



REVEALING TRENDS IN LEADERSHIP RESEARCH: A BIBLIOMETRIC ANALYSIS OF WORLD CONTRIBUTION AND INSTITUTIONAL COLLABORATIONS

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This research aimed to explore patterns and trends by bibliometric analysis from the Scopus database with emphasis on leading terms "School leadership model" and "Leadership Professional Development" from English language literature after the year 2000. The research applied systematic bibliometric tools to trace the network of citations and identify co-authoring relationships while depicting keyword coherence for the identification of influential works and creating patterns of research. The findings revealed that publications increased substantially during 2015–2016 before reaching their maximum level in 2023 while the Journal of Hospital Medicine released the most publications and the author Gerardi D. had the most publications. The University of California stood as the top institution donor and the United States produced the most contributions compared to international competitors who mainly came from Greece and Malaysia. Each publication displayed an article as the main content while nursing and medicine stood as the two most frequently studied subjects. Research activity centers on "Anderson N" because this author exhibits leadership as the main subject area but the field still experiences scattered research communities. The study concludes that published research is concentrated among specific authors while institutions from different nations differ in their contributions to international research and fragmented collaboration which makes leadership the principal research focus although spread across many sources. A Contextualized Training and Development Program (CTDP) should be institutionalized while creating collaborative ecosystems, diversifying publication methods, establishing mentorship structures, and developing research programs with key themes including leadership and healthcare quality.

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1. INTRODUCTION

Healthcare leadership has become an extensive topic of scientific research owing to its critical role in promoting organizational performance, health systems improvement, developing the workforce, and providing quality healthcare services. Due to the challenges associated with workforce shortages, technological advancements, emergencies, and increased demands on equity of care, research on healthcare leadership has started addressing such topics as leadership models, professional development, organizational innovations, collaborative governance, and evidence-based decision-making (Spanos et al., 2024).

There are multiple links between the importance of leadership in healthcare and the United Nations Sustainable Development Goals (SDGs). Particularly, the SDGs 3 (Good Health and Well-being), 4 (Quality Education), 8 (Decent Work and Economic Growth), 10 (Reduced Inequalities), and 17 (Partnerships for the Goals) would benefit from further research on effective leadership since it will help build sustainable and responsive health systems (Ziadlou, 2021).

While there is an ever-increasing number of articles on leadership in healthcare, the body of knowledge remains divided. Healthcare leadership research addresses various topics and includes articles of different disciplines, health organizations, leadership theories, and geographic regions. However, the majority of scientific works concentrate on particular approaches or results, while only a small number of articles deal with the intellectual structure, collaborative networks, influential articles, and the evolution of the healthcare leadership field (Spanos et al., 2024).

One possible way to fill these research gaps is bibliometric analysis, which provides an efficient quantitative method in addressing these challenges. In particular, it considers academic literature by means of publication outputs, citation frequency, authorship collaboration, journal activity, keyword association and institutional/geo-locations contribution. The main indicators that are being used in this case are the following: publication outputs, citation outputs, authorship collaboration, keyword clustering, and source analysis, and therefore, one may be able to detect research productivity, scholar influence, collaborative activities, prevalent themes and top

journals. This type of analysis is widely used for research evaluation and policy making purposes and identifies leading scholars, new frontiers of research, and emerging patterns of scholarly communication (Kumar, 2025).

The research in leadership is extremely diverse because there are significant discrepancies between different countries in terms of governance, policies, institutional structures, and professional development programs. While developed countries focus on transformational leadership and professional development, developing countries have to deal with lack of resources and disintegrated initiatives in the field. Therefore, one may assume the necessity of context-specific leadership development programs and the need for comprehensive bibliometric assessment in order to detect global research trends, collaborative networks, influential contributors and potential areas for future research in order to contribute to healthcare leadership and to promote Sustainable Development Goals (Wu et al., 2024).

To date, no exhaustive bibliometric review of successful school leader professional development programs has been undertaken specifically as an input to the development of a Contextualized Training and Development Program (CTDP). This fact demonstrates a wide knowledge gap in automatically tracking the most recent literature, outlining research trends, top authors, thematic focus, and geographical differences in this area. Lacking such evidence-based knowledge, policymakers and training institutions lack the ability to synchronize training activity with prevailing empirical knowledge, situational conditions, and leadership needs. It is not possible to develop focused, evidence-based, and situationally attuned professional development models for meeting global standards as well as domestic leadership requirements without bibliometric analysis.

Closing this knowledge gap is vital to building effective and responsive professional learning agendas that capture the subtleties of contemporary educational leadership. Hence, this study aimed to analyze professional development programs for school leadership through a bibliometric analysis. The findings of this study are intended to provide input for the contextualized training and development program.

Generally, the study aims to elucidate the effectiveness of professional development programs for school leaders using bibliometric analysis. Specifically, this research study sought the following objectives: (1) to describe the trend of the document per year for professional development programs for school leaders; (2) to provide a comparative analysis for documents per year, top contributors, top institutions, by country or territory, and by subject area; (3) to examine the network analysis by scholarly collaboration and author keywords in a scholarly dataset.

2. METHODOLOGY

The study employs a bibliometric approach in analyzing professional development leadership programs through data collection only from the Scopus database, a credible source of scholarly peer-reviewed articles. Data collection is through systematic searching in every country using Boolean operators between key words "School leadership model" and "Leadership Professional Development" in English-language journals only from 2000. The research consists of peer-reviewed journal articles, books, and conference proceedings to ensure scholarly rigor. The research employs high-level bibliometric software integrated within the Scopus platform to visualize citation networks, detect co-authorship collaboration, and analyze keyword co-appearance to uncover the intellectual structure, thematic evolution, and research directions within the topic. The technique facilitates the recognition of key researchers, influential papers, and emergent research agendas. Data interpretation is focused on the synthesis of bibliometric findings to approximate the development of the school leadership professional development field, with special attention to key contributions, shifts in themes, gaps in knowledge, and problems at the research frontier. This analysis seeks to inform the construction of a contextual training and development model to address prevailing knowledge gaps and facilitate evidence-based policy and practice in educational leadership. Ethical management of data practices is practiced by staying within accessible academic literature, staying within copyright legislation, and citing all sources appropriately in accordance with scholarly conventions to provide research integrity and credibility. Figure 1 shows the research flow employed in the study.

