

Principal Leadership, School Management, and Governance in K-12 Education: A Bibliometric Performance and Thematic Mapping Analysis, 2015-2026

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ABSTRACT: Principal leadership is frequently examined through instructional, transformational, and distributed leadership perspectives. Yet the field has expanded faster than its conceptual integration with school management and governance. This study maps the development, intellectual structure, and emerging agenda of K-12-focused principal leadership research. Methods: A Scopus search using the supplied Boolean logic returned 2,441 records. Filters for English language, article document type, and 2015-2026 produced 1,456 interface records. The imported Biblioshiny report contained 1,450 analyzable articles, which formed the final corpus. Performance indicators, source and author profiles, keyword frequencies, temporal topic trajectories, and network centrality measures were analysed. Results: The corpus spans 411 sources, 3,213 authors, and 93,852 cited references. Bibliometrix reported annual growth of 15.52%, 11.7 average citations per document, 2.88 co-authors per document, and 20.97% international co-authorship. Annual output grew from 36 articles in 2015 to 273 in 2025. The keyword structure is organised around four connected domains: principal-centred leadership and organisational context; instructional, distributed, and improvement leadership; transformational leadership and teacher work outcomes; and context-specific, inclusive, and primary education leadership. Recent topics include digital transformation, policy enactment, and job performance. Conclusion: The field is mature in leadership models and teacher-mediated pathways but less integrated in governance mechanisms, longitudinal designs, and technology-enabled leadership. Future studies should connect leadership practice with autonomy, accountability, equity, data use, and digital governance under explicit contextual conditions.

KEYWORDS- principal leadership; school management; school governance; instructional leadership; distributed leadership; bibliometric analysis.

I. INTRODUCTION

School principalship is a central organisational function in basic education. Principals coordinate instructional priorities, human resources, school improvement processes, accountability demands, and relationships with families, communities, and governing authorities. Their work is therefore more than an individual leadership role. It is a governance function located between policy and practice. The need to understand this function has intensified as schools face persistent achievement gaps, teacher shortages, changing accountability systems, digital transformation, and more diverse student populations. Leadership research has responded with a large and increasingly fragmented literature that uses several theoretical lenses, especially instructional leadership, transformational leadership, and distributed leadership.

The three leadership lenses have distinct emphases. Instructional leadership addresses how leaders establish academic direction, monitor instruction, support professional learning, and create conditions for coherent teaching. Transformational leadership emphasises vision, motivation, commitment, and organisational change. Distributed leadership shifts attention from the formal principal to the pattern through which leadership work is shared across teachers, middle leaders, and teams. These traditions often overlap in school settings, but they are not interchangeable. Each implies different pathways through which leadership may shape teachers' practice, organisational conditions, and ultimately student learning. (Leithwood et al., 2020) argue that school leadership

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matters through organisational conditions that support teaching and learning. (Hallinger, 2018) further stresses that leadership effects must be interpreted within institutional, cultural, political, and community contexts rather than treated as universal.

Recent evidence reinforces both the relevance and the complexity of the leadership-outcome relationship. A systematic review by (Özdemir et al., 2024) found that the relationship between school leadership and student achievement requires a more differentiated framework. (Pietsch et al., 2025) likewise show that the instructional leadership-student achievement relationship varies across cultures and time. These findings are important because they challenge simple claims that a leadership style directly produces higher achievement. Leadership commonly operates through intermediate conditions, including teacher collaboration, professional learning, trust, collective efficacy, school climate, and the quality of teaching. (Ninković & Knežević Florić, 2024) identify teacher collaboration, professional learning, and teacher self-efficacy as recurring mediators in research on leadership and teaching practice.

The field has also expanded across national contexts. (Walker & Hallinger, 2015) documented the consolidation of principal leadership research in East Asia. (Hallinger & Liu, 2016) examined leadership and teacher learning across urban and rural schools in China. (Gümüş et al., 2021) synthesised instructional leadership research in a centralised and competitive education system, while (Shaked et al., 2021) demonstrated how national context can shape instructional leadership indirectly. Such work has moved school leadership research beyond a narrow group of Anglophone systems. However, it also makes it more difficult to compare constructs, mechanisms, and outcomes across institutional settings.

School management and governance provide a necessary bridge between leadership theory and contextual variation. Management refers to the coordination of people, resources, routines, and organisational processes. Governance concerns decision rights, accountability relationships, stakeholder participation, regulation, and the allocation of authority. Principal leadership is often examined as if it were conceptually separate from management and governance, even though principals enact leadership through managerial and governance arrangements. Teacher autonomy in performance-based accountability systems, for example, is shaped by regulatory models and organisational conditions, not only by a principal's behaviour (Parcerisa et al., 2022). Participative decision making can likewise depend on the micropolitics of schools and cultural expectations regarding authority (Or & Berkovich, 2023).

The post-2020 period has added further complexity. School leaders had to organise crisis responses, sustain communication, protect instructional continuity, and support staff under conditions of uncertainty. (Ramos-Pla et al., 2021) showed how school principals faced new leadership demands during the COVID-19 disruption. Digital instructional leadership has become more visible because leaders increasingly mediate technology use, data practices, and online learning conditions. (Berkovich & Hassan, 2024) link principals' digital instructional leadership during the pandemic with teachers' motivation and students' learning. The recent emergence of artificial intelligence in school management has extended this agenda toward questions of task redesign, data ethics, decision support, and professional responsibility (Adams & Thompson, 2025).

A bibliometric analysis is useful at this point because the problem is not a lack of individual studies. The problem is that the literature has grown across overlapping constructs, contexts, and outcomes without a sufficiently clear map of how the field is organised. (Karakose et al., 2022) mapped distributed leadership research in schools, but a broader synthesis is needed to connect principal leadership with school management and governance while retaining the distinctions among instructional, transformational, and distributed approaches. The present study therefore examines the production, sources, authors, conceptual clusters, and temporal evolution of K-12-focused research published between 2015 and 2026.

