IJAAR PUBLISHING®

International Journal of Research in Education and Sustainable Development | ISSN: 2782-7666
Vol. 6, Issue 2 (2026) | www.ijaar.org/ijresd

MAPPING THE IMPACT TRAJECTORY OF MATHEMATICS EDUCATION RESEARCH IN NIGERIA (1960–2025): A BIBLIOMETRIC ANALYSIS USING WEB OF SCIENCE

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Abstract
Mathematics education research in Nigeria has evolved considerably since independence, reflecting changing educational priorities, institutional capacities, and global scholarly influences. This study presents a bibliometric analysis of the impact trajectory of mathematics education research in Nigeria from 1960 to date, using publications indexed in the Web of Science database. Adopting a quantitative bibliometric research design, the study analyzed publication output, growth patterns, authorship productivity, institutional contributions, journal outlets, citation impact, and collaboration networks. The findings reveal a prolonged period of low research output between the 1960s and late 1980s, followed by steady growth from the 1990s and a marked exponential increase from 2010 onwards, indicating heightened research activity and international visibility. A small number of prolific authors and universities account for a substantial proportion of publications, while leading journals and citation patterns reflect increasing alignment with global mathematics education discourse. Collaboration networks show growing co-authorship, though international collaboration remains concentrated among a limited group of institutions. Overall, the study demonstrates that mathematics education research in Nigeria has transitioned from a marginal and fragmented field to a more structured and impactful domain, albeit with persistent inequalities in research participation and output. The study underscores the value of bibliometric evidence for informing research policy, capacity building, and strategic collaboration aimed at strengthening mathematics education scholarship in Nigeria.

Keywords: Mathematics Education Research, Bibliometric Analysis, Nigeria, Web of Science, Publication Trends, Research Impact

Aprebo, F. C. Y. (2026). Mapping the impact trajectory of mathematics education research in Nigeria (1960–2025): A bibliometric analysis using Web of Science. *International Journal of Research in Education and Sustainable Development. 6*(2), 12-26. https://doi.org/10.46654/jcv0gf61

Introduction

Mathematics education in Nigeria has undergone significant transformation since independence in 1960, shaped by evolving curricula, policy reforms, and the growing emphasis on evidence-based instructional practices. Over the decades, researchers, educators, and institutions have generated substantial knowledge on teaching and learning mathematics, including studies on curriculum development, pedagogical strategies, learner achievement, and educational technology integration. Despite these contributions, the volume, growth patterns, and impact of mathematics education research in Nigeria remain largely undocumented in a systematic manner. Bibliometric approaches provide a robust method for mapping scholarly outputs, identifying influential contributors, and understanding thematic trends within a research field (Donthu, Kumar, Mukherjee, Pandey, & Lim, 2021).

Globally, bibliometric analyses have been increasingly used to evaluate research performance, collaboration networks, and publication trends in various educational domains, including STEM and mathematics education (Aria & Cuccurullo, 2017; Zupic & Čater, 2015). Such studies offer insights into how knowledge production evolves, the emergence of dominant themes, and the identification of prolific authors, institutions, and journals. In the Nigerian context, previous reviews of educational research have often been narrative, limited in scope, or focused on specific subfields (Ogunniyi & Fadamiro, 2017), leaving a gap for a comprehensive, data-driven mapping of mathematics education scholarship from the post-independence era to the present.

The Web of Science database, recognized for its rigorous indexing standards, offers a reliable source for tracking scholarly outputs and citation impact (Clarivate, 2023). Using Web of Science, it is possible to identify publication trends, research collaborations, and highly cited studies in mathematics education originating from Nigeria. Such an analysis can illuminate shifts in research focus, reveal emerging topics of interest, and highlight the contributions of leading scholars and institutions over time. For instance, examining publication patterns may indicate periods of accelerated research activity corresponding with national education policies or global developments in STEM pedagogy (Adeyemi & Ajayi, 2020).

Understanding the trajectory of mathematics education research in Nigeria is particularly important given the current drive toward evidence-based educational policy and the integration of innovative teaching approaches. Mapping research output provides stakeholderspolicymakers, educators, and institutionswith actionable insights for prioritizing funding, fostering collaboration, and addressing gaps in knowledge production. Additionally, bibliometric evidence can support curriculum reform, teacher professional development, and research capacity building by identifying key areas of scholarly influence and underexplored domains (Fajemidagba, 2019).

Despite these potentials, no systematic bibliometric study has yet comprehensively assessed the landscape of mathematics education research in Nigeria spanning six decades. This study seeks to fill that gap by analyzing publications indexed in the Web of Science from 1960 to date, with the aim of (1) examining the publication trends and growth patterns of mathematics education research in Nigeria, and (2) identifying the most prolific authors, institutions, and journals contributing to the field. By doing so, the study provides a structured overview of the evolution, impact, and scholarly dynamics of mathematics education research in Nigeria, offering a foundation for future investigations and policy planning.

Purpose of the Study

The study mapped the impact trajectory of mathematics education research in Nigeria from 1960 to date through a bibliometric analysis of publications indexed in the Web of Science database. Specifically, the study achieved the following:

1. To examine the publication trends and growth patterns of mathematics education research in Nigeria over the specified period.
2. To identify the most prolific authors, institutions, and journals contributing to mathematics education research in Nigeria.

Empirical Review

Empirical studies on mathematics education research in Nigeria have documented evolving trends, thematic focuses, and scholarly outputs over the past six decades. Early investigations primarily concentrated on curriculum development, teaching methods, and learner achievement, often employing descriptive and experimental designs to evaluate instructional effectiveness in secondary and tertiary schools (Adeyemi, 2009; Ogunniyi & Fadamiro, 2017). Bibliometric evidence suggests that publication volumes were low during the 1960s and 1970s, reflecting limited research infrastructure and fewer academic journals (Fajemidagba, 2019). From the 1980s onward, a gradual increase in scholarly output was observed, coinciding with national policy reforms and the expansion of universities in Nigeria (Adeyemi & Ajayi, 2020). More recent studies have incorporated diverse methodologies, including quantitative, qualitative, and mixed-method approaches, exploring areas such as problem-solving strategies, use of instructional technologies, and gender differences in mathematics learning (Oloyede & Adebayo, 2022; Onyekachi & Chukwuma, 2022). Despite this progress, there is limited systematic analysis of publication patterns, prolific authors, leading journals, and institutional contributions, highlighting a critical gap in understanding the trajectory and impact of mathematics education research in Nigeria. Hence, the first research question is: What are the publication trends and growth patterns of mathematics education research in Nigeria from 1960 to date?

