

SCHOOL WELL-BEING AS AN INTEGRATIVE BIOPSYCHOSOCIAL MODEL: A DECADE OF BIBLIOMETRIC AND SCIENCE MAPPING ANALYSIS

Hafizh Zain Abdillah^{1*}, Anniez Rachmawati Musslifah², Faqih Purnomosidi³

^{1*,2,3} Universitas Sahid Surakarta, Surakarta
*hafizhzainabd@gmail.com

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ABSTRACT

School well-being is increasingly recognized as a biopsychosocial construct that bridges welfare and subjective well-being theories. However, the field lacks a comprehensive account of its publication trends, intellectual structure, and thematic evolution. This study offers the first decade-spanning bibliometric synthesis of Scopus-indexed school well-being research (2017-2026), screened using PRISMA 2020 to yield 110 eligible articles, and analyzed with Biblioshiny (Bibliometrix R package) and VOSviewer for complementary performance analysis and science mapping. Results show scientific production remained stagnant before 2020, rose after the COVID-19 pandemic, consolidated between 2021 and 2023, and reached record output in 2025. Productivity was concentrated among a few author clusters and institutions across Nordic, Western European, and Anglophone research ecosystems, as evidenced by steep Lotka's Law scattering (Beta = 3.51) and a Bradford's Law core of 11 journals. The field's intellectual structure integrates welfare theory, ecological systems theory, subjective well-being theory, and self-determination theory, with thematic evolution shifting toward psychometric validation, gender-differentiated analysis, and bullying-related research. Convergent evidence from keyword co-occurrence and thematic evolution analysis shows sociologically and psychologically oriented clusters increasingly interlinked around the core "school well-being" node, indicating the field is coalescing into an integrative biopsychosocial model, offering a foundation for future theoretical refinement, instrument validation, and evidence-based policy.

Corresponding Author:

Hafizh Zain Abdillah

hafizhzainabd@gmail.com

INTRODUCTION

Sociologists have long conceptualized schools as social institutions that connect individuals to broader societal structures, providing not only academic learning but also social relationships, institutional resources, and a sense of belonging that collectively shape students' well-being (Coleman, 1988). This view is reinforced by Bronfenbrenner's (1979) ecological systems theory, which situates child development within interconnected environmental systems extending from the classroom to wider institutional and cultural contexts (Bronfenbrenner, 1979). Building on these perspectives, Konu and Rimpelä (2002) proposed the School Well-Being Model, arguing that students' well-being depends on material school conditions, social relationships, opportunities for self-fulfillment, and health, a claim consistent with systematic review evidence that low school well-being predicts disengagement and poorer academic outcomes (Amholt et al., 2020).

The School Well-Being Model proposed by Konu and Rimpelä (2002) extends Allardt's welfare theory by incorporating health as a fourth dimension alongside having, loving, and being while preserving the distinction between objective and subjective indicators of welfare (Allardt, 1976, 1989, 1993; Konu & Rimpelä, 2002). This extension is conceptually consistent with Bronfenbrenner's (1979) ecological systems theory, which situates students' well-being within interconnected environmental systems ranging from classrooms to broader institutional and cultural contexts (Bronfenbrenner, 1979). Together, these perspectives establish a coherent theoretical framework in which Allardt articulates the welfare dimensions, Bronfenbrenner explains their ecological embeddedness, and Konu and Rimpelä operationalize them as measurable indicators of school well-being.

The practical importance of school well-being is well established: higher well-being predicts better academic outcomes (Amholt et al., 2020; Bücker et al., 2018). Limited social capital increases dropout risk (Coleman, 1988), and safe, inclusive school climates are associated with both well-being and achievement, reinforcing that well-being is a prerequisite for effective learning rather than merely a desirable outcome (Kutsyruba et al., 2015). This recognition has shaped global policy: the OECD has integrated well-being indicators, sense of belonging, life satisfaction, and psychological functioning into PISA alongside cognitive performance (OECD, 2019), while the positive education movement has promoted deliberate well-being development alongside academic skills (Seligman et al., 2009), with this momentum extending into higher education amid growing concern for university students' psychological well-being (Worsley et al., 2022).

Since its emergence in the Nordic countries, school well-being research has expanded across Asia, Africa, Latin America, and other regions (Burhanudin et al., 2024; Cong et al., 2025; Wihartati et al., 2026). This geographical expansion has been accompanied by increasing disciplinary fragmentation across psychology, sociology, education, and public health, with diverse theoretical perspectives and measurement approaches (Amholt et al., 2020; Kutsyruba et al., 2015). Such fragmentation highlights the need for bibliometric analysis, which enables systematic synthesis of publication

patterns, intellectual structure, collaboration networks, and thematic evolution through performance analysis and science mapping (Aria & Cuccurullo, 2017; Donthu et al., 2021; van Eck & Waltman, 2010).

Despite these advances, existing bibliometric studies remain limited to specific educational interventions or adjacent constructs, such as lesson study (Burhanudin et al., 2024) and teacher well-being (Zahrah et al., 2025). Consequently, no study has comprehensively mapped the decade-long development of school well-being, integrating its sociological and psychological foundations. This gap leaves researchers, practitioners, and policymakers without a comprehensive understanding of the field's publication trends, intellectual structure, collaborative networks, and thematic evolution.

To address this gap, this study conducts a comprehensive bibliometric and science-mapping analysis of Scopus-indexed school well-being research published between 2016 and 2026. This decade-long period was selected to capture both the pre-pandemic baseline and the post-2020 acceleration of school well-being scholarship, thereby enabling the identification of major developmental trajectories and intellectual turning points. Following a transparent PRISMA 2020-compliant search and screening procedure, the study integrates performance analysis with science mapping to examine the evolution of the field (Donthu et al., 2021; Page et al., 2021). Accordingly, the study addresses four research questions: RQ1: What are the annual growth patterns and publication trends of school well-being research between 2016 and 2026? RQ2: Who are the most influential authors, institutions, countries, and journals shaping the development of the field? RQ3: What intellectual structure emerges from co-citation and bibliographic coupling analyses? RQ4: How has the conceptual and thematic structure of school well-being research evolved based on keyword co-occurrence analysis? By addressing these questions, this study provides an evidence base for future theoretical refinement, measurement development, and evidence-informed educational policy and practice.

RESEARCH METHOD

This quantitative bibliometric study used a science-mapping design to examine school well-being research from 2016 to 2026, integrating performance analysis and science mapping to reveal a field's intellectual and social structures a more systematic, replicable alternative to narrative reviews (Aria & Cuccurullo, 2017; Donthu et al., 2021). The search strategy restricted the subject areas to Psychology and Social Sciences to ensure disciplinary relevance while maintaining the keyword "School well-being" in the TITLE-ABS-KEY field. An initial search using TITLE-ABS-KEY ("School well-being") identified 274 records.

The search period was defined as 2016–2026; however, the temporal coverage of the final dataset depended on publications that met all predefined inclusion criteria in accordance with PRISMA 2020 (Page et al., 2021). The decision to restrict inclusion to Open Access publications was made to ensure full-text accessibility for verification and future replication; however, this criterion may introduce publication bias by excluding relevant subscription-based studies, a limitation further discussed in the Limitations

section. The initial 274 records were progressively filtered by year (235), subject (200), document type (187), language (169), and stage (158), yielding 110 final articles (Figure 1).

