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Gender gaps in school education: a two-decade bibliometric analysis

Malika M. Temirtayeva[1], Irina V. Kovaleva[1]*, Alma K. Kudebayeva[1]

[1]KIMEP University, Almaty, Kazakhstan

Abstract

Despite significant international efforts to ensure universal access to education, millions of girls still face systemic barriers to basic education. This study aims to identify research trends and structural imbalances in the academic literature on gender gaps in girls' schooling between 2000 and 2025. A bibliometric analysis was conducted using the Web of Science Core Collection, applying the Analyze Results and VOSviewer tools to map thematic clusters, co-authorship networks, and citation patterns. The final dataset comprises 323 peer-reviewed articles selected from 1,083 initial records, based on their relevance to girls' access to primary and lower-secondary education. Publications in English from the fields of education, sociology, and economics were analyzed. Research output steadily increased from the early 2000s and surged after 2015, coinciding with the adoption of SDG 4 (Quality Education) and SDG 5 (Gender Equality). Core topics include adolescent pregnancy, child marriage, and reproductive health, particularly in Sub-Saharan Africa and South Asia. Institutions from the Global North dominate the field, while scholars from the Global South remain underrepresented. Less than 3% of works are review papers, reflecting a lack of fragmentation and limited synthesis. Research should expand participation from the Global South, emphasize early education, integrate SDG frameworks, apply intersectional approaches, and strengthen policy relevance through inclusive and context-sensitive collaboration.

Keywords: educational inequality, social inequality, social development, women, women's education, bibliometric analysis, results analysis tool, VOSviewer

Мектептегі білім берудегі гендерлік олқылықтар: жиырма жылдық библиометриялық талдау

Темиртаева М.М. [1], Ковалева И.В. [1]*, Кудебаева А.К. [1]

[1]КИМЭП Университеті, Алматы, Қазақстан

Түйіндеме

Жалпыға бірдей білім алуға қол жетімділікті қамтамасыз етуге бағытталған айтарлықтай халықаралық күш-жігерге қарамастан, миллиондаған қыздар әлі де негізгі білім алу жолында жүйелік кедергілерге тап болады. Бұл зерттеу 2000–2025 жылдар аралығында қыздардың мектептегі білім алуындағы гендерлік алшақтықтарға арналған академиялық әдебиеттердегі зерттеу үрдістері мен құрылымдық теңсіздіктерді айқындауға бағытталған. Зерттеу Web of Science Core Collection дерекқоры негізінде библиометриялық талдау тәсілімен жүргізілді. Analyze Results және VOSviewer құралдары тақырыптық кластерлерді, бірлескен авторлық желілерді және дәйексөз алу үлгілерін картаға түсіру үшін қолданылды. Қыздардың бастауыш және негізгі мектептегі білімге қолжетімділігіне қатысты 323 рецензияланған мақала 1083 бастапқы жазбадан іріктеліп алынды. Талдауға білім беру, әлеуметтану және экономика салаларындағы ағылшын тіліндегі жарияланымдар енгізілді. Зерттеу жұмыстарының саны 2000-жылдардың басынан бастап біртіндеп артып, 2015 жылдан кейін күрт өсті. Бұл үрдіс Тұрақты даму мақсаттары (ТДМ 4 – Сапалы білім беру, ТДМ 5 – Гендерлік теңдік) қабылданған кезеңмен сәйкес келеді. Негізгі тақырыптар – жасөспірім жүктілігі, бала неке және репродуктивті денсаулық, әсіресе Сахараның оңтүстігіндегі Африка мен Оңтүстік Азия елдерінде. Зерттеу саласында Глобалдық Солтүстік институттары басым, ал Глобалдық Оңтүстіктегі ғалымдар аз қамтылған. Жұмыстардың 3%-дан аз бөлігі шолу мақалаларына жатады, бұл зерттеу алаңының фрагментарлығы мен синтездің шектеулілігін көрсетеді. Болашақ зерттеулер бағыттары. Глобалдық Оңтүстіктің қатысуын кеңейту, бастауыш білімге назар аудару, ТДМ шеңберін интеграциялау, интерсекционалды тәсілдерді қолдану және контекстке сезімтал, инклюзивті ынтымақтастық арқылы зерттеулердің саясатпен байланысын күшейту қажет.

Кілттік сөздері: білім беру теңсіздігі, әлеуметтік теңсіздік, әлеуметтік даму, әйелдер, әйелдер білімі, библиометриялық талдау, нәтижелерді талдау құралы, VOSviewer

Гендерные разрывы в школьном образовании: библиометрический анализ

Темиртаева М.М. [1], Ковалева И.В. [1]*, Кудебаева А.К. [1]

[1]Университет КИМЭП, Алматы, Казахстан

Аннотация

Несмотря на значительные международные усилия, направленные на обеспечение всеобщего доступа к образованию, миллионы девочек по-прежнему сталкиваются с системными барьерами на пути к получению. Настоящее исследование направлено на выявление научных тенденций и структурных дисбалансов в академической литературе, посвящённой гендерным разрывам в школьном образовании девочек в период с 2000 по 2025 годы. Проведён библиометрический анализ публикаций из базы данных Web of Science Core Collection с использованием инструментов Analyze Results и VOSviewer для картирования тематических кластеров, сетей соавторства и цитирования. Итоговая выборка включает 323 рецензируемые статьи, отобранные из 1083 первоначальных записей на основе их релевантности теме доступа девочек к начальному и основному образованию. В анализ вошли англоязычные публикации в областях образования, социологии и экономики. Количество публикаций стабильно росло с начала 2000-х годов и резко увеличилось после 2015 года, что совпало с принятием ЦУР 4 (Качественное образование) и ЦУР 5 (Гендерное равенство). Основные темы включают подростковую беременность, детские браки и репродуктивное здоровье, особенно в странах Африки к югу от Сахары и Южной Азии. В исследовательском поле доминируют институты Глобального Севера, тогда как учёные Глобального Юга остаются недостаточно представленными. Менее 3% работ являются обзорными, что указывает на фрагментарность и ограниченный уровень синтеза. Направления будущих исследований. Следует расширять участие стран Глобального Юга, уделять больше внимания начальному образованию, интегрировать рамку ЦУР, применять интерсекциональные подходы и усиливать практическую значимость через инклюзивное и чувствительное к контексту сотрудничество.

Ключевые слова: образовательное неравенство, социальное неравенсто, социальное развитие, женщины, женское образование, библиометрический анализ, инструмент анализа результатов, VOSviewer

Introduction

Despite decades of global effort to improve educational access, millions of school-aged girls remain excluded from even primary education [1]. While education is widely regarded as a foundation for individual advancement and national development, deep-rooted gender disparities continue to prevent young girls from entering or completing basic schooling. These disparities are often reinforced by a combination of cultural norms, economic pressures, and institutional shortcomings [2].

Although the academic literature on gender inequality in education has grown steadily since 2000, it remains fragmented in focus and scope. Much of the existing research centers around adjacent but distinct themes, including menstrual hygiene, health conditions, and gender-based violence. These remain critical issues, but they frequently overshadow a more fundamental concern: the persistent lack of access to primary education for girls. This stage represents the point where systemic educational and labor market exclusion begins, yet it remains underexplored in bibliometric and meta-analytical studies [3, 4].

This research seeks to fill that gap by addressing the central question: How have gender gaps in schooling, particularly in access to primary education among school-aged girls, been represented in academic literature between 2000 and 2025? To explore this, the study analyzes 323 articles retrieved from the Web of Science Core Collection. Using the Web of Science *Analyze Results* tool and Excel spreadsheets, the assessment of publication trends, disciplinary classifications, prolific authors, and geographic concentrations of research was conducted. Additionally, VOSviewer was employed to generate visual maps of co-authorship, keyword co-occurrence, and citation analysis by country.