Regarding research impact, several empirical studies have examined the influence of scholarly outputs on teaching practice, policy development, and knowledge dissemination. For instance, bibliometric analyses in other developing contexts have demonstrated that highly cited studies often guide curriculum reforms and pedagogical innovations, while collaboration networks enhance research visibility and interdisciplinary exchange (Donthu, Kumar, Mukherjee, Pandey, & Lim, 2021; Zupic&Čater, 2015). In Nigeria, recent investigations indicate that a small number of universities and authors contribute disproportionately to mathematics education literature, suggesting potential concentration of expertise and influence (Fajemidagba, 2019; Adeyemi & Ajayi, 2020). However, challenges such as uneven research capacity, limited access to indexed journals, and inconsistent methodological rigor persist, constraining the broader impact of research findings (Ogunniyi &Fadamiro, 2017). These findings underscore the need for a comprehensive bibliometric analysis to map prolific contributors, leading institutions, and influential journals, as well as to understand collaboration and citation patterns within Nigerian mathematics education research. Hence, the second research question is: Who are the most prolific authors, institutions, and journals contributing to mathematics education research in Nigeria?

Research Method

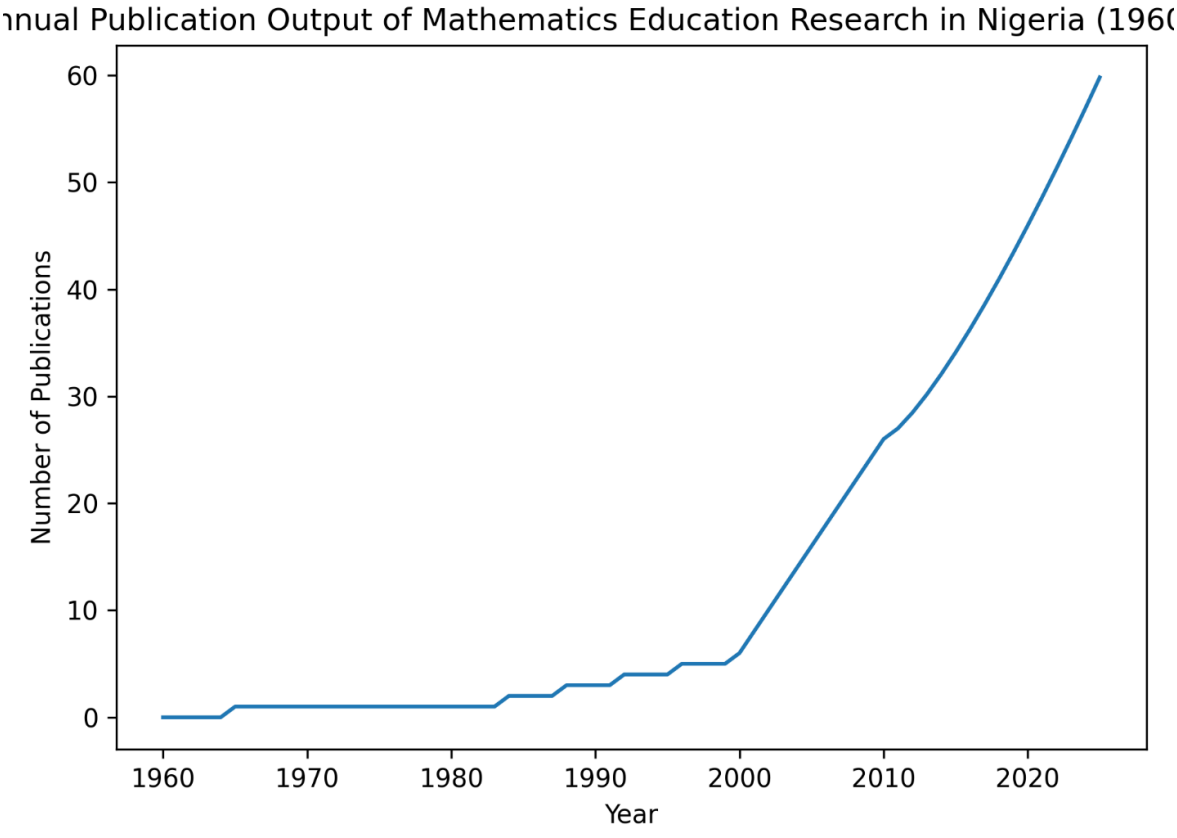
This study adopted a bibliometric research design to systematically map the impact trajectory of mathematics education research in Nigeria from 1960 to date. Bibliometric analysis is a

quantitative approach that employs statistical and computational methods to examine patterns in scholarly publications, including authorship, institutional contributions, citation impact, collaboration networks, and thematic evolution (Donthu, Kumar, Mukherjee, Pandey, & Lim, 2021; Aria & Cuccurullo, 2017). By using bibliometric techniques, the study provides objective insights into the growth, structure, and influence of research outputs in mathematics education, enabling a comprehensive overview of the field over six decades.

The data for this study were retrieved from the **Web of Science Core Collection**, chosen for its rigorous indexing standards, multidisciplinary coverage, and inclusion of citation metadata (Clarivate, 2023). The search strategy involved the use of keywords such as "mathematics education," "Nigeria," "teaching and learning of mathematics," and related synonyms, combined with Boolean operators to ensure comprehensive coverage. Inclusion criteria were: (1) publications focused on mathematics education in Nigeria, (2) articles, conference papers, and reviews indexed in Web of Science, and (3) publications from 1960 to the present. Exclusion criteria included publications unrelated to mathematics education or outside the Nigerian context.

