



Mapping five decades of life skills education research in compulsory schooling: A dual-database bibliometric and science mapping analysis (1977–2026)

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Abstract

Life skills education has been promoted in school systems for five decades, yet its research literature has rarely been mapped with compulsory schooling as a defining condition. At primary level the agenda is carried largely by an integrated course taught by the generalist primary school teacher, a course known in the English-language literature as Life Studies, which makes the state of this literature a question for primary teacher education as well as for policy. This bibliometric study examines the conceptual structure, intellectual foundations, and geographical development of school-based life skills education, with particular attention to primary schooling and teacher education. Records from Web of Science and Scopus were merged, deduplicated, and screened using explicit eligibility criteria. Keyword co-occurrence and cited-reference analyses were conducted using normalised terminology, community detection, and sensitivity testing. Out-of-school sport literature was analysed separately to examine its intellectual connections with school-based research. The literature has expanded considerably over the past decade, revealing five thematic groupings and two keyword pairs. Major themes include adolescent wellbeing and social and emotional learning, prevention and substance use, sport-based positive youth development, psychosocial competencies, and secondary education. Primary schooling and teachers appear mainly within prevention-oriented research rather than curriculum-focused scholarship. Over time, research emphasis has shifted from substance-use and infection prevention towards wellbeing and social and emotional learning. Although sport-based research forms a distinct literature, sport psychology remains influential in the school-based field. Sensitivity analyses indicate that thematic structures vary across analytical parameters and corpus definitions, warranting cautious interpretation. The findings suggest that life skills education represents a policy-driven label spanning multiple research traditions rather than a consolidated field. A shared operational definition linked explicitly to social and emotional learning is needed to strengthen conceptual coherence and future research.

Keywords: Bibliometric analysis; Compulsory schooling; Keyword co-occurrence; Life skills education; Life studies; Primary education; Primary school teachers; Science mapping

1. Introduction

Since the World Health Organization set out a programme for life skills education in schools (World Health Organization, 1994), the idea that compulsory schooling should teach competencies for living – decision-making, communication, coping, relating to others – has become one of the more durable commitments of international education policy. It has also become one of the more loosely bounded. Programmes described as life skills education sit alongside, and often overlap with, social and emotional learning, twenty-first-century skills, psychosocial competence and positive youth development, and the same intervention can appear under several of these labels depending on where it is published.

That looseness is a problem for synthesis. Systematic reviews of life skills interventions report effects (Nasheeda et al., 2019; Sherif et al., 2023), and bibliometric studies have begun to describe the field's output (Akcan, 2022a; David & John, 2026), but the question of what the field consists of has mostly been settled by the search string. A corpus assembled from a query returns the literature that uses the query's words. If the school setting is then assumed rather than established, the resulting map describes a vocabulary spread across clinical, community and higher-education contexts, and attributes it to schools.

Where the setting is a school, the level at which the agenda arrives matters for who has to deliver it. In lower-secondary and secondary education, life skills content is typically distributed across subject specialists or delivered as a standalone programme. At primary level it is more often

carried by an integrated course taught by the generalist primary school teacher, a course rendered in the English-language literature as Life Studies and sometimes as life science, and it is the main curricular vehicle through which decision making, personal safety, health and living together reach children in the first years of compulsory schooling (Akcan, 2022a, 2022b). That placement puts the generalist primary school teacher, rather than a specialist, in charge of the competencies the agenda names, and it makes the state of the surrounding research literature a question for primary teacher education as much as for policy. Primary-level evidence is accumulating on how these competencies are understood by teachers, parents and pupils (Isik & Sahin Taskin, 2024; Kwambaza & Basela, 2024), but it has not been set against a map of the literature it belongs to. This study began from that gap: if the life skills agenda is delivered at primary level through one integrated course and one teacher, it is worth knowing what five decades of research on the agenda actually consists of, and whether the primary classroom is visible in it at all.

1.1. What Is Known, and What the Evidence Rests On

The evidence base is larger than its coherence. The programme that gave the field its template, Botvin's Life Skills Training, was evaluated in long-term randomised trials showing reduced substance use into early adulthood (Botvin et al., 1995; Botvin & Griffin, 2000), and the school-based drug-prevention literature that grew around it was synthesised early enough to shape later practice (Cuijpers, 2002). From that root the field spread outwards rather than deepening: reviews now cover life skills interventions for adolescents in general (Aromatario et al., 2026), age-specific provision across school stages (Kirchhoff & Keller, 2021), programmes in low- and middle-income countries (Murphy-Graham & Cohen, 2022; Singla et al., 2020), and the construct's facets as such (Bansal & Kapur, 2023). Hvalby et al. (2024) is the closest predecessor to the present study, scoping life skills specifically within compulsory education.

Two features of this body of work matter for what follows. The first is that outcomes are claimed across domains sharing little besides the label: substance use, bullying victimisation (Potard et al., 2021), mental health (Shah et al., 2024), socio-emotional development and schooling outcomes together (Tagat et al., 2025), and leadership-related skills approached through self-esteem and assertiveness (Yücel et al., 2026). The second is that the theoretical warrant is usually borrowed rather than built. Self-efficacy (Bandura, 1977) does much of the explanatory work, and where a developmental mechanism is specified it is frequently imported from youth sport (Hermens et al., 2017) – a dependence this study is able to quantify.

The adjacent literature on social and emotional learning is both larger and better consolidated, with meta-analyses of universal school-based programmes (Cipriano et al., 2023; Corcoran et al., 2018; Durlak et al., 2011; Taylor et al., 2017), of whole-school approaches (Goldberg et al., 2019) and of the preschool years (Murano et al., 2020), together with a stocktaking of what remains unknown (Durlak et al., 2022). That contrast – a consolidated neighbour beside a diffuse field – is part of what makes the boundary question unavoidable.

1.2. Defining the Object of Study

This study therefore fixes its conceptual boundary before describing its search, and states which adjacent labels fall inside it. Life skills, skills for life and life competences are treated as the object of study and are the query terms. Social and emotional learning is treated as adjacent but distinct: it is a separately institutionalised tradition with its own instruments, programmes and review literature (Corcoran et al., 2018; Durlak et al., 2011; Taylor et al., 2017), and merging it into the query would conflate two bodies of work that cite each other only sparingly. It enters this study where authors themselves apply the term. Twenty-first-century skills and transferable competencies are treated as outside: they are organised around labour-market and curriculum-policy framings rather than the psychosocial-competence tradition (Akongo et al., 2025). Psychosocial skills and problem solving are too general to serve as query terms; retrieving them would map a vocabulary rather than a field.

The second boundary is institutional. Compulsory schooling is taken to mean formal education at primary and lower-secondary level – broadly the span that national systems require children to attend, although the exact ages differ. Because that span is defined differently across countries, the criterion applied here is built on institutional vocabulary rather than on ages, and it is applied as a positive requirement: a record must carry evidence of the school setting to be included, rather than merely failing to trigger an exclusion.

1.3. The Present Study

Bibliometric mapping of education research is itself a developing methodological area (Çiftçi et al., 2016; Jing et al., 2024; Karadağ et al., 2017; Lim et al., 2024), with established procedural guidance (Donthu et al., 2021; Zupic & Čater, 2015) and a familiar toolchain, most often VOSviewer (van Eck & Waltman, 2010) or bibliometrix (Aria & Cuccurullo, 2017), surveyed by Moral-Muñoz et al. (2020); recent education applications combine the two toolchains and bound their corpora by educational phase or setting (Kavitha & Joshith, 2024; Tran & Doan, 2026). The choices that most affect a map – how a corpus is bounded, how duplicates are resolved, how keywords are normalised, how clusters are produced – are nonetheless often reported too briefly to be reproduced. This study reports them in full, implements them in scripts rather than in a graphical tool so that each step is inspectable, and deposits the code.

