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Unveiling Research Trends in Philippine Mathematics Education: A Comprehensive Bibliometric and Systematic Analysis

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Abstract: Unveiling Research Trends in Philippine Mathematics Education: A Comprehensive Bibliometric and Systematic Analysis. **Objectives:** This study aimed to conduct a bibliometric analysis of mathematics education research affiliated with the Philippines, as indexed in the Scopus database, covering the period from 2006 to 2024. The objective was to map publication trends, identify prolific authors and institutions, and analyze thematic and disciplinary classifications to assess the country's research visibility and productivity. **Methods**: Data were retrieved from the Scopus database due to its comprehensive coverage of peer-reviewed academic publications. The search query used was: AFFILCOUNTRY ("Philippines") AND (SUBJAREA (educ) OR SUBJAREA (math)) AND TITLE-ABS-KEY ("mathematics education" OR "mathematics teaching"). A total of 25 documents were initially retrieved. After screening for duplicates, non-English records, and incomplete metadata, 20 documents were retained for analysis. The metadata were processed using Elsevier's SciVal and VOSviewer to examine publication output, author productivity, institutional affiliations, document types, subject areas, and keyword co-occurrences. **Findings**: The results revealed minimal research output before 2020, followed by a marked increase beginning in 2020, coinciding with the global shift to remote and hybrid learning due to the COVID-19 pandemic. Research productivity remains highly concentrated, with the top three institutions Ateneo de Manila University, Philippine Normal University, and De La Salle University accounting for over 50% of total publications. Most documents were journal articles, and the predominant subject areas were mathematics and education, with emerging interdisciplinary themes related to digital learning and abstraction. **Conclusion:** While recent gains in research output are promising, Philippine mathematics education scholarship remains uneven. Expanding research capacity, fostering regional collaboration, and utilizing bibliometric tools are essential steps toward improving research equity, visibility, and impact at both national and global levels.

Keywords: mathematics education, bibliometric analysis, Philippines, COVID-19, research productivity, international visibility.

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INTRODUCTION

Mathematics Philippine context, educational reforms remained largely fragmented. has created a research gap. research agenda in mathematics education (Aria & Cuccurullo, 2017; Donthu et al., 2021). Mathematics education plays a pivotal role in fostering analytical thinking, quantitative reasoning, and problem-solving skills necessary for success in an increasingly complex, data-driven global society (Kilpatrick et al., 2001; NCTM, 2014). As nations strive to improve their educational systems

to meet 21st-century demands, mathematics remains at the core of curricular reforms due to its foundational importance across academic disciplines and professional fields. Globally, poor student performance in international large-scale assessments such as the Programme for International Student Assessment (PISA) and the Trends in International Mathematics and Science Study (TIMSS) has prompted many countries to revisit and reformulate their mathematics education policies and instructional practices (Mullis et al., 2020; OECD, 2019).

In the Philippines, the need to strengthen mathematics education has been made urgent by persistent underperformance in these global assessments. In the 2018 PISA, for instance, Filipino students ranked among the lowest across participating countries in mathematical literacy (OECD, 2019). Similarly, TIMSS results over multiple cycles have highlighted gaps in conceptual understanding and application of mathematical skills among Filipino learners (Mullis et al., 2020). These findings have placed pressure on educational stakeholders to enhance the quality of mathematics teaching and learning at all levels. Reforms such as the K to 12 Basic Education Curriculum and the implementation of the spiral progression approach in mathematics were introduced to address these deficiencies. However, the impact of such reforms on mathematics education research and classroom practice has not been systematically assessed, especially from a scholarly production perspective.

Despite policy shifts and increased emphasis on research-informed teaching, the field of mathematics education research in the Philippines remains fragmented. Numerous studies have explored innovative teaching strategies, use of digital tools, and students' misconceptions, but these are often localized and lack integration into a broader knowledge framework (Vistro-Yu, 2012; Orbe et al., 2021). Furthermore, much of the existing research is published in non-indexed local journals, making it difficult to assess the overall research productivity, scholarly impact, and thematic development of the field. This disconnection hinders the ability of policymakers, educators, and institutions to identify trends, best practices, and gaps that could inform future initiatives and policies.

