

Half a Century of School Management Research: A Bibliometric Analysis

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ABSTRACT

School management helps owners of educational institutions manage their education systems more efficiently. Good school management will make it easier to achieve the goals of education itself. This paper aims to examine the status and position of the visual map of research in international school management publications using a bibliometric approach. Bibliometric analysis involves using statistical methods to analyze literature on a particular topic, helping to identify patterns, trends, and networks in research publications. In this study, researchers used data collected from 2,241 documents published from 1970 to 2020, utilizing analytical tools such as Scopus, VOSviewer, and Sci2. The results showed that the University of South Africa and Tshilidzi G. Netshitangani are the most active institutions and individual researchers in school management publications. Articles are the most common type of document in school management publications. There are four groups of collaborative researchers who are researching the issue of school management publications. To classify the body of knowledge resulting from the publication of half a century, this study establishes a clustering of convergence axes associated with school management publications: Schools, Organization and Management, Leadership, and Education, abbreviated as SOLE research themes. These themes help categorize the vast array of research into distinct focus areas, facilitating targeted studies and informed decision-making in educational policies and practices. The implications of the findings highlight the importance of international collaboration and the need for localized studies to address specific educational challenges. Future research should focus on evaluating contributions and describing the implications of school management studies by combining data from the Web of Science and Scopus.

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1. INTRODUCTION

The field of school management has seen a significant increase in research, reflecting its critical role in enhancing educational outcomes. Studies in this area intersect with various domains such as school development, cybercrime, knowledge management, team dynamics, electronic management, and organizational barriers. Research on school management spans numerous themes including the development of effective teaching environments (Benoliel, 2021), the application of national education standards (Hosnan, Hidayat, Heruwati, Jamaludin, & Mursyid, 2019), and the impact of school infrastructure and teacher competence on educational quality (Sari, Koul, Rochanah, Arum, & Muda, 2019).

School management significantly affects the culture within a school, as it acts as a social agent to disseminate benefits related to technological advancements (Altinay, Beyatli, Dagli, & Altinay, 2020; Wibowo, Marini, Safitri, & Wahyudi, 2020). Effective school management can meet the community's expectations for a better quality of education (Taniguchi & Hirakawa, 2016). Additionally, professional management plays a crucial role in achieving the school's mission, vision, and goals (Cooper, Scandura, & Schriesheim, 2005).

School management teams face the responsibility of running the school and implementing policies on a daily basis (Chen-Levi, Schechter, & Buskila, 2021). Recent years have seen significant attention given to the introduction of effective and productive management within the public administration and organization of school institutions (Grandy, 2009). These challenges require school management teams to navigate complex administrative and organizational tasks to ensure smooth school operations.

Technological developments are increasingly integrated into school management practices, providing new tools and strategies to enhance educational outcomes. Schools, as social agents, benefit from advancements in technology, which help to streamline management processes and improve communication and efficiency within the school environment (Altinay et al., 2020).

Every school needs to increase the role and quality of the school management that it runs so that it is to the current social context and community needs (Mccaslin & Good, 1992), so that education can produce quality and quality students. The public, education researchers and policymakers agree that the global education system needs attention because it is in a crisis. The progress of the times, balanced with technological developments every year, encourages social quality, especially education for the community, to increase (Vennebo & Ottesen, 2015). However, adopting educational ideas is often obtained mysteriously without the support of objective evidence and discussions with teachers, students, and existing learning (Smyth, 2011). A superior education system needs to be built by schools to realize the quality and character of education. Schools will need educators who can develop teaching methods in the classroom and at the school level and are assisted by a healthy education system (Meirink et al., 2020). Schools need educators who can understand educational standards, and the academic and technological advances they see in schools can be introduced (van der Heijden, Beijgaard, Geldens, & Popeijus, 2018).

The school manager, or in this case, is the head of the institution. It is necessary to be able to analyze many data to make decisions (Balcita & Palaoag, 2020). The leadership role and performance of school principals who have an entrepreneurial spirit as part of joint school management significantly influence the quality of culture in educational institutions (Anam, Purnomo, Ismanto, & Rosyidah, 2019). The national education department has planned strategically to achieve institutional efficiency in future goals (Şahin & Faruk Ak, 2018). In the education system in Indonesia itself, teaching teachers who are not by the educational background results in professional competence (Matin, Sugiarto, & Pujiastuti, 2020). However, this results in less than the maximum knowledge obtained by students.

School management plays a fundamental role in the quality of education of a nation. Scientists have studied for years to learn why educational performance, especially in developing countries, remains below (Tavares, 2015). Some economists believe that for sustainable economic development, an educated population of citizens is essential (Glewwe & Maïga, 2011). Thus, in the era of global economic globalization at the end of the 1980s, various countries competed to improve the nation's economy by

improving the quality of the education system to produce more competitive and quality human resources (Ball, 2012; Court, 1994; Robertson, 1996; Whitehead, 2001). School management performance depends on school productivity which can be measured based on the added value of students (Crawford, 2017). Therefore, good school management can significantly influence the country's economy because it contributes to creating a productive, competitive, and quality generation.

Management is a mechanism to achieve organizational goals with continuous planning, coordination, coaching, and supervision. So that all planned activities, leadership structures, and orders owned by the school can run sustainably (Setiawan et al., 2017). By understanding and managing conditions that promote sustainable management, schools can increase the use of resources more productively and effectively (Chatterley et al., 2014). In addition, employee trust in school leaders is also needed so that school management can run well. Previous research has proven that trust between employees will also have a considerable influence on leadership in a business organization (Lubis, Sagala, Saragih, & Sagala, 2021).

Previous research studies deal with management from a normative perspective (Vázquez-Recio, 2019). Research on school management theory in education has been conducted internationally during the last few years. However, previous research on the subject of school management has usually been limited to school services (Balcita & Palaoag, 2020; Feng, 2019; Hillah, 2019), or state-owned school management (Alanezi, 2021; Garnica & Martínez-Garrido, 2019; Horvat, Žvorc, & Skoko, 2019; Naidoo, 2019). However, only a few scientific studies at the international level are visualized from year to year by giving public demonstrations, and not much school management research. In addition, only a few studies address the relationship between affiliation, authors, and their research implications. Despite extensive research on various aspects of school management, there is a notable gap in the visualization and mapping of research trends and collaborations in this field. This paper aims to examine the status and position of research in international school management publications using scientometric analysis. By visualizing research trends, keywords, and collaborations, this study seeks to provide valuable insights for new scholars and guide future research in the field.