What we take to be new here is a combination rather than any single element: coverage of both major citation databases with the overlap reported rather than assumed; the compulsory-schooling restriction applied as a positive criterion, with the rule behind every decision recorded and the rule set validated against human coding; and the parallel analysis of the records the restriction excludes, so that the boundary can be inspected instead of being taken on trust. We have not run an exhaustive search for prior bibliometric work across every synonym and database, and we therefore state what we looked for rather than assert a negative we cannot support. Within the corpus the main search screened, five records carry a bibliometric or science-mapping term in the title, and the compulsory-schooling screen excluded all five of them. They map adjacent objects – social and emotional learning, mental health in occupational therapy, multimedia learning, sport and physical activity in autism, and financial literacy – rather than life skills education in compulsory schooling across both databases. The count is of titles, so a study that calls itself bibliometric only in its abstract is not counted. One further example is instructive about the boundary rather than about novelty: Akcan (2022a) maps the Turkish Life Studies lesson but is not in either database, so no query would have retrieved it – a coverage gap rather than the terminology gap quantified later in this paper. Prior work using other vocabulary, or indexed in neither database, would likewise not have been retrieved.

The study addresses four questions:

RQ 1) How large is the compulsory-schooling life skills education literature, how is it distributed across the two major citation databases, and how has its volume developed between 1977 and 2026?

RQ 2) What conceptual structure does the field display, and how stable is that structure under reasonable variation in analytic parameters?

RQ 3) How has the emphasis of the field shifted across periods, once within-period volume is held constant?

RQ 4) What is the intellectual base on which this literature draws, and how does it relate to the out-of-school sport literature that a compulsory-schooling criterion excludes?

2. Method

2.1. Research Design

The study is a descriptive bibliometric and science mapping analysis of journal articles and reviews. It follows the reporting logic of the Preferred Reporting Items for Systematic Reviews and Meta-Analyses [PRISMA] 2020 statement (Page et al., 2021), adapted for a bibliometric rather than an effect-size synthesis: the flow records identification, deduplication, screening with reasons, and

inclusion, but there is no risk-of-bias appraisal because no effect estimates are pooled. The unit of analysis is the indexed bibliographic record rather than a person: the study analyses published metadata and has no human participants, so the Method reports data sources, screening and analysis in place of a participants section.

2.2. Data Sources and Search Strategy

Two databases were searched on 16 October 2026: the Web of Science Core Collection, restricted to the Science Citation Index Expanded, the Social Sciences Citation Index, the Arts and Humanities Citation Index and the Emerging Sources Citation Index; and Scopus. Conference and book indexes were not searched, because the design concerns the journal literature.

The Web of Science query was:

TS= ("life skill*" OR "skills for life" OR "life competenc*") AND (educat* OR school* OR curricul* OR student* OR pupil* OR child*)

The Scopus query was:

TITLE-ABS-KEY(("life skill*" OR "skills for life" OR "life competenc*") AND (educat* OR school* OR curricul* OR student* OR pupil* OR child*))

Both searches were limited at source to the document types article and review. Web of Science returned 3,778 records, 3,655 after that limit; Scopus returned 5,515 records, 4,396 after it. Records were exported with full metadata and complete cited-reference lists.

Because a citation database is a moving target, the stability of the search was measured rather than assumed. The Web of Science search had also been run on 9 August 2026, 68 days earlier, returning 3,648 records against 3,655 in October. The two extractions share 3,593 records, a Jaccard overlap of 96.8%, and 98.5% of the August records reappear in October. The October extraction is the one analysed throughout.

2.3. Data Collection

Exports were parsed into a common record structure by purpose-written scripts rather than by a graphical tool, so that the parsing itself is inspectable. Web of Science plain-text exports were read in eight parts of up to 500 records, the maximum the full-record-with-references format permits; the parts contain no overlapping accession numbers. The Scopus export was taken as a single comma-separated file with all fields selected and with the option that truncates long fields for spreadsheet use switched off, because that option would have removed the reference lists on which the citation analysis depends.

2.4. Deduplication

The two sets were matched in three stages, reported separately so that the overlap figure can be audited. Stage one matched on normalised digital object identifiers and resolved 2,595 pairs. Stage two matched records whose titles were identical after case, accent and punctuation folding, with publication years within one year of each other, and resolved 232 further pairs. Stage three compared the remaining titles by sequence similarity within the same year window and accepted matches at a ratio of .930 or above, resolving 7 more. A final pass removed 17 residual duplicates in total, within rather than between the databases (4 in Web of Science and 13 in Scopus) – the same work indexed twice – which a rule based on identifiers and exact titles alone would have retained.

2.5. Eligibility and Screening

Eligibility was decided by a positive criterion. A record was included only if its title, abstract or keywords carried evidence that the study was set in compulsory schooling. Matching was performed on a punctuation-free token stream, so that variant renderings of the same term are not missed, and the matched spans of competing contexts were removed before school cues were counted. Both steps were added after checking output against source records. Without the first, variant renderings such as “social and emotional (life) skills” failed to match and 128 records were wrongly classified as off topic – a count from the preparation error log, not from the current

pipeline, which no longer contains the fault – and under the corrected rule that category holds 18 records. Without the second, the word teachers inside the phrase pre-service teachers was counted as the school concept teacher, so teacher-education studies in universities scored as school studies. Every decision stores the rule that produced it and the terms that fired.

Two rules admit a record. Rule I1 admits records carrying explicit compulsory-schooling evidence: named school levels (primary, elementary, middle, secondary, high), basic or compulsory education, named grade, form or key-stage levels, levels 1 and 2 of the International Standard Classification of Education, and unambiguous compounds such as schoolchildren, school pupils and classroomö teacher (1,504 records). Rule I2 admits records carrying two or more independent school concepts among classroom, curriculum, lesson, physical education, pupil, school and teacher, with no competing context at least as well evidenced (567). The distinction matters for a word such as pupil: on its own it is one weak concept under I2, and only the compound school pupils counts as I1 evidence. Every term in both lists is in screen.py in the deposit.

A third rule was written and then withdrawn. It would have admitted records carrying a single school concept and no competing context at all (666 records). Validation against human coding showed that it carries no information: within that band the rule admits every record by construction, and the human coder retained 20 of the 44 sampled, an agreement of 45.5% and a kappa of .00. The band is therefore excluded from the primary corpus and recorded as its own exclusion category, so that the records remain identifiable; the permissive corpus that adds them back is reported as a sensitivity analysis.

Level-neutral educational vocabulary – students, teaching, pedagogy, learners, education – is deliberately excluded from the school concepts, because it is as true of a university as of a school and so carries no information about the setting. Physical education inside formal schooling counts as a school cue; out-of-school sport does not. Eight exclusion categories are recorded with counts: absence of any compulsory-schooling evidence, higher education, clinical or adult context, early years only, out-of-school sport, non-formal or out-of-school provision, the withdrawn single-cue band, and absence of the topic terms from the record. Figure 1 shows the flow.