The primary objectives of this study are to:

1. Provide statistical evidence on how the literature frames the educational gender gap,
2. Determine significant thematic clusters and temporal trends,
3. highlight research gaps, particularly the limited focus on primary education access, and
4. Present a new perspective for evaluating gender differences in education.

By providing a systematic bibliometric overview, this paper contributes to the broader debate on gender and development, demonstrating how early educational inequalities influence later social and economic disparities [5, 6].

Literature Review

Gender inequality persists despite advancements in female educational attainment around the world, especially for school-age girls in low- and middle-income nations. Although educational outcomes for girls have improved globally, systemic poverty continues to exacerbate disparities. Evans, Akmal, and Jakiela (2020) note that gaps still exist in settings where boys' education is also underfunded, indicating that limited resources intensify inequality for both sexes, but have a greater impact on girls [2].

Similarly, the UNESCO Global Education Monitoring Report (2020) highlights the complex nature of relating women's labor outcomes to educational attainment [1]. Due to ingrained gender norms and societal expectations, women's labor market participation does not always increase in proportion to gains in schooling. Findings published in the *Asia Pacific Journal of Social and Behavioral Sciences* support this, showing that educational equality alone is insufficient to eliminate economic disparities, particularly in areas where discriminatory hiring practices and cultural norms persist [7].

The circumstances in South Asia exemplify the multifaceted nature of educational inequality. Government initiatives, such as girls' grants and the participation of non-governmental organizations like BRAC, have increased enrollment in Bangladesh and India; however, systemic problems, including inadequate teacher training, unsafe learning environments, and poverty, continue to hinder long-term enrollment and success [8]. Bhutan's community-based education initiatives have shown promise, particularly when they provide hostel accommodations and gender-sensitive assistance for girls living in isolated regions.

By studying gender inequality in higher education, Valero-Ancco et al. (2025) expand the discussion, highlighting that, despite improvements in access, obstacles persist in leadership and STEM participation due to institutional and cultural limitations [5]. This demonstrates that access alone does not ensure empowerment in developing nations, underscoring the discrepancy between formal equality and actual agency in academic and professional settings. Dehdarirad, Villarroya, and Barrios (2014) deepen this critique by revealing systemic gender bias in higher education, such as unequal access to funding, slower career progression, and institutional gatekeeping [4]. In areas of poverty, public-private partnerships (PPPs) have become a controversial but increasingly popular strategy for enhancing girls' education. Unterhalter (2017) examines PPPs under programmes such as the UK's *Girls' Education Challenge (GEC)* and finds that although they increase access, their effectiveness in advancing gender equality is still debatable [6]. While some studies emphasize better opportunities for underprivileged girls, others caution against commodification and inequities brought on by profit-driven incentives. Notably, Rose and Subrahmanian (2005) warn that PPPs, particularly when poorly regulated, may compromise the capacity of public systems to guarantee gender equity. However, in certain areas, like rural Pakistan, they have made it possible for more girls to attend school and have provided women with new employment opportunities [6].

Overall, the reviewed literature demonstrates a fragmented and uneven research field. Much of the focus remains on secondary education, adolescent health, and fertility-related issues, while the early stages of exclusion in primary schooling receive limited attention. This bibliometric study addresses that gap by systematically mapping the intellectual structure of the field, using tools such as VOSviewer and the Web of Science Analyze Results function to identify co-authorship networks, thematic clusters, and global citation patterns.

Methodology

Utilizing the Web of Science (WoS) Core Collection as the primary database, this study performed a structured bibliometric analysis of literature on gender differences in

school-aged girls' access to primary and lower-secondary education. The WoS database was selected due to its comprehensive coverage of peer-reviewed journals across the social sciences, education, and development studies, as well as its compatibility with bibliometric tools such as VOSviewer.

With the help of a Boolean search string that focused on the titles, abstracts, and keywords of papers published between 2000 and 2025, an initial dataset of 1,083 results was retrieved from the SSCI, A&HCI, ESCI, and SCI-Expanded indexes. The search string combined terms related to gender inequality, education, and school-aged girls (see Figure 1). After removing duplicates and articles that only addressed tangential issues (e.g., higher education, health without educational outcomes, or purely theoretical gender studies), a final dataset of 323 peer-reviewed articles was created.

The screening process followed three stages: (1) title and abstract review, (2) keyword relevance check, and (3) full-text verification for ambiguous cases. To ensure reliability, the cleaning and selection processes were conducted manually by the author and verified through cross-checking of random samples.

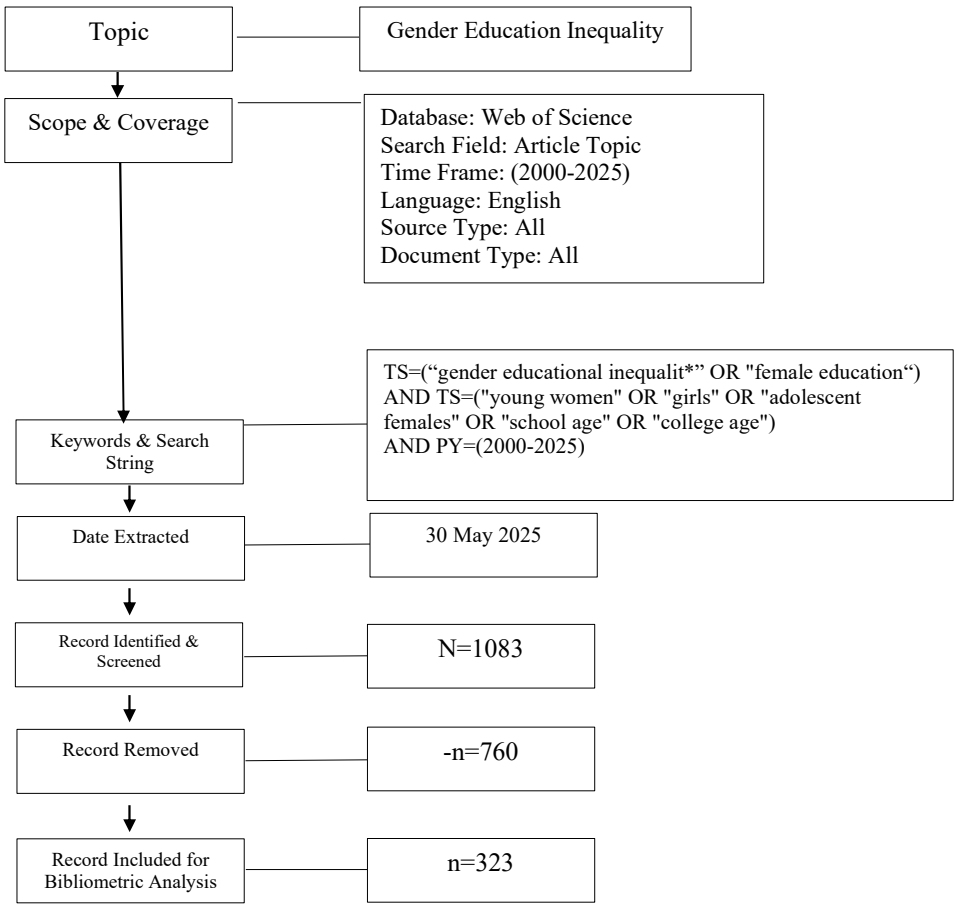


Figure 1. Flow Diagram of Search Strategy

Metadata on publication years, document types, authors, categories, citation topics, Sustainable Development Goals (SDGs), indexing databases, affiliations, source titles, and contributing countries were extracted and categorized using Excel and the WoS *Analyze Results* tool. To identify structural concentrations and thematic patterns, the data were arranged and visualized. Key intellectual clusters were identified by mapping:

- co-authorship by countries overlay ($n \geq 2$);
- all keyword co-occurrence ($n \geq 2$);
- citation networks by country density ($n \geq 3$) using VOSviewer.