The study makes three contributions. First, it provides a transparent performance profile of the literature using the imported corpus rather than an interface count alone. Second, it identifies thematic clusters that link leadership models with organisational conditions and governance concerns. Third, it specifies a research agenda that moves beyond leadership-style comparisons toward context-sensitive, mechanism-oriented, and governance-aware research. The analysis addresses five research questions:

RQ1. How has publication output evolved between 2015 and 2026?

RQ2. Which sources and authors form the visible publication core of the field?

RQ3. Which concepts occupy central positions in the keyword network?

RQ4. How have research topics evolved across the period?

RQ5. What gaps and priorities follow from the field's current structure?

II. METHOD

A. Study design and reporting orientation

This study used a bibliometric performance and science-mapping design. Bibliometric analysis is appropriate when a corpus is sufficiently large to support systematic examination of publication patterns, citation indicators, sources, authors, and conceptual relationships. It does not estimate the causal effect of principal leadership on student or teacher outcomes. Instead, it maps how the literature is produced, connected, and thematically organised. The workflow follows established guidance that distinguishes performance analysis from science mapping and recommends transparent reporting of database selection, search logic, filtering, data preparation, and interpretation limits (Donthu et al., 2021; Zupic & Čater, 2015). Bibliometrix and its Biblioshiny interface

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support this type of analysis through structured processing of bibliographic metadata, descriptive indicators, and network outputs (Aria & Cuccurullo, 2017).

The manuscript also adopts a transparent search-reporting orientation. The study is not a systematic review and does not claim to meet the full requirements of PRISMA. However, it reports the document flow, filters, corpus reconciliation issue, and analytical decisions in the same spirit of reproducible evidence synthesis. This practice is consistent with the emphasis of PRISMA-S on clear reporting of search methods and record handling (Rethlefsen et al., 2021).

B. Data source and search strategy

The search used the Scopus database interface and the Boolean expression supplied with the data package: ("principal leadership" OR "school principal") AND ("school management" OR "school-based management" OR governance) AND ("K-12" OR "primary school" OR "secondary school" OR "basic education") AND ("instructional leadership" OR "transformational leadership" OR "distributed leadership")

The expression combines four conceptual blocks: principalship, management or governance, school-sector level, and leadership theory. It was designed to retrieve research where principal leadership is connected to school management, school-based management, or governance and where the study refers to K-12, primary, secondary, or basic education. It also requires at least one of three major leadership approaches: instructional, transformational, or distributed leadership. The report date was 26 June 2026, as indicated by the uploaded report file and image. The uploaded materials do not specify the exact Scopus field tags used in the interface, such as title-abstract-keyword or another searchable field. Replication should therefore preserve the fielded version of the query as entered in Scopus, together with the date of search.

C. Screening and corpus formation

The initial retrieval contained 2,441 documents. The English-language filter retained 2,358 records. Limiting the document type to articles retained 1,711 records. Applying the 2015-2026 publication window produced 1,456 records in the interface. These counts are reproduced in Figure 1. The imported Biblioshiny report, however, records 1,450 documents. This six-record difference may reflect export timing, data normalisation, document availability, or import handling. The available materials do not permit a definitive diagnosis. To preserve analytical integrity, the study does not adjust the values or add records. All descriptive statistics, tables, and visualisations use the 1,450 articles present in the imported report. The interface count of 1,456 is reported only as a search-flow value.

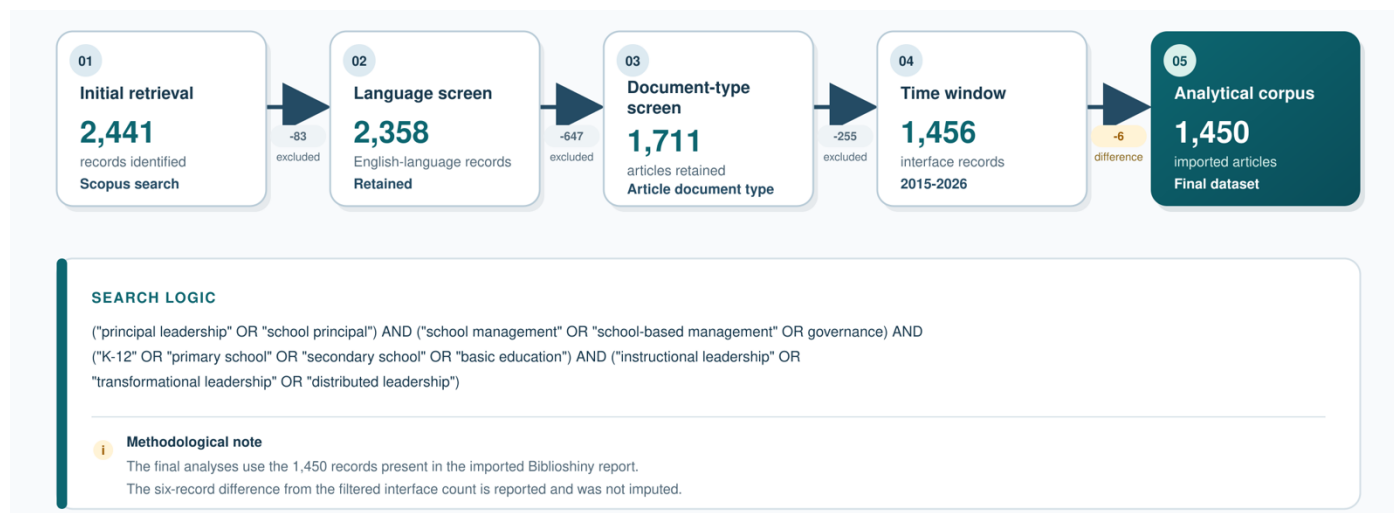


Figure 1. Search and corpus formation process.

Note. The final analyses use the 1,450 records present in the imported report. The six-record difference from the filtered interface count is reported but not corrected by imputation.

This approach produces a K-12-focused corpus, not a perfectly exclusive K-12 corpus. The search terms include K-12, primary school, secondary school, and basic education, but keyword outputs still contain the term "higher education." This indicates that some records may discuss general educational leadership, mixed educational sectors, or comparative settings. The issue is treated as a scope limitation rather than concealed. It also reinforces the value of retaining school-sector descriptors in future bibliometric searches.