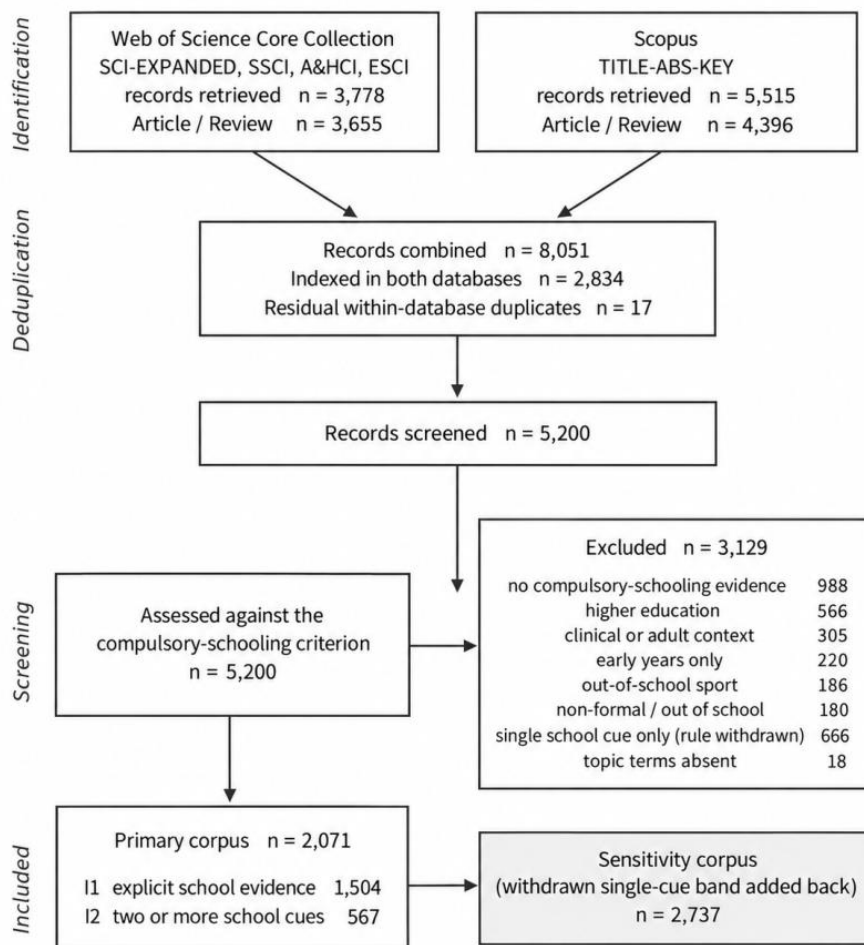
2.6. Validation of the Screen

A rule-based screen is a measuring instrument and was treated as one. A simple random sample of 300 of the 5,200 screened records was drawn with a fixed seed and coded by the author against the criterion. The sample was drawn once and then frozen, so that later changes to the screen were evaluated against coding that could not have been influenced by them; the three sampled records that deduplication later merged into a twin are followed to that twin rather than dropped. The coding was made against the compulsory-schooling criterion, blind to the machine decision and to the rule that produced it. The coder is also the author of the screening rules, so the comparison measures whether the rules implement the criterion as intended rather than whether two independent readers would agree on the criterion itself; this is stated as a limitation. Observed agreement, Cohen's kappa with a 95% confidence interval, and the proportions of false inclusions and false exclusions are reported in the Results, together with error rates by rule and the number of records the coder marked uncertain.

Non-English records were retained. Both databases supply English-language titles, abstracts and keywords for most non-English items, and 223 records (10.8% of the corpus) are in a language other than English, led by Spanish, German, Turkish and Russian, then Chinese and Italian with eleven each. A record whose English-language metadata were absent would match no topic term and would fall to the off-topic category; no such record occurs here, because an English-language query cannot retrieve one.

Figure 1

Identification, deduplication and screening flow, adapted from PRISMA 2020



Searches run 2026-10-16. Publication years 1977–2026.

Note. Adapted from Page et al. (2021). Searches were run on 16 October 2026. Counts are records, not studies. The permissive corpus adds back the single-cue band that validation rejected, and is reported as a sensitivity analysis.

2.7. Data Analysis

2.7.1. Keyword normalisation

Co-word analysis uses author keywords only. The most frequent machine-assigned index terms in this corpus are human, female, article and male – the indexed population and the document type, not the subject matter. Including them produced period trends composed entirely of indexing vocabulary. Author keywords are present for 1,736 of the 2,071 included records. Normalisation applies, in order: case and accent folding; reduction of punctuation to spaces; removal of a leading article; an explicit synonym table; regular plural folding with an exception list; and removal of machine-indexing artefacts, of the query terms themselves, and of terms too generic to locate a record. The full thesaurus is deposited.

2.7.2. Network construction and clustering

Keywords occurring in at least 10 records became nodes; pairs co-occurring at least 3 times became edges. Edge weights were normalised by association strength, the co-occurrence count divided by the product of the two keywords' occurrence counts, so that two common terms are not linked merely because both are common. A further 27 isolated nodes were removed before clustering. Communities were detected with the Louvain algorithm (Blondel et al., 2008) as implemented in NetworkX 3.6.1 (Hagberg et al., 2008), at resolution 1.0 with random seed 2026. Layout is computed for display only and carries no analytic weight.

2.7.3. Cited-reference harmonisation

Cited references were keyed on their digital object identifier where one was present, and otherwise on a structured key combining the first author, the year and the venue. A reference carrying no year was treated as unidentifiable and excluded rather than merged on venue alone; without this rule every year-less anonymous reference in a journal collapses into one node. Of 87,298 reference instances drawn from the included records, 70,446 distinct references were resolved, of which 43.5% are identifier-keyed. Web of Science supplies an identifier on roughly three fifths of its cited-reference strings; the Scopus export supplies almost none. The consequence is a limit worth stating: because identifier keying and the fallback key occupy separate spaces, a work cited with an identifier in one record and without one in another is counted twice. Gould and Carson (2008), the most cited work in the corpus, appears as an identifier-keyed node with 111 local citations and again as a fallback-keyed node with 14. Counts at the node level are therefore lower bounds, and the ranking is affected as well as the magnitudes. We considered merging such nodes and decided against it: the only key the strings support is first author and year, which in this table would also join two different articles published by the same author in the same year, and that is the coarse key this analysis exists to avoid. The exposure is reported instead, as an upper bound: 12 author-year combinations in the 200-row deposited table span more than one node, 27 nodes in all, though most of those are genuinely different articles by the same author in the same year rather than one work split in two. A separate source of splitting is worth naming because merging would not fix it: Web of Science sometimes records an incorrect identifier, so one work can occupy several identifier-keyed nodes. The reference audit is also reported: 1,770 Web of Science and 13 Scopus reference strings carry no year, and 299 carry neither an identifiable author nor a usable venue; all are excluded and counted.

2.7.4. Period analysis

Keyword prominence within a period is reported as the share of that period's keyworded records carrying the term, not as a raw count, so that a term is not described as rising merely because the literature grew. Three breakpoint schemes are reported, and a shift is described as a trend only where it appears under more than one of them. The equal-decade scheme contributes no independent evidence: its first period holds no keyworded records and its later periods coincide with the manuscript scheme, so the cross-scheme test rests on the manuscript and quartile schemes.

2.7.5. Reproducibility and use of artificial intelligence

A large language model was used as a coding assistant in preparing the analysis pipeline: the parsers, the deduplication and screening logic, the keyword thesaurus, the cited-reference harmonisation and the figure scripts. It was not used to generate the study's findings, interpretations or conclusions. All analytic decisions – the inclusion criteria, the thresholds, the comparisons – were taken by the author, who verified the outputs against source records and takes full responsibility for the content of this article.