Special attention was given to harmonizing author names, institutional affiliations, and variations in keywords. A thesaurus file was applied in VOSviewer to merge synonyms (e.g., "girls' education" and "female schooling"), ensuring cleaner network maps.

Although these tools provide strong macro-level insights, they are unable to assess qualitative content or theoretical depth. Furthermore, the analysis may underrepresent regionally and non-English published research, especially from nations most impacted by educational exclusion, because WoS primarily indexes English-language journals. This limitation is particularly relevant for Sub-Saharan Africa and South Asia, where large volumes of policy reports and local-language studies remain uncaptured in global databases.

Findings

Academic output was consistently low between 2000 and 2009, with an average of three to seven articles published annually. This early stage of limited activity likely reflects the marginalization of gender-based educational access in the global research discourse at the time. A gradual but noticeable trend in scholarly interest in the gender educational gap among school-aged girls is evident in the number of publications on the subject annually from 2000 to 2025 (see Figure 2).

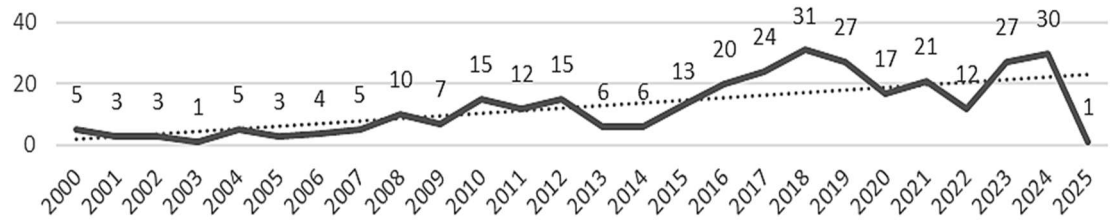


Figure 2. The annual number of publications on the educational gap among school-aged girls

The first central turning point occurred in 2008–2010, when publication counts more than doubled from 7 in 2009 to 15 in 2010. This growth coincided with global initiatives such as the Education for All (EFA) goals and early debates on the post-2015

development agenda. Following a brief decline in 2012–2013, a consistent upturn began in 2015.

Between 2016 and 2020, there was a significant surge in research activity, with yearly publication counts increasing from 20 to 31. The peaks of 2018 (31 articles) and 2019 (27 articles) suggest heightened scholarly attention during the UN's Sustainable Development Goals (SDG) monitoring phase, when SDG 4 (*Quality Education*) and SDG 5 (*Gender Equality*) became central to international education policy.

Although output declined to 17 articles in 2020, this drop may reflect temporary disruptions linked to the COVID-19 pandemic rather than a reduction in scholarly interest. Indeed, recovery is visible in 2021 (21 publications) and again in 2023–2024 (27 and 30 articles). This productive period of six years accounts for more than one-third of the total dataset, underscoring the field's rapid expansion in the last decade.

The apparent decline to just one publication in 2025 is attributed to database indexing delays at the time of data collection, rather than an actual drop in research activity.

Overall, the publication trend shows that research on gender disparities in schooling has shifted from a marginal issue in the early 2000s to a well-established and growing area of inquiry. The upward trajectory not only mirrors global policy milestones but also indicates an expanding recognition of early-stage gender gaps in education as a serious worldwide problem requiring scholarly and policy-driven attention.

The vast majority of sources, 268 out of 323, are categorized as journal articles, accounting for over 83% of the dataset (Figure 3).

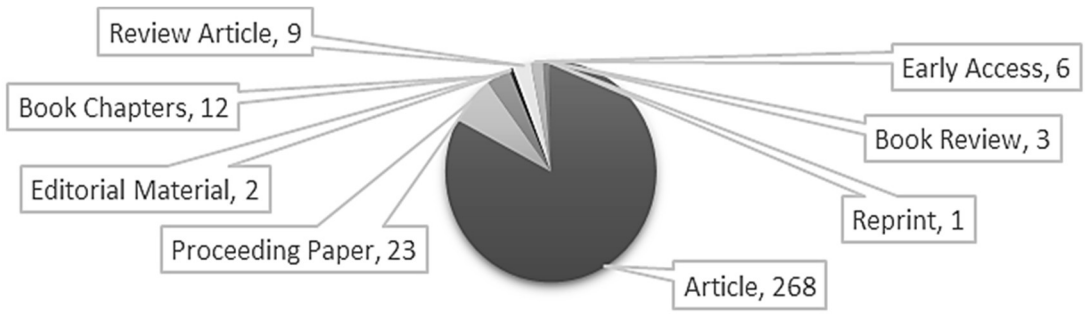


Figure 3. Document types distribution in the dataset

This dominance reflects the firm reliance on peer-reviewed, original research in exploring gender disparities in education. It also signals that the debate is primarily shaped by empirical studies rather than conceptual syntheses or theoretical overviews.

Proceedings papers (23) and book chapters (12) represent smaller but notable portions, suggesting some coverage of the topic in academic conferences and edited volumes. Their presence highlights how discussions on gender and schooling extend beyond journals, often entering policy-oriented and interdisciplinary dialogues.

Other formats contribute minimally. Those include:

- review articles (9);
- early access materials (6);

- book reviews (3);
- editorials (2);
- reprints (1).

The limited number of review articles (less than 3% of the dataset) is particularly significant, as it indicates a gap in the consolidation of systematic literature. Given the rapid growth of publications in recent years, future research would benefit from more comprehensive reviews that synthesize fragmented findings.

The overwhelming prevalence of articles indicates that the field is primarily shaped by empirical and conceptual contributions published in scholarly journals, while secondary and reflective formats remain underutilized. This pattern highlights both the strength of the evidence base and the need for more comprehensive meta-analytical and theoretical contributions.

A small but significant group of recurring scholars actively contributing to the literature on the gender educational gap among school-aged girls is revealed by the author's dataset (Figure 4).

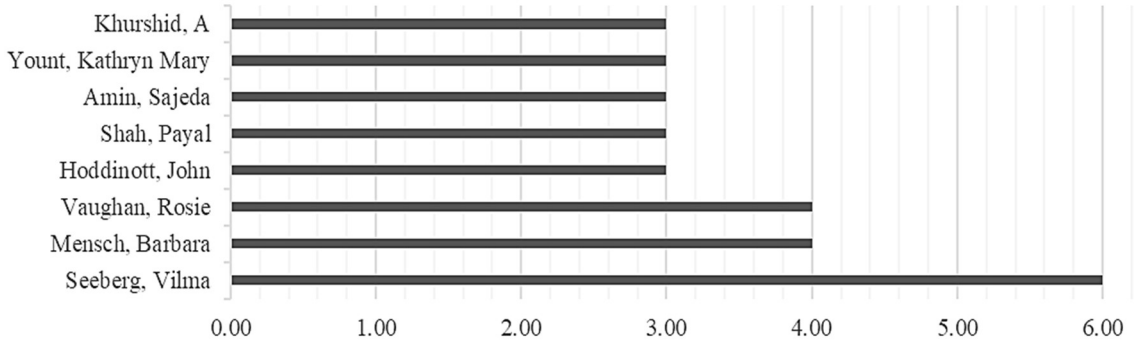


Figure 4. Authors by contribution

With six publications, Vilma Seeberg is the dataset's most prolific author, demonstrating a consistent commitment to the topic. Her work, often centered on comparative education and international development, positions her as a leading voice in framing girls' schooling as part of global equity debates. Barbara Mensch follows with four publications, while Rosie Vaughan also contributed four studies, focusing on education and social development in Africa and South Asia. Six other researchers, including John Hoddinott, Payal Shah, Sajeda Amin, Kathryn Mary Yount, and A. Khurshid, each contributed three articles. This second tier of contributors includes specialists in demography, sociology, and development studies, showing that the debate draws from multiple disciplines.