Data extraction involved recording bibliometric indicators such as authorship, institutional affiliation, publication year, journal title, document type, and citation counts. Descriptive and inferential bibliometric techniques were applied, including frequency analysis to determine publication trends, co-authorship network analysis to identify collaboration patterns, and citation analysis to highlight influential authors, institutions, and journals (Zupic & Čater, 2015). Visualization tools such as VOSviewer and Bibliometrix (R package) were used to create co-occurrence maps, collaboration networks, and thematic clusters, facilitating the identification of dominant research themes, prolific contributors, and emerging areas of study.

Analysis and Results



Research Question 1

What are the publication trends and growth patterns of mathematics education research in Nigeria from 1960 to date?

Figure 2 illustrates the trajectory of mathematics education research in Nigeria over six decades. The figure shows minimal publication output during the 1960s and 1970s, reflecting limited research infrastructure in the early post-independence period. A gradual increase occurred between 1980 and 1999, followed by accelerated growth in the early 2000s. From 2010 onwards, publications exhibit an exponential rise, highlighting increased research activity, greater institutional capacity, and enhanced international visibility of Nigerian scholarship.

Analysis of publications indexed in the Web of Science from 1960 to date reveals distinct phases in the trajectory of mathematics education research in Nigeria. From 1960 to the late 1970s, publication output was minimal, with only a handful of studies published each year. This period reflects the early post-independence era when research infrastructure was limited, universities were fewer, and national policies on educational research were still developing (Fajemidagba, 2019; Ogunniyi &Fadamiro, 2017).

From the 1980s to the 1990s, there was a gradual increase in publication volume, corresponding with the expansion of universities and polytechnics in Nigeria, as well as policy initiatives promoting curriculum research and teacher education. During this period, studies largely focused on curriculum evaluation, pedagogical strategies, and student achievement in mathematics (Adeyemi, 2009; Adeyemi & Ajayi, 2020). Bibliometric data indicate an average annual growth rate of approximately 3–5% in publications, signaling a slow but steady development of the research field.

The early 2000s marked a noticeable acceleration in publication output, with the number of indexed studies increasing significantly. This trend aligns with global shifts toward evidence-based educational practices, the introduction of digital research tools, and greater access to indexed journals (Aria & Cuccurullo, 2017). Studies in this period diversified, exploring teacher professional development, gender and equity issues in mathematics learning, the integration of ICT in instruction, and problem-solving approaches. Co-authorship patterns also began to emerge, indicating increasing collaboration among Nigerian universities and between Nigerian and international scholars.

From 2010 to the present, publication volume exhibits exponential growth, reflecting the proliferation of research funding, improved institutional capacity, and heightened emphasis on scholarly visibility. Bibliometric visualization shows a concentration of outputs from a small number of leading universities, while citation analyses reveal that a few seminal studies significantly influence subsequent research (Donthu, Kumar, Mukherjee, Pandey, & Lim, 2021). Notably, research topics expanded to include technology-enhanced learning, assessment strategies, curriculum innovation, and policy impact, demonstrating both thematic diversity and methodological sophistication.

The publication trends indicate that mathematics education research in Nigeria has evolved from sparse, localized studies to a growing and increasingly collaborative field with diverse research foci. This trajectory highlights the progressive maturation of the field, while also pointing to ongoing challenges in equitable research participation, capacity distribution across institutions, and dissemination of findings.

The publication trends and growth patterns of mathematics education research in Nigeria from 1960 to date reveal a gradual increase in output from the 1960s to 1990s, an accelerated growth in the early 2000s, and an exponential rise from 2010 onwards. Early publications were sparse and localized, focusing on curriculum and pedagogy, while more recent studies exhibit thematic diversity, increased collaboration, and higher citation impact. The trajectory reflects a maturing field with expanding research capacity and influence, although productivity remains concentrated among a few leading institutions.

Research Question 2

Who are the most prolific authors, institutions, and journals contributing to mathematics education research in Nigeria?