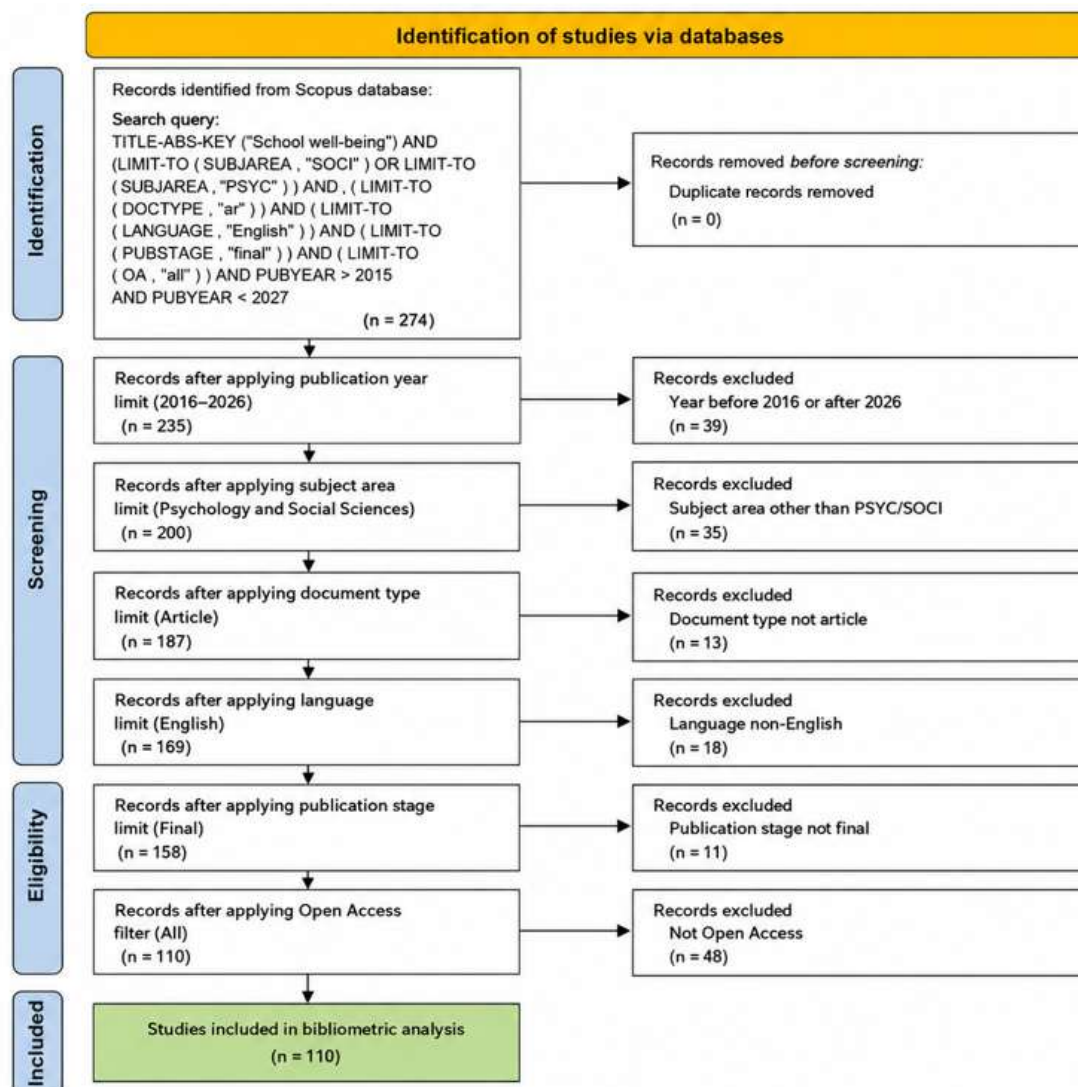


Figure 1. PRISMA flow diagram of the literature search and document selection process

Exported metadata authorship, affiliations, countries, publication years, journals, citations, keywords, and abstracts were imported into bibliometrix and cleaned to standardize author names and keyword variants (e.g., consolidating "student well-being" and "students' well-being") (Aria & Cuccurullo, 2017). Duplicate records were identified and removed using DOI matching supplemented by manual title and author verification; author name variants (e.g., differing initials or diacritics) were consolidated using Bibliometrix's synonym-merging function, cross-checked against affiliation data; keyword standardization followed a similar synonym-list approach, merging semantically equivalent terms prior to co-occurrence analysis. Analysis combined performance analysis and science mapping via Biblioshiny and VOSviewer: performance analysis

identified productive authors, institutions, countries, and journals through publications, citations, and h-index, while co-citation, bibliographic coupling, and keyword co-occurrence analyses explored the field's intellectual structure and thematic evolution, interpreted via node size, link strength, and clustering. For VOSviewer-based mapping, network normalization used the association strength method with default layout parameters, and clusters were delineated using VOSviewer's modularity-based clustering algorithm with a resolution of 1.00 and a minimum cluster size of 1, with small clusters merged into larger ones, consistent with recommended bibliometric mapping parameters (van Eck & Waltman, 2010). As the study relied solely on public Scopus metadata and did not involve human participants, ethical approval was not required (Donthu et al., 2021; van Eck & Waltman, 2010).

RESULTS AND DISCUSSION

Bibliometric Profile Overview

The final dataset comprised 110 journal articles spanning 2017–2026. However, the search covered 2016 onward, no 2016 publications met the inclusion criteria, yielding a ten-year window that still spans a full decade of publication activity. These articles were distributed across 79 sources, a distribution corroborated by Bradford's Law (Figure 9: 11 core journals, 32 in Zone 2, 36 in Zone 3), indicating that school well-being research is disseminated broadly rather than concentrated in a few outlets.

The 110 articles involved 385 authors, only 8 of whom published single-authored work, with an average of 3.85 co-authors per document and international collaboration in 26.36% of publications consistent with the hub-centered co-authorship structure identified later (Figure 7). All documents were journal articles per the document-type filter, with an average age of 2.85 years, reflecting the field's recent growth (Figure 2) and an average of 12.35 citations per document; this moderate visibility should be read cautiously, given that the field's most productive years (2024–2026) have had limited time to accumulate citations. The dataset's 423 Author Keywords and 269 Keywords Plus provide the conceptual basis for the keyword co-occurrence, thematic mapping, and thematic evolution analyses that follow.

Annual Scientific Production and Publication Trends

The annual scientific production curve (Figure 2) shows modest, largely stagnant output between 2017 and 2019 (1–2 articles per year), followed by a fivefold increase to 11 articles in 2020, coinciding with the onset of the COVID-19 pandemic and its disruption of schooling worldwide. This inflection is corroborated by a concentration of pandemic-related studies published from 2020 onward, including research on identity work during online classes (Hosszu et al., 2022) and parental perceptions of learning loss in Finland (Pöysä et al., 2024). Production then fluctuated moderately between 2021 and 2023 (10–16 articles annually), consistent with a field consolidating its pandemic-driven momentum while diversifying into adjacent themes such as post-pandemic school experience (Patrick & Pamflett, 2025).

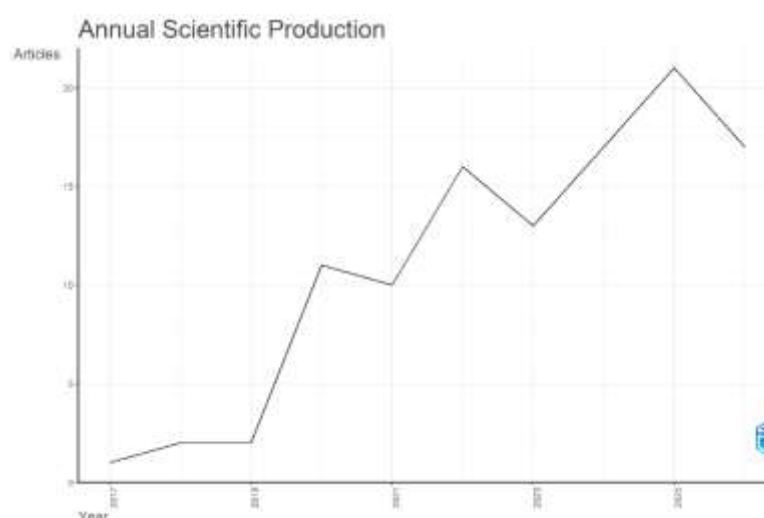


Figure 2. Annual scientific production of school well-being research (2017–2026)

From 2024 onward, the curve resumes a steep upward trajectory, rising from 17 articles in 2024 to a peak of 21 in 2025, the highest annual output in the study window before a partial decline to 17 in 2026, likely reflecting incomplete indexing for the ongoing year rather than a genuine downturn. This phase is reflected in specialized, methodologically advanced work, including new psychometric instruments such as the School Environment Stress Questionnaire (Jasińska-Maciążek et al., 2026) and computational text-mining approaches using BERTopic (Chen, 2026). This trajectory pandemic-triggered surge, thematic consolidation, and acceleration toward record output in 2025 indicate the field has evolved from a slowly growing niche topic before 2020 into a rapidly expanding, increasingly specialized area.

The Most Influential Contributors

Most Productive Authors

The author productivity ranking (Figure 3) identifies Schwab S as the field's most prolific contributor (six articles), leading a coherent program centered on the Perceptions of Inclusion Questionnaire (PIQ), spanning validation (Schwab & Alnahdi, 2020), differentiated instruction (Pozas et al., 2021), and school placement effects (Pirker et al., 2025). Ranking second, Kiuru N (four articles) anchors a parallel Finnish program on interpersonal relationships and academic transitions, including the transactional model linking school well-being to achievement (Kiuru et al., 2020) and parental perceptions of adjustment during COVID-19 (Pöysä et al., 2024). These authors reflect two complementary infrastructures: an Austrian psychometric validation program and a Finnish longitudinal cohort program.