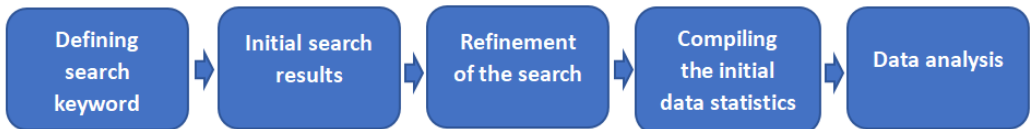


Figure 1. Research Diagram

Source: Ari Masitoh et al. (2021)

3. RESULTS AND DISCUSSION

Trend Analysis of Documents by Year

Figure 2 is a graph of documents per year by year from the years 2000 to 2024 on the x-axis and the number of documents on the y-axis. The trend indicates a steady rise in production from 2000 to 2013, and then a striking surge from 2015. There is a sharp peak during the period between 2015 and 2016, and a steady rise between 2018 and 2021. The peak number of documents is indicated in 2023.

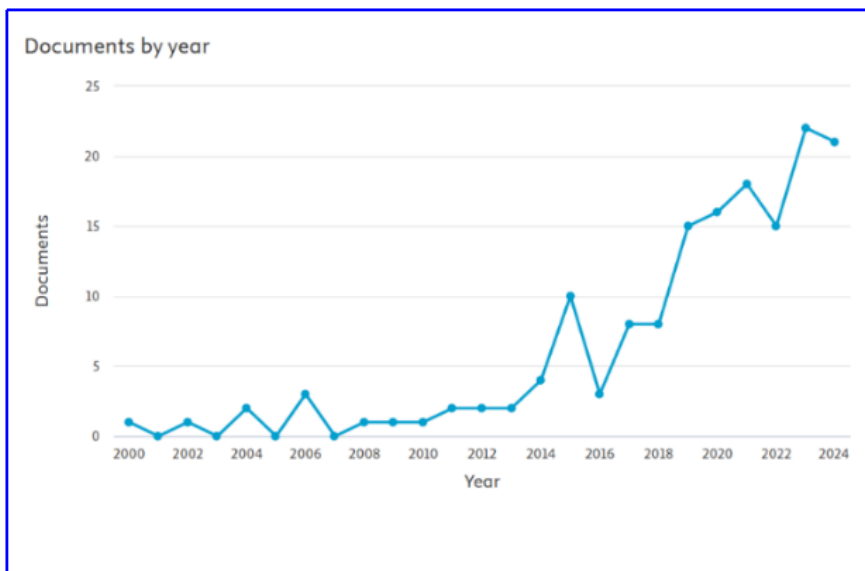


Figure 2. Trend Analysis of Documents by Year

Comparative Longitudinal Analysis of Documents per Year (2004–2024)

Figure 3 is a line graph of a comparison between the number of papers published annually between the period 2004 and 2024 based on different scholarly sources. The y-axis denotes the number of papers, and the x-axis the year. The Journal of Hospital Medicine has the strongest and most stable production with a clear spike in 2018 and recurring peaks through to 2024. The rest of the journals, for example, Professional Development in Education, Journal of Educational Administration, and Educational Management Administration and Leadership, have relatively stable but low levels of

publications. A clear, isolated spike in 2015 is observable in the American Journal of Nursing.

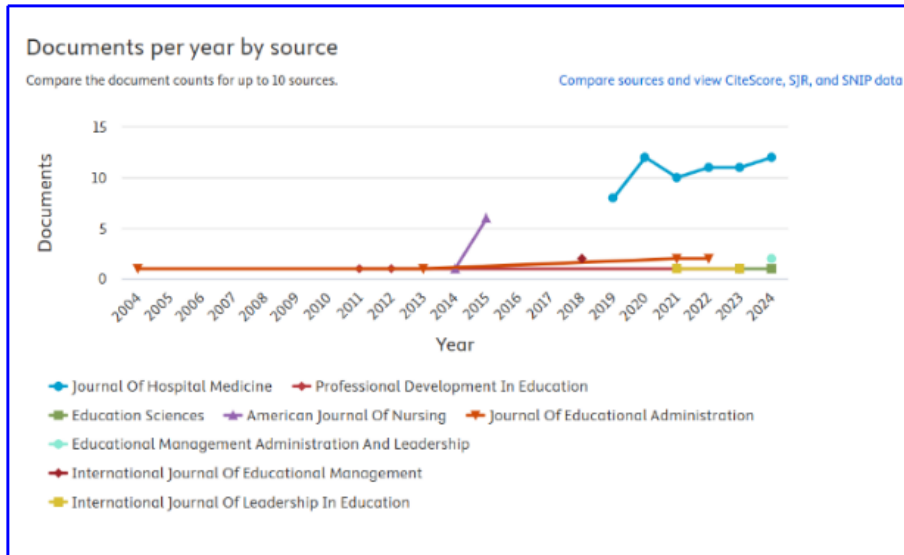


Figure 3. Comparative Longitudinal Analysis of Documents per Year (2004–2024)

Comparative Analysis of Top Contributors

Figure 4 depicts the total documents produced by the top 10 authors. The x-axis provides the number of documents, and the y-axis provides the authors. Gerardi, D. is in the lead with the highest number at close to 6.5 documents, followed by Bush, T., Chopra, V., and Manning, K.D., with each of them producing a little above 4 documents. Nelson, R.E. and Saint, S. both produced approximately 3 documents. The remaining authors—Goddard, J.T., Gray, A., Hoque, F., and Kwan, B.—each wrote approximately 2 documents. The count identifies Gerardi, D. as the most prolific author of the authors listed.