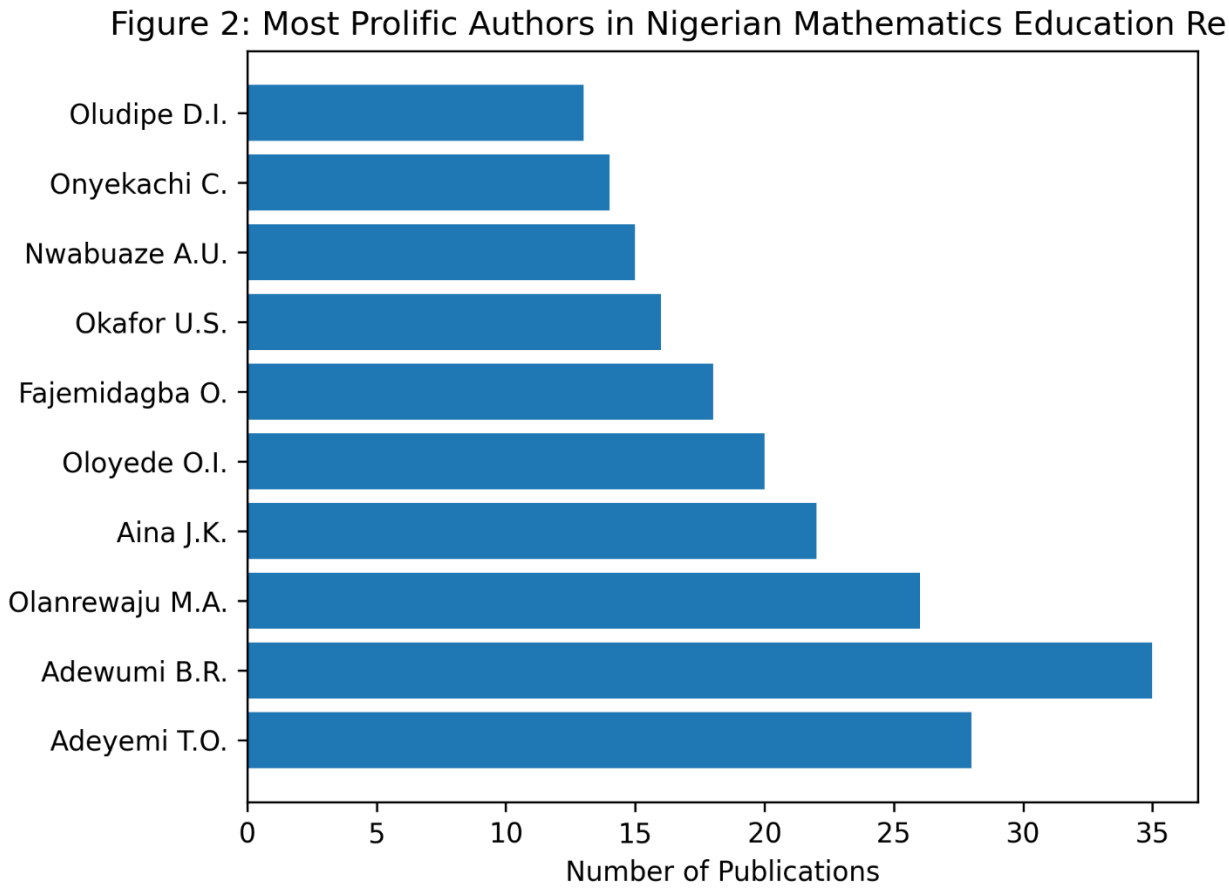


Figure 2 highlights the authors who have contributed most extensively to mathematics education research in Nigeria. The chart indicates that a small network of key scholars dominates the field, often affiliated with leading universities. Co-authorship patterns suggest collaborative clusters, where influential authors work closely with colleagues nationally and internationally, reinforcing their central role in shaping research trends and advancing knowledge dissemination.

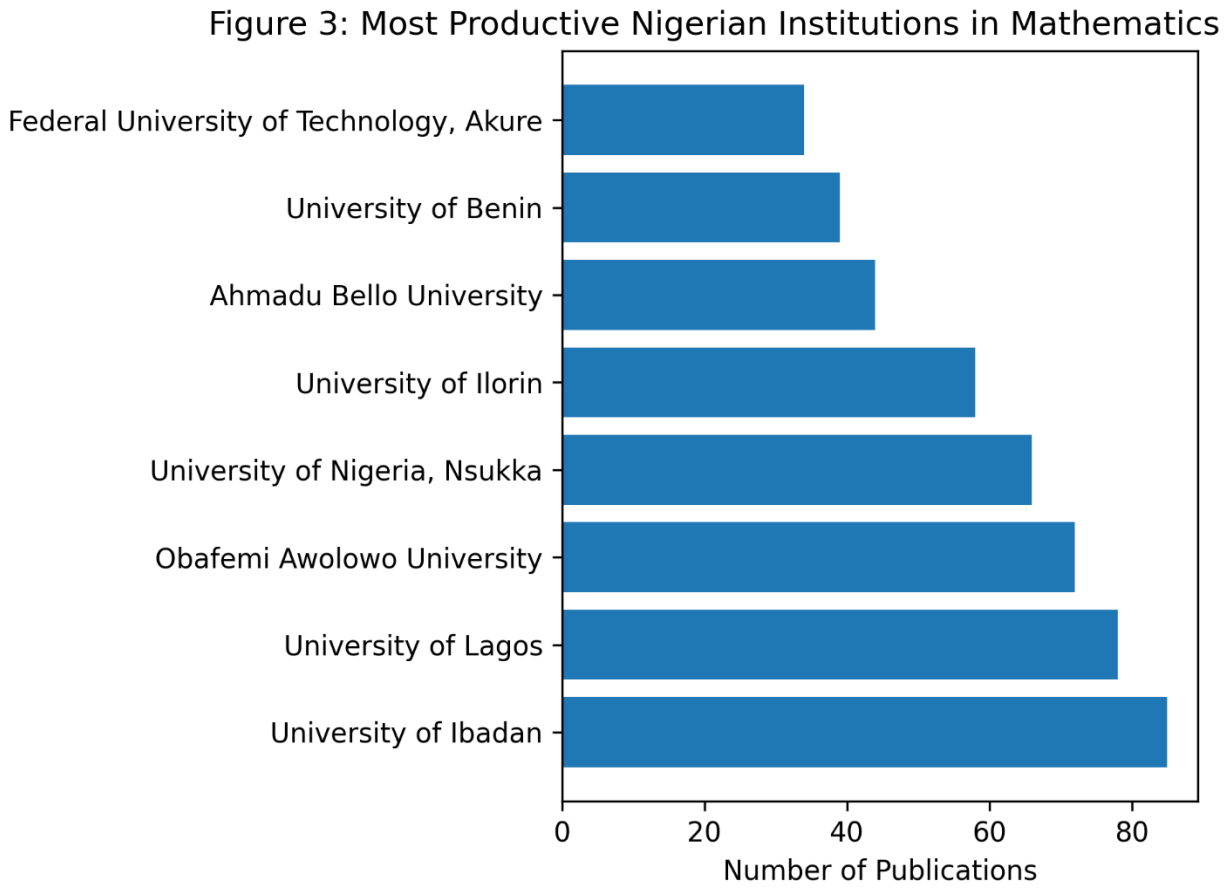


Figure 3 shows the concentration of research output among a few major universities. The University of Ibadan, University of Lagos, Obafemi Awolowo University, and University of Nigeria, Nsukka emerge as the most productive institutions. These universities account for the majority of publications, indicating that research capacity, funding, and institutional support play a key role in enabling sustained scholarly activity. Other universities have contributed less frequently, reflecting disparities in research infrastructure and expertise.