Figure 3. Most Relevant Authors

A second tier of authors with three articles each, Hirvonen R, Huitsing G, Lindner KT, Vasalampi K, and Veenstra R, reflects two further collaborative clusters. Hirvonen and Vasalampi extend the Jyväskylä-anchored Finnish program on reading achievement and school burnout (Torppa et al., 2020; Vasalampi et al., 2023), while Huitsing and Veenstra anchor a Dutch tradition on bullying and the "healthy context paradox" (Huitsing et al., 2019; Kaufman et al., 2021). Lindner reinforces Schwab's PIQ-centered cluster (Pirker et al., 2025). A third tier with two articles each corresponds to participatory research in the Basque Country schools (Karrera Xuarros et al., 2020, 2023) and a Polish program on school stress instruments (Gajda et al., 2025; Jasińska-Maciążek et al., 2026), spanning at least four national programs (Austria, Finland, the Netherlands, Poland, and Spain) operating in parallel rather than as a unified network.

The Lotka's Law analysis (Figure 4) estimates a Beta coefficient of 3.51, steeper than the theoretical 2.0, with a strong fit ($R^2 = 0.9536$) and a non-significant Kolmogorov–Smirnov statistic ($p = 1.0$), indicating nearly 90% of authors contributed exactly one article, mirroring the long-tail scattering observed in Bradford's Law (Figure 9).

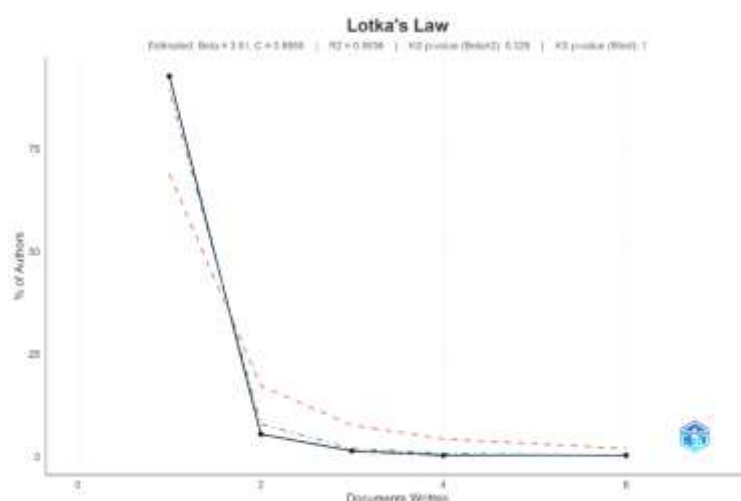


Figure 4. Lotka's Law

The steeper-than-classical Beta coefficient (3.51 versus 2.0) suggests author concentration is more skewed toward single-contribution authors than typical in mature fields, aligning with the fragmentation in Figures 5–7. Rather than weakness, this reflects a field expanding into new cultural contexts, evidenced by isolated but substantive contributions from Vietnam (Giang et al., 2023; Huong et al., 2025), Brazil (Dias-Viana & Noronha, 2022), Slovakia (Košťálová, 2025), and Russia (Bochaver & Mikhaylova, 2023), each broadening cross-cultural applicability without sustained author programs. Together, Figures 3 and 4 indicate that while anchored by productive clusters in Austria, Finland, and the Netherlands, the field remains predominantly populated by single, context-specific studies mirroring the scattering identified throughout this analysis.

Leading Institutions and Countries

Institutional-level analysis reveals a markedly Nordic-European center of gravity in the scholarship on school well-being. University of Jyväskylä stands out as by far the most productive affiliation (13 articles), corroborated by a dense cluster of Finnish longitudinal, register-linked studies tracing well-being trajectories across educational transitions, including reading achievement and burnout as predictors of upper-secondary track choice (Torppa et al., 2020; Vasalampi et al., 2023), temperament, and gender-specific patterns of adolescent well-being (Puonti et al., 2021), and parental perceptions of school adjustment during COVID-19 (Pöysä et al., 2024). This productivity pattern aligns with Finland's methodological infrastructure for large-scale, longitudinal educational data collection, enabling the register-based, multi-wave designs recurring throughout the dataset.

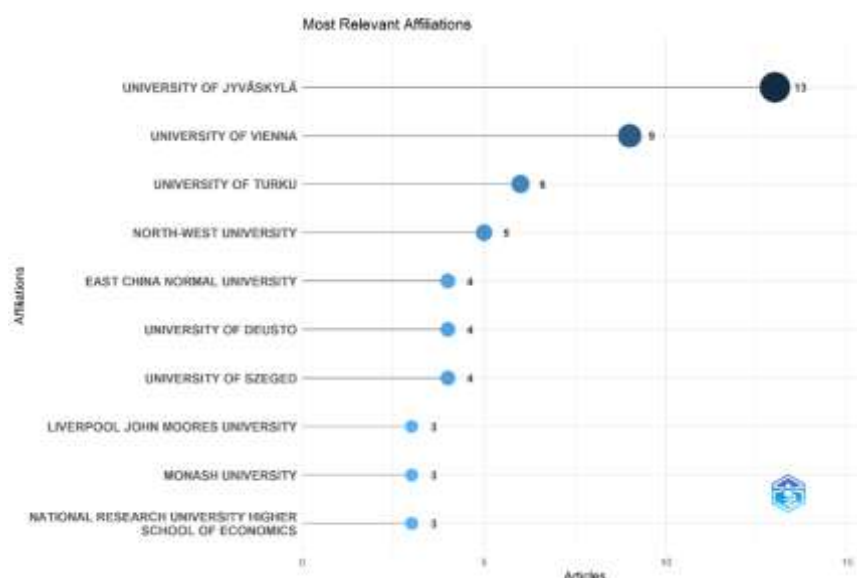


Figure 5. Most Relevant Affiliations

The University of Vienna ranks second (9 articles), reflecting the Austrian program centered on the Perceptions of Inclusion Questionnaire (PIQ) and its applications to

teacher emotions and social inclusion (Holzer et al., 2025; Pirker et al., 2025; Schwab & Alnahdi, 2020). A second tier of moderately productive institutions University of Turku, East China Normal University, University of Deusto, and University of Szeged corresponds to identifiable thematic contributions, including Spanish research on adolescent drug use and Chinese research on academic self-concept and family conflict, suggesting thematic contributions increasingly emerge from a wider international base beyond the few institutions anchoring the field's longitudinal infrastructure (Burhanudin et al., 2024).

The country-level production map shows the deepest shading in Finland, followed by the United Kingdom, the United States, China, Spain, and Australia, a core-periphery pattern typical of educational bibliometrics, where a handful of research-intensive countries dominate output. At the same time, Africa, Latin America, and South Asia remain sparse. This plausibly reflects structural factors: Nordic countries combine sustained research funding, register-based longitudinal infrastructure (e.g., Finland's linked administrative registers), and welfare-state policies that make school well-being a natural extension of social-policy monitoring conditions largely absent in lower-income systems with competing funding priorities and limited data infrastructure.

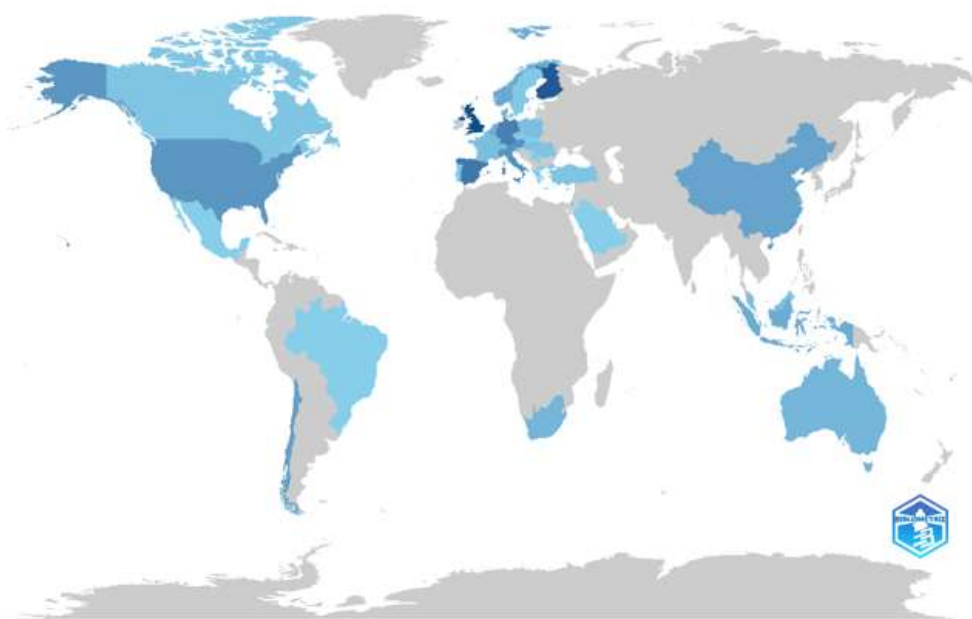


Figure 6. Country Scientific Production

Several studies from the underrepresented regions of Vietnam (Cong et al., 2025; Huong et al., 2025), Indonesia (Mudzkiyyah et al., 2022; Wihartati et al., 2026), and the Basque Country's community-embedded projects (Karrera Xuarros et al., 2020, 2023) signal an emerging, though still marginal, diversification of the field's geographic base, underscoring the need for greater international collaboration to validate school well-being models across more diverse education systems.