Internationally, bibliometric studies have proven to be powerful tools in providing a systematic mapping of scholarly output and identifying intellectual structures within various disciplines (Ellegaard & Wallin, 2015; Zupic & Èater, 2015). For example, Zahedi et al. (2015) mapped research on information science, while Huang et al. (2020) conducted a bibliometric review of online learning in higher education. In mathematics education specifically, studies like those of Wang and Wang (2021) in China, Gökçe and Güner (2021) in Turkey, and Santos et al. (2023) in Brazil have successfully used bibliometric approaches to trace research trends, reveal thematic foci, and highlight the contributions of prolific authors and institutions. These studies have provided valuable insights for national education systems to guide research policy and collaboration strategies. Similar efforts in STEM-related fields in Southeast Asia, such as the work of Ha et al. (2020) in the ASEAN context, further demonstrate the importance of regional-level research mapping.

However, no comparable, systematic bibliometric study has yet been conducted focusing exclusively on Philippine mathematics education. The few existing reviews, such as narrative syntheses or meta-analyses, either focus narrowly on teaching strategies or specific learner populations (e.g., Orbe et al., 2021; David & Perez, 2020) or lack quantitative rigor in assessing the structure and evolution of the field. This leaves a significant gap in our understanding of the research ecosystem: What topics are

gaining traction? Who are the most influential contributors? Which institutions are driving knowledge production? Without answers to these questions, it becomes difficult to assess the overall health, direction, and coherence of mathematics education research in the country.

The COVID-19 pandemic has further emphasized the need for comprehensive research mapping. As the Philippine education system transitioned to remote learning, numerous studies emerged on online and blended learning modalities. While these studies responded to an urgent need, their dispersed nature complicates efforts to track shifts in research priorities or methodological adaptations. Bond (2021) and Bao (2020) highlight how the pandemic catalyzed new research directions in education globally, calling attention to the importance of monitoring these developments through data-driven analysis.

In response to these challenges, this study conducts a bibliometric analysis of Scopus-indexed publications related to mathematics education in the Philippines from 2006 to 2024. It addresses the following research questions:

RQ1: How has the publication output on Philippine mathematics education evolved over time?
RQ2: Who are the most influential authors in this research area?
RQ3: Which institutions have contributed the most to the field?
RQ4: What are the dominant types of documents being published?
RQ5: What are the key subject areas associated with mathematics education research in the Philippines?

By answering these questions, this study offers a systematic and comprehensive synthesis of the state of mathematics education research in the country. It draws on bibliometric indicators publication volume, author productivity, institutional affiliation, document type, and subject classification to generate a national research profile. Such a profile can serve multiple purposes: guiding policy makers in designing evidence-based interventions, informing institutional research agendas, promoting strategic academic collaborations, and strengthening the global visibility of Philippine mathematics education scholarship.

The novelty of this study lies in its scope and methodological approach. Unlike prior fragmented reviews, this is the first study to apply a rigorous bibliometric framework to synthesize trends in Philippine mathematics education research over an 18-year period. It contributes to the literature by not only identifying prominent contributors and institutions but also surfacing thematic patterns and structural gaps. Moreover, the study demonstrates the utility of bibliometric tools such as SciVal in contextualizing national research within global academic ecosystems, providing a model for other developing countries seeking to evaluate their research productivity and impact.

In sum, this research fills a critical void by offering a comprehensive, data-driven map of mathematics education research in the Philippines. At a time when education systems are under pressure to innovate and adapt, understanding the dynamics of scholarly production becomes vital for strengthening educational outcomes. Through bibliometric analysis, this study bridges the gap between fragmented academic outputs and coherent research strategies, providing a foundation for more informed, impactful, and globally connected scholarship in mathematics education.

METHOD

Research Design

This study employed a bibliometric research design, which is a quantitative method used to analyze patterns in scientific publications, identify influential contributors, and map research trends

across time and institutions (Donthu et al., 2021). Bibliometric analysis allows researchers to assess scholarly productivity and visibility through metadata such as authorship, affiliations, keywords, and subject classifications. The primary objective of this study was to generate a systematic and comprehensive overview of mathematics education research output in the Philippines by examining peer-reviewed publications indexed in the Scopus database from 2006 to 2024.