2. METHODS

This research has been conducted using the bibliometric method. Bibliometric analysis involves using statistical methods to analyze literature on a particular topic, helping to identify patterns, trends, and networks in research publications (X. Zou, Yue, & Vu, 2018). This research data was taken from January to April 2021 from the Scopus database using a document search service (Purnomo, Anam, Asitah, & Firdaus, 2021). Researchers have used the Scopus database as the primary source of information because it is considered a reliable and trusted scientific publications database by academics.

The search query 'TITLE-ABS-KEY ("school management" OR "management of the school") AND PUBYEAR > 1969 AND PUBYEAR < 2021' was used to extract relevant documents from the Scopus database. Publications from 1970 to 2020 were selected, resulting in 2,241 documents for analysis. The position of research in global research is mapped in reports on school management conducted globally in the last 50 years.

This study utilized data analysis and visualization through various analytical tools, specifically Scopus, VOSViewer, and Sci2 (Hajiheydari, Talafidaryani, Khabiri, & Salehi, 2019; Purnomo, Septianto, Rosyidah, Ramadhani, & Perdana, 2021). Researchers used the "Analyze search results" feature on Scopus to map graphic tables related to bibliometric indicators, such as sources of scientific publications that are most widely used, countries with the highest production, institutional affiliations of researchers, types of publications, most productive authors, and most cited articles.

In this study, the VOSviewer version 1.6.16 application was employed for co-occurrence and co-authorship analysis. Co-authorship analysis was performed using the author's unit of analysis, applying a systematic computational technique with VOSviewer to derive a research network of international collaborative researchers. Additionally, an in-depth co-occurrence analysis was conducted using

keyword relationship analysis and VOSviewer to generate a network of keyword maps for research themes (Eck & Waltman, 2010; Ranjbar-Sahraei & Negenborn, 2017).

The Sci2 application was used to visualize research trends in school management (Sci2 Team, 2009). First, descriptive statistics such as the number of publications per year, the distribution of publications by country, the frequency of keywords, and the citation counts were calculated and tabulated using Microsoft Excel. Results from different analytical tools were synthesized and cross-verified (triangulated) to ensure the robustness and reliability of the findings.

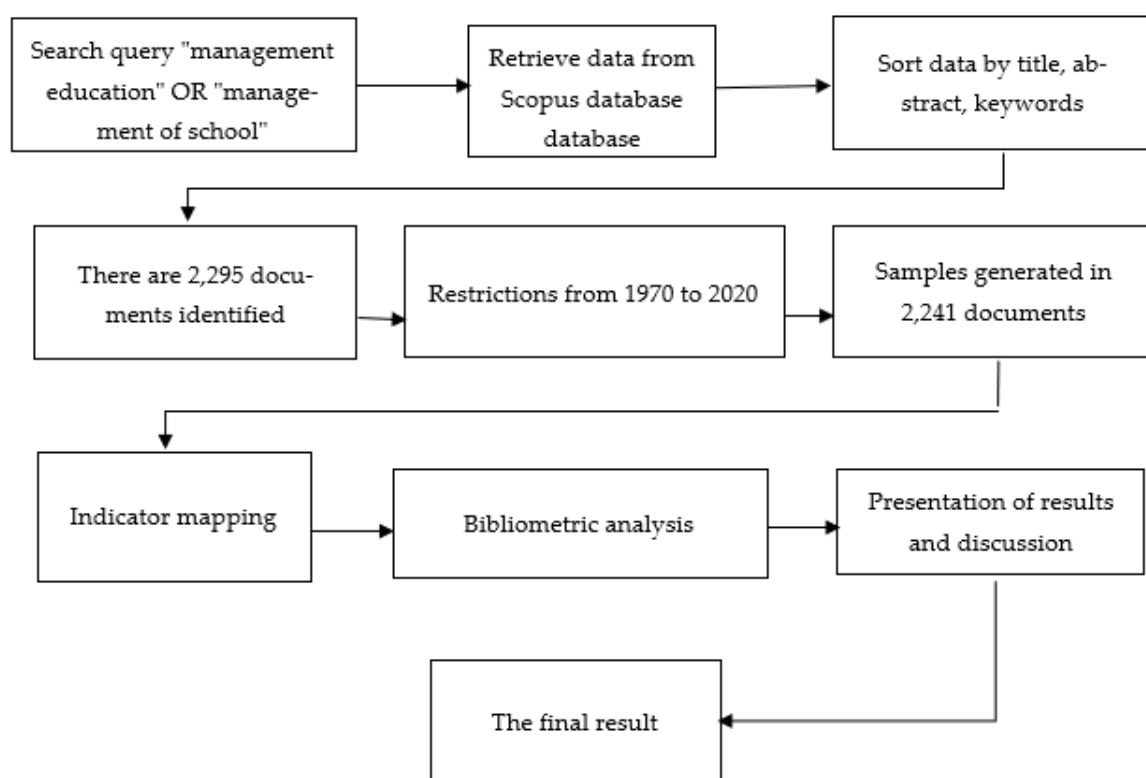


Figure 1. Research flow framework

3. FINDINGS AND DISCUSSION

This section presents data on the evolution of school management publications, highlighting trends, key sources, countries, authors, and research themes.

3.1 The Evolution of Scientific Production

Publications related to the theme of school management generally show an increasing trend every year. In Figure 2, it can be seen that the study of school management can be divided into four stages based on annual publication productivity, namely the initial stage, primary development stage, consolidation and stabilization stage, and rapid development stage.