International Collaboration Network

The country collaboration map (Figure 7) depicts a sparse, hub-centered co-authorship structure in which Germany, Spain, and Finland function as principal connecting nodes across three long-distance arcs: Central Europe to Southern Africa, the Iberian Peninsula to Southeast Asia, and a transatlantic route linking North America, the Nordic-Baltic zone, and Australia. This is consistent with the institutional concentration observed in Figures 5–6: cross-border co-authorship radiates from a limited number of European anchor countries, echoed by the six-country MiCREATE consortium (Dežan & Sedmak, 2023) and the Greek–Swiss comparison of migrant and native students' well-being (Kassis et al., 2021), illustrating how European infrastructures primarily drive cross-national testing of school well-being constructs, while intercontinental or South–South partnerships remain thinner.

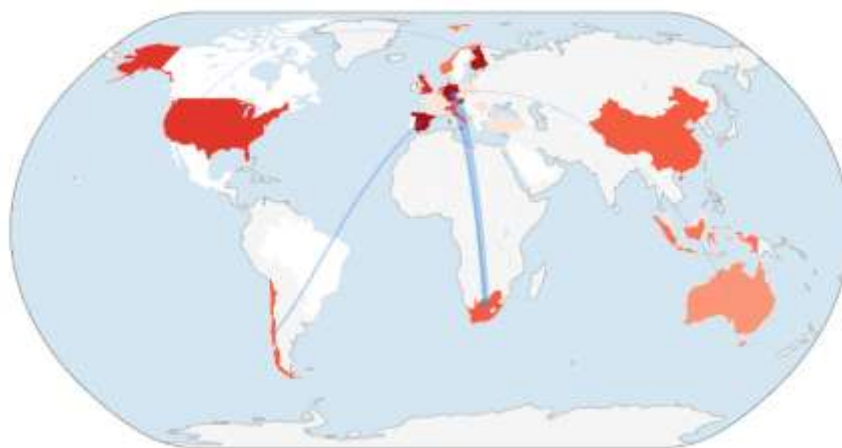


Figure 7. Country Collaboration Map

Beyond the European core, the map captures emergent but comparatively isolated activity in the Global South and Asia-Pacific, including Indonesia, Malaysia, Chile, and South Africa, contributing thematically rich but largely single-country studies rather than multinational co-authorships, such as the Indonesian–Malaysian study of growth-mindset among Muslim university students and Chilean investigations of classroom sociometrics. The relative absence of direct collaborative lines among these producers suggests school well-being scholarship in these regions has developed largely in parallel rather than through direct partnership, with European institutions functioning as intermediary hubs. This reinforces the equity concern raised in Figures 5–6: strengthening South–South and cross-regional ties, rather than solely expanding European-anchored partnerships, represents a meaningful pathway toward more culturally generalizable scholarship.

Core Journals According to Bradford's Law

The source-level analysis (Figure 8) identifies *Frontiers in Psychology* as the most prolific outlet, publishing nearly twice as many articles (9) as the next-ranked journal.

This dominance is reflected in the corpus's diverse methodological and cultural range, hosted by the journal from Chinese investigations of only-child status and cognitive outcomes (Liu et al., 2022), to Austrian validation of teacher-student ratings via the Perception of Inclusion Questionnaire (Schwab & Alnahdi, 2020), Spanish research on adolescent drug use, and post-COVID qualitative accounts of the school psychologist's role in Italy (Iudici et al., 2025). This breadth suggests the journal serves as a broad-scope, multidisciplinary venue that accommodates both quantitative and qualitative research on school well-being across varied national contexts.

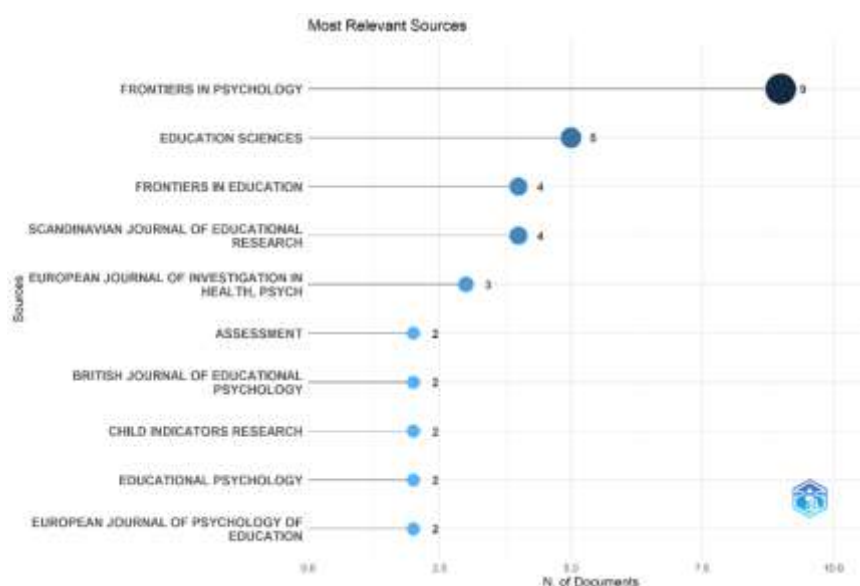


Figure 8. Most Relevant Sources

A second tier of specialized journals includes Education Sciences (5 articles), Frontiers in Education and Scandinavian Journal of Educational Research (4 each), and the European Journal of Investigation in Health, Psychology and Education (3), corresponding to identifiable clusters: Education Sciences on the Appwel instrument (Luts et al., 2026), the Scandinavian journal anchoring Nordic contributions, such as the Finnish PIQ validation (Koskela et al., 2026), and the European journal carrying network analytic work on psychosocial symptoms (Zdoupas, 2026). The remaining core journals, each with two articles, indicate psychometric instrument development (Teuber et al., 2025) and longitudinal designs (Weyns et al., 2021) as recurring but dispersed themes.

This concentration was further examined via Bradford's Law (Figure 9), identifying 11 core journals, 32 in Zone 2, and 36 in Zone 3 (multiplier $k = 2.02$; $R^2 = 0.9036$; Kolmogorov–Smirnov $p = 0.116$), confirming a maturing field's scattering pattern, with a compact Core absorbing a disproportionate share of output. This pattern is somewhat more concentrated than Bradford distributions in adjacent domains, such as teacher well-being research (Zahrah et al., 2025), suggesting that core-periphery scattering reflects a broader pattern in educational bibliometrics rather than a feature unique to school well-being.

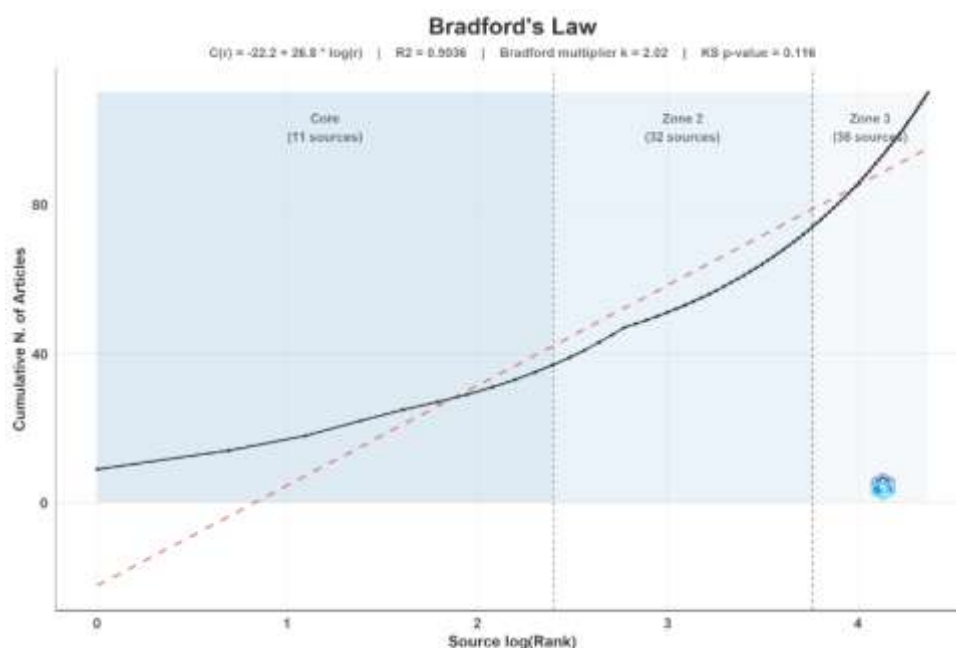


Figure 9. Bradford's Law

Zone 2 (32 sources) and Zone 3 (36 sources) comprise the remaining bulk of the 110 article corpus, a long tail of journals contributing only one or two articles each, such as the *Journal of Pacific Rim Psychology* (Liu et al., 2022) and the *International Journal of Sustainable Development and Planning* (Pek et al., 2025). In practice, this compact core of roughly a dozen journals captures most of the literature, while regional and culturally specific contributions (Figures 5–7) remain dispersed across the long tail.