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D. Data processing and measures

The report provided summary indicators, annual scientific production, most relevant sources, authors' production over time, trend topics, high-frequency terms, and keyword-network centrality values. The analysis used five groups of measures. First, performance indicators described documents, sources, authors, references, average citation counts, collaboration, and annual growth. Second, annual production data described the field's temporal expansion. Third, source and author panels identified visible publication anchors. Fourth, term frequencies and centrality measures described the conceptual structure. Fifth, trend-topic values captured the first quartile, median, and third quartile of publication years for selected terms.

The keyword network output included cluster identifiers and three centrality measures. Betweenness centrality indicates the extent to which a node connects otherwise separated parts of a network. Closeness centrality reflects the average distance from a node to others in the network. PageRank represents the influence of a node based on its relational position. These indicators were interpreted descriptively. The exported report did not provide the full edge list or parameter settings used to generate the network. Consequently, the study does not report edge density, modularity, threshold values, or inferential significance tests that cannot be recovered from the supplied data. This constraint is important because science mapping tools can yield different structures when thresholds and normalisation options change (Cobo et al., 2011).

E. Analytical procedures

Annual growth was taken from the Biblioshiny report, which indicates a 15.52% annual growth rate for the 2015-2026 series. Year-to-year changes were calculated descriptively from annual counts. The 2026 count is interpreted as a partial-year value and is not compared as a full-year decline. Source concentration was calculated by summing the ten leading source counts and dividing by the 1,450-document analytical corpus. Selected author indicators were calculated from the authors' production-over-time panel. They should not be interpreted as a definitive ranking of all 3,213 authors because the report panel includes only selected productive authors.

For thematic interpretation, the analysis first examined high-frequency terms. It then compared them with high-centrality nodes and trend-topic data. The four supplied keyword clusters were interpreted inductively using the highest PageRank and betweenness terms in each cluster. Cluster labels are analytic summaries rather than software-generated names. They are used to explain the field's conceptual composition without claiming that each cluster represents a fixed theoretical school. The final stage compared the mapped patterns with recent empirical and review studies to identify substantive gaps, rather than simply listing themes.

F. Research quality and interpretive boundaries

Three boundaries guided interpretation. First, citation counts are time-dependent and favour older publications. The report's average citations per document and selected author citation values should therefore not be equated with research quality. Second, bibliometric co-occurrence patterns indicate conceptual association, not causal relationships between leadership practices and outcomes. Third, a single-database, English-language, article-only corpus may underrepresent regional scholarship, local policy studies, books, and non-English work. These limitations are material in school leadership research because context, policy language, and national publication cultures shape what is visible in large bibliographic databases.

III. RESULT

A. Corpus profile

The final analytical corpus contains 1,450 articles published between 2015 and 2026. It draws on 411 publication sources and includes 3,213 authors. The report identifies 264 single-authored documents and 229 authors who produced single-authored documents. The average number of co-authors per document is 2.88, while international co-authorship represents 20.97% of the corpus. These values indicate that collaboration is common, but that international collaboration remains a minority mode of publication. The corpus contains 93,852 cited references, 595 Keywords Plus terms, and 3,311 author keywords. The average document age is 3.77 years, which is consistent with a rapidly expanding and recent literature. The report records an average of 11.7 citations per document. Table 1 presents the full bibliometric profile.

Table 1. Bibliometric profile of the analytical corpus.

Item	Value
Database and analytical report	Scopus search; Biblioshiny report
Search period	2015-2026
Initial retrieval	2,441 documents
English-language records	2,358
Article records	1,711
Filtered interface count, 2015-2026	1,456
Final imported analytical corpus	1,450
Sources	411

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Authors	3,213
Single-authored documents	264
Co-authors per document	2.88
International co-authorship	20.97%
Cited references	93,852
Author keywords	3,311
Keywords Plus	595
Annual growth rate	15.52%
Average document age	3.77 years
Average citations per document	11.7

Note. The displayed performance indicators are reproduced from the supplied Biblioshiny report. The analytical corpus is 1,450 articles.

The dataset shows a sizable difference between the number of author keywords and Keywords Plus terms. Author keywords are more numerous and often reflect current constructs and local research concerns. Keywords Plus are more standardised but can be less sensitive to emerging vocabulary. This distinction matters in the present corpus because recent themes such as digital transformation and policy enactment are more likely to appear through author-supplied terminology than through older indexing patterns. The study therefore gives greater interpretive weight to the joint reading of frequency, trend-topic timing, and centrality rather than to any single keyword indicator.

B. Annual scientific production

Annual output increased markedly across the period. The corpus begins with 36 articles in 2015 and reaches 273 articles in 2025, a 7.6-fold increase. Figure 2 and Table 2 show the annual pattern. The series is not linear. Output rose from 36 in 2015 to 55 in 2016, dipped slightly to 52 in 2017, and then increased to 81 by 2019. A larger expansion occurred in 2020, when output reached 127 articles. Production fell to 106 in 2021 but resumed a sustained increase to 125 in 2022, 145 in 2023, 200 in 2024, and 273 in 2025.

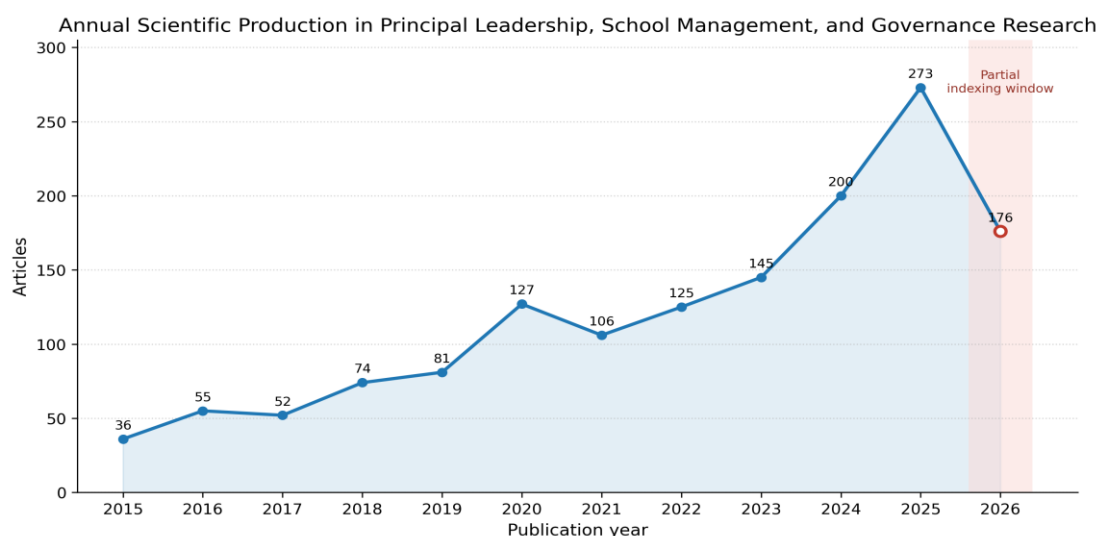


Figure 2. Annual scientific production, 2015-2026.