First, Initial stage, during this stage, from 1970 to 1984, school management publications were sparse and irregular, averaging three documents per year, with a total of 49 publications. Second, Primary development stage (1985-2000), publication numbers increased significantly, averaging 19 documents per year, with a total of 290 articles, indicating growing interest in the field. Third, Consolidation and stabilization stage (2001-2012), this period saw steady growth, with an average of 74 publications per year, totalling 668 articles. The last, Rapid development stage (2013-2020), publications

surged, averaging 176 documents per year, peaking at 212 articles in 2020, reflecting heightened research activity.

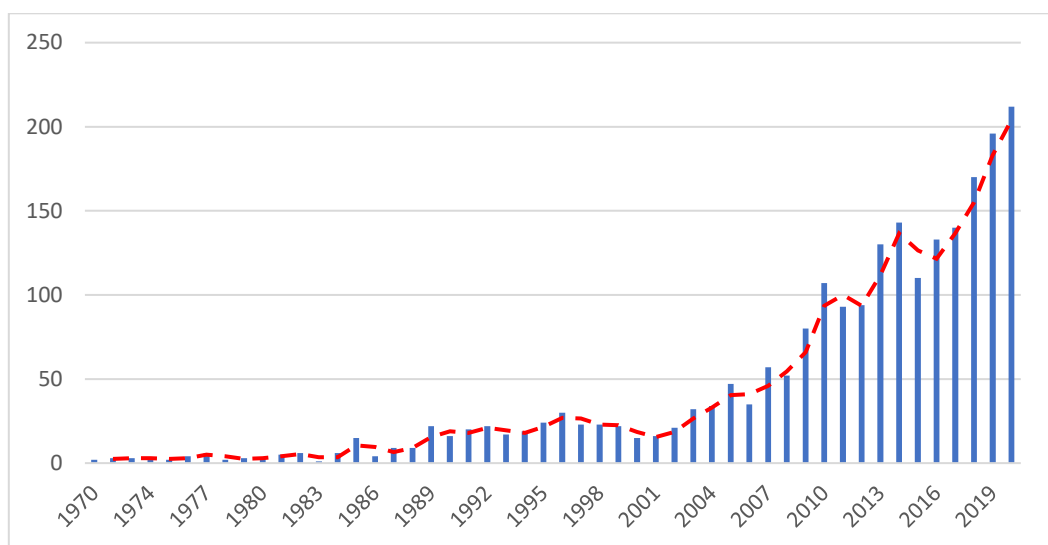


Figure 2. The evolution of scientific publications (1970 – 2020)

3.2 The most widely published sources of scientific publications in school management

Bradford's law allows researchers to identify the essence of the sources of published publications (Biradar & Kumbar, 2020; Borgohain, Verma, Nazim, & Sarkar, 2021; Brookes, 1969; Desai, Veras, & Gosain, 2018). Bradford's law, formulated by Samuel C. Bradford in 1934, states that if scientific journals are arranged in order of decreasing productivity of articles on a given subject, they can be divided into a core group of journals particularly dedicated to the subject, followed by several groups or zones containing a similar number of articles but a larger number of journals. This law is relevant to the analysis as it helps to determine which journals are most influential and prolific in the field of school management, thus highlighting the key sources that contribute significantly to the body of knowledge on this topic. The number of articles related to a topic in a publication source shows the implications of that publication source for knowledge on that topic.

Table 1. The publication source that publishes the most school management and SJR indicators

No	Scientific Source Publication	SJR	Article
1	Mediterranean Journal of Social Sciences	0.13	49
2	Educational Management Administration and Leadership	1.71	48
3	International Journal of Educational Management	0.57	47
4	School Leadership and Management	0.73	32
5	South African Journal of Education	0.37	25
6	Journal of Educational Administration	0.95	24
7	School Organisation	0.30	23
8	Ensaio	0.25	21
9	Education Policy Analysis Archives	0.66	18
10	Educational Management Administration Leadership	1.71	18
11	Management in Education	0.87	18
12	Procedia Social and Behavioral Sciences	-	18
13	Others 141....		821

In this field, there are 2,241 publication documents published in 153 journals, which are then analyzed (Table 1). The Mediterranean Journal of Social Sciences has the highest impact factor among other publication sources, with articles on the theme being published the most. The Mediterranean Journal of Social Sciences has published 5,414 articles since 2010, and 49 of them are articles on the theme of school management.

The international relevance of a journal is determined by its impact factors or SJR indicators. The two journals that present the highest SJR indicators have also published more articles on school management. SCImago Journal Rating (SJR) ranks journals according to average prestige per article, and journal subject areas, quality, and reputation based on citation scores. The most productive journals that publish school management research have SJR indicators of 0.25 – 1.71 (Scimago Lab, 2021).

3.3 *Author's country of origin*

There are 2,241 articles related to school management published in 80 countries. The country that contributed the most was the United Kingdom, with 342 documents or 14 percent of the number of published articles, as shown in Figure 2. Then, the United States had 216 documents (9 percent), and South Africa had 169 documents (7 percent). Then, Brazil (n = 112), China (n = 108), Spain (n = 99), Australia (n = 84), Turkey (n = 84), Indonesia (n = 81), and Malaysia (n = 58).) was the next country to join.

The United States, Germany, and the United Kingdom are the most active countries in school management publications. Most school management publications are dominated by developed countries with a high human development index and a supportive research ecosystem compared to developing countries. Historical records, research and literature on educational leadership and management have been dominated by the United Kingdom and the United States (Bush, 2018).

The significance of these findings lies in the fact that the dominance of developed countries like the United Kingdom and the United States in school management research highlights the disparities in research output between developed and developing countries. This disparity could be attributed to better access to research funding, advanced research facilities, and a more established tradition of academic publishing in developed countries. Moreover, the focus on school management in these countries can provide valuable insights and frameworks that can be adapted and applied to improve educational practices in other parts of the world. However, the presence of contributions from countries like South Africa, Brazil, China, and Indonesia indicates a growing interest and capability in conducting school management research in diverse global contexts, which can enrich the overall understanding of effective school management practices across different educational systems. Philip Hallinger's work in expanding the research and literature base through systematic reviews in South Africa, Nigeria, and Kenya further emphasizes the importance of regional and contextual studies in developing a comprehensive view of educational leadership and management globally (Bush, 2018).