Five implementation errors were found during preparation and corrected, all documented in the deposited repository. Four were found by checking output against source records; they changed reported values and are noted at the points where they arise. The fifth, a non-determinism in the clustering step that returned different partitions on different runs of the same input, was found by re-running the deposited archive rather than the working copy. All randomness is seeded. No step queries a network service at run time. The scripts, the derived outputs and the figure code are openly deposited at <https://doi.org/10.5281/zenodo.23439084>, with the eight largest intermediate tables regenerated by the pipeline rather than shipped. The raw exports are deposited at <https://doi.org/10.5281/zenodo.23439446> under restricted access, because the terms of the database subscriptions under which they were retrieved do not permit redistribution; access is granted on request through the repository. Running the pipeline in the documented order regenerates every value in Tables 1 to 6 and Figures 1 to 5 from the deposited exports. This was

verified by unpacking the archive into a clean directory and re-running it on the same software stack, which reproduced every derived output file byte for byte. Three reported figures are the exception, and are stated as such rather than implied. The two pre-limit record totals at the identification step, which the exports cannot carry because the exports are already filtered, are taken from the deposited search log and entered once in the pipeline; the count of records wrongly classified during preparation comes from the error log kept at the time rather than from the current pipeline. What cannot be regenerated is retrieval itself: every search ran against a live database, and the deposit carries the exports rather than the means of reproducing them. That applies to the targeted Turkish-terminology search as much as to the two main searches: its export is deposited, but the retrieval that produced it is not reproducible. Every analysis of the deposited exports, that one included, runs offline.

3. Results

3.1. Corpus and Database Overlap

The two searches carried 8,051 records forward between them, of which 2,834 were indexed in both databases, leaving a union of 5,217. Removing 17 residual within-database duplicates gave 5,200 records for screening. Table 1 reports the overlap.

Table 1

Database overlap before screening

<i>Source</i>	<i>Records</i>	<i>% of screened</i>
Web of Science only	818	15.7
Scopus only	1,549	29.8
Both databases	2,833	54.5
Records screened (after residual deduplication)	5,200	100.0

Note. Matching proceeded in three stages: identifier (2,595 pairs), normalised title (232), sequence similarity at .930 or above (7). Percentages in this table are of the 5,200 screened records, that is after residual deduplication; the overlap percentages quoted in the text are computed before it, from the 2,834 cross-database pairs, which is why the records in both databases number 2,833 here against 2,834 cross-database pairs there.

Neither database subsumes the other. Of Web of Science records, 77.5% are also in Scopus, and 64.5% of Scopus records are also in Web of Science, a Jaccard overlap of 54.3%. A single-database study of this literature would miss between 15.7% and 29.8% of the screened records, depending on which database it used.

3.2. Screening Outcome

Screening retained 2,071 records (39.8%) and excluded 3,129. The exclusion categories, in descending order, were no school evidence (988), the withdrawn single-cue band (666), higher education (566), clinical or adult context (305), early years only (220), out-of-school sport (186), non-formal provision (180) and topic terms absent (18). The primary corpus is 2,071 records; the permissive corpus, which adds the withdrawn band back, is 2,737.

3.2.1. Agreement with human coding

All 300 sampled records were coded. Observed agreement was .830 (249 of 300) and Cohen's kappa was .646, 95% CI [.558, .735] – substantial agreement on the conventional benchmarks. Taking the human coding as the reference, 19 of the 113 records the screen admitted were rejected by the coder (16.8%), and 32 of the 187 it excluded were retained by the coder (17.1%). Sensitivity was .746 and specificity .891. The coder marked 48 records uncertain. Removing them raises kappa from .646 to .720 (95% CI [.633, .808], $n = 252$), so a sixth of the sample accounts for a substantial part of the disagreement. We report the figure that keeps them, because a screen has to decide the hard cases too.

Agreement is not uniform across the rules, and the pattern is informative. Every figure here is agreement between the decision the screen actually made and the coder's, so the categories are comparable with one another and with the overall figure; the counts sum to it. The categories that

agreed with the coder on every sampled record are clinical or adult context, early years only and non-formal provision. The remainder, in descending order of agreement, are higher education (97.2%, 35 of 36), out-of-school sport (92.9%, 13 of 14), no school evidence (86.4%, 51 of 59), explicit school evidence (83.9%, 73 of 87), two or more school concepts (80.8%, 21 of 26), the withdrawn single-cue band (54.5%, 24 of 44) and topic terms absent (0.0%, 0 of 2). Two cautions. The off-topic category rests on two sampled records and should not be read as a rate at all. And the withdrawn single-cue band appears here as an exclusion, which is what the screen now does with it; the separate question of how the withdrawn rule would have performed had it been applied is reported above, where the comparison is with an inclusion it never made.

Two sources of residual error are worth naming. The first is records without an abstract: the screen can only read what the databases supply, and the coder, reading the same titles, was willing to infer a school setting where the screen was not. The second is studies set in both school and non-school contexts, where the screen follows whichever context is better evidenced in the metadata and the coder weighed the study as a whole.

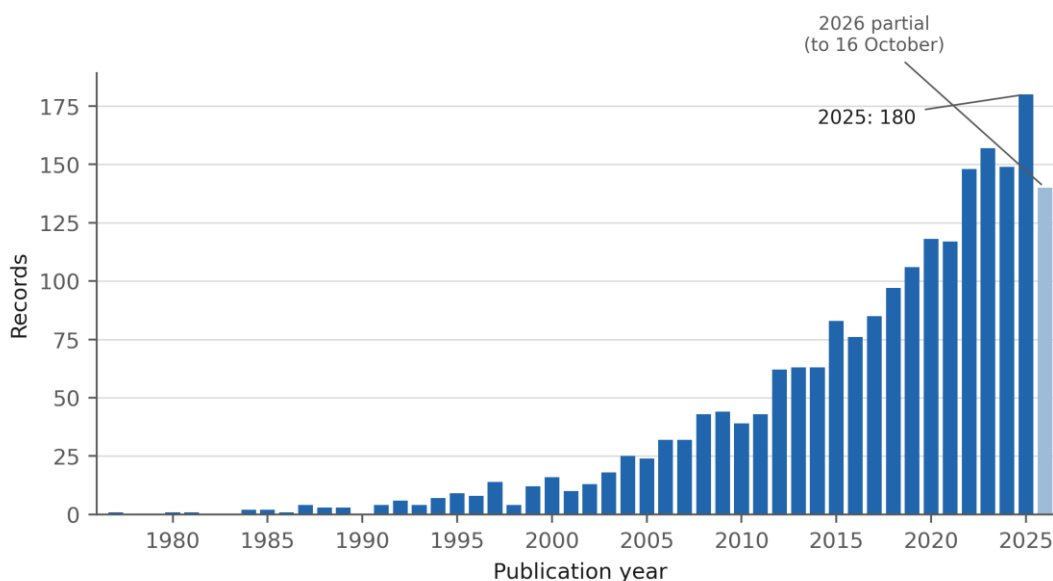
The two corpus definitions were compared directly. Under the primary definition kappa is .646; under the permissive definition, which admits the withdrawn band, it is .636. The two are close, and the choice between them is not settled by kappa but by the kind of error each makes: admitting the band roughly halves false exclusions (8.4% against 17.1%) and multiplies false inclusions by 1.6 (27.4% against 16.8%), on the strength of a rule that is itself uninformative. We chose the more conservative corpus, and report the co-word analysis and the agreement statistics for the permissive one alongside it.

3.3. Publication Growth

The corpus spans 1977 to 2026. Two records carrying a later publication year, indexed ahead of their nominal date, are held out. Output is heavily concentrated in recent years: the 1970s contributed 1 record, the 1980s 17 and the 1990s 68, against 717 in the 2010s and 1,009 in the seven years from 2020. The decade from 2017 to 2026 accounts for 1,297 records, 62.6% of the corpus. Because the search date falls in October, 2026 is a partial year and no growth statistic is computed across that boundary. Figure 2 shows the annual series.