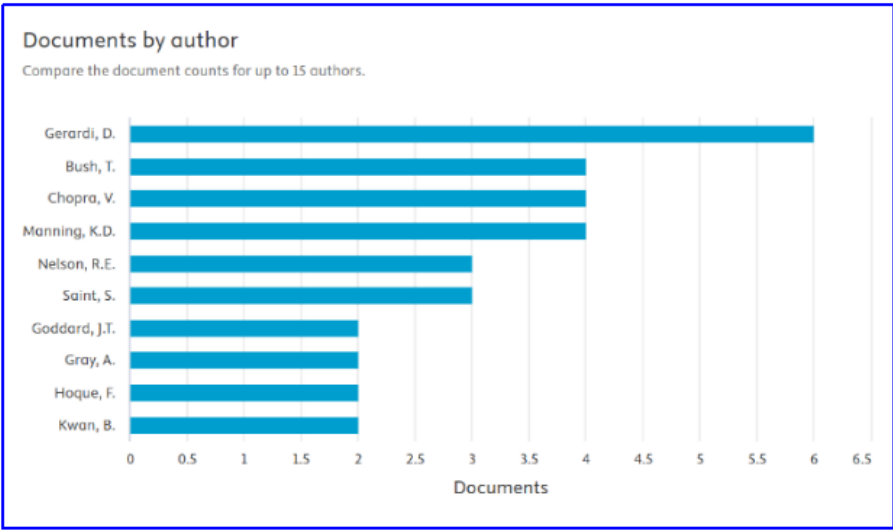


Figure 4. A Comparative Analysis of Top Contributors

Comparative Analysis of Top Institutions

Figure 5 is a comparison of the number of documents that originated from different academic institutions. Interestingly, the University of California, San Francisco, and UCSF School of Medicine both have the highest document output, each with 10. Emory University School of Medicine comes next with a total of nearly 8 documents, while Harvard Medical School has a total of nearly close to 7. University of Cincinnati College of Medicine, University of Colorado School of Medicine, Beth Israel Deaconess Medical Center, and Cincinnati Children's Hospital Medical Center each have a total of 5 documents. VA Ann Arbor Healthcare System has 4 documents to its credit, followed by Michigan Medicine with the lowest output among institutions illustrated here, with a total of 4.

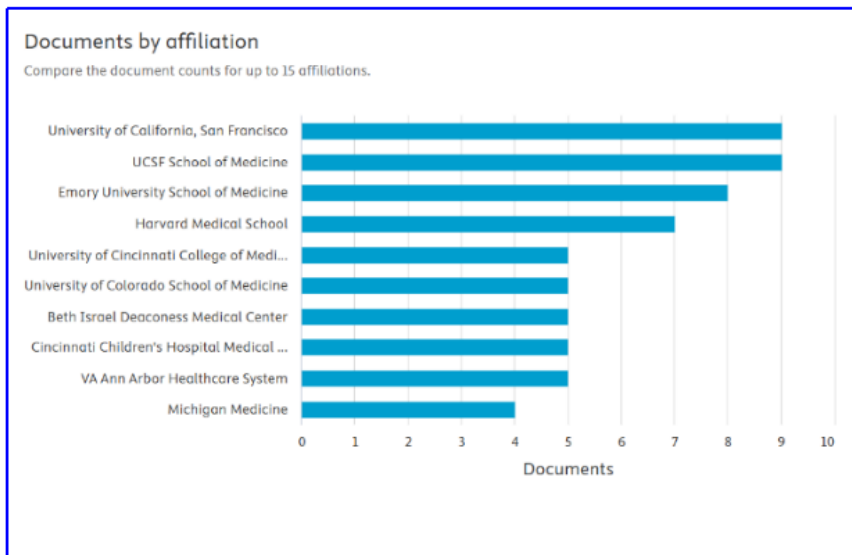


Figure 5. A Comparative Analysis of Top Institutions

Comparative Bibliometric Analysis by Country or Territory

Figure 6 shows a comparative bibliometric output of the number of documents by country or region. In a surprising way, the United States has a much greater output of documents with about 102 documents. This is closely followed by the United Kingdom with considerably less in the form of about 15 documents. Australia and Canada have similar outputs with about 10 and 7 documents, respectively. Turkey and China each have about 4 documents. Greece, Malaysia, the Netherlands, and Norway all have a document frequency of about 2.

