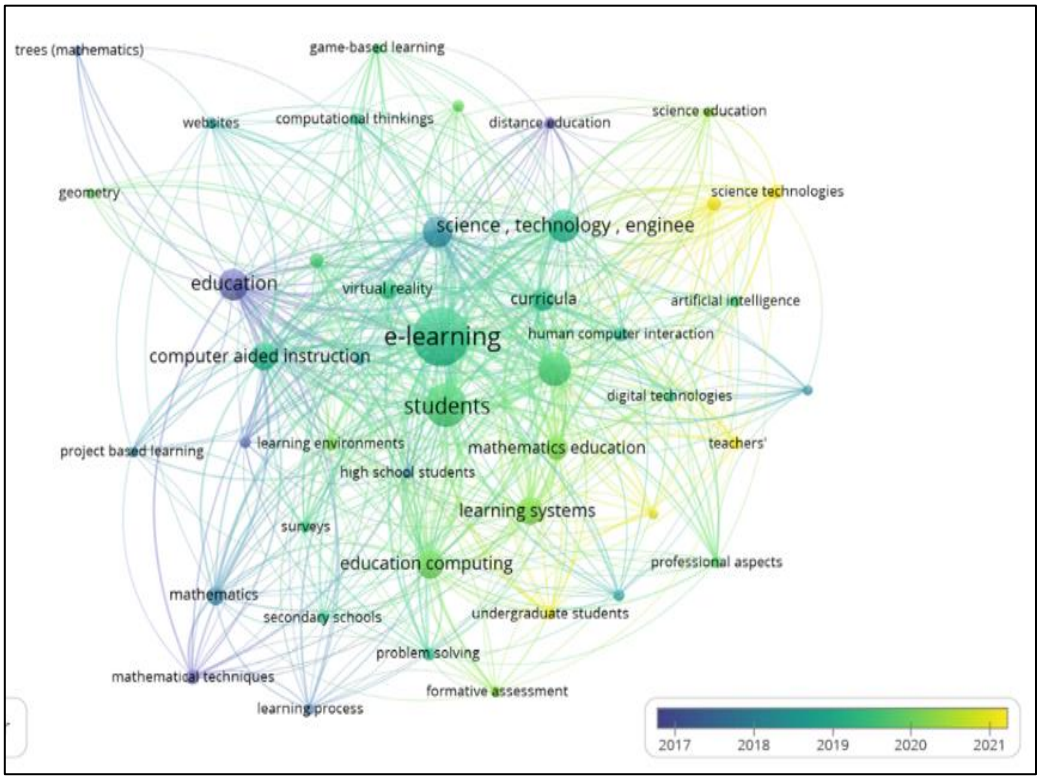

Figure 7. Overlay visualization

Figure 7 displays color variations that correspond to the publication year of the keywords utilized in the study. Blue keywords represent older peers, whilst yellow keywords represent more recent themes in the area of E-learning pertaining to mathematical education. Additional topics identified in this research encompass STEM, teacher responsibilities, educational technology, game-based learning, and undergraduate students. An assessment of advancements in E-learning research in mathematics education was conducted by examining the associations between keywords. The researchers analyzed crucial elements of their investigations and found novel subjects to evaluate the uniqueness of their research. In initial studies, the primary emphasis on E-learning did not directly pertain to growing topics such as motivation, project-based learning, and specialized learning methodologies. In the second study, keywords associated with technology did not exhibit a direct correlation with the keywords found in the third, fourth, and fifth research foci, which included problem solving and geometry. Furthermore, the inclusion of the term "undergraduate students" in the initial research emphasis does not have a direct correlation with computational thinking. The scarcity of studies investigating the relationship between computational thinking skills and mathematics education in the setting of E-learning at the higher education or university level is evident.