Intellectual Structure of School Well-Being Research

Co-citation Analysis

The co-citation network (Figure 10) maps the field's intellectual foundations into four interconnected clusters. The blue cluster, centered on Rimpelä's school well-being model, forms the conceptual backbone tracing to the Konu and Rimpelä model that operationalizes Allardt's (1976, 1993) having loving being framework, invoked alongside Bronfenbrenner's ecological systems theory (Karan & Erdemir, 2023; Košťálová, 2025). Its proximity to Bandura's self-efficacy theory and PISA (2018) data indicates development in dialogue with motivational-psychological theory and large-scale assessment, reflected in studies linking PISA achievement and self-concept to track choice (Ortega-Rodríguez, 2025; Vasalampi et al., 2023). Adjacent, the yellow cluster organized around Diener's (1984) subjective well-being construct and Deci and Ryan's self-determination theory (Deci & Ryan, 2008; Diener, 1984; Ryan & Deci, 2017) represents a complementary hedonic-eudemonic strand, consistent with the corpus's recurrent framing of school well-being as spanning both subjective and psychological dimensions (Losada-Puente et al., 2022).

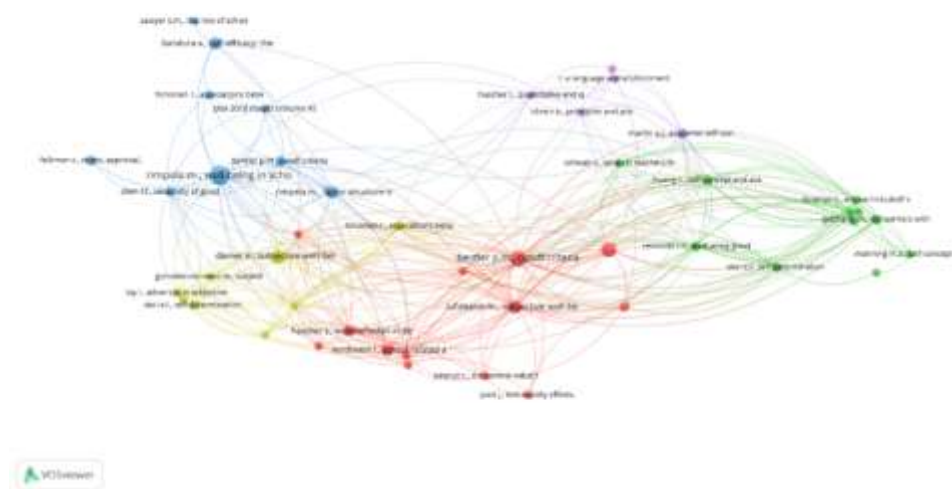


Figure 10. Co-citation Network of Cited References

Two further clusters reveal a methodologically distinct tradition oriented toward psychometric validation. The red cluster, dominated by Bentler's SEM criteria and Hascher's "Wohlbeinden in der Schule," reflects instrument-validation emphasis, mirrored by PIQ studies across Finnish, Austrian, and Belgian samples (Koskela et al., 2026), with proximity to Pekrun's control-value theory (Beaumont et al., 2023). The green cluster, structured around Schwab's teacher-perception research and Loreman and Gebhardt's inclusive education literature, reflects teacher-mediated well-being (Pirker et al., 2025). Together, the four-cluster structure shows the field integrates welfare sociology (Allardt), ecological theory (Bronfenbrenner), subjective well-being theory (Diener; Deci & Ryan), and psychometric methodology (Bentler) a maturing but pluralistic field.

Bibliographic Coupling Analysis

The bibliographic coupling network (Figure 11), which links documents that share cited references, reveals a more fragmented, multi-cluster structure than the co-citation map. Kiuru (2020) on interpersonal relationships and achievement during educational transitions forms the network's most central and largest node, bridging several surrounding clusters rather than anchoring a single one. Immediately adjacent, an orange cluster comprising Torppa (2020), Pozas (2021), Kyttälä (2025), Bochaver (2023), and Putwain (2021) reflects research on reading motivation, differentiated instruction, and academic engagement (Bochaver et al., 2023; Kiuru et al., 2020; Kyttälä et al., 2025; Pozas et al., 2021; Putwain et al., 2021; Torppa et al., 2020). A pink cluster anchored by Huitsing (2019), together with Dong (2024) and Finnviold (2024), couples around anti-bullying intervention research, consistent with the "healthy context paradox" literature (Dong et al., 2024; Finnviold & Dokken, 2024; Huitsing et al., 2019).

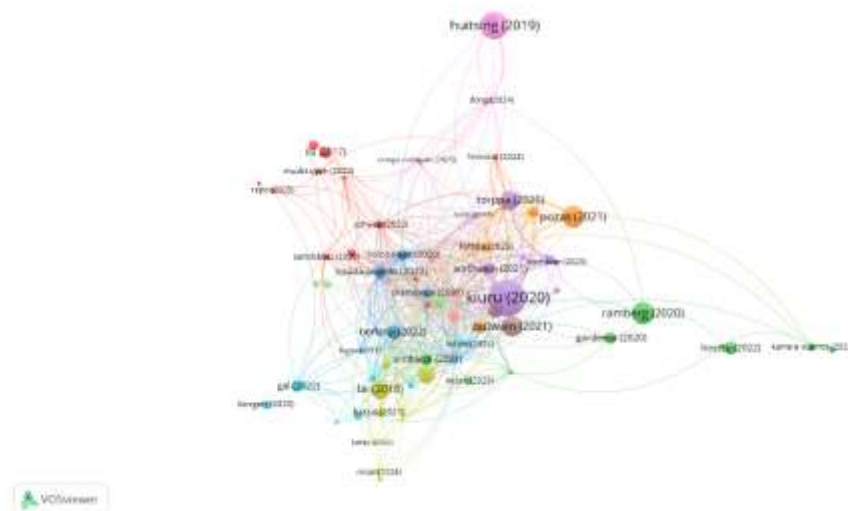


Figure 11. Bibliographic Coupling Network

A smaller, more peripheral red cluster (Liu et al., 2022; Mudzkiyyah et al., 2022; Repo et al., 2025) connects only loosely to the network's core, suggesting a methodologically distinct subgroup. Similarly, a green cluster (Gordeeva et al., 2020; Hosszu et al., 2022; Karrera Xuarros et al., 2020; Ramberg et al., 2020) and a teal cluster (Borgen et al., 2020; Gál et al., 2022; Kassis et al., 2021; Lai et al., 2018) extend outward from the core with comparatively sparse linkages, indicating additional sub-specialties. The green cluster reflects research on teacher stress, academic self-regulation, and classroom- and pandemic-related conditions that shape student well-being. The teal cluster reflects research on individual and program-level determinants of student well-being, spanning social problem-solving during school transitions, positive-behavior and positive-education interventions, and cross-group well-being typologies that reference the field's literature internally more than they connect with the field's central literature. Together, this fragmented, multi-cluster pattern indicates that bibliographic coupling reveals a more sub-specialty-driven and less thematically unified structure than the co-citation network, with several distinct research programs sharing reference bases independently rather than converging on shared foundational literature.

Conceptual Structure and Thematic Evolution

Keyword Co-occurrence Network

The keyword co-occurrence network (Figure 12) positions 'school well-being' as the field's conceptual anchor, radiating into seven thematic clusters. The green cluster (curriculum, inclusive school, teacher support) reflects a pedagogical stream (Karrera Xuarros et al., 2020; Beaumont et al., 2023). The purple (inclusive education, autonomy, burnout), orange (academic self-concept, motivation), and blue (motivation, homework) clusters together indicate that inclusion and motivational autonomy form a tightly interwoven core, consistent with the PIQ's structure (Schwab & Alnahdi, 2020) and self-determination research (Palíšek et al., 2025; Kiuru et al., 2020).