This focus signifies the emergence of a core academic community that continually examines issues related to gender-based exclusion, access, and educational inequality. Multiple high-contributing authors are indicative of both individual expertise and possible networks of collaboration that shape the scholarly discourse. At the same time, the long tail of authors with only two publications (e.g., Masquelier, Ross, Behrman, Austrian, Yamauchi, Bhabha) illustrates that the field remains open and

multidisciplinary, with contributions emerging from anthropology, economics, and public health.

Rather than being dominated by a single school of thought or a small group of institutions, the field is shaped by loosely connected yet diverse efforts. This dispersed authorship base strengthens interdisciplinarity, but also highlights the need for more sustained collaboration across regions, particularly involving underrepresented scholars from the Global South.

The literature on gender differences in the education of school-aged girls is firmly grounded in interdisciplinary scholarship, with a notable emphasis on education-focused research (Table 1).

Table 1. Web of Science subject categories

Web of Science Categories	**Record Count**
Education Educational Research	123
Economics	47
Sociology	32
Development Studies	27
Public Environmental Occupational Health	21
Social Sciences Interdisciplinary	19
Women S Studies	19
Demography	13
History	11

Note: compiled by the authors

With 123 records, *Education & Educational Research* is the most prominent category, highlighting the field's primary focus on educational systems, pedagogical barriers, and access disparities. Economics (47) and Sociology (32) come next, demonstrating a thorough examination of the societal, economic, and structural aspects of educational exclusion. This overlap between economics and sociology reflects how the academic gender gap is studied both as a developmental challenge and as a product of broader social inequalities.

Beyond these leading categories, *Development Studies* (27) indicates the field's strong link to international policy agendas and global initiatives. *Public, Environmental, and Occupational Health* (21) highlights the importance of attention to reproductive health, nutrition, and adolescent well-being as factors influencing girls' schooling. The presence of *Women's Studies* (19) adds a feminist theoretical lens, while *Social Sciences Interdisciplinary* (19) confirms that gender in education is often treated as a cross-cutting issue.

Demography (13) provides quantitative insights into household structures, fertility, and population-level determinants of schooling, whereas History (11) reflects more limited but essential contributions that trace long-term structural inequalities in educational systems.

Taken together, the subject category distribution shows that while education dominates, research on gender and schooling is enriched by inputs from economics, sociology, health, and feminist studies. However, the relatively low representation of

Women's Studies and *History* suggests that theoretical, critical, and long-term historical perspectives remain underdeveloped compared to policy-driven and empirical approaches.

According to the meso-level citation topic analysis, *Gender & Sexuality Studies* and *Education & Educational Research*, which together account for just over 50% of the dataset, exhibit a strong disciplinary alignment (Figure 5).

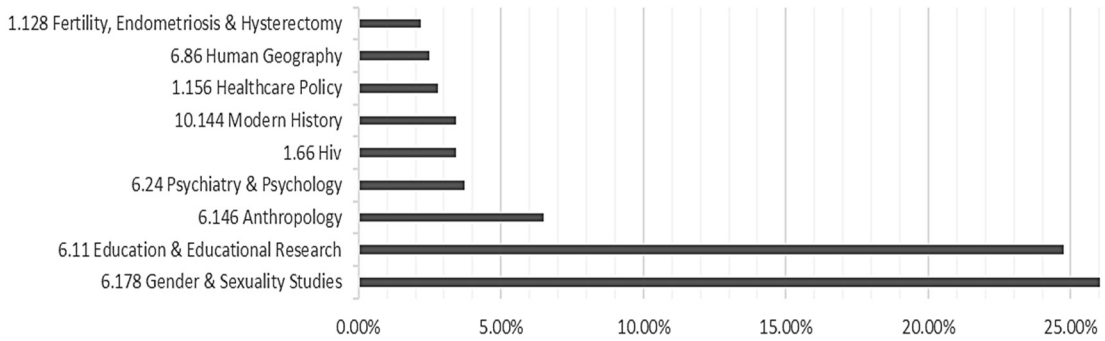


Figure 5. Meso-level citation topics

The field's ongoing emphasis on the structural obstacles and gendered experiences that contribute to educational inequality is highlighted by the fact that *Gender & Sexuality Studies* leads with 26.01%. Not far behind, *Education & Educational Research* (24.77%) affirms that debates about institutional discrimination, curriculum design, and access remain central to academic inquiry.

Anthropology (6.5%) reflects a continuing interest in cultural practices, kinship systems, and community norms that shape educational access. *Psychiatry & Psychology* (3.72%) and *HIV-related research* (3.41%) highlight the intersection of education with mental health, stigma, and reproductive health in low-income settings. The inclusion of health-related categories such as *Healthcare Policy* (2.79%), *Fertility/Endometriosis* (2.17%), and *Nutrition & Dietetics* (1.86%) confirms that girls' education is often studied through a health-development lens, particularly in contexts where adolescent pregnancy, malnutrition, and chronic illness affect school participation.

Modern History (3.41%) presents a limited but valuable strand of work that traces the historical evolution of gender and schooling. In comparison, Human Geography (2.48%) emphasizes spatial inequalities in educational access across rural–urban divides. Smaller clusters—such as *Economics* (1.86%), *Asian Studies* **(**1.55%), and *Social Psychology* (1.24%)—illustrate that economic and regional perspectives remain present but underdeveloped compared to social and health sciences.

The long tail of low-frequency topics—including *Political Philosophy, Sociology, Management, Religion, and Literary Theory* (each <1%)—demonstrates occasional but fragmented attempts to situate gender and schooling within broader theoretical or interdisciplinary debates. This dispersion suggests that while the field is anchored in education and gender studies, it remains highly porous, borrowing concepts from history, philosophy, and the health sciences without fully integrating them.

Overall, the meso-level analysis confirms that the research landscape is dominated by education and gender studies but enriched by peripheral contributions from anthropology, health, and history. The relative underrepresentation of economics and sociology, however, highlights a gap in linking schooling inequalities to labor markets, household economics, and long-term social mobility—an area where future research could expand.

The micro-level citation analysis reveals that research on the gender educational gap among school-aged girls is intricately linked to themes of family dynamics, structural inequality, and poverty-related gender disparities (Figure 6).