Figure 2

Annual publication output, 1977–2026



Note. N = 2,071; 2,069 records are plotted, the 2 carrying a publication year after 2026 being held out. The final column is shaded to mark 2026 as a partial year, complete to 16 October 2026.

3.4. Sources and Fields

The corpus is dispersed across 1,119 distinct sources, and the most frequent accounts for 0.9% of it.

The leading titles mix public-health and education venues, which is itself a finding about the field rather than about the search. Table 2 lists the leading sources.

Table 2

Eleven most frequent sources in the primary corpus

<i>Source</i>	<i>Records</i>
PLOS ONE	19
Journal of Youth Development	16
BMC Public Health	15
Education Sciences	15
South African Journal of Childhood Education	15
Frontiers in Psychology	14
Children and Youth Services Review	13
Journal of Applied Sport Psychology	13
Journal of School Health	13
Journal of Teaching in Physical Education	13
Physical Education and Sport Pedagogy	13

Note. The table lists every source with at least 13 records, so that journals tied at the cut-off are not separated.

Journals were classified by Web of Science Research Areas, taken from the record where present and otherwise matched by normalised journal title to another record from the same journal. This covers 76.2% of the corpus. The remaining 23.8% are almost all Scopus-only records in journals absent from the Web of Science set and are not classified; they are disproportionately non-English and regionally published, so the uncovered portion is not missing at random. Among classified records, education is the single largest area (619 records). The health-related areas taken together are of comparable size (630 across 10 categories: public and occupational health; rehabilitation; psychiatry; pediatrics; health care sciences and services; substance abuse; general and internal medicine; nursing; neurosciences and neurology; nutrition and dietetics), but that comparison sets several areas against one, the grouping is ours rather than the databases', and a record may carry more than one area, so it is offered as an impression rather than a test. Table 3 reports the leading areas.

Table 3

Eight most frequent research areas among classified records

<i>Research area</i>	<i>Records</i>
Education & Educational Research	619
Psychology	323
Public, Environmental & Occupational Health	243
Social Sciences - Other Topics	148
Sport Sciences	83
Rehabilitation	77
Psychiatry	68
Pediatrics	58

Note. Classified records $n = 1,579$ (76.2% of the corpus). A record may carry more than one research area, so counts sum to more than the number of records.

3.5. Geographic Distribution

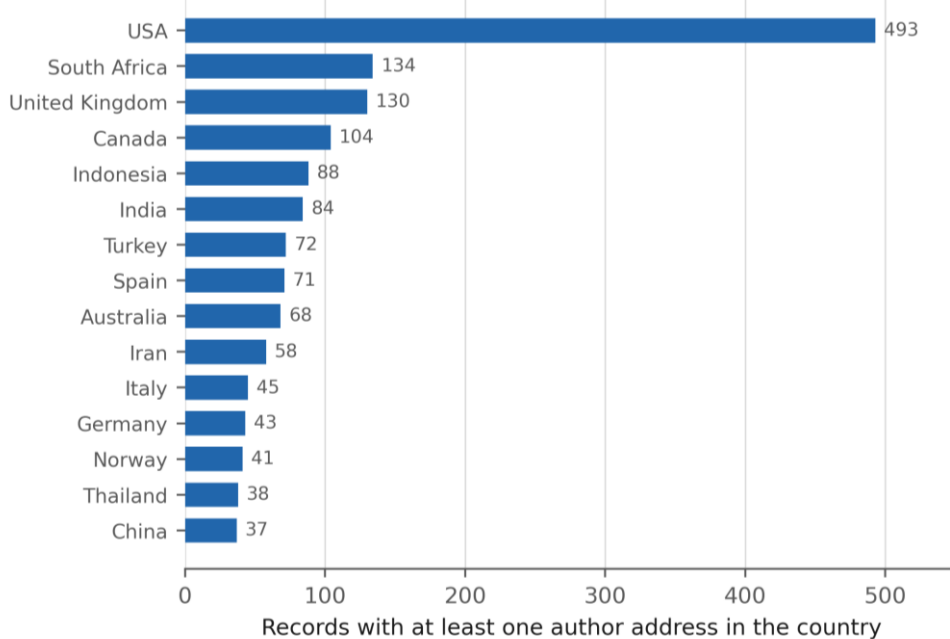
The two databases record author location differently. Web of Science supplies a structured address field, present for 98.1% of the Web of Science-indexed records in the primary corpus; Scopus supplies affiliation strings, which are less structured but end in a country and are parsed here as well. Using both, 2,016 records (97.3% of the corpus) resolve to at least one country, against 72.0% from the Web of Science field alone. The geography therefore describes the corpus rather than its Web of Science subset, which matters because the records Scopus indexes alone are disproportionately non-English and regionally published. The Web of Science field is parsed by splitting only on the semicolon that begins a new bracketed author block. Splitting on every semicolon, as an earlier version of the parser did, tears the author lists apart and leaves institution

names standing where a country should be. Running the same records through the naive split leaves 2,463 address fragments unresolved and yields 106 putative countries, against 56 and 105 under the rule used here. Scopus affiliation strings carry no bracketed author blocks and are split on the semicolon; they are the less structured of the two sources and account for most of the residual unresolved chunks.

One hundred and five countries are represented. The five most frequent are the United States (493), South Africa (134), the United Kingdom (130), Canada (104) and Indonesia (88). The presence of South Africa (134), Indonesia (88) and India (84) among the six most frequent is notable against the usual North American and European concentration of education research. We have no benchmark distribution for education research as a whole against which to test that impression, so we describe it rather than claim a departure. Figure 3 maps the distribution.

Figure 3

Fifteen most frequent countries among the records that resolve to one



Note. The fifteen most frequent of one hundred and five countries, based on the 2,016 records (97.3% of the corpus) that resolve to at least one country from a Web of Science address field or a Scopus affiliation string. A record with authors in several countries contributes to each.

3.6. Conceptual Structure

The co-word network contains 54 keyword nodes and 80 edges and partitions into 7 communities with modularity $Q = .698$.

The communities are described here in order of size; five contain three or more keywords and the remaining two are keyword pairs.

The largest community (20 keywords) gathers adolescence, mental health, life skills education, social and emotional learning, wellbeing, physical activity and social skills.

The second community (10 keywords) gathers prevention, teachers, primary education, physical education, substance use, HIV/AIDS and South Africa.

The third community (10 keywords) gathers curriculum, positive youth development, sport, youth sport, qualitative study, youth development and coach.

The fourth community (5 keywords) gathers secondary education, autism, technology, intellectual disability and mathematics.

The fifth community (5 keywords) gathers self-efficacy, health promotion, health education, self-esteem and health literacy.