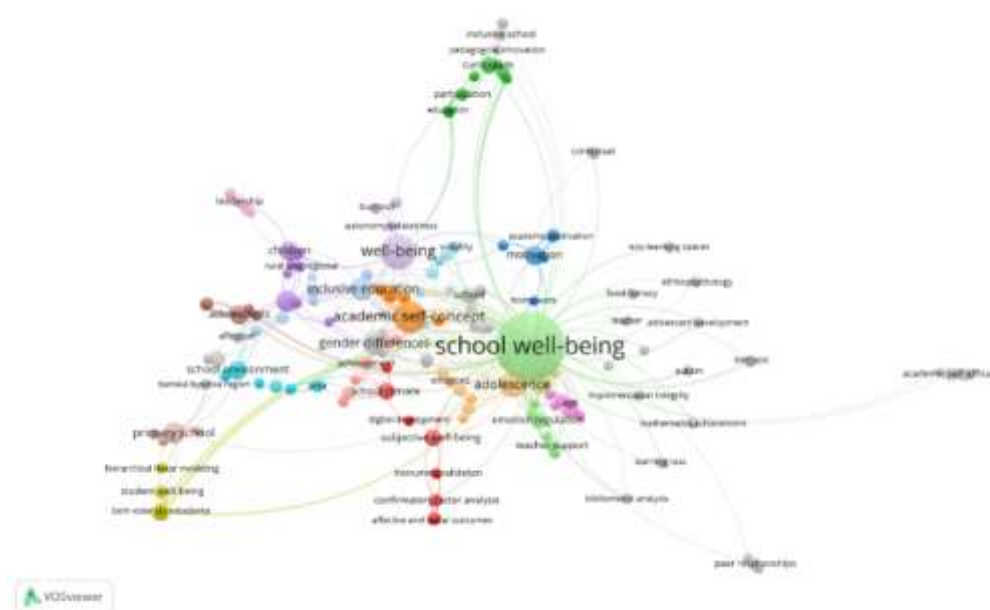


Figure 12. Keyword co-occurrence network of school well-being research

A methodologically distinct red cluster (school climate, subjective well-being, instrument validation) signals a psychometric stream (Dias-Viana & Noronha, 2022; Jasińska-Maciąg et al., 2026), while cyan and yellow clusters (school environment, PISA) point to multilingual adaptation research (Košťálová, 2025). Peripheral nodes BERTopic, autism, and food literacy represent emergent topics such as text-mining on school avoidance (Chen, 2026) and autistic students' well-being (Greer et al., 2026), suggesting the field has reached conceptual maturity while diversifying into cross-disciplinary frontiers, consistent with Bradford's Law scattering (Figure 9).

Thematic Map

The strategic thematic map (Figure 13) plots clusters along centrality and density axes. The core construct "school well-being, adolescence, academic achievement" falls in the Emerging or Declining Themes quadrant (low centrality, low density), consistent with the field's still-evolving conceptual boundaries: many studies treat "school well-being" as a construct still being defined and operationalized differently across contexts, illustrated by systematic reviews clarifying its definitional ambiguity ((Losada-Puente et al., 2022) and new instruments such as Appwel (Luts et al., 2026) that continues to refine rather than consolidate its dimensions. Adjacent, the "school, humans, schools" cluster falls within the Basic Themes quadrant (high centrality, moderate-low density), representing foundational, generic terminology underpinning nearly all studies functioning as transversal indexing vocabulary rather than a distinct theoretical contribution, as seen across studies from Norwegian positive behavior support evaluations (Borgen et al., 2020) to Danish cohort-based well-being surveys (Repo et al., 2025).

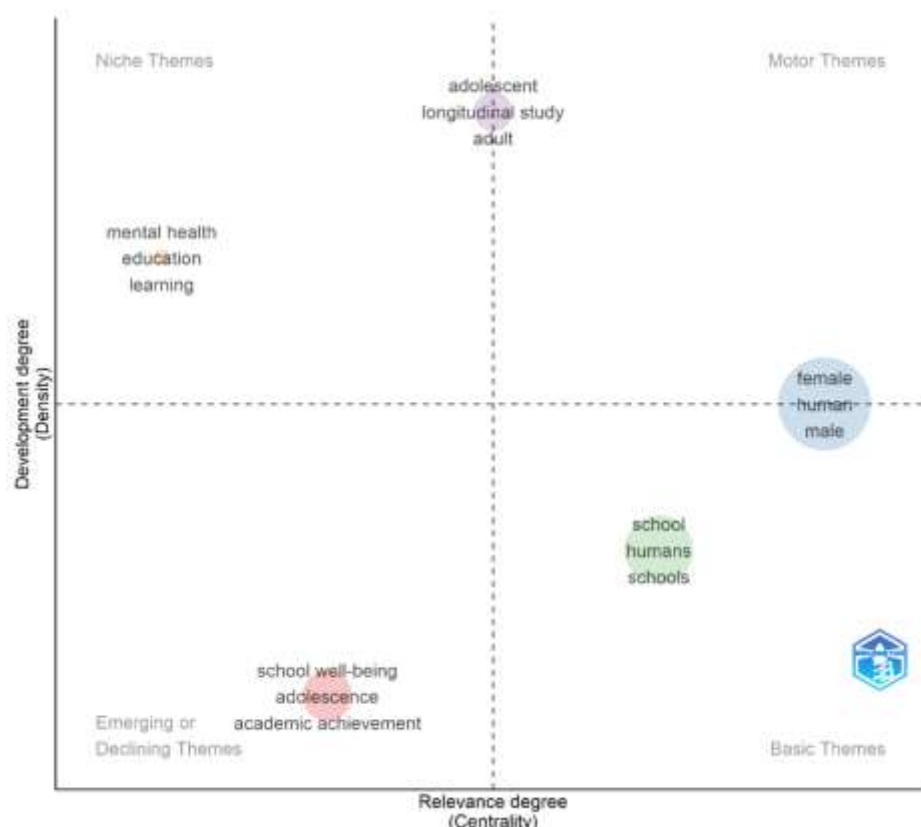


Figure 13. Thematic map of school well-being research

Three additional clusters are positioned within the Niche Themes quadrant, indicating well-developed but relatively specialized research domains with limited influence on the broader conceptual structure of school well-being. The first cluster, comprising mental health, education, and learning, reflects an established line of inquiry linking school well-being to psychological functioning and educational outcomes, with particular attention to mental health and clinical perspectives (Cong et al., 2025; Zdoupas & Laubenstein, 2026). A second cluster, represented by adolescent, longitudinal, and adult studies, highlights a specialized developmental perspective that examines the continuity of well-being across life stages through longitudinal designs (Kiuru et al., 2020). The third cluster, defined by the keywords female, human, and male, emphasizes gender-related differences in school well-being and occupies a position closest to the Motor Themes quadrant, suggesting increasing relevance within the field (Mella-Defranchi & Araya, 2025; Zdoupas, 2026). Collectively, these findings indicate that school well-being research has matured across several complementary, specialized domains rather than converging on a single dominant research theme.

Thematic Evolution and Trend Topics

The trend topics analysis (Figure 14) illustrates a clear temporal shift from broad methodological and developmental topics toward increasingly specialized school well-being constructs between 2020 and 2026. Early themes, including longitudinal studies,

school children, and adolescence, emphasize developmental and cohort-based research designs (Kassis et al., 2021; Kiuru et al., 2020). During 2022–2023, keywords such as high school, motivation, and well-being indicate growing attention to motivational processes underlying students' school experiences (Tunkkari et al., 2023). By 2024, the emergence of school well-being as a dominant keyword, alongside female and human, reflects a transition toward more focused investigations of the construct and increased attention to gender-related differences in students' well-being (Marquez et al., 2022; Zdoupas, 2026).