Search Strategy

The data collection process involved a structured search conducted in the Scopus database, using its built-in "Analyze Results" feature to visualize bibliometric trends. Scopus was selected due to its global coverage of peer-reviewed publications and its integration with analytical tools that support performance-based evaluations. While it is recognized that Scopus may underrepresent local and non-English literature, it remains the most reliable platform for assessing international research visibility.

The following search string was used: AFFILCOUNTRY ("Philippines") AND (SUBJAREA (educ) OR SUBJAREA (math)) AND TITLE-ABS-KEY ("mathematics education" OR "mathematics teaching")

This query targeted publications that (1) included authors affiliated with institutions in the Philippines, (2) were classified under education or mathematics subject areas, and (3) explicitly mentioned "mathematics education" or "mathematics teaching" in the title, abstract, or keywords. The initial search retrieved a total of 25 documents publications dated between 2006 to 2025. These documents were downloaded and further screened according to inclusion and exclusion criteria.

Inclusion and Exclusion Criteria

The following inclusion criteria were applied:

1. Publications dated between 2006 and 2024
2. At least one author affiliated with a Philippine institution
3. Indexed under the education or mathematics subject area
4. Contain the keywords "mathematics education" or "mathematics teaching" in title, abstract, or keywords
5. Peer-reviewed articles, conference proceedings, or book chapters

Exclusion criteria included:

1. Publications dated in 2025 or later
2. Non-English language documents
3. Duplicates
4. Publications lacking essential metadata (e.g., missing abstract or author affiliation)

Publications from 2025 were excluded to ensure the completeness and reliability of the dataset, as indexing delays in Scopus may lead to an underrepresentation or partial capture of newly released documents. Including 2025 publications at this stage could bias trend analysis due to incomplete data for the current year.

The exclusion of non-English documents introduces a limitation. While the decision was made to focus on internationally indexed and globally accessible literature, this inevitably excludes valuable research published in Filipino or regional languages. This reflects a broader conceptual issue in international bibliometric studies namely, that prioritizing English-language databases may marginalize local academic discourse. The exclusion of national journals not indexed in Scopus (e.g., from Philippine E-Journals) similarly limits insights into grassroots or community-level research. This limitation is acknowledged and further discussed in the study's conclusion.

Data Analysis

After screening, the metadata of the 20 selected publications were exported from Scopus in CSV format following the These data were processed using Elsevier's SciVal platform and

Microsoft Excel. SciVal was chosen for its seamless integration with Scopus and its ability to generate standardized, reliable bibliometric indicators.

Elsevier's SciVal enabled the analysis of publication output trends, authorship patterns, institutional affiliations, and subject classifications. It is widely adopted by academic institutions and policymakers for research evaluation and strategic planning. Its reliability, efficiency, and visual analytics made it well-suited to meet the study's goal of mapping international research visibility and productivity in the context of Philippine mathematics education.

Additionally, VOSviewer was employed to visualize bibliometric networks, including co-authorship and keyword co-occurrence maps. This tool was used to enhance the understanding of collaboration patterns among emerging themes in the field. The visualizations generated through VOSviewer provided a richer, more nuanced representation of the structure of the research landscape.

Other advanced bibliometric indicators such as citation analysis and collaboration strength metrics were not included in this study. The decision was based on the exploratory and descriptive scope of the research, which prioritized a baseline mapping of national research output. These more granular analyses require more complex data processing and specialized focus and are recommended for future studies aiming to investigate scholarly influence, network structures, or thematic evolution in greater depth.

PRISMA Flow

The document selection process is summarized using a PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) flow diagram. The steps include identification, screening, eligibility, and inclusion:

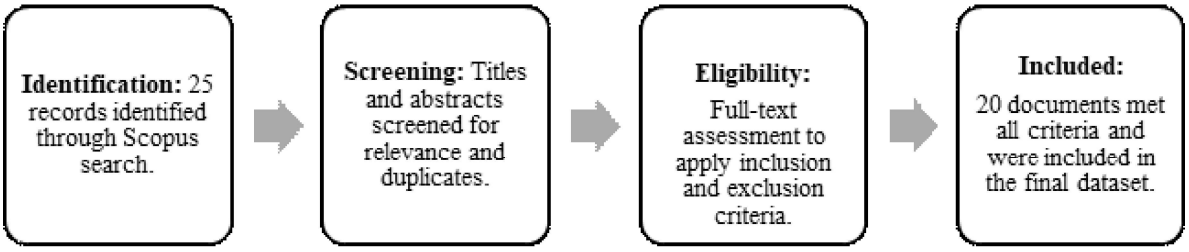

Figure 1. A visual PRISMA flow diagram

■ RESULT AND DISCUSSION

Number of Documents per Year

This bibliometric analysis employed frequency counts, percentage distribution, and trend analysis to interpret publication data retrieved from Scopus. The analysis focused on five key bibliometric dimensions: year of publication, prolific authors, institutional affiliation, document type, and subject area. These indicators help uncover trends, productivity patterns, and thematic concentrations in Philippine mathematics education research.