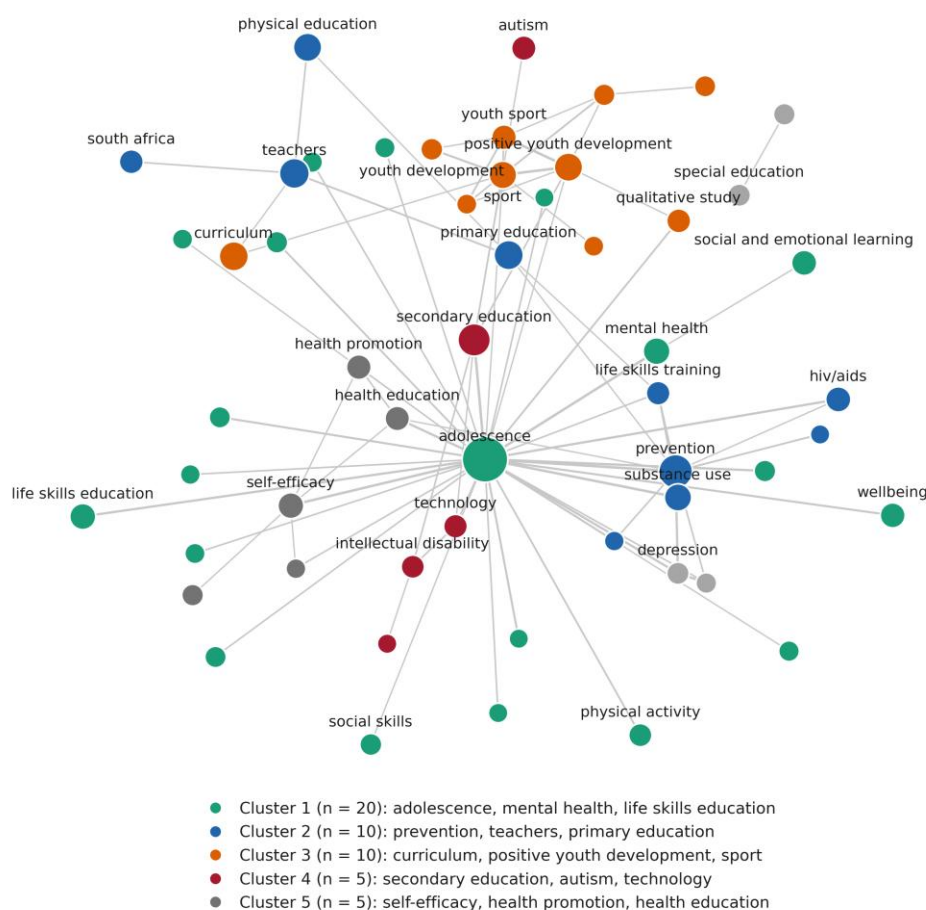
The pairs are depression and anxiety; special education and disability.

Primary education and teachers fall in the same community — one of two that hold 10

keywords, behind only the largest – alongside prevention, physical education, substance use, HIV/AIDS and South Africa. The primary classroom is therefore present in the map, but it is drawn into the prevention vocabulary rather than into a curricular or pedagogical one: where the field attends to the level at which the agenda is taught, it attends to it as a delivery site for programmes. Three features of this partition are worth drawing out. Adolescent mental health and wellbeing form the largest community, while prevention and the school workforce fall into a second and sport into a third: the field is not organised around the school. Sport-based positive youth development forms a community of its own, carrying curriculum with it, which matters for the parallel analysis reported below. And social and emotional learning does not form a grouping of its own. It sits inside the largest community, beside mental health and wellbeing. That placement is not stable: under the permissive corpus it stays in the largest community, but under the stricter corpus it and mental health separate into a pair of their own. This cuts against the boundary we drew in the Introduction, and we report it as such: where authors in this corpus use the term, it is embedded in the adolescent mental-health vocabulary rather than standing apart from it. Treating social and emotional learning as adjacent but distinct remains defensible as a decision about what to search for – the two traditions have separate programmes, instruments and review literatures – but it is a decision this map does not corroborate. The partition is shown in Figure 4.

Figure 4

Author-keyword co-occurrence network of the primary corpus



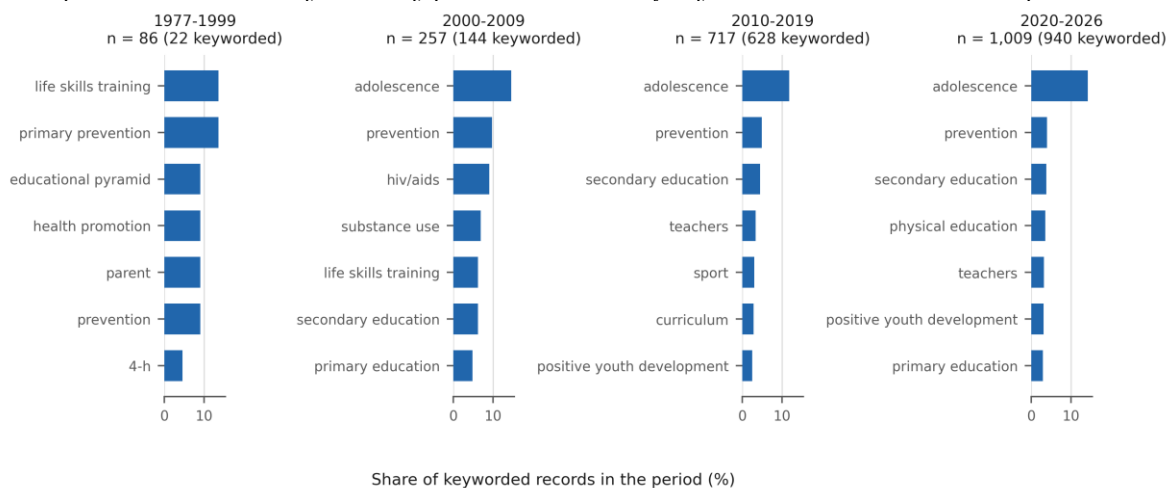
Note. The network shows 54 keywords occurring in at least 10 records; edges are co-occurrences of at least 3, weighted by association strength. Communities detected with the Louvain algorithm at resolution 1.0, seed 2026. Node area increases with occurrence on a sublinear scale, so the largest nodes do not crowd out the rest. Four communities carry a categorical palette chosen to stay distinguishable under the common forms of colour-vision deficiency; a fifth and a sixth colour could not be added without losing that separation, so the remaining communities are shown in grey. The four are taken in the deposited size order, which also settles the two places where communities are equal in size. Keyword pairs are shown in light grey without a legend entry. Communities are named in the legend, so identity does not rest on colour alone.

3.7. Shifting Emphasis across Periods

Keyword shares within each period show a succession of emphases rather than a single break. Two keywords recur in every period and head the list from the 2000s onwards, so they carry little information about change – adolescence and prevention – at 4.5–14.6% and 3.9–9.7% of keyworded records respectively across the four periods. They are set aside here and the terms that follow are those that move. In the first period the leading keywords are life skills training, primary prevention and educational pyramid; in 2000–2009, HIV/AIDS, substance use and life skills training; in 2010–2019, secondary education, teachers and sport; in 2020–2026, secondary education, physical education and teachers. Each period is named here by its three most prominent keywords; the figure shows twelve, and the movement described next is read from those. Across both the scheme shown here and the quartile scheme, health education, health promotion, HIV/AIDS and life skills training drop out of the leading keywords, while life skills education, social and emotional learning and wellbeing appear only in the final period. The direction of that movement – away from infection and substance-use prevention, towards wellbeing and social and emotional learning – is common to the breakpoint schemes; the intermediate stages are not, and under the equal-decade scheme the first period contains no keyworded records at all. The earliest period rests on 22 keyworded records and its shares should be read with that in mind. Figure 5 shows the period shares and Table 4 the records per period under each scheme.

Figure 5

Most prominent author keywords by period, as a share of keyworded records within the period



Note. Shares use the keyworded records of each period as the denominator, shown in each panel heading, so that prominence is not confounded with the growth of the literature.