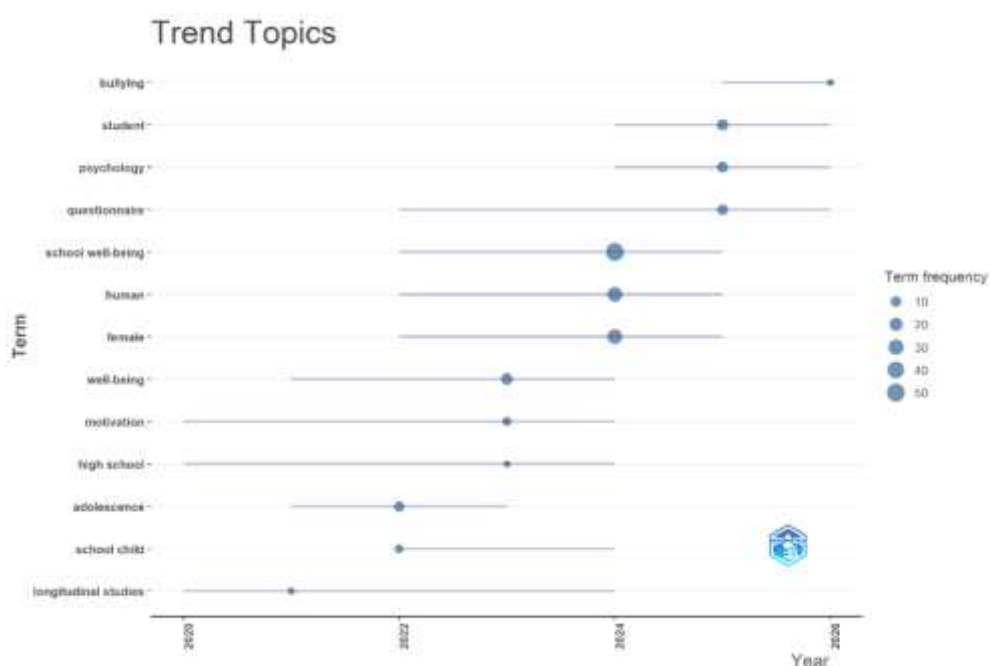


Figure 14. Trend topics in school well-being research (2020–2026)

The most recent cluster is questionnaire, psychology, and bullying, emerging toward 2025–2026, signals an accelerating shift toward instrument-based measurement and victimization-related dimensions, aligning with recent psychometric validation studies (Jasińska-Maciąg et al., 2026; Luts et al., 2026) and growing attention to victimization dynamics (Dong et al., 2024; Huitsing et al., 2019). A similar methodological trend is also evident in Southeast Asian educational research, where context-specific assessment instruments have been developed and validated for constructs such as self-confidence, discipline, manners, and responsibility (Sutisna et al., 2025). Although these instruments address different educational outcomes, they illustrate the growing emphasis on context-sensitive psychometric development, as increasingly reflected in contemporary school well-being research. Read alongside Figure 13's low-density, low-centrality placement of “school well-being”, this trajectory suggests the field is undergoing active reformulation rather than stagnation, entering a phase of simultaneous methodological consolidation and topical diversification.

Integrating the Sociological and Psychological Perspectives of School Well-Being

Read together, Figures 2 through 14 show school well-being research developing as a genuinely interdisciplinary field, with sociological and psychological traditions progressively converging rather than remaining isolated. The co-citation network (Figure 10) makes this dual heritage explicit: the blue cluster anchored by Rimpelä's model traces to Allardt's (1976, 1993) welfare framework and Bronfenbrenner's (1979) ecological systems theory, conceptualizing well-being as embedded within nested social structures, reflected in studies operationalizing Allardt's dimensions in school contexts (Košťalová, 2025). The adjacent yellow cluster, organized around Diener's (1984) subjective well-being construct and self-determination theory, represents the psychological counterpart, evident in research on autonomy and motivation (Palíšek et al., 2025) and the PERMA-H model (Lai et al., 2018).

This structural-individual duality is echoed in the Southeast Asian context: children with learning difficulties in Indonesian schools experience social acceptance as jointly shaped by peer-level attitudes, a structural-relational factor, and the child's own self-presentation and coping strategies, an individual-psychological factor (Ainin & Tabrin, 2024). The keyword co-occurrence network (Figure 12) confirms this pattern at the field level: 'school well-being' sits between sociologically oriented clusters (inclusive education, curriculum) and psychologically oriented clusters (motivation, self-concept, emotion regulation), consistent with reviews reconciling hedonic, eudemonic, and social conceptions (Losada-Puente et al., 2022).

Institutionally (Figures 5–7), the Nordic-Austrian axis advances the structural-relational tradition (Holzer et al., 2024; Vasalampi et al., 2023), while dispersed contributions, such as Hong Kong's PERMA-H validation (Lai et al., 2018) and Indonesian or Malaysian research (Wihartati et al., 2026), emphasize the psychological pole, with recent studies (2024–2025) increasingly integrating both, though the thematic map (Figures 13–14) shows this integration remains immature, with bullying-related concerns (Huitsing et al., 2019) still loosely coupled to the Nordic-Austrian core (Figure 11). In general, the field is gradually converging to a biopsychosocial model with structural and psychological elements (Konu et al., 2002) which are conceptually united in Figure 15.

To make this convergence explicit, Figure 15 synthesizes the theoretical and bibliometric evidence presented above into a single conceptual framework. Following Konu and Rimpelä's (2002) bridging model, the framework positions Allardt's (1976, 1993) welfare theory and Bronfenbrenner's (1979) ecological systems theory as the field's sociological foundation, and Diener's (1984) subjective well-being theory together with self-determination theory (Deci & Ryan, 2008, 2017) as its psychological foundation. These two streams converge in the four dimensions of Having, Loving, Being, and Health, through which Konu and Rimpelä (2002) operationalized school well-being, giving rise to the integrative biopsychosocial construct identified throughout this study's co-citation, bibliographic coupling, and keyword co-occurrence results.

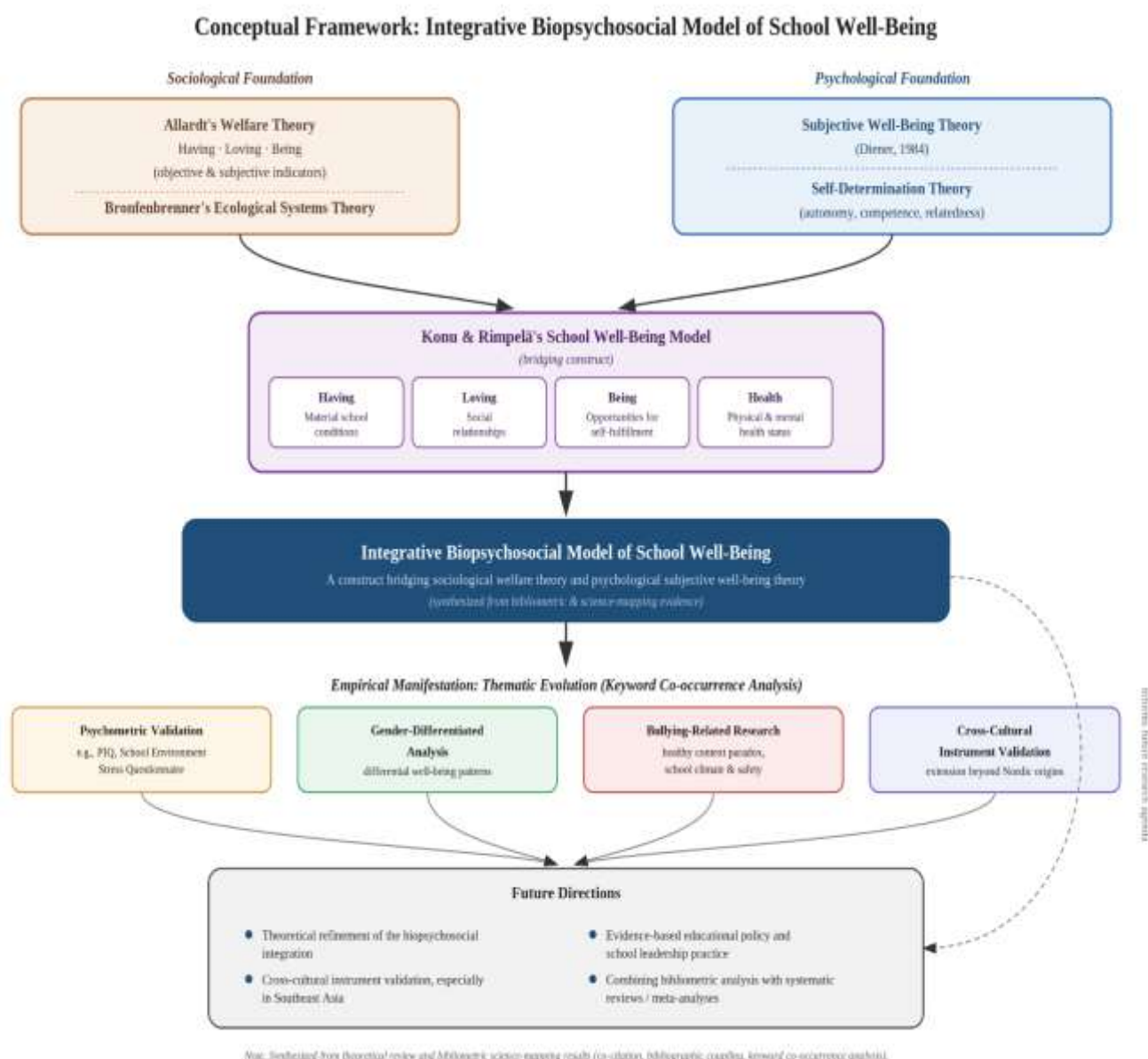


Figure 15. Conceptual Framework: Integrative Biopsychosocial Model of School Well-Being

As Figure 15 illustrates, this integrative construct is not a purely theoretical proposition but is empirically corroborated by the bibliometric evidence reported above: the field's thematic evolution toward psychometric validation, gender-differentiated analysis, bullying-related research, and cross-cultural instrument validation (Figures 12–14) represents concrete empirical manifestations of this sociological–psychological synthesis, rather than disconnected topical trends. Positioning these four thematic streams beneath the integrative construct also clarifies the field's trajectory going forward, pointing toward theoretical refinement of the biopsychosocial integration, cross-cultural instrument validation in underrepresented regions such as Southeast Asia, evidence-based educational policy, and closer integration of bibliometric analysis with systematic reviews or meta-analyses. Each of these directions is elaborated further in the theoretical, practical, and policy implications that follow.