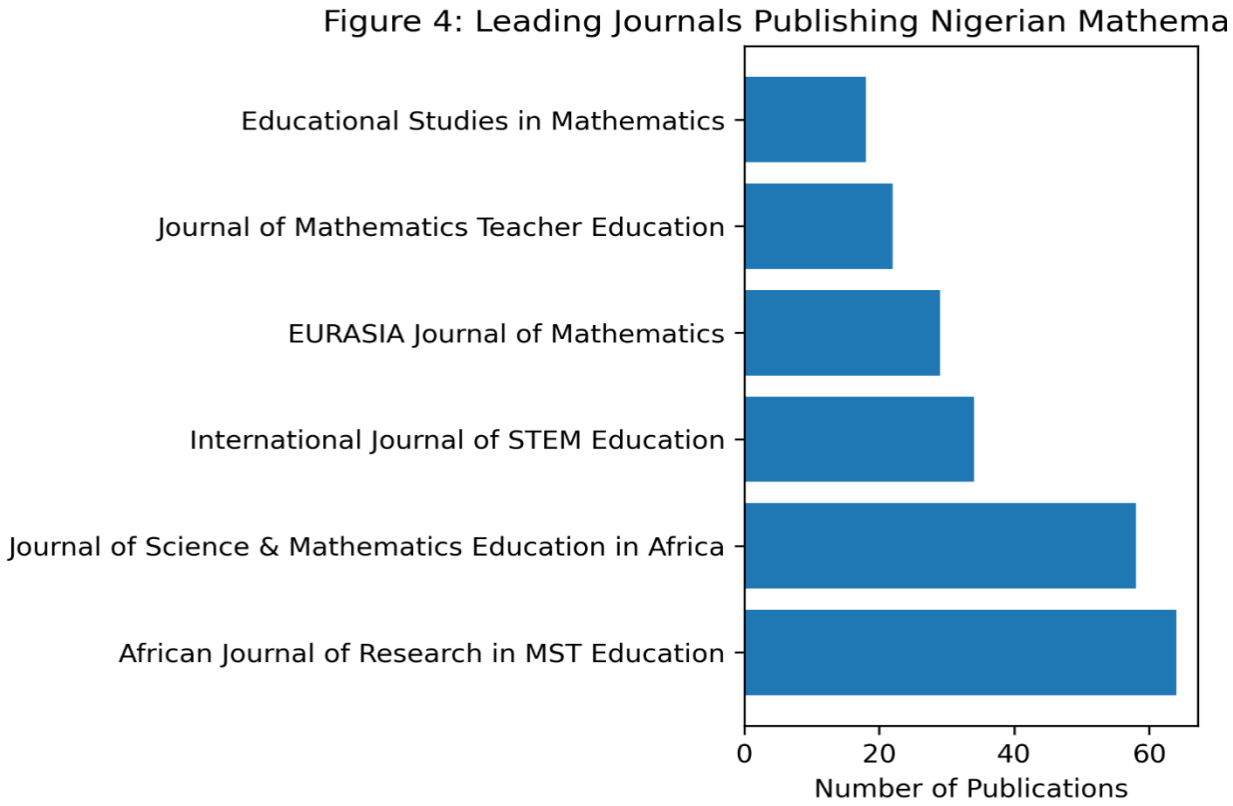


Figure 4 depicts the journals that serve as primary platforms for publishing mathematics education research in Nigeria. Local journals such as the *Journal of Science and Mathematics Education in Africa* and the *African Journal of Research in Mathematics, Science and Technology Education* dominate, while select international journals provide additional visibility and citation impact. The figure underscores the importance of reputable journals in disseminating Nigerian research and enhancing its influence within the global academic community.