Table 4

Records per period under three breakpoint schemes

Scheme	Periods
Scheme A	1977-1999 (n = 86); 2000-2009 (n = 257); 2010-2019 (n = 717); 2020-2026 (n = 1,009)
Scheme B	1977-2013 (n = 550); 2014-2019 (n = 510); 2020-2023 (n = 540); 2024-2026 (n = 469)
Scheme C	1977-1989 (n = 18); 1990-1999 (n = 68); 2000-2009 (n = 257); 2010-2019 (n = 717); 2020-2026 (n = 1,009)

Note. Scheme A is the manuscript scheme, Scheme B the quartile scheme and Scheme C the equal-decade scheme; the text refers to them by those names. All three begin at the first year the corpus contains. Scheme C's first period holds no keyworded records, so the cross-scheme test rests on Schemes A and B.

3.8. Intellectual Base

The co-citation core comprises 230 references cited at least 10 times within the corpus. Links of weight three or above – 3,140 of them – connect 220 of the core references; the rest are isolated at that threshold. Table 5 lists the ten most cited.

Table 5

Ten most-cited references within the corpus

<i>Reference</i>	<i>Local citations</i>
Gould et al. (2008), International Review of Sport and Exercise Psychology	111
Holt et al. (2017), International Review of Sport and Exercise Psychology	69
Pierce et al. (2017), International Review of Sport and Exercise Psychology	69
Durlak et al. (2011), Child Development	66
Petitpas et al. (2005), The Sport Psychologist	59
Danish et al. (2004), World Leisure Journal	57
Camiré et al. (2012), The Sport Psychologist	56
Bean et al. (2018), Quest	53
Gould et al. (2007), Journal of Applied Sport Psychology	52
Turnnidge et al. (2014), Quest	51

Note. Counts are citations from within the corpus, at the level of the cited-reference node. They are lower bounds: a work cited with an identifier in one record and without one in another occupies two nodes, as Gould and Carson (2008) does (111 and 14). The nodes are not merged, because the only key available for merging is first author and year, which in this table would also join two different articles by the same author in the same year. Twelve author-year combinations in the 200-row deposited table share a first author and year, spanning 27 nodes; most of those are different articles rather than one work split in two.

Sport and positive youth development psychology dominate the table: nine of the ten most-cited references come from that literature, including the first. The one exception is a meta-analysis of social and emotional learning. No work on life skills education in compulsory schooling as such appears in the ten. One caveat belongs here rather than in a footnote: Braun and Clarke (2006), a thematic-analysis methods text, occupies four nodes totalling 95 citations across three different identifiers, two of which belong to other works. Counted as one work it would rank second and the table would read eight of ten rather than nine. We leave the nodes unmerged for the reason given above, and state the consequence rather than leaving a reader to find it.

3.9. Parallel Analysis of the Excluded Sport Corpus

The 186 records excluded as out-of-school sport were analysed with the same pipeline at thresholds scaled to the smaller corpus: a keyword must occur in at least 3 records rather than 10, and a pair must co-occur at least twice rather than three times. The resulting network has 20 nodes and 31 edges and partitions into 5 communities with modularity $Q = .505$, of which 2 contain three or more keywords; it is organised around positive youth development, youth sport and coach education. The partition is thinner than the school one and should be read as an indication of structure rather than a map of comparable resolution.

The comparison does not support reading the sport literature as disconnected. Its vocabulary does stand apart – the two networks share 9 keywords of 54 and 20, a Jaccard overlap of .138, and most of what they share is sport vocabulary – but the works most cited by the school corpus are drawn from sport psychology. That the physical education literature has its own bibliometrically identified canon (Wyant et al., 2022) makes the overlap in theory, rather than in setting, the more notable finding. Excluding sport settings therefore removes sport contexts from the corpus without removing sport-derived theory from its intellectual base, and the exclusion should be read as a scope decision rather than as evidence of separation.

3.10. Sensitivity Analyses

Three sensitivity analyses test whether the findings depend on analytic choices. The first re-runs the whole co-word analysis on two alternative corpora: the permissive corpus, which adds back the withdrawn single-cue band (2,737 records), and the I1-only subset of records carrying explicit compulsory-schooling evidence (1,504). With identical parameters these yield 72 nodes in 8 communities ($Q = .732$) and 40 nodes in 7 communities ($Q = .669$) respectively. Rather than assert that these reproduce the primary partition, we measure it: each primary community is matched to its closest counterpart by Jaccard overlap over the vocabulary the two networks share. Neither

alternative reproduces the partition closely (median Jaccard .625 for the stricter corpus and .667 for the permissive one), and what survives differs between them. The sport community is the most robust under the permissive corpus (.900) and the prevention-and-teachers community the least (.222), while under the stricter corpus the prevention-and-teachers and special-needs communities survive intact (1.00 each) while the psychosocial community largely dissolves (.250). The partition is therefore conditional on where the corpus boundary is drawn, and we report the boundary rather than presenting the partition as a property of the field. Second, the community partition was recomputed across the resolution parameter, the keyword threshold and the edge threshold (Table 6). Each partition is compared with the reported one by the same Jaccard matching, so the question is how much of the grouping survives rather than only how many communities appear, and the worst-matching community is reported beside the median, because the median alone stays at 1.00 while a large community is broken up. The partition is reproduced exactly across part of the range – the resolution parameter at 1.0, 1.2 and 1.5 – and degrades away from it, where the worst-matching community falls to .333 at the resolution parameter 0.6, .400 at the keyword threshold 20 and .067 at the edge threshold 5. At the most damaging setting, an edge threshold of 5, the community of secondary education and autism is the least preserved (.067) and the community of adolescence and mental health the most (.600), and at this setting the larger a community is the better it survives. At a keyword threshold of 20, however, the relation reverses: the largest community is the worst preserved and the two smallest survive intact, so size is not what decides which holds. We therefore report the partition as a set of groupings rather than as a membership list, and state the parameters rather than tuning them. Third, a targeted search in Turkish terminology is reported below in the following.

Table 6

Sensitivity of the community partition

<i>Parameter</i>	<i>Nodes</i>	<i>Edges</i>	<i>Communities</i>	<i>Q</i>	<i>Median J</i>	<i>Lowest J</i>
Resolution 0.6	—	—	6	.691	1.00	.333
Resolution 0.8	—	—	7	.695	1.00	.400
Resolution 1.0	—	—	7	.698	1.00	1.00
Resolution 1.2	—	—	7	.698	1.00	1.00
Resolution 1.5	—	—	7	.698	1.00	1.00
Keyword threshold ≥ 5	85	112	13	.822	.950	.600
Keyword threshold ≥ 10	54	80	7	.698	1.00	1.00
Keyword threshold ≥ 15	38	58	7	.659	.875	.444
Keyword threshold ≥ 20	26	43	6	.627	1.00	.400
Edge threshold ≥ 2	74	184	8	.660	.625	.308
Edge threshold ≥ 3	54	80	7	.698	1.00	1.00
Edge threshold ≥ 4	42	50	7	.666	.800	.500
Edge threshold ≥ 5	29	28	6	.654	.429	.067

Note. Each community of the reported partition with three or more keywords is matched to its closest counterpart under the varied parameter by Jaccard overlap, over the vocabulary the two networks share. Median J is the median of those five values and Lowest J the worst of them; the median alone can stay at 1 while a large community is broken up, which is why both are given. Em dashes mark the rows where the network itself is unchanged and only the partition parameter varies. The reported analysis is resolution 1.0, keyword threshold 10, edge threshold 3.