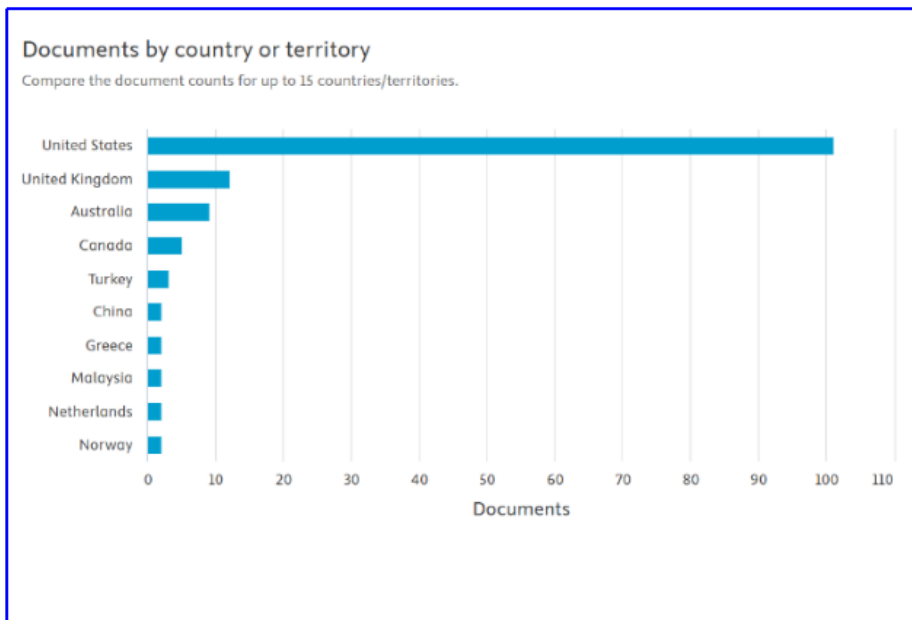


Figure 6. A Comparative Bibliometric Analysis by Country or Territory

Figure 7 is a statistical distribution of methods documents are being disseminated by categories of publications in the data to be analyzed. As already been seen the most common document category is "Article" and it enjoys a majority dominance of 50.0%. "Note" is the next largest category to form a significant 32.7%. Then there come "Book Chapter" and "Review" each forming a minority constituent at 7.1% and 6.4% respectively. "Conference Paper" constitutes 1.9%, whereas "Book" constitutes 1.3% of the dataset. The least represented are "Editorial," which constitute a mere 0.6% of the dataset. The plot easily points towards the dominance of "Articles" in the dataset, and "Notes" constituting a significant percentage too. Other publication types like book chapters, reviews, conference papers, books, and editorials form comparatively smaller parts of the document distribution.

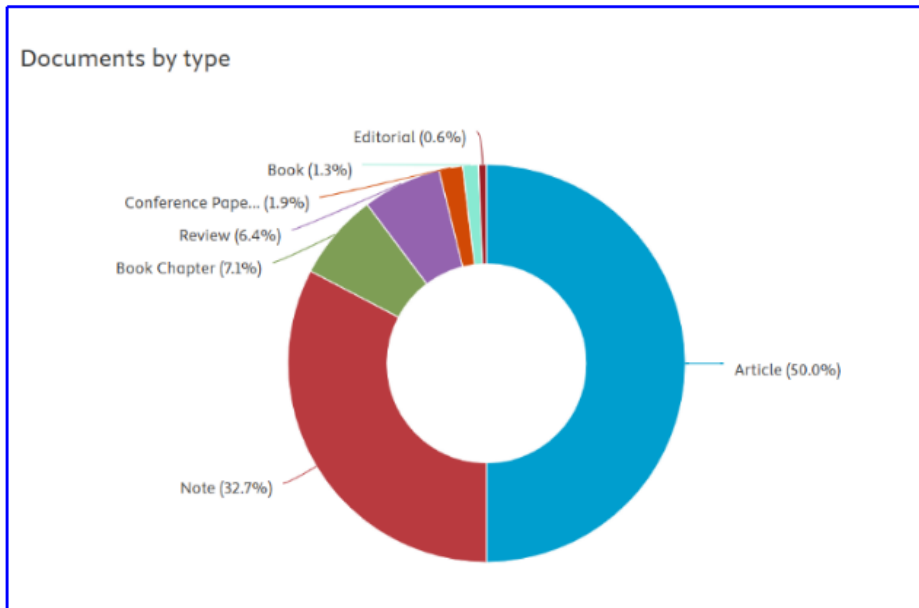


Figure 7. A Quantitative Analysis by Publication Type

Proportional Analysis by Subject Area

Figure 8 depicts the relative number of documents per subject category within the dataset that is under study. The largest subject category is "Nursing," and it takes up 29.1% of the total documents. "Medicine" comes in second place, taking up 26.2% of the dataset. "Social Sciences" is another large percentage, taking up 22.0% of the documents. "Business, Management and Accounting" takes up 7.8% of the total. Lower rates are encountered in "Arts and Humanities" (3.2%), "Psychology" (2.8%), "Other" (2.8%), and "Economics, Econometrics and Finance" (2.1%). "Computer Science" accounts for 1.8%, and "Health Professions" accounts for 1.4%. The lowest subject group in this category is "Mathematics" (0.7%).

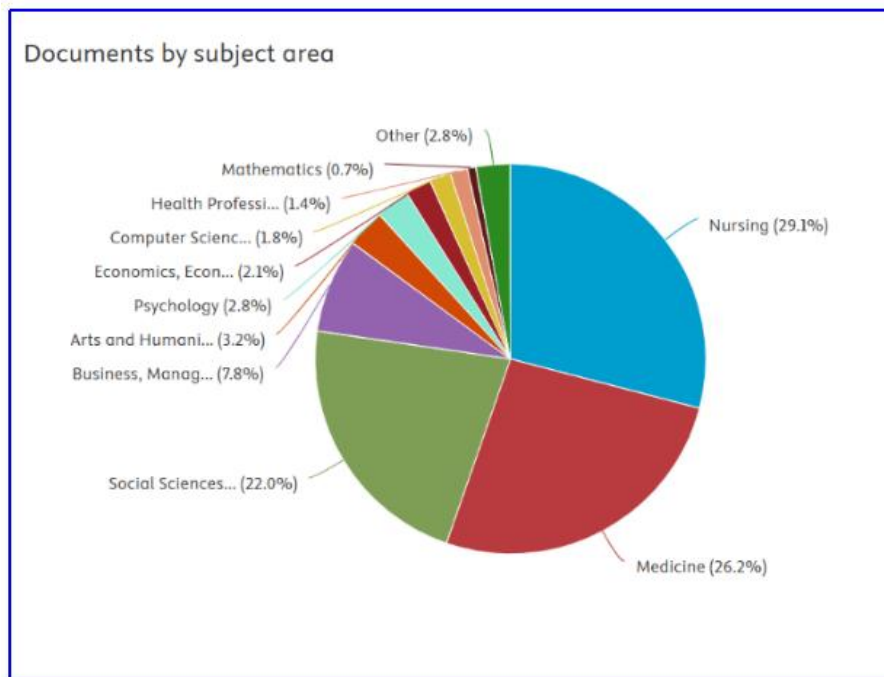


Figure 8. A Proportional Analysis by Subject Area

Co-Authorship Network Analysis of Scholarly Collaboration

Figure 9 (network graph) shows the co-authorship connections between a set of authors. The pattern structure of the connections determines the collaborative structure within this set of authors. Significantly, "anderson, n" is connected to a large number of other authors ("flick, a," "trinidad, s," "smith, h," "white, b," "reading, c," "shaw, g," "mcloughlin, c"), implying a possibly central and extremely collaborative position within this particular set. Other writers show different levels of connectivity, implying different levels of co-authorship in the data being studied.