Note. The 2026 value is partial because the report was generated in June 2026. It should not be interpreted as a full-year decline.

Table 2. Annual scientific production in the final analytical corpus.

Year	Articles	Share of corpus (%)	Year-to-year change (%)
2015	36	2.5	Baseline
2016	55	3.8	52.8
2017	52	3.6	-5.5
2018	74	5.1	42.3
2019	81	5.6	9.5
2020	127	8.8	56.8
2021	106	7.3	-16.5
2022	125	8.6	17.9
2023	145	10.0	16.0

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2024	200	13.8	37.9
2025	273	18.8	36.5
2026	176	12.1	-35.5a

Note. a. The 2026 year-to-year value is not comparable with a full calendar year.

The 2026 count is 176 articles in the imported report. The report was generated in June 2026, so the value reflects a partial indexing window. It should not be treated as a full-year decline from 2025. Even so, 176 articles by the report date indicate that publication activity remained high. The 15.52% annual growth rate reported by Bibliometrix is based on the entire 2015-2026 series, including the partial 2026 year. A full-year comparison from 2015 to 2025 produces a steeper raw growth pattern, but the study does not substitute a new annual growth rate for the software-reported value.

The temporal distribution is also concentrated in recent years. Publications from 2020 to 2025 account for 976 articles, or 67.3% of the final corpus. Articles published in 2024 and 2025 alone account for 473 articles, or 32.6%. This concentration suggests that the field has entered a high-production phase. The growth coincides with greater attention to leadership during crisis, teacher work conditions, school improvement, digitalisation, and policy change. The bibliometric trend alone cannot identify the cause of this expansion, but it establishes that recent literature now dominates the field's visible knowledge base.

C. Source structure

The source structure combines a small set of specialised educational leadership journals with broader education and management outlets. Educational Management Administration and Leadership is the leading source with 116 articles, followed by Leadership and Policy in Schools with 71 and the International Journal of Leadership in Education with 69. The Journal of Educational Administration contributes 50 articles, and the International Journal of Educational Management contributes 45. Table 3 lists the ten leading sources.

Table 3. Ten leading publication sources.

Rank	Source	Articles	Share of corpus (%)
1	Educational Management Administration And Leadership	116	8.0
2	Leadership And Policy In Schools	71	4.9
3	International Journal Of Leadership In Education	69	4.8
4	Journal Of Educational Administration	50	3.4
5	International Journal Of Educational Management	45	3.1
6	Frontiers In Education	36	2.5
7	Education Sciences	30	2.1
8	School Leadership And Management	22	1.5
9	Sustainability (Switzerland)	22	1.5
10	International Journal Of Evaluation And Research In Education	21	1.4

Note. The ten sources published 482 articles, equal to 33.2% of the 1,450-document corpus.

The ten leading outlets published 482 articles, representing 33.2% of the corpus. This indicates moderate concentration: a specialised journal core carries a substantial share of the field, but two thirds of the literature remains distributed across more than 400 sources. The concentration has analytical implications. Specialised journals are likely to shape research norms, construct definitions, and preferred methods. At the same time, wider source dispersion introduces scholarship from policy studies, educational technology, teacher education, public administration, psychology, and country-specific education journals. The field is therefore institutionally coherent but not closed.

D. Selected author production

The authors' production-over-time panel identifies a visible group of recurrent contributors. Philip Hallinger has 23 listed publications, 1,700 total citations, and an average of 73.91 citations per listed document. Pascale Benoliel and Izhak Berkovich each have 21 listed publications. Chen Schechter has 20, while Haim Shaked has 14. Mehmet Şükrü Bellibaş and Sedat Gümüş also show strong citation profiles among the selected authors. Table 4 presents the panel values.

Table 4. Selected authors in the production-over-time panel.

Rank	Selected author	Listed articles	Total citations	Mean citations per listed article	Publication span
1	Philip Hallinger	23	1700	73.91	2015-2026
2	Pascale Benoliel	21	242	11.52	2016-2026
3	Izhak Berkovich	21	482	22.95	2017-2025
4	Chen Schechter	20	283	14.15	2017-2026
5	Haim Shaked	14	167	11.93	2017-2026

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6	Mehmet Şükrü Bellibaş	13	442	34.00	2017-2026
7	Sedat Gümüş	12	447	37.25	2019-2025
8	Bity Salwana Alias	11	37	3.36	2019-2026
9	Bambang Budi Wiyono	11	81	7.36	2019-2026
10	Donnie Adams	9	201	22.33	2015-2026

Note. The Biblioshiny authors' production-over-time panel is a selected panel. These values do not represent a complete ranking of all authors in the corpus.

The author evidence should be interpreted carefully. It shows a visible scholarly core in the report, not a complete bibliometric ranking. The panel nevertheless confirms that the field is shaped by researchers who have produced work across multiple leadership models, national contexts, teacher outcomes, and school improvement questions. Hallinger's prominence is consistent with the centrality of contextualised instructional leadership in the field. The presence of Benoliel, Berkovich, Schechter, Shaked, Bellibaş, and Gümüş further indicates an active international network that connects work from the Middle East, Turkey, Southeast Asia, and other contexts with broader leadership debates.