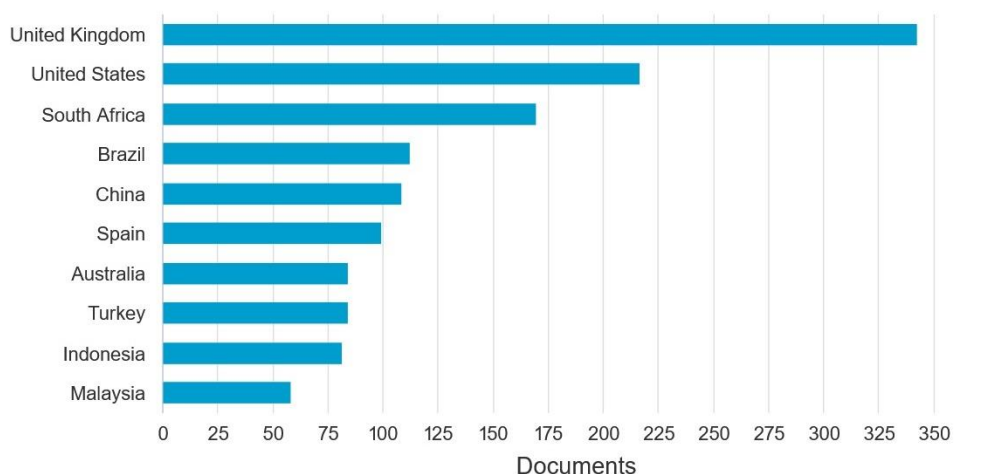


Figure 2. Number of School management Publications by Country

Table 2 shows countries grouped according to the global study culture cluster scheme (House, Hanges, Javidan, Dorfman, & Gupta, 2004; Mensah & Chen, 2012), grouping countries according to cultural, geographic, demographic and historical factors, referring to commonalities. Particular in the context of national culture. National culture is mainly influenced by the stories, traditions, norms, values, and collective beliefs of a particular country (Fayolle, Basso, & Bouchard, 2010). Empirical studies have provided the influence of national culture on educational behaviour, namely school management, intentions, and potential (Lee, Lim, & Pathak, 2011).

Table 2. Breakdown, by country, production of scientific articles (1970 to 2020)

Region	Country	Articles	Region	Country	Articles	
Anglo (714)	United Kingdom	342	Sub-Sahara (226)	South Africa	169	
	United States	216		Nigeria	40	
	Australia	84		Kenya	17	
	Germanic Europe (278)	Canada	35	Latin American (129)	Brazil	112
		Ireland	20		Mexico	17
		New Zealand	17	Confucian Asia (240)	China	108
		Spain	99		Hong Kong	54
Netherlands		49	Japan		27	
Chile		42	Taiwan		24	
Germany		33	Singapore		14	
Belgium	16	South Korea	13			
Middle East (126)	Czech Republic	15	Latin Europe (87)	Portugal	41	
	Switzerland	12		France	23	
	Poland	12		Italy	23	
	Turkey	84	Southern Asia (212)	Indonesia	81	
Israel	42	Malaysia		58		
Nordic Europe (39)	Sweden	27		India	41	
	Norway	12		Thailand	20	
Eastern Europe (73)	Russian Federation	23		Pakistan	12	
	Greece	20				
	Croatia	16				
	Cyprus	14				

It was noted that most of the school management research focused on the Anglo-san region (n = 714), followed by Germanic Europe (n = 278), Confucian Asia (n = 240), and Sub-Saharan (n = 226). A study by Wales (2013) also focused on Anglo and Nordic Europe. However, according to data from this study, it did not point to German Europe, the second most developed region, which may represent the progress of studies on school management in this region in the period between the two research works. The four study areas that cover the topic at least appear on the other end - Latin America, Sub-Saharan Africa, Eastern Europe, and the Middle East - these data corroborate the study results. Other data that differs from the study refers to the Latin Europe region, which in 2011 was designated as a highlight, and in this study is considered an area with little development in school management studies.

3.4 Author's institutional affiliation

There are 1,049 authors of 2,241 articles affiliated with 693 research institutions. The most productive organization researching School management publications is the University of South Africa, South Africa (n = 34), as shown in Table 3. Then followed by The Education University of Hong Kong, Hong Kong (n = 30), University of Johannesburg, South Africa (n = 25), North-West University, South Africa (n = 23), UCL Institute of Education, United Kingdom (n = 18), Universidade de Sao Paulo - USP, Brazil (n = 17), University of KwaZulu-Natal, South Africa (n = 15), University of Cambridge, United Kingdom (n = 15), Pontificia Universidad Católica de Valparaíso, Chile (n = 14), and Universidad de Granada, Spain (n = 14).

Table 3. Affiliations of organizations that have produced at least five articles

Affiliation	Articles
University of South Africa	34
The Education University of Hong Kong	30
University of Johannesburg	25
North-West University	23
UCL Institute of Education	18
Universidade de Sao Paulo - USP	17
University of KwaZulu-Natal, University of Cambridge	15
Pontificia Universidad Católica de Valparaíso, Universidad de Granada	14
The Open University, University of Birmingham	13
Bar-Ilan University, Universidade do Minho, University of Twente	12
Universiti Kebangsaan Malaysia, The University of Manchester, University of Nottingham, Cardiff University, Universidade de Lisboa	11
University of, Yakin Doğu Üniversitesi, Maastricht University, Universiteit van Pretoria, Universitat Autònoma de Barcelona, University of California, Los Angeles, University of Seville	10
University of Fort Hare, Tel Aviv University, Universidade Federal do Rio Grande do Sul, University of Warwick, Beijing Normal University, Universitas Pendidikan Indonesia, The World Bank, USA	9
Loughborough University, Universiti Utara Malaysia, Chinese University of Hong Kong, University of Leicester	8
University of Haifa, Nanyang Technological University, UNESP-Universidade Estadual Paulista, The University of Hong Kong, Trinity College Dublin, Monash University, Universidade de Aveiro, University of California, Berkeley, Dublin City University, Universidad Autónoma de Madrid, UNSW Sydney, Universidade Estadual de Campinas, The University of Queensland, Universitas Negeri Yogyakarta	7
Pontificia Universidade Católica de Sao Paulo, Universitat de Barcelona, Universiteit van Amsterdam, Uppsala Universitet, Panepistimion Ioanninon, Firat Üniversitesi, Universidade do Porto, King's College London, Universidad de Chile, Universidad de Huelva, Universidade Federal do Parana, University of Witwatersrand, University of York, Göteborgs Universitet, Universidad de Zaragoza, National Research University Higher School of Economics, University	6