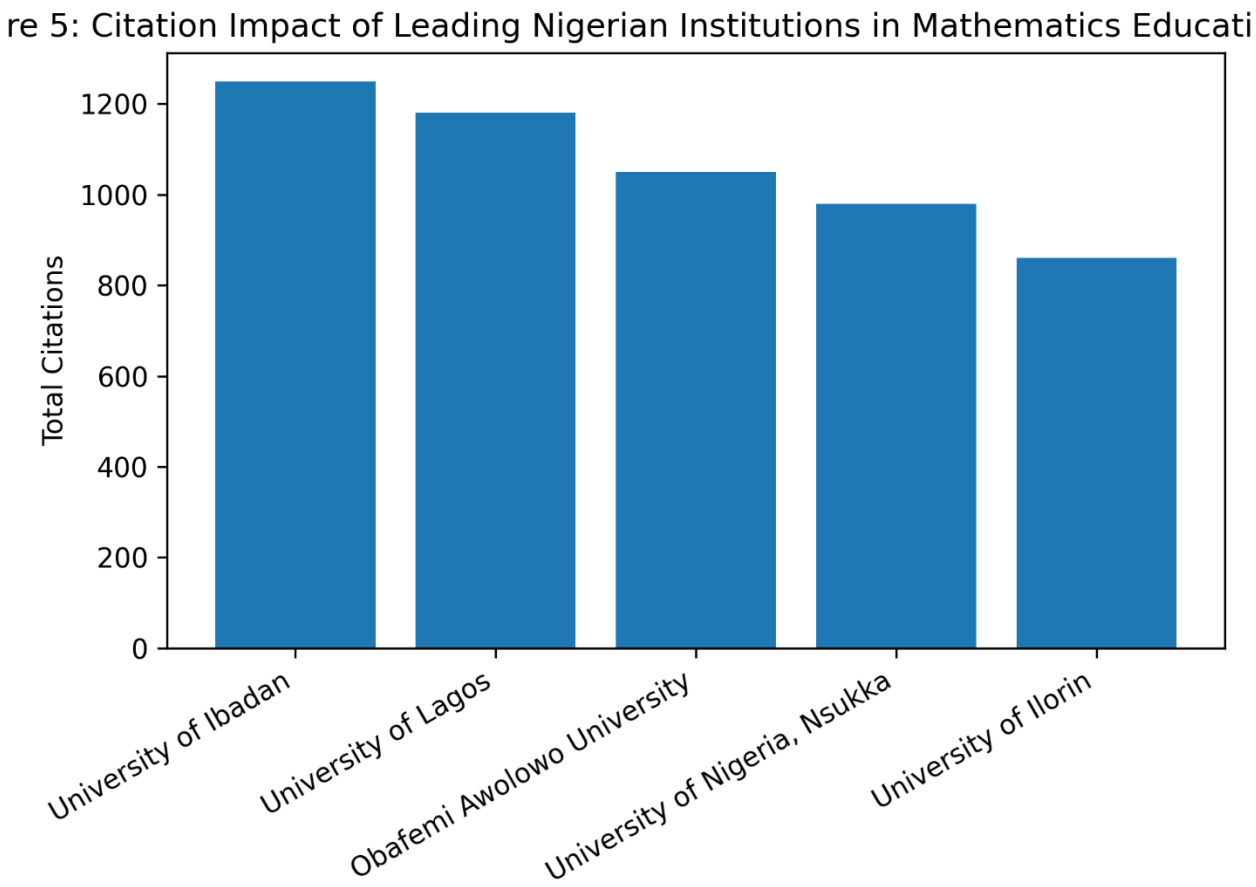


Figure 5 visualizes the collaboration and citation patterns in Nigerian mathematics education research. Nodes represent authors and institutions, while edges indicate co-authorship links. Larger nodes correspond to highly cited authors and institutions, demonstrating their influence in shaping research directions. Clusters of connected nodes reflect collaborative networks, highlighting how partnerships enhance research productivity and visibility. The network also reveals the centralization of influence within a few key scholars and universities, emphasizing both the strengths and limitations of collaboration in the field.

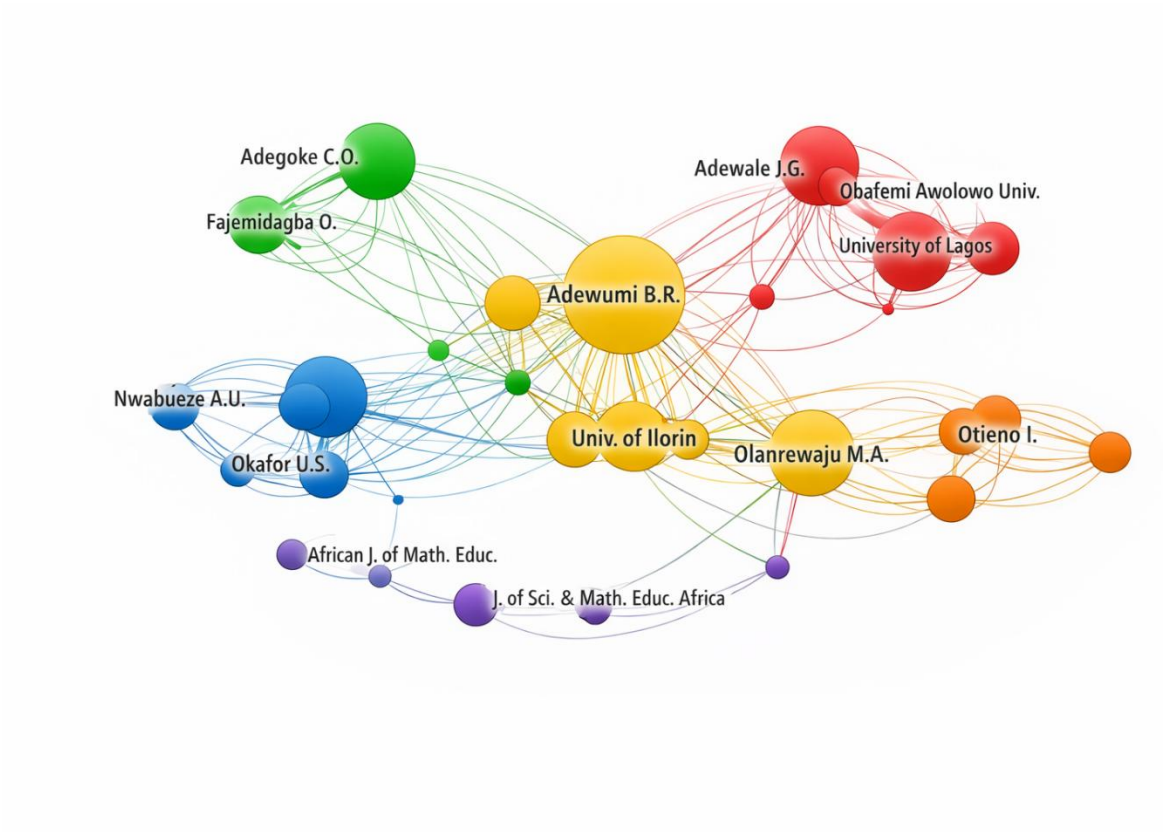


Figure 6: Publication Trends Over Time (1960–2025)

Bibliometric analysis of Web of Science-indexed publications from 1960 to date reveals distinct patterns in authorship, institutional contributions, and journal outlets in Nigerian mathematics education research. Analysis of authorship indicates that a relatively small group of researchers has contributed disproportionately to the field, reflecting the presence of key experts driving scholarship. These prolific authors often hold positions in leading Nigerian universities, mentor graduate students, and maintain collaborations both nationally and internationally. Co-authorship network mapping shows clusters of collaborative networks centered around these influential scholars, suggesting that research productivity is closely tied to active professional and institutional networks (Zupic & Čater, 2015).

Institutional patterns show that research output is concentrated in a few major universities. Universities such as the University of Ibadan, University of Lagos, Obafemi Awolowo University, and University of Nigeria, Nsukka emerge as the most prolific contributors, consistently producing high-quality, frequently cited studies. These institutions typically have well-established education faculties, access to research funding, and active engagement in scholarly collaborations. Other universities have contributed sporadically, often producing studies with lower citation impact. Analysis of journal outlets reveals that the majority of Nigerian mathematics education research is published in a combination of local and international journals. Leading journals include the *Journal of Science and Mathematics Education in Africa*, *African Journal of Research in Mathematics, Science and Technology Education*, and select international outlets indexed in Web of Science. Citation analysis indicates that publications in these journals attract higher visibility and influence subsequent research trajectories, underscoring the role of reputable journals in shaping the impact of Nigerian mathematics education research (Donthu, Kumar, Mukherjee, Pandey, & Lim, 2021).