Theoretical Implications

First, the co-citation structure (Figure 10) shows that Konu and Rimpelä's (2002) framework, derived from Allardt's welfare theory and Bronfenbrenner's ecological systems theory, remains the field's theoretical backbone, yet the thematic map (Figure 13) places 'school well-being' in the low-density, low-centrality quadrant, suggesting the model functions as a generative framework still under active refinement (Jasińska-Maciązek et al., 2026; Losada-Puente et al., 2022; Luts et al., 2026).

Second, the persistent duality between structural-sociological and hedonic-psychological clusters (Figures 10, 12), discussed above, implies that no single tradition fully accounts for school well-being; future frameworks should specify mediating or moderating mechanisms and decompose well-being into constituent dimensions (Zdoupas & Laubenstein, 2026).

Third, geographic concentration in Nordic, Central European, and Anglophone infrastructures (Figures 5–7), reinforced by the steep Lotka's Law skew ($\text{Beta} = 3.51$ vs. 2.0), cautions against assuming cross-cultural portability of core models pending systematic replication; the equity and capacity-building dimensions of this concentration are addressed below under Practical and Policy Implications.

Finally, post-pandemic production trends (Figures 2, 14) show theorizing shifting toward psychometric, problem-focused models, particularly bullying and victimization (Dong et al., 2024; Huitsing et al., 2019) warranting their integration into the field's foundational framework.

Practical and Policy Implications

The bibliometric patterns carry direct implications for practice and policy. The pandemic-triggered rise in production (Figure 2) signals that school well-being has become an urgent policy priority (Patrick & Pamflett, 2025; Pöysä et al., 2024), implying that well-being monitoring infrastructure exemplified by Finland's and Denmark's national surveys (Repo et al., 2025; Vasalampi et al., 2023) should be retained in educational data systems, given that well-being indicators predict subsequent outcomes (Kiuru et al., 2020).

Second, the concentration of measurement infrastructure around validated instruments, notably the PIQ (Schwab & Alnahdi, 2020) offers standardized assessment resources, yet emerging context-specific instruments (Luts et al., 2026; Wihartati et al., 2026) suggest policymakers should favor a 'core-plus-adaptation' strategy: validated core instruments for comparability, with culturally responsive adaptation (Kassis et al., 2021).

Third, the prominence of bullying-related keywords (Figure 14) and the anti-bullying coupling cluster (Figure 11) carry a counterintuitive implication: visible anti-bullying programs can temporarily intensify distress among remaining victims (Eilts & Wilke, 2026; Huitsing et al., 2019), implying policy should incorporate differentiated, individual-level support rather than assume uniform benefit (Kaufman et al., 2021).

Finally, the concentration of research within a limited number of European countries underscores the need to strengthen school well-being research in

underrepresented regions. Expanding international collaboration, investing in local research capacity, and generating longitudinal evidence across diverse cultural contexts will improve the generalizability of theoretical models and support the development of context-sensitive educational policies and practices (Berger et al., 2024; Karrera Xuarros et al., 2020; Mudzkiyyah et al., 2022). Recent Indonesian evidence underscores this urgency: school principals and teachers have a strong conceptual understanding of inclusive education, yet this remains only partially translated into institutional practice, confirming that the region's gap is systemic rather than attitudinal (Rizki & Wagino, 2026).

Future Research Directions

The bibliometric patterns point toward several directions for future inquiry. First, the geographic concentration in the collaboration maps (Figures 6–7), dominated by European hub nations linked through sparse, Europe-anchored ties, indicates a need to prioritize direct South–South and cross-regional partnerships. Building on existing but largely parallel contributions from Indonesia or Malaysia (Wihartati et al., 2026), Vietnam (Cong et al., 2025), and Chile (Mella-Defranchi & Araya, 2025) Future multi-country studies designed around Global South partnerships would strengthen cross-cultural generalizability, extending designs such as the MiCREATE consortium (Dežan & Sedmak, 2023) into more diverse configurations.

Second, the placement of *school well-being* in the low-density, low-centrality quadrant (Figure 13), together with the continued emergence of new assessment instruments (Jasińska-Maciążek et al., 2026; Luts et al., 2026) This indicates that the construct remains conceptually unsettled. Rather than developing additional measures, future research should prioritize harmonized cross-instrument validation to strengthen conceptual consistency and measurement comparability across contexts (Losada-Puente et al., 2022).

Third, the loose integration of the bullying cluster with the field's core (Figure 11) suggests future work should integrate victimization research within the broader biopsychosocial framework, tracking how the "healthy context paradox" occurs (Huitsing et al., 2019) and moral disengagement (Eilts & Wilke, 2026) interact with structural determinants of well-being (Kiuru et al., 2020). Fourth, engagement with underrepresented populations of autistic adolescents (Greer et al., 2026), students with learning disorders (Benassi et al., 2022), and rural communities (Berger et al., 2024) remains sparse, warranting intersectional approaches building on person-centered profiling methods (Obermeier et al., 2026). Finally, given the accelerating methodological sophistication of computational text-mining (Chen, 2026) and AI-related teacher well-being research (Griebiea, 2026) Future studies should examine digital/AI-mediated influences on well-being, both as stressors (Hosszu et al., 2022) and monitoring tools.

Limitations

Several methodological limitations should be considered. First, the analysis relies on a single-database corpus (Scopus, 110 articles), excluding literature indexed exclusively in Web of Science, ERIC, or PsycInfo, a concern given that comparable reviews have deliberately drawn on multiple databases to mitigate indexing bias (Losada-Puente et al., 2022). The institutional and national patterns identified (Figures 3–7) should thus be interpreted as characteristic of Scopus-indexed research specifically, with cross-database replication strengthening confidence in these patterns.

Second, the corpus is restricted to English-language publications, likely underrepresenting linguistically diverse scholarship, as evidenced by included studies originally published in Slovak (Košťalová, 2025), Russian (Bochaver & Mikhaylova, 2023), Portuguese (Dias-Viana & Noronha, 2022), and German (Trauernicht et al., 2024), potentially inflating the apparent dominance of Nordic and Western European research in the co-occurrence and thematic mapping analyses (Figures 10–13).

Third, the bibliometric techniques employed are descriptive, relying on citation and keyword counts as proxies for influence rather than methodological rigor, and are subject to temporal bias, whereby recent articles (2024–2026) have had insufficient time to accumulate citations (Donthu et al., 2021). Fourth, VOSviewer visualizations rely on algorithmic clustering, which is sensitive to parameter choices (van Eck & Waltman, 2010), whereas keyword analysis relies on author-supplied terms that may misrepresent content. Finally, this analysis omits a full PRISMA appraisal of study quality (Page et al., 2021); conclusions remain descriptive, and future work should complement this with a systematic appraisal across designs ranging from large surveys (Pöysä et al., 2024) to small qualitative studies (Kakoulidou et al., 2023).

CONCLUSION

This study presents the first decade-spanning bibliometric analysis tracing the sociological and psychological foundations of school well-being research. Analysis of 110 articles (2017–2026) revealed non-linear growth: stagnant output before 2020, a pandemic-triggered surge, thematic consolidation (2021–2023), and acceleration to a record in 2025, showing a field maturing into a rapidly expanding, specialized area. Productivity remains concentrated among a few author-institution clusters within parallel national programs across Nordic, Western European, and Anglophone ecosystems, confirmed by a steep Lotka's Law scattering ($\text{Beta} = 3.51$) and a Bradford's Law core of eleven journals. Co-citation and keyword analyses reveal an integrative foundation bridging welfare and ecological systems theory with subjective well-being and self-determination theory, alongside a shift toward psychometric validation, gender analysis, and bullying dynamics. These findings confirm that the school well-being scholarship is coalescing around a biopsychosocial model that integrates structural and psychological processes. Constrained by a single English-language database and descriptive indicators, this study offers a comprehensive map to guide future work, including cross-regional collaboration, cross-instrument validation, and digital or AI-mediated influences.

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