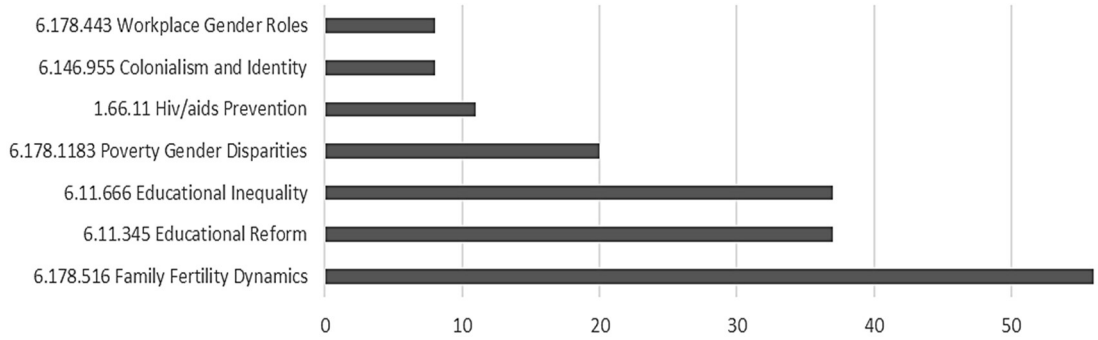


Figure 6. Micro-level citation topics

The most frequently referenced topic (56 records) is *Family Fertility Dynamics*, which emphasizes how girls' capacity to pursue and finish school is directly shaped by early marriage, childbearing expectations, and reproductive roles. This highlights that gender inequality in schooling cannot be separated from household-level decisions and fertility norms.

Educational Inequality (37) and *Educational Reform* (37) follow, demonstrating how scholarship not only documents persistent gaps but also evaluates policy measures designed to address them. The equal weight given to these two themes underscores the dual nature of the debate: describing exclusion on one hand, and testing reform outcomes on the other.

The intersection of economic vulnerability and health-related barriers that disproportionately affect girls' school attendance and retention is further reflected in *Poverty Gender Disparities* (20) and *HIV/AIDS Prevention* (11). These themes show how structural poverty and public health crises reinforce each other, compounding the risks of school dropout for adolescent girls.

Emerging, yet less well-known themes, such as Colonialism and Identity (8) and Workplace Gender Roles (8), indicate a growing recognition of how historical legacies, cultural contexts, and socialization processes shape educational access. Similarly, *Maternal Health Equity*, *Cultural Transformation*, and *Intimate Partner Violence* (each with 7 points) highlight the increasingly intersectional ways in which education is analyzed, not only as a schooling outcome, but also as a broader issue of gender justice and social protection.

Taken together, these micro-level topics show that while structural and policy-focused debates dominate, researchers are increasingly attentive to how cultural, familial, and personal factors intersect to influence girls' educational opportunities. This growing intersectionality suggests that future research will likely integrate household-level data, cultural analysis, and gender norms into broader studies of educational reform and inequality.

The mapping of the Sustainable Development Goals (SDGs) reveals that SDG 3: Good Health and Well-Being is the most frequently aligned with the literature, appearing in 132 records (Figure 7).



Figure 7. Distribution of literature by Sustainable Development Goals

This prevalence highlights the close relationship between educational access and retention and health outcomes, including adolescent pregnancy, malnutrition, and mental health issues. The dominance of SDG 3 reflects the reality that barriers to girls' education are often mediated by reproductive health risks, nutritional deficiencies, and psychosocial well-being—areas where the education and health agendas strongly intersect.

SDG 4: Quality Education (96) and *SDG 5: Gender Equality* (107), which directly address the field's main concerns, follow. Their prominence attests to the fact that the majority of the research explicitly targets the eradication of gender-based barriers to schooling and the achievement of inclusive education (see Figure 7). Together, SDG 4 and SDG 5 form the normative backbone of the field, aligning with global advocacy campaigns that frame girls' education as both a right and a pathway to gender empowerment.

Additionally, alignment with *SDG 1: No Poverty* (32) and *SDG 10: Reduced Inequalities* (78) demonstrates that broader structural and economic injustices, which disproportionately impact girls' access to education in developing and emerging economies, are also recognized. This reflects a growing policy-oriented scholarship that situates girls' education not just as an individual-level outcome, but as part of larger struggles against intergenerational poverty and social stratification.

Notably, 65 records (approximately 20%) were not associated with any SDG category, indicating that future research should either improve tagging or employ more deliberate SDG framing. The absence of explicit SDG alignment in a fifth of the literature suggests a gap between global policy frameworks and academic research practices. This disconnect highlights the need for more intentional integration of SDG targets into research design and bibliometric indexing.

Overall, the distribution demonstrates that the literature strongly backs the intersectional goals of the 2030 Agenda, particularly those related to health, equity, and educational justice. Yet it also underscores the importance of bridging policy frameworks with research outputs, so that evidence on gender and schooling can inform SDG monitoring and implementation more effectively.

The vast majority of the bibliometric study's publications, 240 out of 368 entries, are included in the *Social Sciences Citation Index (SSCI)*, demonstrating the field's solid foundation in social science scholarship and its acceptance in peer-reviewed journals (Figure 8).

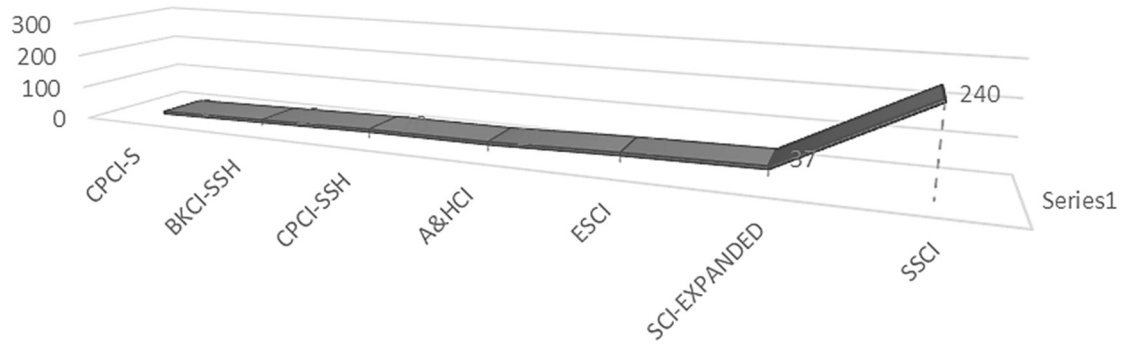


Figure 8. Distribution of literature by Web of Science Index

This dominance confirms that research on girls' educational inequality is primarily framed as a social science issue, analyzed through the lenses of sociology, economics, and education policy. With 37 records, *SCI-EXPANDED* comes next, indicating a secondary but significant intersection with fields related to science and health. This crossover highlights the increasing significance of public health, nutrition, and epidemiology in shaping discussions on educational access. The fact that there are 21 articles in the *Arts & Humanities Citation Index (A&HCI)* and 31 in the *Emerging Sources Citation Index (ESCI)* emphasizes the topic's interdisciplinary nature, drawing on both established and newer journals.

The discussion also extends beyond journals to conference platforms and edited volumes, as evidenced by other indices such as *CPCI-SSH* (20), *BKCI-SSH* (13), and *CPCI-S* (6), which represent proceedings and book chapters. Their inclusion indicates that debates on gender and schooling are not confined to traditional journals but also find expression in scholarly gatherings, policy dialogues, and edited collections.

Overall, the index distribution shows that while the SSCI anchors the field in the social sciences, there is a steady contribution from health sciences, humanities, and emerging sources. This multidimensional spread strengthens the claim that gender gaps in schooling are a global, cross-cutting issue that requires interdisciplinary inquiry.

The institutional affiliation analysis reveals that a diverse range of global research institutions contribute to the literature (Figure 9).