3.11. Turkish Terminology

Because the queries are in English, a targeted search was run in Web of Science for the Turkish terminology of the primary-school subject Hayat Bilgisi, rendered in English as Life Studies. Two broader formulations were rejected: adding living skills returns a large daily-living-skills and special-education literature, and life studies alone retrieves quality of life studies and real-life studies. The specific query returned 13 records, of which one was already in the screened corpus and 12 were not retrieved by the main search – 0.6% of the primary corpus. These records are listed in Supplement S1 and are not added to the primary corpus, which is defined by a single pre-specified query. That the Turkish Life Studies literature is sparse here is consistent with most of it

appearing in national index journals that neither database covers; we did not measure that output and so do not claim it as established.

The sparseness is not a sign that the subject is young. Life Studies has been a curricular subject in Turkish primary schooling since the founding of the Republic, carrying an explicit civic and practical formation agenda from the outset (Kaya, 2022; Salmoni, 2003). A century-old subject that is almost absent from the two databases on which international syntheses are built is a useful reminder of what such syntheses can and cannot see.

4. Discussion

Three findings seem worth carrying forward. The first is structural: the literature that calls itself life skills education in compulsory schooling is not organised around schooling. Its largest community (20 keywords, 2.0 times the size of the next) gathers adolescence, mental health, life skills education and social and emotional learning; the community that concerns prevention, teachers and primary education holds 10 keywords, the same as the sport community. Education is nonetheless the single largest research area (619 records), ahead of psychology (323); taken together the health-related areas are of comparable size (630 records across 10 categories), though records carry more than one area and the grouping is ours rather than the databases'. Schooling appears in this literature more often as a delivery site than as the object of study.

The second concerns the field's intellectual base. The parallel analysis was designed to test whether the sport strand stands apart, and it does — as a body of keywords. But the works the school literature most often cites are drawn from sport psychology and positive youth development. A field whose contexts are schools and whose theory is imported from youth sport has a coherence problem that a map makes visible and that no amount of further mapping will resolve.

The third is the shift in emphasis. The movement from substance-use and infection prevention towards wellbeing, mental health and social and emotional learning tracks changes in what school systems have been asked to absorb rather than a maturation of the construct itself. Life skills education appears to function as a flexible label attached to whatever the surrounding policy problem happens to be, which explains both its durability and the difficulty of bounding it.

The early primary years deserve a separate word, because this design cannot settle the question. The screen excluded 220 records as early-years-only, so an absence of early-primary work in the corpus is partly an artefact of the boundary we drew. What the map suggests, no more, is that where foundational competencies in the first school years appear, they tend to carry special-educational-needs or teacher-practice labels rather than the life skills label (Kwambaza & Basela, 2024). That is a hypothesis about vocabulary worth testing with a query built for it, not a finding this corpus establishes.

For primary teacher education the combination of these results is awkward in a way worth stating plainly. The level at which an integrated life skills course most often sits, and the workforce that teaches it, are present in the map but inside the prevention vocabulary; the national literature on that course is almost absent from the two databases, with the targeted Turkish-terminology query returning 13 records of which 12 were not retrieved by the main search; and the term the Turkish curriculum uses is rendered inconsistently in English as Life Studies and as life science (Akcan, 2022a, 2022b), which keeps even the work that is indexed from assembling into a visible body. A generalist primary school teacher looking to this literature for curricular guidance would find programme evaluation rather than pedagogy, and would find little of it written about the course they actually teach. That is an argument for indexing and terminological work in primary education research, not only for more intervention studies.

5. Limitations

The most important limitation is the one the design cannot escape: a corpus assembled from a query maps the vocabulary of that query. Everything below follows from that, and from the choice of databases.

Screening error. The screen is rule-based and its error rates are measured rather than assumed: 16.8% of admitted records were rejected by the human coder and 17.1% of excluded records were retained, at kappa .646. The coder is also the author of the rules, so this measures whether the rules implement the stated criterion, not whether two independent readers would agree on the criterion itself.

Where the false exclusions sit. Of the 32 records the screen excluded and the coder would have kept, 20 fall in the withdrawn single-cue band and 8 in the residual no-school-evidence category. The withdrawn band is therefore the main source of false exclusion, which is the price of the conservative definition and is why the permissive corpus is reported alongside it. Records without an abstract are a secondary source: the screen reads only the metadata the databases supply, and the coder, reading the same titles, was sometimes willing to infer a school setting where the screen was not.

False negatives from terminology. Quantified for Turkish terminology at 12 records. For social and emotional learning, twenty-first-century skills and psychosocial-competence labels it is not quantified, and the size of that gap is unknown.

Automated screening and multilingual records. The screen reads English-language metadata, so a record without it could not be screened on text. No such record is in the corpus, because an English-language query cannot retrieve one; the limitation therefore falls on what the searches could reach, not on what the screen then did with it.

Cluster sensitivity. The partition holds at some parameter settings and not others, and which community survives is not a matter of size; the Results give the figures and Table 6 every setting. The groupings are reported as findings; the individual memberships are not. Sensitivity to the thesaurus itself was not tested, so the effect of the normalisation choices is unmeasured.

Periodisation. Period boundaries are not given by the data. Three schemes are reported and only cross-scheme shifts are interpreted.

Cited-reference resolution. Only 43.5% of distinct references are identifier-keyed; the remainder rest on a structured fallback. Identifier keying also inherits errors in the source data, and at least one widely cited methodological work carries an incorrect identifier in its Web of Science cited-reference strings.

Field classification. Research areas cover 76.2% of the corpus, and the uncovered portion is disproportionately non-English and regionally published — precisely the part of the corpus to which a comparison between health and education framings would be most sensitive. We also did not recompute the research-area distribution on the stricter corpus, so that comparison is hedged in the text rather than tested.

Address completeness. Country figures rest on the 97.3% of records that resolve to a country from an address or affiliation string; the remainder is small but not random, and affiliation strings are less structured than the Web of Science address field, so the parse of them is the weaker of the two.

6. Conclusion

Five decades of research on life skills education in compulsory schooling form a large, fast-growing and conceptually unsettled literature. It is split between two citation databases whose overlap is only about half; it is organised around prevention and adolescent health rather than around schooling; its emphasis appears to have moved with surrounding policy concerns rather than with any internal theoretical development, though we did not analyse policy and cannot show the link; and it draws its most-cited theory from youth sport psychology even where its settings are classrooms.

What would help most is not another map but agreement on what is being mapped. A shared operational definition of life skills in compulsory schooling — one that states its relationship to social and emotional learning rather than leaving it to the search string — would make synthesis possible. Until then, studies of this kind should report their boundary decisions as findings in their

own right, which is what this one has tried to do.

Artificial Intelligence (AI) Use Disclosure: The author used a generative AI assistant (Claude, Anthropic) for language refinement and, as described in Section 2.7.5, for assistance with the analysis code. No text, data, finding, interpretation or figure was generated by AI. All analytic decisions were taken by the author, who verified every output against source records and takes full responsibility for the intellectual content of this article.

Data availability: The analysis code, the derived outputs and the figure scripts are openly deposited at <https://doi.org/10.5281/zenodo.23439084>. The raw Web of Science and Scopus exports are deposited at <https://doi.org/10.5281/zenodo.23439446> under restricted access, because the terms of the database subscriptions under which they were retrieved do not permit redistribution; access is granted on request through the repository. The records returned by the targeted Turkish-terminology search are listed in Supplement S1.

Declaration of interest: The authors declare no conflict of interest.

Ethical statement: Ethical approval was not required for this study. It is a bibliometric and science mapping analysis of published bibliographic metadata retrieved from the Web of Science Core Collection and Scopus. It involved no human participants, no human data and no animals, and was conducted in accordance with the principles of the Declaration of Helsinki and with the journal's research and publication ethics policy.

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