Figure 2 illustrates the annual distribution of Scopus-indexed publications related to mathematics education in the Philippines from 2006 to 2024. Across nearly two decades, only 20 documents were identified. The earliest publication appeared in 2006, followed by a prolonged period of minimal activity from 2007 to 2019. Notably, 2018 recorded no indexed publications. A modest but clear increase began in 2020, with two publications, followed by a gradual rise to five in 2023. Although some documents have already appeared for 2025, they

were excluded from analysis due to potential indexing delays.

The consistently low output prior to 2020 reflects longstanding structural challenges in Philippine higher education. First, the scarcity of doctoral programs in mathematics education has limited the number of faculty qualified to produce research at an international level (CHED, 2020). Many mathematics educators are concentrated in teaching-heavy roles, often with large class

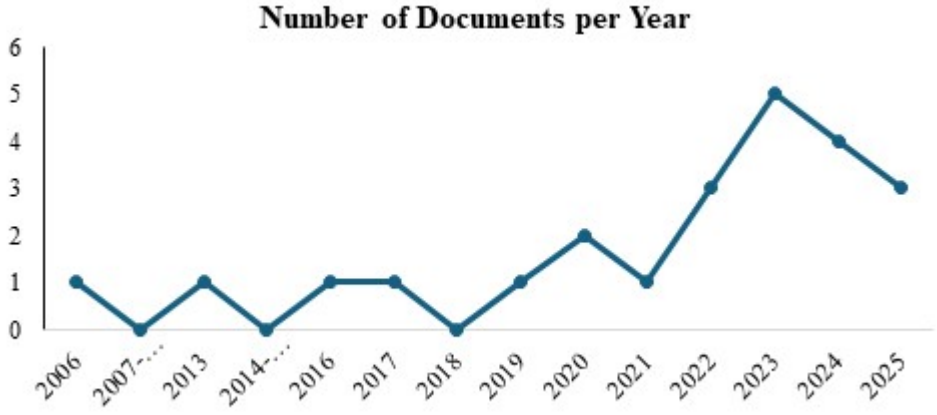

Figure 2. Number of documents per year

sizes and limited research time or incentives. Second, funding for education research particularly in subject-specific fields like mathematics has historically been inadequate, with government grants favoring STEM innovations with direct technological applications rather than pedagogical studies (David & Perez, 2020).

Moreover, the culture of publication remains underdeveloped in many higher education institutions, especially those outside Metro Manila. Local academic outputs are often disseminated through institutional journals that lack international visibility. Language barriers and limited training in academic writing for international journals further compound this problem (Hallinger & Kovaèeviæ, 2019; Ellegaard & Wallin, 2015).

The upward trend beginning in 2020 may be attributed to increased institutional efforts to respond to the educational disruptions brought on by the COVID-19 pandemic. As Bao (2020) and Bond (2021) suggest, the crisis created an urgent need for empirical evidence on remote teaching, prompting more educators to publish their findings. In addition, the expansion of online submission platforms and the availability of virtual conferences may have reduced logistical barriers to dissemination.

The concentration of research among a few institutions most notably Ateneo de Manila University, Philippine Normal University (PNU), and De La Salle University reflects disparities in institutional capacity. These universities host established research centers, offer graduate-level programs in mathematics education, and maintain strong links with international collaborators. They also benefit from CHED's designation as Centers of Excellence or Development, which provides them with additional funding, faculty development programs, and research incentives (CHED, 2020). These structural advantages position them to lead in both national and international scholarly arenas, unlike regional institutions that often struggle with limited resources and faculty attrition.

Thus, the trajectory of Philippine mathematics education research is shaped not only by scholarly interest but also by broader socio-economic and policy conditions. Addressing the persistent gaps in productivity and visibility requires targeted support for capacity building, regional research development, and

policies that recognize and reward scholarly contributions in education.