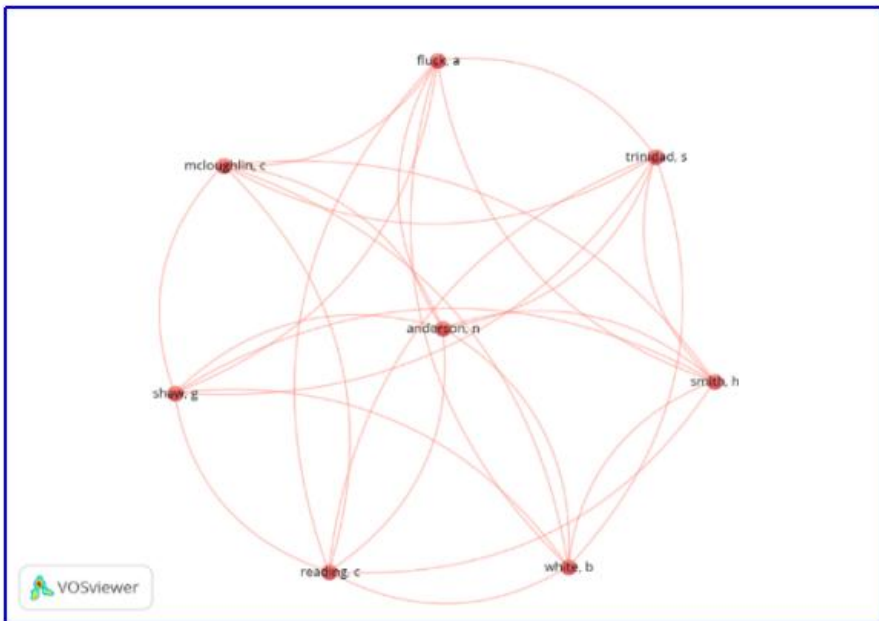


Figure 9. Co-Authorship Network Analysis of Scholarly Collaboration

Co-occurrence Network of Author Keywords in a Scholarly Dataset

Figure 10 shows author-recommended keyword co-occurrence clusters in a scholarship corpus. The blue and red coloring of the nodes indicates groups of semantically close keywords. For example, the large blue node for the term "leadership" shows a central position and is linked to several different clusters, indicating its centrality and relevance to wide-ranging themes. The red cluster includes medical education terminology combined with health care quality terms and patient care expressions as well as nurse practice vocabulary. Within the green terminology cluster, researchers use terms such as article, learning, teaching, education, and curriculum. Others, for example, the yellow cluster including "organization," "mentors," and "conflict (psychology)," and the purple one including "female" and "middle-aged," are not related but perhaps related fields of interest. The individual blue cluster on the right-hand side consists of words such as "teacher leadership," "school leadership," and "principals," a specific sub-domain.

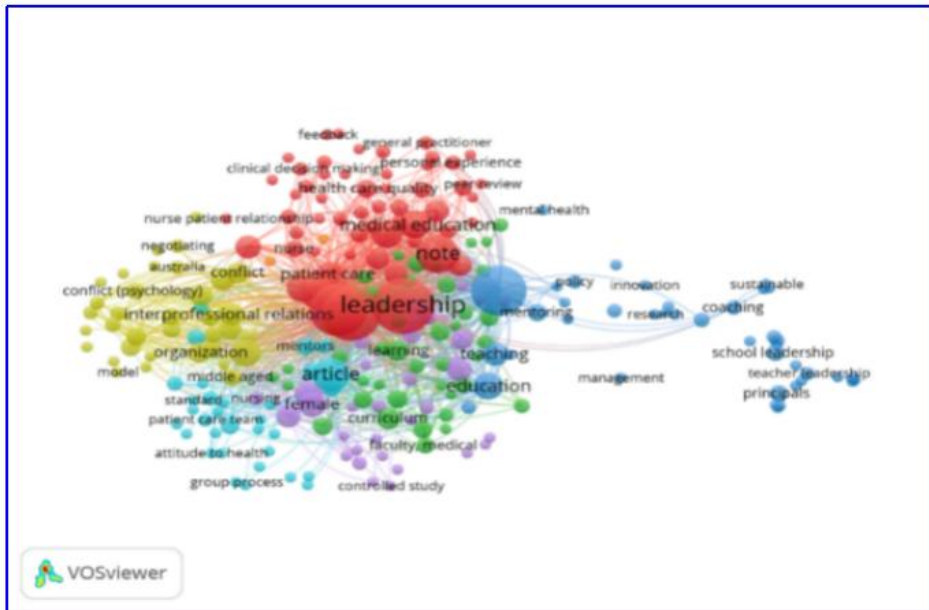


Figure 10. Co-occurrence Network of Author Keywords in a Scholarly Dataset

Initially, the trend shows not only increased interest but also increasing institutional and academic investment in the coverage area covered by these reports. From a policy and professional development perspective, the trend can be viewed as an indication of changing education priorities and emerging structures that place the highest priority on evidence-based practices in training and development. The publication boom comes in response to international and national demands for more localized, responsive, and evidence-based educational interventions (Slavin, 2020). Particularly, the high rate of acceleration post-2015 may be linked to public education systems wherein contextualized training and development models are employed, wherein regional-specific needs, cultural contexts, and performance statistics are incorporated within training programs (Abera, 2023). Such growth trend is likewise an indication of greater conformity to institutional and accreditation standards of professional development programs to emphasize more persistent quality improvement. It may be an expression also of the evolution from generic, traditional, and outdated training mechanisms to more discriminative, competency-based, and practice-oriented mechanisms like the Contextualized Training and Development Program (CTDP) that inject local contexts in training module conception and implementation (Benayoune, 2024). The greater

documentation and dissemination of such efforts in academic forums help to feed the pool of knowledge that informs policy-making, capacity-building, and evaluation of education reforms. The consistency of output from 2018 to 2021 reflects the institutionalization of research-informed training models among education and academic agencies.