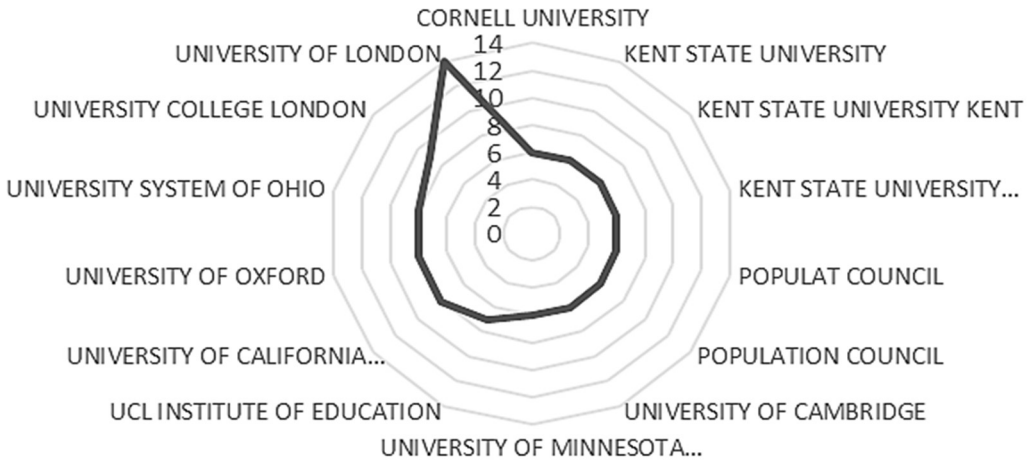


Figure 9. Literature by institutional affiliation

The University of London leads with 14 publications, followed by University College London (9), the University of California System (8), the University of Oxford (8), and the University System of Ohio (8). Together, these universities represent major centers of research on gender and education in high-income countries, particularly the United Kingdom and the United States.

Several other institutions consistently make notable contributions, including the UCL Institute of Education (7), Cornell University (6), the University of Cambridge (6), and multiple campuses of Kent State University (with three entries, totaling 18 publications). This suggests that certain universities, particularly in the UK and the US, have developed sustained research agendas focused on addressing gender disparities in education.

Policy-oriented and applied research organizations also play a visible role. The *Population Council* and *CGIAR* each contributed multiple studies, while the *International Food Policy Research Institute (IFPRI)* added five publications. The presence of these institutions demonstrates how empirical research on girls' education is often connected to global development agendas, linking education to poverty alleviation, health, and food security.

Interestingly, smaller but regionally significant institutions, such as Mkwawa University (Tanzania) and the State University of New York (SUNY) system, appear with four records each, indicating that contributions also emerge from outside elite Western institutions. This suggests that while the field is dominated by Anglo-American universities, research partnerships and regionally focused institutions are steadily shaping the debate.

Overall, the affiliation analysis reveals a dual structure: on the one hand, globally renowned universities underpin the theoretical and methodological frameworks of the field; on the other hand, development institutes and regionally focused universities provide context-specific insights, ensuring that the literature reflects both global frameworks and local realities.

The interdisciplinary nature of research on gender disparities in the education of school-aged girls is highlighted by the distribution of publication venues. With 15 publications, the *International Journal of Educational Development* leads the dataset, underscoring its central role in disseminating research on education and development in low- and middle-income countries (Table 2).

Table 2. Number of publications by Web of Science journal titles

Web of Science Journals	Number of publications
International journal of educational development	15
Gender and education	10
World development	9
British journal of sociology of education	6
Compare: a journal of comparative and international education	6
Pedagogica historica	6
Anthropology & education quarterly	4
Bmc women's health	4
Comparative education	4
Comparative education review	4
Economics of education review	4

Note: compiled by the authors

Other prominent outlets include *Gender and Education* (10) and *World Development* (9), which show that the debate extends beyond education studies into feminist theory and international development. Journals such as the *British Journal of Sociology of Education* (6) and *Compare: A Journal of Comparative and International Education* (6) reinforce the comparative and sociological perspectives that dominate much of the field.

Minor but significant contributions also come from *Pedagogica Historica* (6), which emphasizes historical perspectives, and *Anthropology & Education Quarterly* (4), which highlights cultural and ethnographic approaches. Health-oriented venues such as *BMC Women's Health* (4) confirm the integration of reproductive and maternal health concerns into the schooling debate. Meanwhile, *Comparative Education Review* (4) and *Economics of Education Review* (4) demonstrate the field's engagement with policy evaluation, cost-effectiveness, and structural reforms.

This spread of journals reveals three main clusters of engagement: (1) education-focused journals that anchor the field; (2) interdisciplinary development and sociology journals that broaden its scope; and (3) specialized outlets in history, anthropology, and health that enrich the analysis. Together, they confirm that the study of girls' education is positioned at the crossroads of educational science, gender studies, development policy, and health research.

The geographical distribution of research on the gender educational gap among school-aged girls is heavily skewed toward Western and high-income countries. The United States leads by a wide margin, with 119 publications, reflecting its strong research infrastructure and long-standing engagement in global education debates. England follows with 53 publications, while Germany, India, and Canada each account for 23 and

18 records, respectively. This dominance of the US and UK indicates that much of the academic framing of girls' education continues to be shaped by Anglo-American institutions.

Australia (13), Pakistan (10), South Africa (8), and Turkey (8) also contribute, suggesting some involvement from the Global South, particularly from regions directly impacted by educational exclusion. Bangladesh (7) and Ethiopia (5) are notable contributors, given their acute challenges in achieving gender parity in schooling. However, contributions from Sub-Saharan Africa overall remain sparse, despite the region being one of the most affected by gender gaps in education (Figure 10).



Figure 10. Number of publications by country/region

Even though the subject is especially pertinent to developing contexts, Latin America is almost absent from the dataset, and large, demographically significant nations such as China and Brazil each register minimal output (around 4–5 publications). This underrepresentation highlights a discrepancy between the areas where educational inequalities are most pronounced and where research is being produced and published.

Overall, the country distribution highlights a structural imbalance: while the Global North produces the majority of research, the Global South often provides the empirical cases but contributes fewer publications. This imbalance highlights the need to foster collaborative research partnerships, capacity-building initiatives, and more inclusive publication practices, ensuring that perspectives from the most affected regions are adequately represented in global scholarship.

Further analysis, conducted using VOSviewer to determine keyword co-occurrence across the literature, revealed nine logical clusters grouped by specific colors (see Figure 11).

Cluster 1: Disruption in Education, Reproductive Risk, and Health (RED). This cluster focuses on how girls' access to education is impacted by sociocultural and health-related factors, including intimate partner violence, HIV/AIDS, and adolescent pregnancy. The keywords, which are frequently found in research from Sub-Saharan Africa and places like Mexico, associate early childbearing and sexual behavior with low educational attainment and school dropout.