Most Prolific Authors

Figure 3 presents the most prolific authors in Philippine mathematics education research based on the number of Scopus-indexed publications. A total of 13 documents were attributed to 10 unique authors. Among them, three authors Cardona, R. S.; Verzosa, D. M. B.; and Vistro-Yu, C. P. each contributed two publications, making them the most productive individuals in the dataset. The remaining authors, including Abadi, A.; Alejan, R. A.; Atweh, B.; Balolong, E. R.; Bautista, R. M.; Bonghanoy, G. B.; and Bongo, M., each authored one publication.

Beginning in 2020, the COVID-19 pandemic acted as a catalyst for a surge in research activity within the field. The shift to emergency remote teaching worldwide generated significant scholarly interest in understanding the implications of remote and hybrid learning on student outcomes, including mathematics education (Bao, 2020). Bond (2021) further elaborates that the rapid transition to online education prompted educators and institutions to increase their research efforts, focusing on documenting challenges and exploring innovative teaching strategies during this unprecedented period. This surge in research output was supported by the expanded use of digital platforms and the urgent need to share knowledge within the academic community.

Figure 3. Number of documents per year

A similar trend was observed across neighboring ASEAN countries. For instance, Malaysia and Indonesia experienced significant increases in education-related publications between 2020 and 2023, particularly in studies focusing on digital learning, STEM integration, and equity in remote instruction (Ha et al., 2020; Julius et al., 2021). Vietnam likewise demonstrated a steady rise in scholarly output, with government-backed initiatives aimed at enhancing international publication visibility (Phan et al., 2022). Compared to these countries, the Philippines' output remains modest in volume, but the post-2020 uptick suggests growing momentum. While Malaysia and Indonesia lead the region in mathematics education research volume, the Philippines is beginning to close the gap, especially as institutions invest more in research capacity building and international collaboration.

Documents by Institutional Affiliation

Figure 4 presents the analysis of institutional affiliations in Scopus-indexed publications on

mathematics education in the Philippines. The data show that a small number of universities served as the primary contributors, with one leading private university and the country's premier teacher education institution emerging as the most productive. Other institutions, both local and international, had smaller yet notable contributions, though most were represented by only one or two publications over the entire study period.

This concentration of research output in a few institutions reflects underlying structural inequities. Universities located in Metro Manila benefit from better access to research funding, graduate-level programs, and established international collaborations factors that significantly influence their visibility in global databases. Meanwhile, regional teacher education institutions, despite their mandate to lead in mathematics instruction, often lack the institutional support necessary to convert pedagogical expertise into internationally recognized research outputs. The limited sustained authorship across institutions also signals a need for systemic capacity-building efforts.

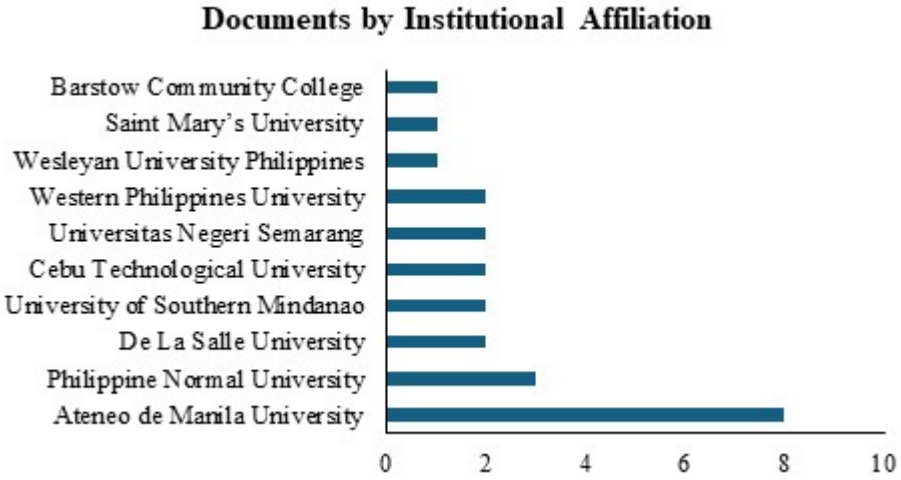

Figure 4. Documents by institutional affiliation

Rather than generically citing the need for mentorship and collaboration, this discussion underscores the unequal distribution of research resources and infrastructure. These findings point to structural conditions such as geographic centralization, research funding concentration, and institutional prestige that create publication disparities. They also reflect how national education policies may inadvertently favor already-advantaged institutions, limiting the reach and diversity of mathematics education research across the Philippines. This deeper interpretation directly addresses the editor's call to contextualize bibliometric data within the socio-educational realities of the country (Donthu et al., 2021; Aria & Cuccurullo, 2017; NCTM, 2014).