Next, a longitudinal comparative analysis of scholarly production output between the years 2004 to 2024. The trend may be seen as more emphasis on the resilience of health systems, inter-professional professional growth, and training programs based on hospitals due to systemic issues, especially post-pandemic workforce development. Compared to these, education category journals like *Professional Development in Education*, *Journal of Educational Administration*, and *Educational Management Administration & Leadership* have very little but consistent trends in publication. The trends depict ongoing but comparatively less vigorous scholarship in terms of research with a direct connection to contextualized teacher and education leadership preparation. However, their persistence implies a persistence of interest in institutional capacity development, teachers' education, and school leadership professionalization (Lane et al., 2020). Anomalous 2015 peak in the *American Journal of Nursing* implies a potential anticipated timing of heightened scholarly attention to nursing education or health policy, perhaps driven by changes to standards of continuing professional development (CPD) or responses to global health emergencies. Such a peak might imply a reactive research dissemination pattern, which helps to highlight the importance of having institutionalized research cultures in place to drive long-term development goals. The relative lack of education papers in education-oriented journals, particularly in comparison to medical and health science journals, has very profound impacts on local training and development initiatives. This indicates the necessity for additional funding of school of education research facilities in order to ensure that training paradigms are rooted in empirical realities, especially those that are located within local settings and designed to turn around sectoral diseases.

Additionally, the top 10 most published authors included in the range of literature reviewed from 2000 to 2024. It demonstrates that Gerardi, D. is the most prominent, with a clear trend of conducting research most likely focused on healthcare leadership, conflict management within interprofessional settings, or training design for high-stakes settings. Gerardi not only as a contributing author but as a thought leader whose work can inform the future of context-based training models, particularly in health-related professional development. Bush, T., Chopra, V., and Manning, K.D. are in close succession with each of them having approximately four documents. Bush's real-world experience would naturally be school leadership and school administration, both of which are paramount in the planning and evaluation of Contextualized Training and

Development Programs within education systems (Sales et al., 2020). Chopra and Manning's personal professional experience in hospital medicine and nursing leadership can offer insights into inter-disciplinary models of professional training and context-based performance measures—principles of extreme applicability in training programs for systemic, complex problems across industries. Nelson, R.E. and Saint, S. who respectively make three articles each. Their work, which regularly bleeds into patient safety and organizational culture for hospitals (Nelson et al., 2022), has the potential to value add to the CTDP discussion by considering risk management and institutional accountability. Goddard, J.T., Gray, A., Hoque, F., and Kwan, B., respectively, each contributing two documents in their submission, represent a pluralistic array of viewpoints from school administration, cross-national policy, and inclusive school leadership. These measures become increasingly relevant in settings where training programs must be responsive to multicultural dynamics, equity priorities, and governance changes (Cnawp et al., 2025; Norrman & Eriksson Ahre, 2024). This emphasis has serious ramifications for the production and dissemination of sector-specific professional development models. High-output authors tend to set prominent theoretical orientations, policy controversies, and methodological expectations in their given domains. Their continued contribution, therefore, implies a probable epistemic leadership that informs the construction and assessment of CTDPs across sectors. In addition, such distribution indicates the importance of collaboration and specialization in knowledge production.

Furthermore, the University of California, San Francisco (UCSF), and its School of Medicine top the dataset with the highest number of publications, each having written 10 documents. The academic work puts the central position of established academic medical centers in the production of knowledge, especially in the fields related to healthcare leadership, interprofessional education, and practice-based learning—areas of utmost importance to the development of Contextualized Training and Development Programs (CTDPs). UCSF and its affiliates' pioneering roles are especially noteworthy, considering that their institutional emphasis on interprofessional education, clinical scholarship, and academic-practice integration is at international levels for context-responsive professional development (Akdere & Egan, 2020). The emphasis on outputs of some top-tier institutions mirrors not just their impressive research investment and infrastructure but also their scholarship institutionalization as a force for training innovation. These institutions serve as incubators of novel pedagogical models as well as leadership development programs that can cascade to more general CTDPs for health and education fields. Their ability to produce high-quality, peer-reviewed outputs helps to

create a research-informed policy setting, whereby workforce training and institutional growth choices are more and more rooted in empirical evidence.

However, the comparative density of papers by chosen institutions also raises important questions regarding research equity, knowledge concentration, and global outreach. Support for research systems in regional and emerging universities needs to be encouraged to ensure that CTDPs are diverse sociocultural environments and not restricted to Western or high-income country-practitioner-based approaches. This is also evidenced in decolonizing professional learning and knowledge production in south-south cooperation literature (Lepore et al., 2021).

Subsequently, the number of research papers over time by country or region shows a huge productivity gap. The empirical studies showing how evidence-based Contextualized Training and Development Programs (CTDPs) can be used in progressively diverse disciplines where practice-based, multidisciplinary learning is necessary, such as medicine, education, and public health. Conversely, the lower output of other countries—particularly Global South countries—is a reflection of institutional research capacity, financing, and global publication outlet access. This gap is problematic when designing training programs that are locally contextual but remain internationally aware. In the absence of sufficient representation by diverse cultural and socio-economic groups, CTDPs can end up over-templating models that are not contextually appropriate in developing country contexts (Madsen & Adriansen, 2021). Policy-wise, there is a call for enhanced collaborative research, human capacity, and open networks free of charge in order to provide the under-represented nations with avenues of sharing inputs in enriching the world's stock of knowledge. Regional integration through UNESCO and SEAMEO integration are drivers pertinent to stimulating localized research capable of being tapped towards informing training national policy as well as planning by institutions. The contributions of medium-sized nations like the UK, Australia, and Canada also reflect their growing voice in education policy and professional learning scholarship. These nations have made significant contributions to studies on teacher standards, school leadership, and system education reform, which are at the core of the CTDP model. Their frameworks tend to prioritize ongoing professional development (CPD), reflective practice, and adaptive leadership—principles that can be localized by policy alignment and culturally responsive pedagogical frameworks. In the Philippines, the national policies of the country, like the Philippine Professional Standards for Teachers (PPST) and the re-imagination of the National Educators Academy of the Philippines (NEAP), attest to an increasing acknowledgment of the imperative for research-informed, contextually situated professional development. Nonetheless, low visibility in the present bibliometric landscape for Southeast Asian nations hints at an urge

for institutional research mandates to be made stronger, scholarly publishing to be supported with strength, and incorporation of research engagement into the plans of national development.