Discussion

This study aims to provide a comprehensive analysis of the scholarly articles published on E-learning in mathematics education between 2013 and 2023. Within this framework, a total of 203 scientific papers were

retrieved from the Scopus database, and a bibliometric analysis was carried out. Initially, scholarly articles pertaining to the research topic were scrutinized based on their publication year and the quantity of citations they received. There was a notable rise in the quantity of articles concerning the use of electronic learning methods in mathematics education between 2019 and 2021, encompassing the period from 2013 to 2023. According to (Moreno-Guerrero et al., 2020) & (Das, 2021), research on E-learning in mathematics education is rapidly expanding. Moreover, the citation pattern of the E-learning research field in mathematics education between 2013 and 2023 can be analyzed by examining several features of the data. The year 2020 is notable for its remarkable accomplishment in terms of citation count. The publications in that year received the highest level of acknowledgment, with a total of 569 citations. The articles presented provide a clear demonstration of the significance and power of E-learning research in the field of mathematics education. One such study conducted by (Mailizar et al., 2020) titled "Secondary School Mathematics Teachers' Views on E-learning Implementation Barriers during the COVID-19 Pandemic: The Case of Indonesia" exemplifies this. This study highlights the significance of equipping mathematics educators with essential tools and training to address learning obstacles and ensure the efficacy of mathematics instruction during and after the COVID-19 epidemic. In 2020, there were an additional 4 papers that received considerable recognition, making it the year with the highest number of citations.

Table 2. Citation trends

Author (Year)	Sources	Citation
Mailizar et al. (2020)	Eurisia Journal of Mathematics, Science and Technology Education	330
Irfan et al. (2020)	Infinity Journal	70
Jeong & González-Gómez (2020)	Mathematics	22
Taranto & Arzarello (2020)	ZDM – Mathematics Education	15

A comprehensive evaluation of the scholarly literature on the implementation of E-learning in mathematics education has been conducted, encompassing the years 2013 to 2023. This review encompasses a wide range of perspectives from all continents. The United States assumes a prominent position in this domain because to its significantly higher quantity of publications compared to other countries. Furthermore, the United States actively establishes robust international alliances, thereby enhancing its influence in this field. According to a bibliometric researcher undertaken by (Gökçe & Güner, 2021), it has been proven that the United States holds the highest level of influence in the subject of mathematics. The United States actively engages in extensive collaboration in the field of mathematics education with numerous other nations (Julius et al., 2021).

The research on E-learning in mathematics education from 2013 to 2023 has been categorized into five primary areas of focus: 1) The impact of the learning environment on students; 2) The role of education and teaching methods; 3) The relationship between curriculum and technology; 4) The integration of STEM subjects with mathematics education. The primary emphasis in mathematics education E-learning is on the environment and the students. In the realm of E-learning, the domain of environment and students focuses on the impact of many aspects within the learning environment on the process of learning mathematics. These factors encompass the online platform used, the degree of student autonomy in learning, student motivation, and the interaction between students and teachers. Strong motivation can enhance students' active participation in the online learning process and bolster their comprehension of mathematics (Bringula et al., 2021). On the other hand, acquiring the ability to be self-reliant is a crucial competency that students must possess in order to effectively handle their time and utilize their resources. Student engagement plays a significant role in online mathematics learning. Collaborating with peers or teachers can facilitate the flow of ideas and enhance comprehension of mathematical concepts. According to the studies conducted by (Nuryadi et al., 2020) and (Moliner et al., 2021), online communication tools like discussion forums and online tutor sessions enable students and teachers to communicate with each other while studying. Hence, the domain of environmental studies and students in online education takes into account not only the technological infrastructure, but also the psychosocial elements that impact the caliber and efficacy of mathematical learning over the internet.

The second area of emphasis is Education and pedagogy. This region highlights the need of recognizing efficient pedagogical techniques and methodologies to foster profound comprehension of mathematical principles. Multiple studies have investigated this matter (Engelbrecht et al., 2020; Barana et al., 2021) uncovering that the incorporation of interactive learning tools is essential in online education to enhance student involvement and facilitate improved comprehension. For instance, the utilization of interactive simulations or online math games can aid pupils in comprehending abstract concepts in a more tangible and enjoyable manner.

The third area of emphasis is the curriculum and technology. The design of a curriculum that is relevant to technology is a significant challenge in this particular area of study. In their study, Abrahamson et al. (2020) investigated the design of the future of mathematics teaching and learning, specifically focusing on the use of technology to address the requirements of the industry 4.0 era. An optimally structured curriculum should take into account the necessity and capacity of technology to facilitate the online acquisition of mathematical knowledge. This encompasses the utilization of educational platforms that facilitate reciprocal engagement between educators and learners, while also offering a diverse range of dynamic and readily available learning materials.