E. High-frequency concepts

The word-frequency results show a clear hierarchy. The most frequent term is "leadership" with 197 occurrences. It is followed by "school leadership" with 103, "instructional leadership" with 81, "transformational leadership" with 71, and "distributed leadership" with 68. These terms mirror the three leadership lenses embedded in the search strategy, but their relative frequencies are still informative. Instructional leadership has a stronger presence than transformational and distributed leadership, while "school leadership" acts as an umbrella construct that joins them.

Table 5. Four keyword co-occurrence clusters and their analytical interpretation.

Cluster	Leading high-centrality terms	Interpretive label	Research implication
1	leadership; principals; principal; management; trust; culture; digital leadership	Principal-centred leadership and organisational context	Examine how principal roles interact with trust, culture, management, and digital conditions.
2	school leadership; instructional leadership; distributed leadership; school management; school improvement; professional development; accountability	Instructional, distributed, and improvement leadership	Test mediated pathways through collaboration, professional learning, efficacy, and decision rights.
3	transformational leadership; job satisfaction; teachers; school culture; organisational commitment; teacher performance; self-efficacy; motivation	Transformational leadership and teacher work outcomes	Link teacher attitudes and work outcomes with observable teaching and student-level conditions.
4	educational leadership; school principals; Greece; primary education; inclusive education; primary schools	Context-specific, inclusive, and primary education leadership	Integrate inclusion, sector differences, and country-level governance context into mainstream leadership models.

Note. Cluster labels are interpretive labels assigned in this study from the supplied high-centrality terms and cluster identifiers.

The next tier of terms locates leadership in organisational conditions and actor outcomes. "Principals" appears 63 times, "educational leadership" 55 times, "school management" 52 times, and "job satisfaction" 51 times. Other recurrent terms include teacher, school improvement, school culture, professional development, accountability, trust, organisational commitment, digital leadership, teacher leadership, teacher performance, inclusion, and school climate. The frequency pattern indicates that research often connects principal leadership with teachers' experience of work, rather than treating leadership as a stand-alone variable. Table 5 summarises the main terms and their thematic role.

F. Keyword-network centrality and cluster structure

The supplied keyword network identifies four clusters among the 50 high-centrality terms. "Leadership" is the dominant bridge node. It has PageRank of 0.1277 and betweenness centrality of 530.48, far exceeding all other reported nodes. This result is expected because leadership is the broadest construct in the corpus, but it also shows that the field still relies on a general leadership vocabulary that connects more specific themes. "School leadership" has PageRank of 0.0645 and betweenness of 112.06. "Instructional leadership" has PageRank of 0.0593 and a higher betweenness value of 145.94, indicating a strong bridging role between conceptual areas.

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Cluster 1 is labelled principal-centred leadership and organisational context. It includes leadership, principals, principal, management, trust, culture, digital leadership, secondary schools, and performance. This cluster links the formal principal role with organisational conditions and newer digital concerns. Cluster 2 is labelled instructional, distributed, and improvement leadership. Its leading terms include school leadership, instructional leadership, distributed leadership, school management, school improvement, professional development, accountability, teacher self-efficacy, teacher commitment, and teacher collaboration. This is the cluster with the clearest focus on indirect pathways from leadership to improvement.

Cluster 3 is labelled transformational leadership and teacher work outcomes. It brings together transformational leadership, job satisfaction, teachers, school culture, leadership styles, organisational commitment, teacher performance, self-efficacy, motivation, school effectiveness, and school climate. The cluster places teacher attitudes and work outcomes at the centre of leadership research. Cluster 4 is labelled context-specific, inclusive, and primary education leadership. It contains educational leadership, school principals, Greece, primary education, inclusive education, and primary schools. The comparatively small cluster should not be interpreted as unimportant. It signals that inclusion, primary-school settings, and country-specific research remain less integrated into the dominant leadership-model clusters.

G. Topic evolution

Figure 3 shows the temporal structure of selected trend topics. Professional learning communities and school autonomy appear early in the series, with first quartiles in 2016 and medians in 2017 and 2018. These topics indicate an initial concern with collective capacity and decentralised decision making. School management becomes more prominent later, with a first quartile in 2020 and a median year of 2021. Core leadership terms remain active across the period. Leadership has frequency 197 with a median year of 2022. School leadership, instructional leadership, transformational leadership, and distributed leadership all have median years between 2022 and 2023 and remain visible through 2025.