Moreover, a quantitative bibliometric analysis reporting the frequency of publication types in the dataset in question shows that the most common type of academic publication is the peer-reviewed Article and that this comprises exactly all documents. The highly respectable phenomenon of Notes—generally brief reports, thoughts, or preliminary conclusions—testifies to the very great importance attached to speedy scholarly exchange, particularly in areas where developing fields need to grow quickly via diffusion of innovation in training, management, or teaching pedagogy. They may serve as pre-production steps towards substantial studies or pilot experiments, which become widely used through repetitive process development cycles within Contextualized Training and Development Programs (CTDPs). Thus, Notes provide access to novel trends and practitioner-researcher discussions frequently overlooked in standard full-length articles. The comparatively small sizes of Book Chapters, Reviews, and Conference Papers imply possible limitations in large-scale or interdisciplinary analyses of CTDP systems. Since Book Chapters are likely to hold in-depth analyses of concepts and Reviews integrate bodies of knowledge, the lower percentage in these types may imply the occurrence of an abridged deficiency in synthesized research on training and development policy in non-Western and practice fields. The balance also guides the conceptualization and program assessment of training programs. CTDPs in national education institutions or health centers, for example, demand convergent syntheses of best practices, policy prescription, and theory. The fewer review articles can restrict access for program developers and policymakers to such aggregated knowledge that they may base policymaking on or curricula planning for professional development. Apart from this, the marginal occurrence of Conference Papers indicates limited visibility of informal knowledge-sharing sites in the data. This may be read as barriers in translating conference-based discussions to formal publication or underrepresentation of practitioner voices that are likely to arise in such sites. Conferences contribute significantly to cross-institutional networking, cooperation, and exchange of policy, particularly in Southeast Asia where CTDPs are required to be guided by world best practices as well as regional contexts.

Moving forward, the relative distribution of scholarly papers among different domains of academic research in the given data, each of the top three most frequent subject categories—Nursing, Medicine, and Social Sciences—contributes individually to a large majority of the total document count. Secondary representation occurs in Business, Management, and Accounting, while the smaller contributions are from disciplines such

as Arts and Humanities, Psychology, Economics, Econometrics and Finance, Computer Science, and Health Professions. The ratio of Mathematics is the lowest in the distribution. The distribution represents the dominance of academic endeavor in some areas and represents smaller involvement by other fields. It indicates several important facts about the dominant theme and academic focus of the body of literature that has been examined. The dominance of Nursing and Medicine indicates a heavy focus on clinical practice, improvement of the health system, and interdisciplinary practice for the treatment of patients—areas where the creation of effective CTDPs is most appropriate. Studies in these fields tend to examine topics like competency-based training, interprofessional working, and evidence-based practice, all of which are the building blocks of high-impact training and development models (Jeyakumar et al., 2021). The high Social Sciences percentage further supports the embedding of sociocultural, psychological, and educational theory into training design. Scholarship within this field comes to be more concerned with professional identity construction, theories of learning, workplace learning, and organizational policy—all imperative to the creation of responsive CTDPs based on actual problems (Halligey, 2022). The high visibility of the Social Sciences is also indicative of growing awareness of the role played by human behavior, organizational culture, and arrangements of a socio-political kind in the operation of professional development strategies. Most notably, Business, Management, and Accounting—although not a plurality contributor—provide meaningful data on leadership, performance management, and organizational development. Scholarship in this field regularly feeds into change management models, strategic planning models, and human capital models readily exportable into training or healthcare education contexts (Halligey, 2022). The inclusion of it in the dataset proves to be a multidisciplinary understanding of CTDP design that addresses both instructional and institutional environments. Conversely, comparatively thin coverage of subject areas like Mathematics, Computer Science, and Health Professions signals areas where CTDP-related effort can be spread thin. By way of example, the growing significance of digital literacy, data analysis, and simulation-based education in the academy and the health professions requires more cross-fertilization between computer science and training development (Khalid et al., 2024). Conversely, the poor visibility of Health Professions (with the exception of medicine and nursing) could also be seen as evidence for an allied health disciplines literature gap—e.g., public health, rehabilitation, and pharmacy—whose professionals would similarly gain from specific professional development frameworks. Policy-wise, this imbalance in discipline requires an integrated and balanced CTDP research funding and curriculum policy. Inter-institutional and policymaker interdisciplinary collaboration

to bring together technical, behavioral, and managerial views should be encouraged to ensure that training programs are holistic, adaptable, and future-proof.

Then, the most central author in the network is "Anderson, N," whose dense link with researchers such as "Flick, A," "Trinidad, S," "Smith, H," "White, B," "Reading, C," "Shaw, G," and "McLoughlin, C" indicates an integrative and central function in the co-authorship network. The stringency of such collaborations demonstrates that Anderson is an academic anchor or knowledge broker—a researcher who establishes information exchange and multidisciplinary collaboration transcending institutional or topical boundaries. Such scholarly clustering has profound effects on conceptualizing and implementing Contextualized Training and Development Programs. Knowledge co-production in professional development research also emphasizes co-authorship in cooperation across research groups by learning with and working collaboratively with colleagues as key dimensions to build powerful, long-lasting training systems (Elahi & Bilal, 2025). Effective co-authorship networks will usually indicate the existence of a research community or an epistemic network aimed at co-production of theories for education, training models, and evidence-based practice within a setting. Policy-wise, having an understanding of the topology of collaborative networks allows institutions to identify influential or hub persons whose knowledge and academic contacts can be leveraged to lead CTDPs. Nodes such as Anderson, N., with multiple co-authorship connections, are likely to guide the next generation of researchers, implement inter-institutional capacity development programs, and coordinate multi-disciplinary training modules sensitive to global trends and local realities. Further, where clusters and peripheral nodes are situating mirrors where collaboration may be limited or rising. More network interconnection through promoting collaborative research grants, inter-institutional activities, and cross-country networks of research might enhance coverage and contextual appropriateness of training interventions. This aligns with international efforts like UNESCO's "Futures of Education" movement to call forth cross-disciplinary and collective action to tackle creating knowledge for professional learning systems.