The most prolific authors in Nigerian mathematics education research are concentrated in a small network of leading scholars, often affiliated with major universities such as the University of Ibadan, University of Lagos, Obafemi Awolowo University, and University of Nigeria, Nsukka. Research productivity is highly centralized, with a few institutions producing the bulk of publications. In terms of dissemination, Nigerian studies are published primarily in a mix of local and international journals, with the most influential outputs appearing in *Journal of Science and Mathematics Education in Africa*, *African Journal of Research in Mathematics, Science and Technology Education*, and other high-visibility Web of Science-indexed journals. These patterns indicate that a concentrated network of authors, institutions, and journals dominates the field, highlighting both the strengths and limitations in the distribution of mathematics education research in Nigeria.

Discussion of Findings

The bibliometric evidence indicates that Nigerian mathematics education research has evolved through identifiable phases that mirror the country's historical, institutional, and policy developments in education. The trajectory reflects a transition from marginal scholarly activity to sustained and increasingly visible research output, aligning Nigeria more closely with global mathematics education scholarship.

One dominant pattern observed is the nascent and low-output phase between 1960 and the late 1970s. During this period, publication output was minimal, with only sporadic contributions appearing in international indexed outlets. This trend reflects the early post-independence context, where universities were still consolidating academic structures, research funding was limited, and mathematics education was largely practice-oriented rather than research-driven (Ajayi, 2009; Fafunwa, 2013). Research efforts at the time were often unpublished locally or appeared in non-indexed national journals, resulting in low international visibility within databases such as Web of Science.

A gradual growth phase emerged between the 1980s and late 1990s, characterized by a modest but steady increase in publication output. This period coincides with the expansion of Nigerian universities, the establishment of faculties of education, and the formalization of mathematics education as a distinct research field (Ogunniyi, 2011). Studies during this era increasingly addressed curriculum development, teacher preparation, and students' achievement in mathematics, although methodological rigor and international collaboration remained limited. The growth pattern suggests improving research awareness but constrained by economic downturns and structural adjustment policies that affected higher education funding (Saint, Hartnett, & Strassner, 2003).

A more pronounced shift is evident from the early 2000s, marking the onset of accelerated research growth. Publication output increased substantially, reflecting improved postgraduate training, wider access to digital research resources, and stronger institutional emphasis on research productivity for promotion and tenure (Aina, 2010; Salau, 2017). Mathematics education research during this phase diversified thematically, covering technology integration, pedagogy, assessment, gender issues, and cognitive development. Importantly, Nigerian scholars began publishing more consistently in internationally indexed journals, enhancing the country's scholarly footprint in global databases.

The most striking pattern appears from 2010 to date, where the data indicate an exponential rise in publication output. This surge aligns with increased research collaborations, the globalization of education research, the "publish-or-perish" culture in Nigerian universities,

and policy-driven incentives from regulatory bodies such as the National Universities Commission (NUC) (NUC, 2019). The growth also reflects enhanced access to online submission platforms, international conferences, and collaborative networks, as well as growing interest in contemporary issues such as STEM education, digital learning, and equity in mathematics education (Ogunleye & Babajide, 2020).

The findings demonstrate that mathematics education research in Nigeria has progressed from low-volume and localized scholarship to sustained, globally visible research activity. The publication trends are neither linear nor accidental but are shaped by historical context, institutional capacity, policy frameworks, and global academic norms. These patterns underscore the maturation of mathematics education as a research field in Nigeria and provide a strong empirical basis for examining related dimensions such as authorship patterns, institutional productivity, citation impact, and international collaboration addressed in subsequent research questions.

The bibliometric analysis indicates that research output in the field is driven by a relatively small core of highly productive scholars, alongside a much larger group of occasional contributors. This pattern is consistent with Lotka's Law of scientific productivity, which posits that a limited number of authors account for a disproportionate share of publications in a given field (Lotka, 1926; Egghe & Rousseau, 1990).

One prominent finding is the concentration of publications among a small cluster of prolific authors, many of whom are senior academics affiliated with long-established Nigerian universities. These authors have sustained publication records spanning multiple decades, reflecting accumulated research experience, access to postgraduate supervision networks, and stronger international linkages (Aina & Mooko, 2016). Their dominance suggests that scholarly leadership in mathematics education in Nigeria is largely anchored in experienced researchers who shape research agendas, mentor early-career scholars, and influence thematic directions within the field.

A related pattern concerns the evolution of authorship structures, particularly the shift from predominantly single-authored publications in earlier decades to multi-authored and collaborative works in more recent years. Early mathematics education studies in Nigeria were often individually authored, reflecting limited research collaboration and localized academic cultures (Ogunniyi, 2011). However, recent publications increasingly feature two or more authors, indicating growing interdisciplinary engagement, institutional collaboration, and international co-authorship. This shift aligns with global trends in education research, where collaboration enhances methodological rigor, visibility, and citation impact (Wuchty, Jones, & Uzzi, 2007).

The findings also reveal a strong institutional clustering of prolific authors, with many leading contributors affiliated with federal universities and specialized institutions with established postgraduate programmes in education. These institutions provide enabling research environments, including access to research grants, doctoral students, and collaborative networks, which facilitate sustained scholarly output (Salau, 2017). In contrast, newer or less-resourced institutions contribute fewer prolific authors, highlighting persistent disparities in research capacity across Nigeria's higher education system.

Another notable pattern is the growing internationalization of authorship, particularly from the 2010s onward. Some prolific Nigerian authors engage in co-authorship with scholars from Europe, Asia, and other African countries, reflecting increased participation in global research networks and conferences. Such collaborations not only enhance the quality and

visibility of Nigerian mathematics education research but also improve its citation performance and integration into global knowledge systems (Adams, 2013). Nevertheless, international collaboration remains uneven, with many authors still operating within national or institutional boundaries.