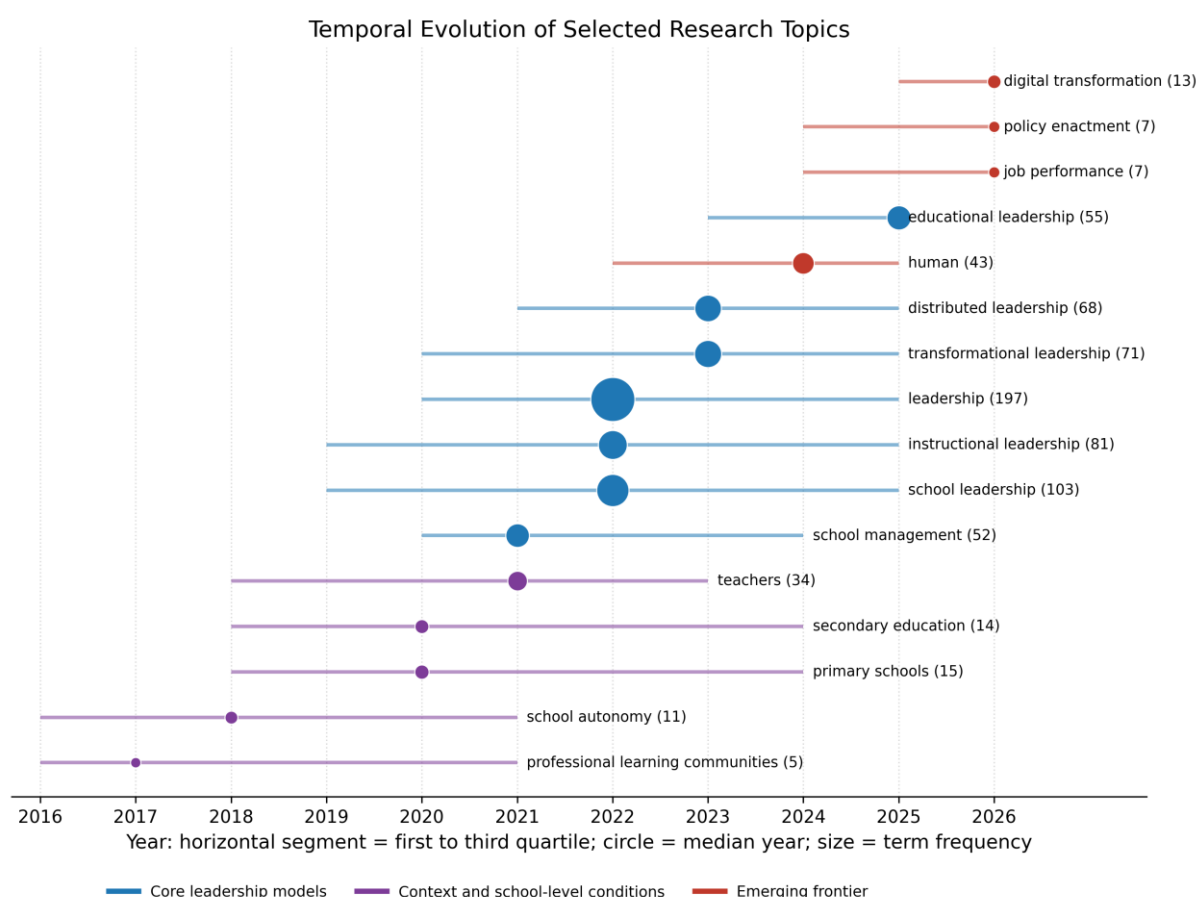


Figure 3. Temporal evolution of selected research topics.

Note. Horizontal segments show the first to third quartile of publication years, circles show the median year, and circle size represents the frequency value in the supplied trend-topic output.

The recent frontier is more distinct. Educational leadership has a first quartile in 2023 and a median in 2025. Digital transformation appears only from 2025, with a median in 2026. Policy enactment and job performance first appear in 2024 and have medians in 2026. These values should be read as signals of recent conceptual uptake rather than definitive evidence of a mature

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research stream. Their low frequencies show that they remain emerging. Nevertheless, their placement at the end of the timeline suggests that future research is likely to connect leadership with digital governance, policy implementation, and measurable work outcomes.

IV. DISCUSSION

H. *Growth without conceptual closure*

The central finding is not simply that principal leadership research has increased. It is that the increase has occurred while the field remains organised around several partially connected traditions. Annual output grew substantially after 2019, and the most common terms retain a stable emphasis on leadership, school leadership, instructional leadership, transformational leadership, and distributed leadership. This pattern indicates a mature field in volume but not yet a fully integrated field in theory. The literature has accumulated evidence on multiple leadership models, yet it has not resolved how these models interact with school management and governance under different institutional conditions.

The high centrality of the generic term "leadership" supports this interpretation. It functions as a bridge across clusters, but it can also conceal conceptual differences. A study of instructional leadership may focus on curriculum and teaching, while a study of transformational leadership may focus on organisational commitment or job satisfaction. A distributed leadership study may focus on the distribution of influence or team-based capacity. These are not identical objects of analysis. Treating them as a single leadership construct can inflate apparent consensus while masking variation in mechanisms, levels of analysis, and outcomes. The field therefore requires more precise theory building about what principals do, through whom, under which conditions, and with what consequences.

Recent reviews support this need for differentiation. (Özdemir et al., 2024) argue that research on leadership and student achievement requires an updated framework because study designs, mediating variables, and context vary widely. (Pietsch et al., 2025) show that the instructional leadership-student achievement relationship cannot be assumed to generalise uniformly across cultures and time. (Ninković & Knežević Florić, 2024) similarly demonstrate that leadership often affects teaching practice through indirect pathways. These findings align with the present map, where school improvement, professional development, teacher efficacy, teacher commitment, collaboration, trust, and school climate appear alongside the major leadership models.

The growth pattern also raises a methodological point. Expanding output may increase the visibility of cross-sectional survey studies because they are efficient and comparable across settings. Yet many studies using the same constructs does not automatically improve causal understanding. School leadership operates within reciprocal systems. Principals may influence teacher conditions, but teacher capacity and school performance can also influence leadership practice. Future work should therefore use longitudinal, multilevel, and mixed-method designs that distinguish direct, mediated, reciprocal, and context-contingent relationships. Research should also report the institutional and governance features that enable or constrain leadership action.

I. *Instructional leadership, distributed leadership, and improvement mechanisms*

Cluster 2 is the most integrative part of the keyword network. It combines instructional leadership, distributed leadership, school management, school improvement, professional development, accountability, and several teacher-mediated mechanisms. This cluster reflects a shift from asking whether leadership matters to asking how leadership is translated into teaching and improvement. The answer in the recent literature is usually indirect. School leaders create conditions for collaboration, professional learning, shared responsibility, and instructional coherence. These conditions then shape teacher practice and, in some designs, student outcomes.

Evidence from empirical studies illustrates this pathway. (Ma & Marion, 2021) found that instructional leadership relates to teacher efficacy through multilevel organisational processes. (Cansoy et al., 2022) identify collective teacher efficacy as a mediator between instructional leadership and teacher commitment. (Kılınç & Gümüş, 2021) show that collaboration mediates the relationship between learning-centred leadership and change in teacher practice. These studies are consistent with the keyword cluster, where professional development and teacher efficacy carry meaningful centrality. They also show why leadership effects should not be interpreted as immediate or uniform.

Distributed leadership is equally important in this mechanism-oriented account. (Amels et al., 2021) link primary school leaders' use of distributed leadership with teachers' capacity to change. (Liu et al., 2021) show that teacher autonomy and collaboration mediate the relationship between distributed leadership and teacher job satisfaction in China. (Lin, 2022) similarly finds mediating roles for autonomy and professional collaboration in the relationship between distributed leadership and teacher innovativeness. (Buyukgoze et al., 2024) extend the discussion by linking distributed leadership with collective teacher innovativeness through job satisfaction and professional collaboration. Together, these studies support the view that distributed leadership is not merely delegation. It is an organisational design problem involving decision rights, relationships, and capacity.