Affiliation	Articles
of Bristol, Flinders University, East China Normal University, University of Botswana, University of Strathclyde, University of Melbourne, University of Oxford, The University of Edinburgh, University of Minnesota Twin Cities, Universiti Tun Hussein Onn Malaysia, Universitas Negeri Jakarta	
Newcastle University, Nelson Mandela Metropolitan University, National Institute of Education, Cumhuriyet Üniversitesi, Oxford Brookes University, Radboud University Nijmegen, Ulster University, Universiti Teknologi Malaysia, Universiti Putra Malaysia, University of Exeter, Ben-Gurion University of the Negev, Universidad Complutense de Madrid, University of Malaya, Pontificia Universidad Católica de Chile, Universiteit Gent, Universitas Negeri Malang, Universidad Católica Silva Henríquez, Mount Kenya University, College of Arts, Humanities and Social Sciences	5

Although the United Kingdom and the United States are the countries with the highest number of publications, South Africa's affiliation is at the top. South Africa is a country with higher school management problems than the United Kingdom or the United States. This highlights the critical role of institutions like the University of South Africa in contributing significantly to research in this field. These institutions address local challenges and provide valuable insights that can inform global practices. The high number of publications from these leading institutions demonstrates their commitment to advancing knowledge and improving school management practices. Furthermore, the significant contributions from the University of South Africa, North-West University, and other institutions in the region underscore the importance of addressing educational challenges in South Africa, where endemic failures in the education system necessitate robust research efforts (Amnesty International, 2020). This creates greater research opportunities and highlights the need for localized studies to develop effective management strategies tailored to the unique context of South Africa.

3.5 Most prolific writer

Lotka's law (Da Silva et al., 2019; Jahina, Batcha, & Ahmad, 2020; Qiu, Zhao, Yang, & Dong, 2017) allows researchers to identify the most prolific authors in a given field, reflecting the maturity of the scientific literature. In areas of more consolidated knowledge, significant production is concentrated among a few authors, while many authors have reduced production (Lotka, 1926; Pritchard, 1969). In school management, there are 1,049 individual researchers. Raj Mestry of the University of Johannesburg, South Africa, and Tshilidzi Netshitangani of the University of South Africa, each with eight publications, are the most prolific authors. They are followed by Ken Reid from Swansea Metropolitan University, UK (seven publications), and several others with six publications each, including Sophia Anastasiou, Pascale Benoliel, Phillip Hallinger, Rosalind Levačić, and Tony Bush.

Table 4. Authors with at least three articles found in the analyzed sample

Authors	Articles
Mestry, R.	8
Netshitangani, T., Reid, K.	7
Anastasiou, S., Benoliel, P., Hallinger, P., Levačić, R.	6
Bush, T., Cheng, E.C.K., Heystek, J., Lee, M., López, V., Martins, A.M., Msila, V., Ng, S.W., Telem, M., Visscher, A., Visscher, A.J.	5
Ahumada, L., Ascorra, P., Busher, H., Costa, J.A., Gomes, C.A., Hartley, D., MacBeath, J., Munn, P., Raath, S., Richter, B., Smyth, J., Tamir, E., Tatnall, A., Thody, A., Walker, A.	4
Adu, E.O., Broadbent, J., Bruno, J.E., Brzozowski, M., Caldwell, B.J., Castanheira, P., Cheng, Y.C., Craenhals, E., Craveiro, D., De Witte, K., Duma, M.A.N., Ezzamel, M., Ferster, I., Galán, I., Grant, C., Hens, L., Huber, S.G., Karagiorgi, Y., Klein, J., Kurniady, D.A., Laughlin, R., Liu, Y., Mafora, P., McCormick, J., Ollendick, T.H., Oplatka, I., Palhares, J.A., Pitsoe, V.J., Pyzik, L., Rahman, M.N.A., Renders, P., Robson, K., Saiti, A., Scott, J., Selesho, J.M., Simkins, T., Sousa, S.Z., Torres, L.L., Ueno, J., Veloso, L., Wiedemann, T., Wild, P., Wood, L.	3

The analysis shows that the most productive researchers in school management are primarily from South Africa and the United Kingdom. For example, Tshilidzi G. Netshitangani from the University of South Africa has extensively researched this field, with studies such as "Contradictions and ambiguities: School management teams' views on school-based violence in Urban South Africa" (Netshitangani, 2014). This work provides crucial recommendations for developing school policies to address various forms of violence in schools.

The analysis also revealed that of the 1,049 authors, 76 had contributed three or more documents, accounting for approximately 7.3 percent of the total scientific production. Furthermore, one of the top ten authors, Hellings, was among the most cited, with at least 145 citations in the sample of 410 articles. This highlights the significant influence these authors have in the field of research.

Table 5. Citation of scientific articles in the sample (1970-2020)

Number of citations	Articles	%	Number of citations	Articles	%
Over 400 citations	1	0.04	51-60 citations	5	0.22
301-400 citations	1	0.04	41-50 citations	18	0.8
201-300 citations	1	0.04	31-40 citations	36	1.6
101-200 citations	12	0.53	21-30 citations	56	2.49
91-100 citations	3	0.13	11-20 citations	208	9.28
81-90 citations	4	0.17	1-10 citations	1.095	64.5
71-80 citations	5	0.22	No citations	795	35.47
61-70 citations	1	0.04			

The number of citations indicates the impact of a publication on scientific and academic development. Analysis of citation numbers (Table 6) shows that highly cited works discuss crucial aspects of school management, such as training, school-based management, educational strategic planning, school management teams, and decentralization policy. These topics, frequently explored by top authors, confirm Lotka's law that a few authors produce a large portion of the literature, thus strengthening the maturity of school management research.