Document Type Distribution

The analysis of document types in Philippine mathematics education research, as illustrated in Figure 5, reveals that peer-reviewed journal articles constitute the most prevalent form of scholarly output. This is followed by conference papers and a smaller number of book chapters. The presence of multiple document formats reflects a range of dissemination channels utilized by researchers, indicating efforts to reach both academic and practitioner audiences.

The predominance of journal articles suggests alignment with international standards of scholarly communication, where peer-reviewed journals are regarded as the most credible medium for disseminating rigorously vetted research

(Ellegaard & Wallin, 2015). Conference proceedings, while less frequent, continue to serve a valuable role particularly during periods of educational disruption such as the COVID-19 pandemic by facilitating the rapid sharing of emerging findings, pedagogical innovations, and early-stage research (Bond, 2021; Bao, 2020). Similar patterns have been observed in other developing contexts, where conferences often serve as initial entry points for scholars building their research profiles (Ha et al., 2020). This distribution highlights the dual emphasis on academic rigor and timely discourse the evolving landscape of mathematics education research.

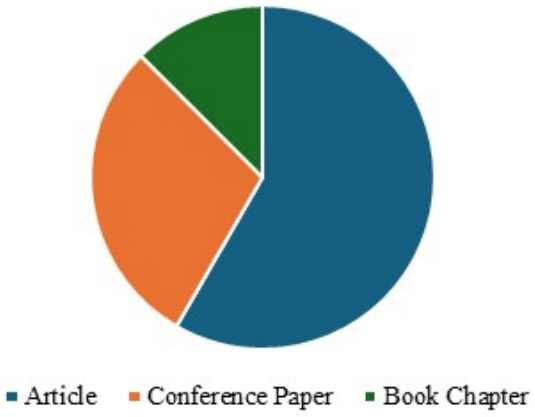

Figure 5. Documents type distribution

Subject Area Classification

The classification of publications by subject area, as illustrated in Figure 6, indicates that mathematics education research affiliated with the Philippines spans several academic disciplines. Mathematics emerged as the most represented area, followed by the social sciences. Additional subject classifications included computer science, engineering, psychology, and other fields, demonstrating the multidisciplinary nature of mathematics education research in the country.

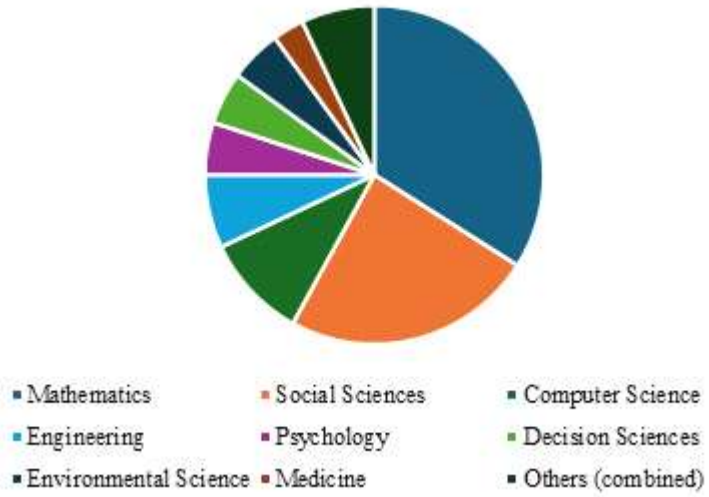

Figure 6. Subject area classification

This diverse classification suggests that mathematics education in the Philippines is increasingly linked to fields such as educational technology, cognitive science, and STEM-related domains. The prominence of mathematics as the core area reflects the field's foundational role, but the inclusion of computer science and psychology points to a broader interest in how learners interact with content in digitally mediated or psychologically informed learning environments (Drijvers et al., 2020). These interdisciplinary connections have become more salient amid the pandemic, where technology-enhanced learning and blended pedagogies surged in relevance. UNESCO (2021) emphasizes the importance of education systems adapting to technological and societal changes, while Bao (2020) and Bond (2021) highlight how the COVID-19 crisis accelerated the integration of educational technology across contexts. Such trends underscore the need for mathematics education research to remain responsive to both global disruptions and cross-disciplinary innovations.