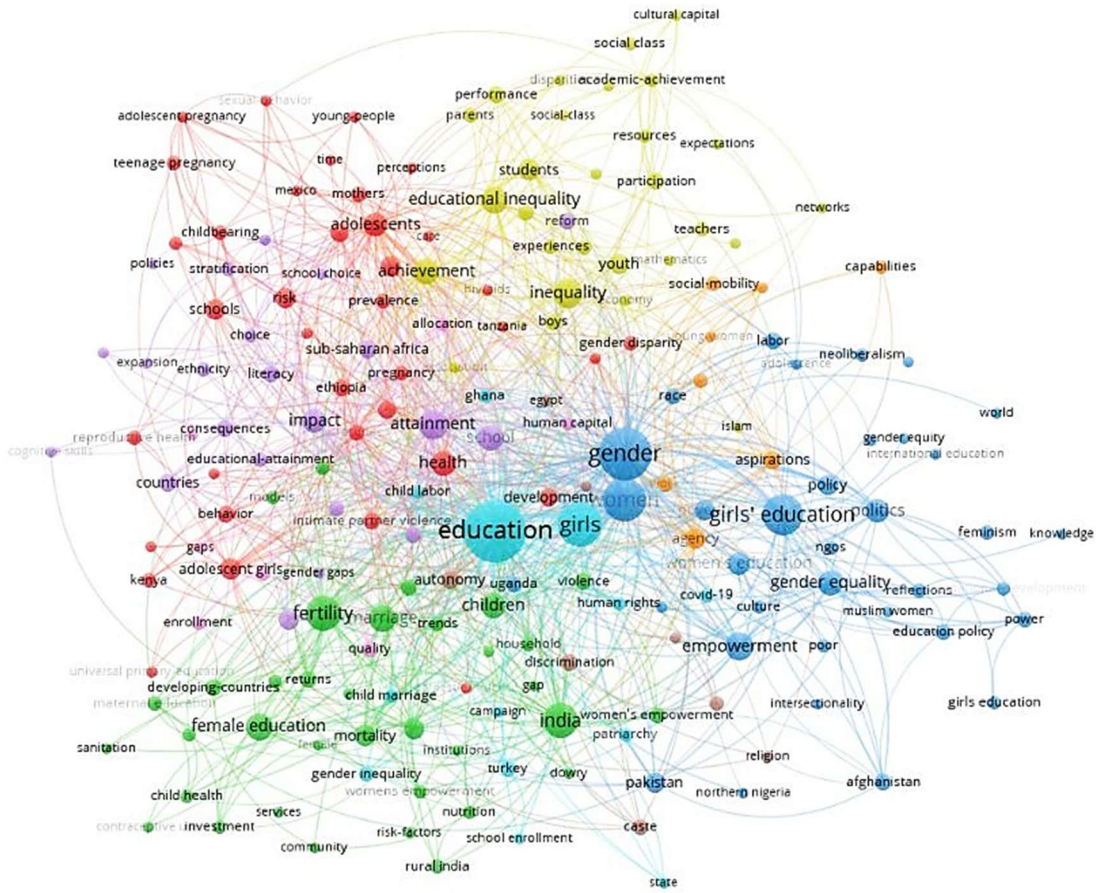


Figure 11. Keyword co-occurrence network (n ≥ 2)

Cluster 2: Investment in Education, Maternal Factors, and Early Marriage (GREEN). This cluster focuses on the demographic and structural elements that impact girls' education, particularly in South Asian countries such as Bangladesh and India. The way that marriage traditions and domestic priorities influence educational access is demonstrated by keywords such as early marriage, dowry, fertility, and maternal education. Public health and well-being are closely linked to school participation through themes such as nutrition, child health, mortality, and sanitation.

Cluster 3: The Politics of Girls' Education, Policy, and Power (BLUE). The political, cultural, and ideological aspects of girls' education are highlighted in this cluster, especially in South Asia and Sub-Saharan Africa. The cluster reflects a critical and theoretical discourse that explores the intersections of education with poverty, power structures, and global development agendas, using keywords such as feminism, empowerment, gender equity, intersectionality, and neoliberalism. Indicating a focus on how local cultures and global actors influence Muslim women's and other marginalized groups' access to education, countries like Afghanistan, Pakistan, Nepal, and Nigeria are mentioned alongside topics like international education, NGOs, and policy.

Cluster 4: Student Performance, Social Class, and Educational Inequality (YELLOW). This cluster focuses on educational inequality and achievement, highlighting how contextual factors, cultural capital, and social class influence school participation and outcomes. The focus on student-level disparities is reflected in keywords like academic achievement, performance, mathematics, and school participation, which frequently compare boys and girls in terms of success and access. While parents, teachers, and networks highlight the institutional and familial structures that shape these outcomes, terms such as social mobility, employment, and transition reveal concern about the long-term effects of education on life opportunities. Islam's presence and inequality point to the need to pay more attention to how religion and culture shape expectations and involvement, especially for young people from underrepresented groups.

Cluster 5: Gender Gaps' Structural Causes, Attainment, and Access (PURPLE). The structural and policy-level factors that affect girls' educational access and achievement are the primary focus of Cluster 5. Key concerns about who gets to go to school and under what circumstances are highlighted by keywords like access, attainment, educational attainment, and girls' schooling. A strong interest in educational systems and institutional design, particularly in the context of Sub-Saharan Africa, is evident in terms such as school choice, reform, policies, and stratification. Examining how intersecting social and economic disparities influence outcomes is suggested by the inclusion of gender gaps, income, ethnicity, and adolescent childbearing. While choice and impact highlight policy discussions about how to increase access and lessen disparities, cognitive skills and literacy highlight the quantifiable effects of unequal schooling.

Cluster 6: Rights, Crisis Governance, and Gender Inequality (CYAN). Cluster 6 addresses gender disparity in education in relation to state accountability, child protection, and human rights. Terms like patriarchy, child labor, and child marriage draw attention to the structural and cultural obstacles that prevent girls from accessing education, especially in nations like Ghana and Turkey. While school enrollment and education remain central concerns, the presence of campaigns, state initiatives, and human rights organizations suggests an emphasis on advocacy, legal frameworks, and governmental interventions. The addition of COVID-19 highlights the impact of crises on girls' education, where vulnerabilities such as dropout risk and household responsibilities are exacerbated.

Cluster 7: Girls' Educational Agency, Aspirations, and Capabilities (ORANGE). With an emphasis on agency, aspirations, and capabilities, Cluster 7 highlights the transformative and individual aspects of girls' education. These words represent a viewpoint on human development and empowerment, where education is viewed as a means of achieving social mobility, employment, and equality. The inclusion of migration and young women highlights how education influences life paths and permits social and physical mobility outside of constrictive settings.

Cluster 8: Programmatic Reactions and Structural Discrimination (BROWN). The institutional and cultural impediments that lead to gender disparities in education are highlighted in Cluster 8. Particularly in places like Egypt and South Asia, keywords like caste, religion, and discrimination imply an emphasis on established social hierarchies. While unemployment emphasizes the financial effects of limited educational access,

autonomy, and the gender gap reflect ongoing struggles for individual agency within restrictive systems. The existence of programs suggests that this cluster also encompasses development initiatives and policy changes aimed at addressing these systemic injustices.

Cluster 9: Quality of Education, Human Capital, and Enrollment (PINK). With a focus on enrollment, school attendance, and participation gaps, Cluster 9 examines the quantitative aspects of educational access and impact. Allocation and program presence indicate focus on intervention tactics and resource distribution, while quality emphasizes concern for both access and the efficacy of educational experiences. This cluster is linked to development economics through the inclusion of human capital, where girls' education is positioned as a significant factor in economic growth and long-term societal benefits.

Taken together, these clusters demonstrate that research on gender gaps in education encompasses a range of barriers, from deeply personal and health-related issues to systemic and global political structures. While health and family dynamics dominate some clusters, others highlight institutional reform, aspirations, and economic growth, illustrating the multidimensional and intersectional nature of the field.

The density visualization of citations by country ($n \geq 3$) highlights which nations are most influential in the scholarly literature on girls' education (Figure 12).