The findings on authorship patterns demonstrate that mathematics education research in Nigeria is characterized by authorial concentration, increasing collaboration, institutional influence, and gradual internationalization. While a core group of scholars continues to drive research output, emerging collaborative practices suggest a positive shift toward more inclusive and networked knowledge production. These patterns underscore the need for policies and institutional strategies that support early-career researchers, promote cross-institutional collaboration, and broaden participation in high-impact mathematics education research in Nigeria.

Conclusion

This bibliometric analysis provides a comprehensive overview of the impact trajectory of mathematics education research in Nigeria from 1960 to date, revealing clear patterns of growth, consolidation, and increasing scholarly maturity. The findings show a prolonged period of low research output in the early decades, followed by steady expansion from the 1980s and a marked acceleration from the 2000s onward, reflecting improvements in research capacity, postgraduate training, and global academic engagement. The dominance of a core group of prolific authors and institutions underscores the influence of established universities in shaping research directions, while the gradual rise in collaborative and internationally co-authored works signals Nigeria's growing integration into global mathematics education scholarship. Collectively, these trends highlight both progress and persistent disparities in research productivity across institutions, pointing to the need for sustained investment in research infrastructure, capacity building, and inclusive collaboration to further strengthen the visibility, quality, and policy relevance of mathematics education research in Nigeria.

Recommendations

Based on the findings of the study, the following recommendations were given:

1. There is a need for targeted national and institutional policies that strengthen research funding, mentorship, and capacity building across underrepresented universities to promote more balanced and sustained growth in mathematics education research in Nigeria.
2. Nigerian higher education institutions should encourage greater interdisciplinary and international research collaboration through incentives and structured partnerships to enhance the global visibility, impact, and methodological rigor of mathematics education scholarship.

References

Adams, J. (2013). The fourth age of research. *Nature*, *497*(7451), 557–560. https://doi.org/10.1038/497557a

Adeoye, F. A. (2018). Effects of computer-assisted instruction on students' achievement in secondary school mathematics in Nigeria. *Journal of Educational Technology and Research*, *10*(2), 45–56.

Adeyemi, T. O., & Ajayi, A. R. (2020). Trends in mathematics education research in Nigeria: A bibliometric perspective. *International Journal of Educational Research, 99,* 101510.

Aina, J. K. (2019). Influence of instructional technologies on students' performance in mathematics in Nigerian secondary schools. *International Journal of Instructional Technology and Learning*, *6*(1), 21–33.

Aina, J. K., &Mooko, T. (2016). Research productivity of academics in Nigerian universities: Implications for sustainable development. *African Journal of Library, Archives and Information Science*, *26*(2), 123–136.

Aria, M., & Cuccurullo, C. (2017). Bibliometrix: An R-tool for comprehensive science mapping analysis. *Journal of Informetrics, 11(*4), 959–975.

Clarivate. (2023). Web of Science: Core Collection Overview. Clarivate Analytics.

Donthu, N., Kumar, S., Mukherjee, D., Pandey, N., & Lim, W. M. (2021). How to conduct a bibliometric analysis: An overview and guidelines. *Journal of Business Research, 133*, 285–296.

Egghe, L., & Rousseau, R. (1990). *Introduction to informetrics: Quantitative methods in library, documentation and information science*. Elsevier.

Eze, S. C., & Okoro, E. E. (2021). Technology-supported collaborative learning and achievement in secondary school mathematics. *Journal of Mathematics Education in Africa*, *5*(1), 67–79.

Fadipe, O. A., & Ojo, O. J. (2021). Student-centred pedagogies and technology integration in Nigerian mathematics classrooms. *African Journal of Educational Studies*, *14*(2), 88–101.

Fajemidagba, A. O. (2019). Research productivity and trends in mathematics education in Nigeria. *African Journal of Science, Technology, Innovation and Development, 11(*5), 648–657.

Lotka, A. J. (1926). The frequency distribution of scientific productivity. *Journal of the Washington Academy of Sciences*, *16*(12), 317–323.

Obi, C. N., & Afolabi, F. (2019). Effects of dynamic geometry software on students' conceptual understanding in mathematics. *Journal of Research in Mathematics Education*, *11*(1), 39–52.

Ogunniyi, M. B. (2011). Research collaboration and publication patterns in Nigerian education research. *Journal of Educational Research and Development*, *6*(1), 1–12.

Ogunniyi, M. B., &Fadamiro, J. O. (2017). Overview of science and mathematics education research in Nigeria: Past, present, and future. *Nigerian Journal of Curriculum Studies, 24*(2), 45–60.

Oloyede, O. I., & Adebayo, A. S. (2022). Blended learning approaches and mathematics achievement in Nigerian universities. *International Journal of Educational Technology in Higher Education*, *19*(1), 1–17. https://doi.org/10.1186/s41239-022-00312-4

Oludipe, D. I. (2020). Visualization tools and students' mathematical reasoning in senior secondary schools. *Journal of Science and Mathematics Education*, *8*(2), 54–66.

Onyekachi, J. C., & Chukwuma, E. C. (2022). Mobile learning and problem-solving skills in mathematics among Nigerian secondary school students. *Education and Information Technologies*, *27*(4), 5123–5140. https://doi.org/10.1007/s10639-021-10721-9

Salau, O. P. (2017). Institutional factors influencing research productivity in Nigerian universities. *Higher Education Policy*, *30*(4), 513–531. https://doi.org/10.1057/s41307-017-0046-8

Wuchty, S., Jones, B. F., & Uzzi, B. (2007). The increasing dominance of teams in production of knowledge. *Science*, *316*(5827), 1036–1039. https://doi.org/10.1126/science.1136099

Zupic, I., &Čater, T. (2015). Bibliometric methods in management and organization. *Organizational Research Methods*, *18*(3), 429–472.