Table 6. List of 10 most cited articles on Scopus

Author, Year	Topic	Journal	Citations
Greiner, A.N., Hellings, P.W., Rotiroti, G., Scadding, G.K. (2011)	Training	<i>The Lancet</i>	410
Stehlé, J., Voirin, N., Barrat, A., (...), Lina, B., Vanhems, P. (2011)	School Based-Management	<i>PLoS ONE</i>	349
Hargreaves, D.H. (1999)	School Based-Management	<i>British Journal of Educational Studies</i>	251
Griffin, J., Symington, D. (1997)	School Based-Management	<i>Science Education</i>	166
Hatcher, R. (2005)	School Based-Management	<i>British Journal of Sociology of Education</i>	143
Binz, T., Breitenbücher, U., Haupt, F., (...), Nowak, A., Wagner, S. (2013)	School Based-Management	<i>Lecture Notes in Computer Science (including subseries Lecture Notes in Artificial Intelligence and Lecture Notes in Bioinformatics)</i>	140
Grissom, J.A., Loeb, S. (2011)	Educational strategic Planning	<i>American Educational Research Journal</i>	137
Keshavarz Mohammadi, N., Nutbeam, D., Rowling, L., Khavarpour, F. (2010)	Educational strategic Planning	<i>Social Science and Medicine</i>	136

Schippers, M.C., Den Hartog, D.N., Koopman, P.L. (2007)	School Management Team	<i>Applied Psychology</i>	133
McEwan, P.J. (2015)	Decentralization Policy	<i>Review of Educational Research</i>	118

3.6 Burst Detection Algorithm: School Management Research Trends

The Burst Detection Algorithm (BDA) was first proposed by Kleinberg, which considers the density of keyword frequency changes to identify keywords with high concentration and high-density characteristics in documents (Kleinberg, 2003). This algorithm helps to detect sudden increases in the frequency of specific keywords, indicating emerging trends and significant research areas over time. BDA provides insights into how knowledge in a field has evolved and highlights the main areas of research at the time of analysis (Sohrabi, Vanani, Jalali, & Abedin, 2019). It can be applied to various aspects of research, including authors, citations, journals, countries, organizations, and keywords, making it a versatile tool for identifying trends in school management research (Tattershall, Nenadic, & Stevens, 2020; K. Zou, Sun, Deng, Gong, & Liu, 2021).

Using the Sci2 tool, a temporal bar graph shows the temporal distribution of burst keywords, indicating the duration, start, and end years, as well as the burst weight of each keyword. As shown in Figure 3, each horizontal bar represents a burst keyword, with its length representing the burst duration, and its size indicating the burst weight. The settings used in Sci2 for this analysis were: Gamma = 1.0, Density Scaling = 2.0, Bursting States = 1, Burst Length = 1 year. The top 30 keywords with the highest burst weight were selected for visualization, as shown in Figure 3 and Table 7.

Table 7. Top-30 original keywords burst in 1970-2020

Period	Keywords	Start	End
1970-2007	Information system	1970	2007
	Education management information system	1993	2009
	Decentralization policy	1995	2013
	Educational strategic planning	1995	2004
	Training	1996	2007
	Technology in education	1999	2005
	School-based management	2003	2011
2008-2020	School administration	2008	2012
	Digital campus	2011	2014
	School safety	2012	2014
	Motivation	2014	2016
	School management team	2014	2015
	Professional development	2019	2020
	Covid-19	2020	2020
	Education needs	2020	2020
	Teacher collaboration	2020	2020

During the period 1970-2007, the study of school management began to develop rapidly, with keywords like "information system", "education management information system", "decentralization policy", "educational strategic planning", "training", and "school-based management" showing significant growth. These keywords indicate important factors in school management, such as the role of information systems in enhancing educational technology (Putra Kusuma, 2020) and the impact of decentralization policies on school management practices (Rahman, 2020).

Temporal Visualization

(Burst Detection Analysis of School Management Research)
July 12, 2021 | 4:14 PM +07:00