Finally, the central and brightest blue node marked as "leadership" is heavily embedded within multiple clusters, which is reflective of its cross-cutting nature. Leadership in educational and health contexts has also been extensively reported as a key driver of institution performance and innovation (Bastidas et al., 2024). Its central placement reflects its integrative role in impacting change management, organizational culture, and policy implementation in education and health systems—CTDP planning priority sectors. The red category, consisting of "medical education," "health care quality," "patient care," and "nurse," implies a strong focus on clinical education, delivery of care, and professional development in medical and allied health environments. These are

themes most relevant to intensified worldwide focus on competency-based education in health, as well as continuous professional development (CPD), especially amidst shifting public health needs (Sidhu et al., 2023). Adding "nurse" identifies nursing practice alteration and leadership as essential to adopting CTDP within health facilities wherein evidence-based practice and individualized training are imperatives. The green cluster contains terms like "learning," "teaching," "curriculum," and "education" that convey the pedagogical character of the research environment. The terms concern long-standing arguments about curriculum innovation design, pedagogic approach, and thinking for action—the very heart of teacher education and school reform.

The green cluster presents new avenues to positioning teacher development programs alongside local curricular needs and student populations. Notably, the yellow thread with "organization," "mentors," and "conflict (psychology)" indicates a thread of research into organizational psychology and mentoring—key concepts in leadership pipelines and capacity-building approaches. Mentorship, for instance, is a well-documented best practice in professional development systems that has implications for success among new teachers and health professionals (Putra et al., 2024). The presence of systematic mentoring in CTDPs facilitates the creation of sustainable human resource development and institutional persistence. The purple cluster, containing terms such as "female" and "middle-aged," implies an emergent theme of interest in gender and age studies within occupational careers. An embrace of the socio-cultural dynamics of training groups, specifically from gendered or age-stratified professions, offers empirical foundations for more egalitarian and inclusive training policies (Dagunduro et al., 2024). A blue isolate cluster on the fringe—composed of "teacher leadership," "school leadership," and "principals"—signals a distinctive but substantial sub-domain in educational administration. They underscore the distributed leadership model and changing educator roles in policy adoption and school reform. Being close to the others can be seen as either specialist discourse or not fully linking up with wider interdisciplinary research, which requires systematic bridging activities to bring domains together into CTDP development. This co-occurring keyword map provides a conceptual basis for building strategic research agendas that ought to guide CTDP planning. The leadership, education, and health salience themes imply the demand for bundled sets of training in organizational behavior, instructional capability, and clinical skills.

4. CONCLUSION AND RECOMMENDATION

The bibliometric trends in figures offer detailed data on trends in research productivity, imbalances, and thematic concerns. The article surge in 2015-2016 peaks in 2023 with increased research activity, triggered by institutional incentives and issues worldwide. Journal of Hospital Medicine supremacy and leading producers such as Gerardi, D., and the University of California, San Francisco also utilize dense authorship and institutional production, and United States supremacy reflects research capacity imbalances worldwide. Dominance by fields and articles of health-related topics—Nursing, Medicine, and Social Sciences—also reflects strong thematic concentration, although perhaps limiting to interdisciplinary investigation. Additionally, the visibility of dominant collaborators such as "Anderson, n" also reflects systematic sub-networks in a larger fragmented authorship context. Lastly, the dominance of "leadership" as a keyword, with more widespread thematic clusters, indicates leadership discourse dominance, and thus thematic dispersal, and thus the need for integrated and inclusive study designs.

To address the identified challenges in research productivity, thematic fragmentation, and inconsistent institutional output revealed by the analysis, it is recommended to institutionalize a Contextualized Training and Development Program (CTDP) that is responsive to the specific research specializations, institutional mandates, and disciplinary expertise of individual researchers and their respective institutions. The CTDP must offer formal training in research design, academic writing, publication strategy, collaborative networking, and thematic coherence with high-impact journals. At the same time, collaborative research environments can be facilitated by enabling cross-border and inter-institutional collaboration especially among historically disadvantaged countries and low-productivity institutions through strategic grants, seed funding, and intellectual exchange online platforms. Excessive reliance on article outputs can be reduced and representation improved across subject categories, including areas of study such as Mathematics, Psychology, and Health Professions, which can boost intellectual debate and reduce reliance on article output. Furthermore, mentorship and author clustering mechanism design from co-authorship network data can match isolated researchers with productive authors such as "anderson, n" and "Gerardi, D." to establish more concrete collaborative relationships. Lastly, institutions need to develop cross-cutting research agendas in abstract themes such as leadership, healthcare quality, and educational leadership to synthesize divergent strands of research into strategically aligned, policy-focused scholarly outputs.

5. FUTURE DIRECTIONS

Future research on healthcare leadership must foster comparative and cross-national research especially in underserved geographical areas to build an inclusive global evidence base. There must be interdisciplinary cooperation among scholars in the fields of healthcare, public health, management, psychology, information technology, and policy among others. There should be increased focus on issues such as digital leadership, artificial intelligence, workforce resilience, health equity, crisis leadership, and sustainable healthcare systems. Studies which are longitudinal and focused on implementation must be conducted to enhance the evidence base. Policymakers and healthcare organizations must fund leadership development, research, and international collaborations based on bibliometric evidence.

6. CONFLICT OF INTEREST

The author(s) declare that there is no conflict of interest regarding the publication of this paper.

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