Keywords and Term Analysis

Figure 7 displays a keyword co-occurrence network based on terms extracted from the included publications. The network reveals five thematic clusters, including those centered on motivation and learning strategies (yellow), mathematics proficiency and self-directed learning (purple), COVID-19 pandemic and new normal (green), abstraction and bibliometric tools like VOSviewer (red), and least preferred topics and mathematics in the modern world (blue). These clusters represent the focal themes in Philippine mathematics education literature indexed in Scopus.

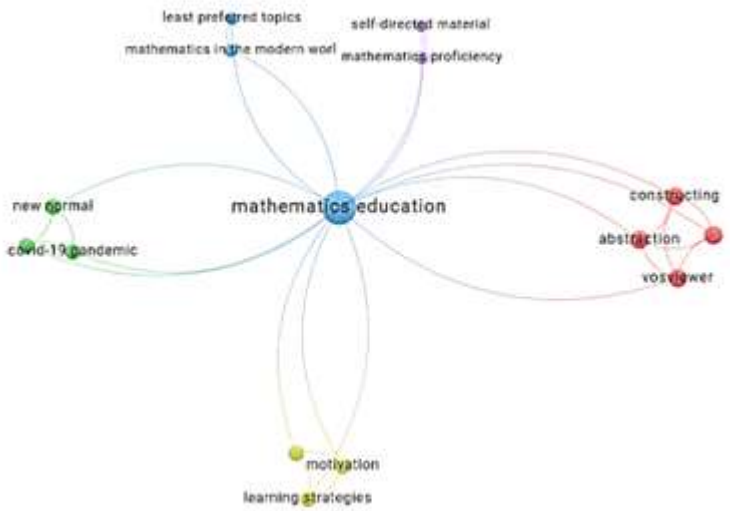

Figure 7. Network visualization

The central position of "mathematics education" suggests it functions as a bridge across otherwise distinct thematic groups. The close association of "abstraction," "constructing," and "VOSviewer" reflects a recent methodological turn toward using bibliometric tools to analyze conceptual development indicating a meta-research trend emerging within the field (Nurhasanah & Darhim, 2022). Meanwhile, keywords such as "motivation," "self-directed material," and "learning strategies" highlight enduring pedagogical concerns in mathematics education research.

The inclusion of terms like "COVID-19 pandemic" and "new normal" underscores the reactive and adaptive response of scholars to global disruptions in education, consistent with global findings (Bond, 2021; Bao, 2020). While

some themes appear well-represented, such as instructional strategies and educational technology, other areas like abstraction research or regional linguistic diversity remain underexplored.

Overall, the network suggests that Philippine mathematics education research is diversifying in both thematic focus and methodological tools, though future efforts may benefit from deeper integration of underrepresented subtopics and broader collaboration across institutions.

Taken as a whole, the findings of this study reveal important structural patterns within Philippine mathematics education research. The most prolific authors, such as Vistro-Yu and Verzosa, are affiliated with the country's most productive institutions namely Ateneo de Manila University, Philippine Normal University, and De La Salle University highlighting how scholarly output is concentrated in institutions with established research infrastructures and graduate programs. This author–institution alignment suggests that research productivity is tied not only to individual expertise but also to institutional capacity and support structures (Hallinger & Kovaèeviæ, 2019). Moreover, the distribution of document types suggests that journal articles are the preferred vehicle for disseminating mature, peer-reviewed findings, whereas conference papers often capture early-stage or experimental studies. Keyword co-occurrence patterns reinforce this distinction, with pedagogical terms like "motivation" and "self-directed learning" dominating journal articles, while conceptual terms such as "abstraction" and bibliometric tools like "VOSviewer" appear across both formats, reflecting an evolving methodological landscape (Drijvers et al., 2020; Aktoprak & Hursen, 2022).