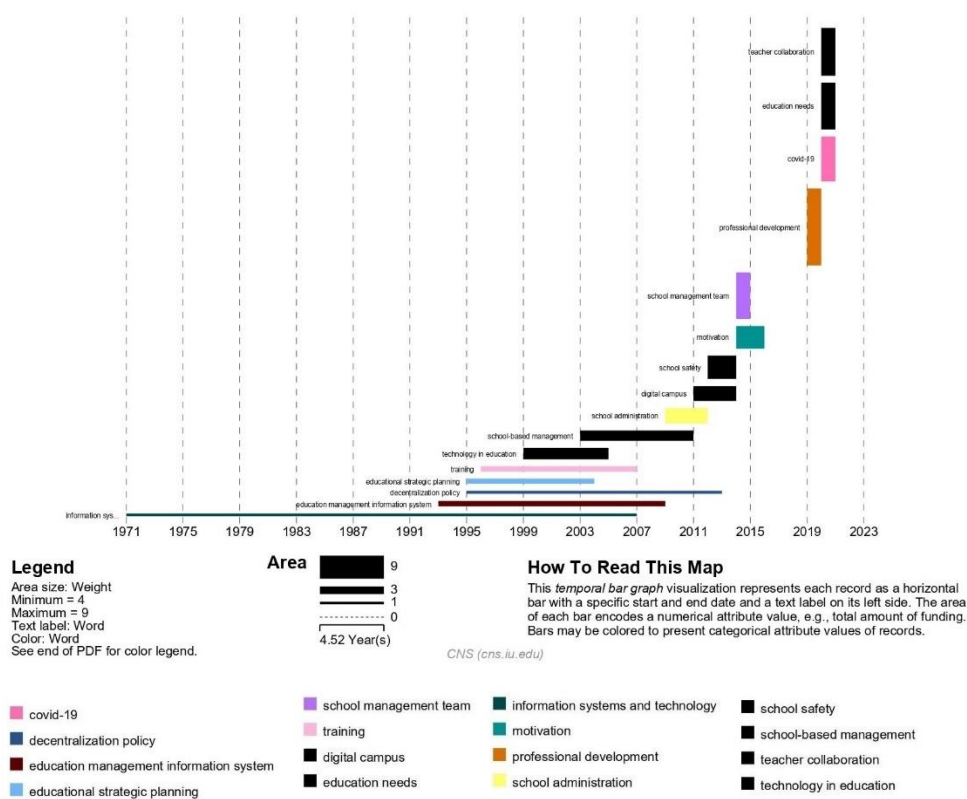


Figure 3. Temporal bar graph of Top-30 original keywords burst in 1970-2020

During 2008-2020, the number of burst keywords increased, and the distribution of burst weights became more even. This period saw a diversification in research trends, focusing on "motivation", "school management teams", "technology in education", and "digital campus". These trends reflect the integration of technology into education and the emphasis on effective school administration and management practices (Christopoulos, Kajasilta, Salakoski, & Laakso, 2020; Habib, Jamal, Khalil, & Khan, 2021; Ma et al., 2014; Zhang, Shen, Wu, & Sun, 2021). The prominence of "school administration" underscores the importance of transparent and accountable management systems in ensuring quality education (Maremi, Herselman, & Botha, 2020; Wiyono, 2017). The focus on "school-based management" highlights the decentralization of authority to key stakeholders to improve educational outcomes (Ezenwaji, Otu, Ezegbe, Okide, & Eseadi, 2019).

3.7 Most Frequency of School management by Document Type

School management research has been investigated in various document types. Article (n = 1.748 or 78 percent) is the field of study with the most global publications in School management research. Followed by conference papers (n = 212 or 9.5 percent); re-view (n = 114 or 5.1 percent); book chapter (n = 105 or 4.7 percent); book (n = 39 or 1.7 percent); conference review (n = 7 or 0.3 percent); editorial (n = 6 or 0.3 per cent); note (n = 3 or 0.1 percent), retracted (n = 3 or 0.1 percent), and letter (n = 2 or 0.1 percent) as shown in Figure 4.

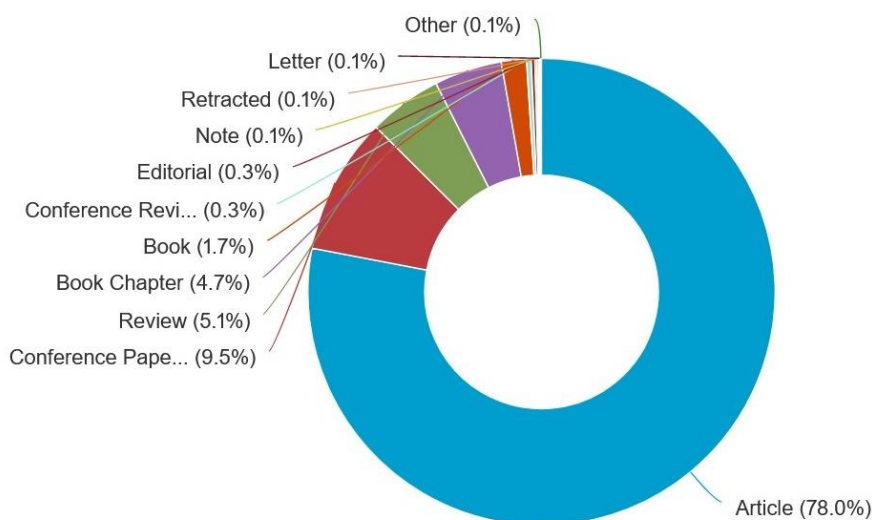


Figure 4. Types of Publication Documents in School management

3.8 Research Theme Map

The research theme map is a review that seeks to identify school management re-search based on the linkage of keywords between publications. The VOSViewer program developed constructs on the school management keyword network for the research theme map. Seven repetitions are the criterion for the minimum number of documents related to the keyword. So, 217 keywords out of 6,099 keywords reached the threshold.

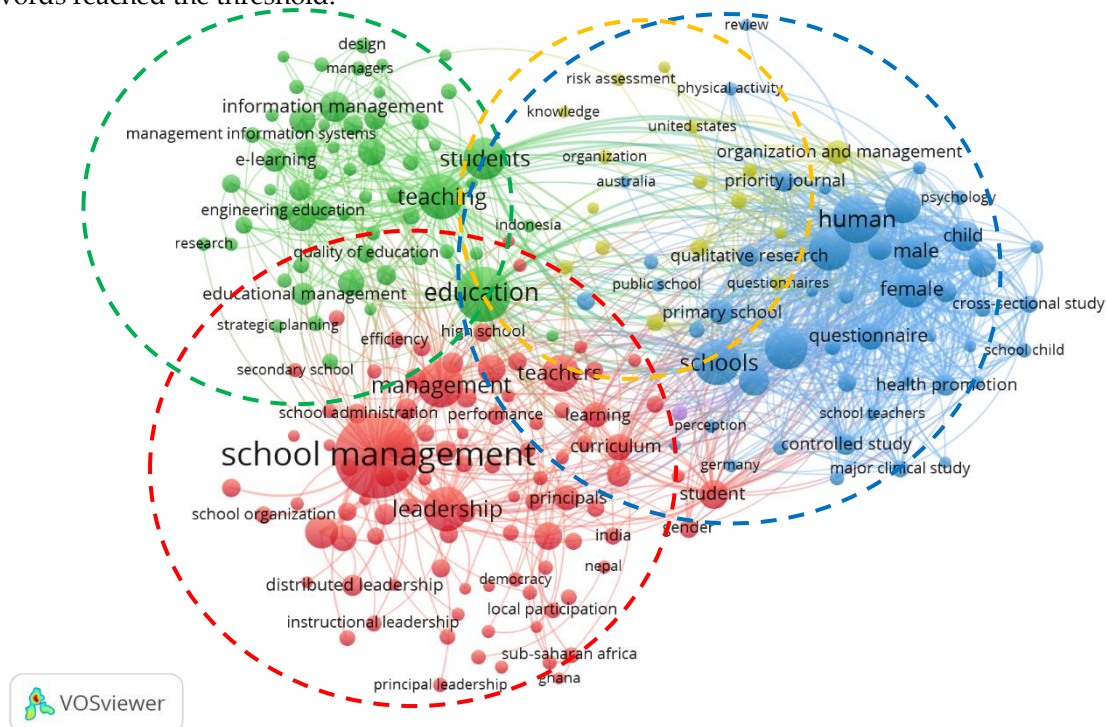


Figure 5. Keyword Network

The research theme map identifies four key clusters—Schools, Organization and Management, Leadership, and Education—highlighting the primary focus areas in school management research, which are simplified and shortened to SOLE research themes in Figure 4.