The cluster also includes accountability. This is significant because distributed leadership can be constrained by accountability arrangements. A school may encourage teacher leadership while maintaining centralised performance requirements, limited discretion, or fragmented reporting systems. The research agenda should therefore examine when distributed leadership produces

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meaningful influence rather than symbolic participation. It should assess the alignment between formal decision authority, access to information, professional learning structures, and accountability consequences. Network leadership may offer a useful extension because it moves beyond a single-school focus toward collaboration across schools and systems (Harris et al., 2023).

J. Transformational leadership and teacher work outcomes

Cluster 3 centres on transformational leadership, job satisfaction, school culture, organisational commitment, motivation, teacher performance, self-efficacy, and school climate. This structure confirms that transformational leadership research often investigates teachers' psychological and organisational experience of work. The prominence of job satisfaction is especially notable because it appears 51 times in the word-frequency output and has high PageRank within Cluster 3. The field therefore links school leadership not only to organisational performance but also to whether teachers experience trust, meaning, support, autonomy, and professional connection.

This emphasis has empirical support. (Zhang et al., 2021) show that authentic leadership relates to teachers' voice behaviour through psychological empowerment and interpersonal trust. (Xia et al., 2023) report that school culture and teaching autonomy help explain teacher job satisfaction in a Chinese early-childhood context. (Kareem et al., 2023) show that transformational educational leadership is associated with educator commitment. These studies do not establish that all transformational leadership practices produce the same outcomes, but they support a general mechanism: leadership can shape affective and relational conditions that influence teachers' willingness to contribute, innovate, and remain engaged.

The cluster also cautions against treating teacher job satisfaction as an end point detached from school improvement. Job satisfaction may be related to retention, professional learning, collaboration, and teaching quality, but the links must be tested rather than presumed. The present map suggests that research frequently stops at teacher attitudes or self-reported performance. Future studies should connect teacher work outcomes with observable organisational practices, instructional quality, student experience, and equity outcomes. Doing so would create a more complete theory of how leadership affects schools while avoiding the assumption that positive teacher attitudes automatically translate into improved learning.

K. Governance, autonomy, participation, and policy enactment

The search strategy explicitly included governance, school-based management, and school management. Yet governance does not appear as a high-frequency or high-centrality term in the visible keyword outputs. This is a substantive gap. The field is rich in leadership-style research but comparatively less developed in its treatment of governance mechanisms. Governance determines who participates in decisions, what authority principals hold, how resources are allocated, how accountability is structured, and how policy is translated into local practice. These mechanisms are essential for explaining why the same leadership practice can have different effects across schools and systems.

The emerging term "policy enactment" provides one signal of change. Its first quartile is 2024 and its median is 2026, although the frequency remains low. The term suggests growing interest in how schools interpret and implement policies rather than simply receive them. This is particularly relevant in systems where principals must mediate between central directives and local needs. (Shaked et al., 2021) demonstrate that national context can shape instructional leadership implementation indirectly. (Gümüş et al., 2021) show that centralised and competitive systems influence how instructional leadership is understood and practised. These studies provide a useful foundation for a stronger governance turn in the field.

Participation is another governance issue that needs deeper study. (Or & Berkovich, 2023) show that participative decision making is shaped by cultural and micropolitical conditions. (Gómez-Hurtado et al., 2021) demonstrate the relevance of inclusive leadership for addressing cultural diversity in schools. These studies imply that participation is not a technical variable that can be increased by a single leadership programme. It depends on whether teachers, students, families, and communities have recognised roles, usable information, protected voice, and genuine influence. Future research should distinguish consultation from shared authority and should examine how governance arrangements affect the distribution of leadership work.

Autonomy requires similar precision. (Parcerisa et al., 2022) show that teacher autonomy is shaped by performance-based accountability and regulatory models. This means school-based management cannot be assumed to enhance autonomy in practice. A principal may have formal management responsibility but limited discretion over staffing, curriculum, finance, or assessment. Research should therefore measure decision rights directly. It should specify who holds authority over instructional programmes, budgets, professional learning, data, technology, and student support. This would connect leadership research with the institutional architecture of schools rather than treating context as background description.

L. Digital transformation and artificial intelligence

Digital transformation is the clearest new frontier in the trend-topic results. It appears only in the 2025-2026 segment, which shows that it is emerging rather than fully established. The keyword network also includes digital leadership in Cluster 1. This placement is instructive. Digital leadership is currently connected more closely to principal-centred leadership and organisational context than to the instructional and distributed leadership cluster. The field may therefore still conceptualise digital leadership primarily as a principal capability rather than as a distributed organisational practice involving teachers, data systems, students, and communities.

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(Berkovich & Hassan, 2024) show that digital instructional leadership during the pandemic relates to teachers' intrinsic motivation and students' learning. Their study points toward the instructional potential of digital leadership. However, the broader issue is governance. Technology adoption changes data flows, communication practices, workload, access, monitoring, and responsibility. It can expand participation, but it can also intensify surveillance or reproduce inequality when infrastructure, professional capacity, or accessibility are uneven. The field needs studies that examine these tensions at the school level rather than treating technology as a neutral tool.

Artificial intelligence increases the importance of this agenda. (Adams & Thompson, 2025) identify applications, implications, and future directions for AI in school leadership. AI may support administrative tasks, communication, planning, analytics, and personalised professional support. However, it also raises questions about transparency, privacy, accountability, bias, human oversight, and the delegation of professional judgement. The emerging term "digital transformation" should therefore be linked to explicit research on digital governance. Future studies should examine how principals establish rules for data use, AI procurement, validation of automated recommendations, student protection, staff training, and equitable access. This would move the field beyond generic digital competence toward responsible institutional leadership.

M. Context-specific and inclusive leadership

Cluster 4 contains educational leadership, school principals, primary education, primary schools, inclusive education, and Greece. The appearance of a country term within a high-centrality cluster illustrates a familiar characteristic of school leadership research: context is not merely a control variable. It shapes the meanings, constraints, and outcomes of leadership. (Hallinger, 2018) argues that context should be brought out of the shadows of leadership research. The present map supports that argument because context-specific terms form a separate cluster rather than being fully absorbed into the dominant leadership-model clusters.