Interestingly, while some subject classifications particularly "Education" and "Mathematics"dominate the dataset, the relatively limited presence of interdisciplinary domains such as "Computer Science" or "Social Sciences" may indicate underutilized opportunities for broader knowledge integration and international visibility (Zupic & Èater, 2015; Börner et al., 2003). This is especially important considering that international collaboration and multidisciplinary research are well-documented factors in enhancing citation impact and scholarly reach. The network visualization further underscores these trends by identifying distinct thematic clusters, suggesting that while research topics are diversifying, stronger integration across themes, document types, and institutional contributions is still needed. Collectively, these findings highlight the interplay between institutional affiliation, research focus, and dissemination practices, pointing toward the need for a more connected, collaborative, and interdisciplinary national research ecosystem in mathematics education.

■ CONCLUSION

This study presents the first systematic bibliometric analysis of Scopus-indexed research on mathematics education in the Philippines, offering a critical overview of the field's productivity, institutional landscape, and thematic evolution from 2006 to 2024. The results reveal a historically low output with a notable increase in recent years, particularly after 2020. This trend reflects both the growing academic engagement with urgent educational challenges such as those brought on by the COVID-19 pandemic and the increasing accessibility of international publication platforms.

The analysis underscores the centralization of research productivity within a handful of institutions, most notably Ateneo de Manila University, Philippine Normal University, and De La Salle University. These universities have emerged as leading contributors, supported by their graduate programs, research centers, and international linkages. However, the limited participation of regional institutions points to enduring disparities in research infrastructure,

visibility, and capacity highlighting the need for more inclusive academic development nationwide.

From a thematic perspective, the field demonstrates a growing multidisciplinarity. While mathematics remains the dominant subject area, studies also intersect with social sciences, computer science, and education. The prevalence of topics such as motivation, abstraction, learning strategies, and digital pedagogy reflects both local classroom concerns and global trends in mathematics education. The use of bibliometric tools and network visualization techniques also signals a methodological shift toward more data-driven approaches, offering new pathways for mapping knowledge production and scholarly influence.

Overall, this study offers a foundational profile of mathematics education research in the Philippines. It contributes novel insights into who is publishing, where research is concentrated, and what topics define the field. By making visible the current strengths and gaps, this analysis provides a valuable reference point for policymakers, academic leaders, and researchers aiming to strengthen the country's research capacity and global engagement. The findings affirm the importance of sustained, collaborative, and strategically supported scholarship to elevate the role of mathematics education in national development and educational reform.

■ RECOMMENDATIONS

Based on the results of this bibliometric analysis, several strategic recommendations are proposed to strengthen mathematics education research in the Philippines:

1. Strengthen Regional Research Capacity

Institutions beyond Metro Manila should be actively supported through targeted funding, research mentorship programs, and infrastructure development. Government agencies such as CHED and DOST should establish grant schemes that promote collaboration between leading universities and regional state colleges and universities to ensure equitable knowledge production.

2. Expand Doctoral Programs in Mathematics Education

The limited number of PhD programs contributes to the low volume of research output. Higher education institutions should invest in establishing and expanding graduate programs in mathematics education, with emphasis on research training, international publication, and faculty development.

3. Incentivize International Publication and Collaboration

Academic institutions should adopt incentive mechanisms for publishing in indexed journals and forming international research partnerships. Such policies can increase the global visibility of Filipino scholars and foster interdisciplinary innovation.

4. Promote Use of Bibliometric Tools and Data-Driven Research

Researchers and graduate students should be trained in bibliometric and scientometric methods using platforms such as VOSviewer, SciVal, or Bibliometrix. These tools enhance research planning, monitoring, and strategic dissemination.

5. Encourage Interdisciplinary and Thematically Diverse Research

Mathematics education research should expand beyond traditional topics to include connections with computer science, psychology, sociology, and digital pedagogy. Such integration not only enriches the field but also improves its responsiveness to contemporary educational challenges.

6. Develop a National Research Repository for Mathematics Education

A centralized, open-access repository of Filipino research outputs especially those not

indexed in international databases would improve accessibility, reduce fragmentation, and support evidence-based policy and practice.

7. Institutionalize Academic Writing and Publication Support

Universities should provide editorial assistance, writing workshops, and peer review support to faculty and graduate students, particularly in regions where academic publishing is less established.

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