- Schools cluster (blue). Schools, human, male, child, adolescent, controlled study, and priority journal dominate this cluster. Many of these keywords are related to themes in schools.
- Organization and management cluster (yellow). We can find the theme of organization and management in this cluster. In addition, the keywords organization united states, knowledge, and risk assessment are linked to this cluster.
- Leadership management cluster (red). We can find leadership themes in this cluster. For example, the keywords management, teachers, curriculum, school organization, principals, distributed leadership, and learning are connected to this cluster.
- Education cluster (green). The keywords of education, information management, students, teaching, and research dominate this cluster. Many of these keywords are related to themes in education.

The significance of the SOLE research themes lies in their ability to categorize the vast array of research in school management into distinct, focused areas. By identifying these four key clusters—Schools, Organization and Management, Leadership, and Education—the research theme map provides a clearer understanding of the primary focus areas in school management research. This categorization helps researchers and practitioners pinpoint where most research efforts are concentrated, facilitating targeted studies and informed decision-making in educational policies and practices. Furthermore, it highlights the interconnectedness of various themes, emphasizing the multidisciplinary nature of school management research.

3.9 Author Network

Several research groups have investigated school management studies. Author network maps were created using VOSviewer software. The co-authorship analysis feature was used to generate knowledge domain maps of the main research groups (X. Zou et al., 2018). One document is the minimum requirement for a collection of publications per author. Thus, 1,049 authors who met the threshold were identified. In school management publications, there are four collaborative group networks between researchers, as shown in Figure 6.

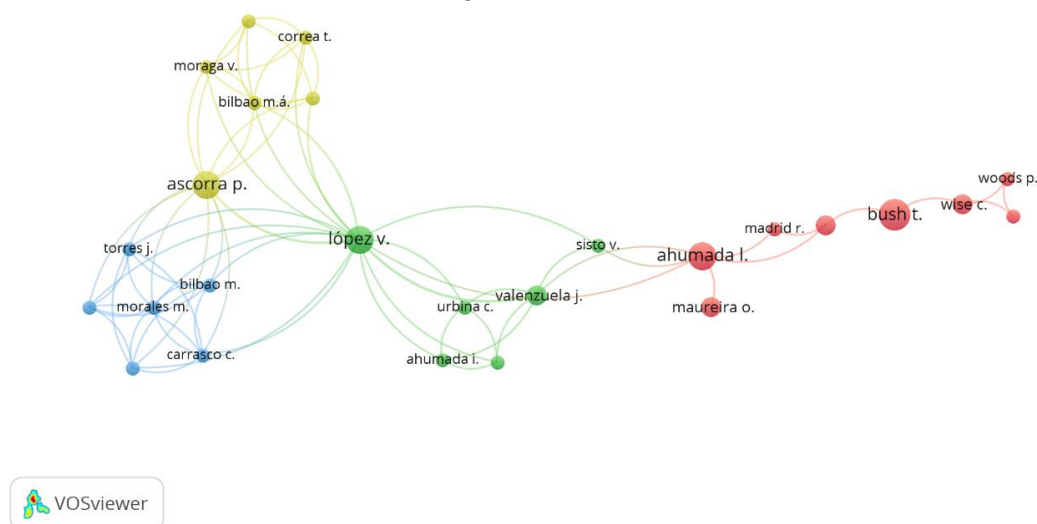


Figure 6. Authorship Network Map

In Figure 6, each color cluster represents an author group within the school management field, with the size of the nodes indicating the number of articles written. The links between nodes indicate co-authorship relationships, and the thickness of these links represents the intensity of the collaboration. Overall, the collaboration among productive researchers is not very close. However, there are some prominent co-author groups:

- The red cluster is centered around Luis Ahumada (Universidad Católica de Valparaíso).

- The green cluster is centered around Verónica López (Pontificia Universidad Católica de Valparaíso).
- The yellow cluster is centered around Paula Ascorra (Pontificia Universidad Católica de Valparaíso).
- The blue cluster is centered around Karla Rosalía Morales (Universidad Católica del Maule).

The author network map illustrates the collaborative relationships among researchers in the field of school management. Identifying these networks helps to understand how knowledge is disseminated and developed through partnerships and collaborations. The presence of distinct clusters indicates specialized areas of research focus within school management, with certain researchers acting as key connectors within their respective networks.

These collaborations can lead to more robust and diverse research outcomes by combining different perspectives and expertise. However, the observation that overall collaboration is not very close suggests opportunities for enhancing collaborative efforts to further advance the field. By fostering stronger and more widespread research partnerships, the field of school management can benefit from a more integrated and comprehensive approach to addressing its challenges and opportunities.

4. CONCLUSION

This study discusses a bibliometric analysis in the field of school management. The results indicate that this field has evolved significantly over the last 50 years, presenting visualizations of affiliates, countries, researchers, types of documents, themes, and their growth. The United Kingdom is the leading contributor to publications in school management, yet the University of South Africa stands out as the most prolific affiliate, with Tshilidzi G. Netshitangani being the top researcher, contributing seven documents. The peak year for publications was 2019, with 183 publications. The most cited document, "Allergic Rhinitis" by Greiner, A.N., Hellings, P.W., Rotiroti, G., and Scadding, G.K., published in 2011, garnered 392 citations. The study identifies four main research collaboration groups based on different affiliations and countries. To organize the knowledge accumulated over the past 50 years, the study recommends classifying publications under the SOLE research themes: schools, organization and management, leadership, and education. This classification helps identify critical topics and gaps in the field, encourage new research to address these gaps, and enhance the understanding of school management's impact on education, management, and public policy. Future research should focus on evaluating contributions and describing the implications of school management studies by combining data from the Web of Science and Scopus.

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