The cluster also identifies inclusion as a distinct but under-integrated topic. Inclusive education is present in the network, but it is not strongly connected to the largest clusters. This suggests that leadership studies often treat inclusion as a specialised topic rather than an organising principle for school management and governance. Yet inclusive education requires leadership over resources, curriculum, professional learning, partnerships, accountability, and school culture. (Gómez-Hurtado et al., 2021) show how managerial practices can address cultural diversity. More research is needed on how principals govern inclusive schools, particularly in relation to disability, language diversity, migration, gender, rurality, and poverty.

Primary and secondary education also require more explicit comparison. The trend-topic output includes primary schools and secondary education, but the main leadership models dominate across both. This can obscure differences in organisational scale, subject specialisation, staffing structures, age-specific student needs, and family engagement. Studies should test whether mechanisms such as distributed leadership, data use, instructional monitoring, and teacher collaboration work differently in primary and secondary schools. (Chen et al., 2022) provide an example of context-sensitive comparative analysis by examining principal leadership and mathematics achievement across Germany and Chinese Taipei. Comparative designs of this kind can strengthen theory by identifying boundary conditions rather than merely replicating models across settings.

N. Implications for research, policy, and practice

The research agenda that follows from this map has five priorities. First, scholars should build integrative models that connect leadership style, management practice, governance arrangement, and outcome mechanisms. A principal's leadership practice should be examined alongside formal authority, accountability pressure, resource discretion, and stakeholder participation. Second, studies should use stronger temporal designs. Longitudinal, multilevel, and mixed-method research can test whether changes in leadership practices precede changes in teacher conditions, teaching practice, organisational capacity, and student outcomes.

Table 6. Research priorities arising from the bibliometric mapping.

Priority	Observed gap from the mapping	Recommended empirical response
Governance integration	Leadership models dominate, whereas governance terms are less central.	Measure decision rights, autonomy, participation, accountability, and resource discretion alongside leadership practices.
Mechanism and temporality	Teacher-mediated variables are prominent, but causal sequence is often unclear.	Use longitudinal, multilevel, and mixed method designs to test mediation, reciprocity, and implementation processes.
Digital governance	Digital transformation is recent and low frequency.	Study AI, data governance, privacy, equity, professional judgment, and distributed responsibility in schools.
Equity and inclusion	Inclusive education is present but peripheral to major leadership clusters.	Use equity-oriented designs that link leadership with disability, language, gender, rurality, migration, and poverty.
Sector and context comparison	Primary and secondary descriptors appear but are weakly integrated.	Compare school phases and systems with explicit policy, institutional, and cultural boundary conditions.

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Note. These priorities are derived from the corpus structure and trend-topic results. They are proposed directions for empirical work, not claims of causal effectiveness.

Third, researchers should broaden the outcome space. Teacher job satisfaction, commitment, and self-efficacy are important, but they should be connected to instructional quality, retention, professional learning, student engagement, inclusion, and equity. Fourth, the field should strengthen contextual reporting. Studies need clear descriptions of governance structures, policy environment, school sector, location, student composition, resource conditions, and cultural expectations. This is essential for cumulative research because leadership constructs may travel more easily across countries than the institutional conditions in which they operate.

Fifth, digital transformation should be treated as an organisational and governance issue. Research should investigate how school leaders distribute digital responsibility, protect privacy, govern AI use, and ensure that digital changes improve rather than fragment teaching and learning. Leadership preparation programmes can respond by combining instructional leadership, data literacy, ethical reasoning, policy analysis, and collaborative governance. Principal professional development should not focus solely on personal leadership traits. It should strengthen the ability to build structures that support collective capacity, responsible innovation, and equitable decision making.

O. Limitations

This study has several limitations. First, it uses a single database and a single supplied search expression. Scopus provides broad coverage, but it does not capture all regional, local, book-based, or non-indexed scholarship. Second, English-language and article-only restrictions increase comparability but reduce visibility of research published in other languages and formats. Third, the interface count of 1,456 differs from the 1,450 records in the imported Biblioshiny report. The analysis uses the imported corpus and reports the discrepancy transparently, but it cannot determine the source of the six-record difference without the original export log.

Fourth, the output includes a K-12-focused query, but some topical leakage is visible through the "higher education" keyword. This means the corpus should be interpreted as school-sector focused rather than perfectly sector-pure. Fifth, the supplied network output did not include the full co-occurrence edge list or settings. The analysis therefore interprets cluster labels and centrality measures descriptively and does not report network density, modularity, or parameter-sensitive metrics. Sixth, citation values are snapshots that favour older publications and vary as databases update. Finally, bibliometric association does not establish the effectiveness of any leadership model. The findings map the literature; they do not test interventions or causal effects.

V. CONCLUSIONS

This bibliometric analysis maps 1,450 articles on principal leadership, school management, and governance in K-12-focused education published between 2015 and 2026. The field has expanded rapidly, with annual output rising from 36 articles in 2015 to 273 in 2025. It is anchored by specialised educational leadership journals and a visible international group of recurring contributors. The conceptual structure is dominated by leadership, school leadership, instructional leadership, transformational leadership, and distributed leadership.

Four thematic domains organise the field. The first connects principal-centred leadership with organisational context, trust, management, and digital leadership. The second centres on instructional and distributed leadership as routes to school improvement through professional learning, collaboration, and teacher efficacy. The third links transformational leadership with teacher work outcomes, including job satisfaction, commitment, motivation, culture, and climate. The fourth captures context-specific, inclusive, and primary education leadership, but remains less integrated with the dominant clusters.

The key gap is not the absence of leadership studies. It is the limited integration of leadership theory with governance mechanisms, policy enactment, autonomy, accountability, equity, and digital transformation. Future research should explain how leadership operates through formal authority, distributed decision rights, professional capacity, and contextual conditions. It should use designs capable of testing indirect and reciprocal pathways over time. Such work can move the field from repeated style-outcome associations toward a more credible account of how principals lead schools within real governance systems.

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