The last aspect of concentration in this study are STEM and Math Education. This region emphasizes the necessity of including science, technology, engineering, and mathematics within the framework of online education. The primary objective of this emphasis on cross-subject integration is to enhance students' comprehension of mathematical principles through the utilization of an interdisciplinary methodology. This is corroborated by the research conducted by Makhmudah et al. (2021) and Rohendi et al. (2023), which demonstrates that the implementation of the STEM method enables students to not only acquire knowledge in mathematics as an independent discipline, but also comprehend how mathematical principles are utilized in many scientific and technical scenarios. Moreover, the integration of STEM and mathematics education in curriculum construction enhances comprehension of mathematical ideas through the lens of natural science, technology, and engineering. For instance, students can acquire knowledge of mathematical principles by applying them in scientific or technological endeavors. This enables them to perceive the significance and tangible utility of mathematics in their daily lives. This method also seeks to equip students with the necessary skills to tackle transdisciplinary difficulties in a world that is becoming more interconnected through digital technology. By combining knowledge and abilities in STEM and Mathematics education, students can enhance their ability to solve intricate problems and explore creative solutions in the modern era of technology.

Conclusion

A comprehensive investigation was carried out from 2013 to 2023 to get a profound comprehension of the subject matter, specifically focusing on E-learning in mathematics education. A bibliometric analysis was performed on 203 scientific papers obtained from the Scopus database to investigate publishing patterns and citation frequencies during a specific time frame. There was a notable increase in the number of publications pertaining to E-learning in Mathematics Education, especially between 2019 and 2021. Upon further investigation, it was observed that the year 2020 was notable for its exceptionally high number of citations, totaling 569. The aforementioned papers demonstrate the significance and influence of (Mailizar et al., 2020) e-learning research, which emphasized the crucial role of providing assistance to mathematics teachers in tackling learning obstacles within the COVID-19 epidemic. Furthermore, the United States is prominently positioned in this field, with a significantly higher number of publications compared to other countries. The active participation of several parties in cross-country collaboration also enhances its impact in this domain, as indicated by the bibliometric analysis conducted by (Gökçe & Güner, 2021). This study primarily focuses on five distinct topics, each of which delves into a crucial part of e-learning in mathematics education.

The first aspect of this study focuses on the impact of the learning environment and psychosocial factors on the online learning of mathematics by students. The primary emphasis in this environment is on student motivation, the development of learning independence, and the interactions between students and teachers. Furthermore, education and teaching emphasize the significance of employing effective teaching tactics and approaches, with particular emphasis on the utilization of interactive learning tools as a means to enhance student engagement. The third topic is centered around curriculum and technology, with an emphasis on the importance of designing technology-relevant curriculum to enable online mathematics learning. STEM and mathematics education emphasizes the incorporation of science, technology, engineering, and mathematics in online learning environments, with the goal of equipping students to tackle diverse difficulties in a world that is becoming more interconnected through digital means. By combining expertise and abilities in STEM and mathematics education, the aim is for students to be better equipped and competent in tackling future difficulties

Recommendations

To enhance the effectiveness of e-learning in mathematics education, it is recommended to provide comprehensive training for mathematics teachers on the effective use of e-learning tools and integrate digital tools into the curriculum to foster interactive learning. Curriculum development should emphasize the use of

technology to facilitate a better understanding of mathematical concepts. Additionally, it is crucial to promote international collaboration among educational institutions to share best practices and resources, and to develop projects that integrate STEM (Science, Technology, Engineering, Mathematics) with mathematics education. Regular evaluations of e-learning programs should be conducted to assess their effectiveness and identify areas for improvement, gathering feedback from students, teachers, and other stakeholders. Adequate policy support and funding are necessary to support the integration of digital technologies in education. Finally, ensuring sufficient technological infrastructure and equitable access for all students is essential, along with developing inclusive e-learning strategies to cater to diverse learning needs and preferences.

Scientific Ethics Declaration

The authors declare that the scientific ethical and legal responsibility of this article published in EPESS Journal belongs to the authors.

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