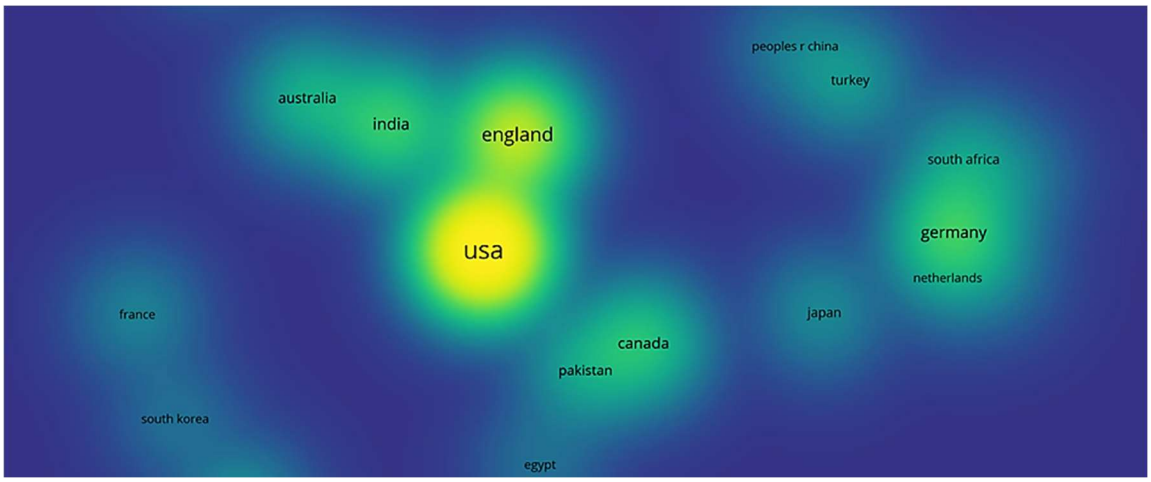


Figure 12. Citation by countries density ($n \geq 3$)

The United States clearly dominates, with the brightest yellow density zone reflecting both its high publication volume and substantial citation impact. This confirms its central role in shaping global academic discourse and producing research that is widely referenced. England also shows a high citation presence, underscoring its importance as a hub for scholarship in education, sociology, and development studies. The Anglo-American concentration of citation influence suggests that much of the conceptual framing of girls' education continues to be guided by institutions in the Global North.

Moderate densities are visible in Canada, Australia, and India. These countries, though less central than the USA and England, play meaningful roles in advancing research. India's growing visibility is particularly notable, as it represents a Global South

perspective on challenges such as early marriage, poverty, and rural-urban disparities in schooling.

By contrast, regions most severely affected by educational gender gaps—such as Sub-Saharan Africa, South Asia outside India, and Latin America—show minimal citation density. This mismatch between the geography of research production and the geography of educational inequality suggests that voices from the most impacted regions remain underrepresented in influential global scholarship.

Overall, the citation density map highlights the uneven distribution of academic influence, characterized by a concentrated North–South divide, where the Global North sets the research agenda. At the same time, the Global South provides empirical cases but receives less recognition in terms of citation impact. Bridging this imbalance will require more equitable research collaborations, open-access dissemination, and support for scholars from underrepresented regions.

Similarly, the USA emerges as the dominant hub in the co-authorship overlay network, as reflected by the large node size and dark purple shading, which signal both publication volume and sustained influence over the 2016–2020 period (Figure 13).

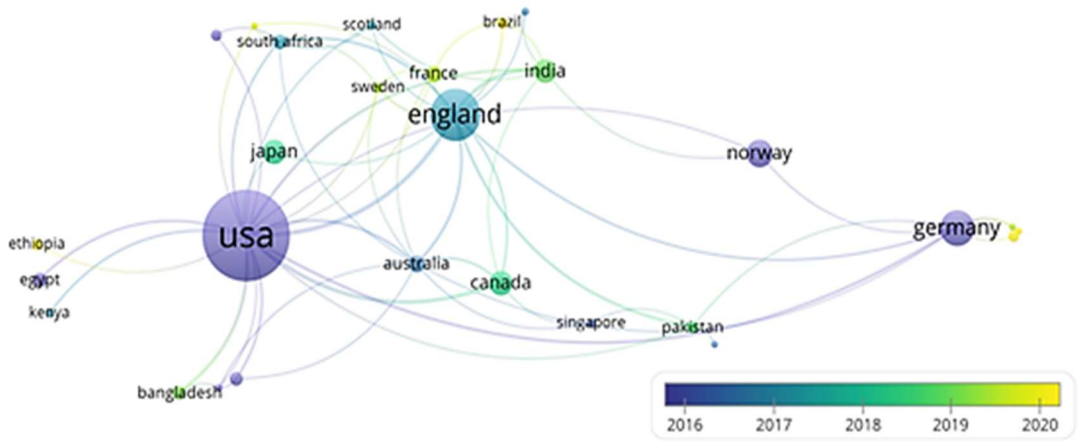


Figure 13. Co-authorship by countries chronological overlay (n ≥ 2)

The USA has acted as the central bridge in connecting research communities across the Global North and South, collaborating actively with Germany, England, Egypt, Singapore, Japan, India, and Bangladesh. England also occupies a prominent position, reinforcing its role as a major partner in collaborative projects, particularly with Commonwealth countries such as India, Canada, and Australia. Germany, though smaller in overall volume, displays newer collaborations (yellow shading), indicating a recent surge in activity within the field.

Partnerships with countries such as Bangladesh, Pakistan, Egypt, and South Africa suggest that Global South contexts are increasingly integrated into international research networks**,** though often in partnership with Global North institutions that provide funding, methodological infrastructure, and publication outlets. This asymmetry highlights the persistence of hierarchical collaboration structures, where Global South nations often

contribute empirical data, while theoretical framing remains centered in universities of the Global North.

Overall, the co-authorship map illustrates a globally interconnected but unevenly balanced research landscape**.** The USA acts as a primary broker of scholarly collaboration, while England and Germany play secondary bridging roles. The gradual inclusion of Asian and African partners signals positive progress toward diversification, yet the field continues to reflect structural inequalities in global knowledge production**.**

Discussion and Conclusion

This bibliometric analysis examined how the exclusion of school-aged girls from foundational education has been represented in scholarly works between 2000 and 2025. By analyzing 323 peer-reviewed articles from the Web of Science Core Collection, the study identified major thematic trends, leading contributors, collaboration networks, and geographical disparities.

The findings reveal that the research landscape is heavily shaped by themes such as adolescent pregnancy, child marriage, and reproductive health—issues that are particularly salient in Sub-Saharan Africa and South Asia. A sharp increase in publication volume after 2015 underscores the growing scholarly and policy attention devoted to these issues. This surge coincides with the adoption of the Sustainable Development Goals (SDGs), especially SDG 4 (Quality Education) and SDG 5 (Gender Equality), which positioned girls' education as a global development priority. Simultaneously, transnational feminist movements such as *#MeToo*, *HeForShe*, and *Girls Not Brides* reframed girls' schooling as a human rights and social justice imperative, leading to broader interdisciplinary engagement.

Despite this progress, several imbalances and limitations persist. Research output remains disproportionately concentrated in the Global North, with the USA and the UK dominating in both publication and citation impact. Collaboration networks, while increasingly global, remain asymmetrical, with Global South institutions often relegated to data collection roles rather than agenda-setting or theoretical framing. Furthermore, despite extensive work on reproductive health and secondary schooling, early-stage exclusion from primary education receives comparatively little scholarly attention. These gaps suggest that the literature does not yet fully capture the complexity of structural, cultural, and economic barriers that affect girls' access to education.

From a methodological perspective, the study is limited by its reliance on the Web of Science database, which tends to underrepresent regionally published and non-English research. While bibliometric methods allow for the mapping of trends and structures, they cannot account for the qualitative depth, theoretical innovation, or policy relevance of individual studies.

Policy and Research Recommendations:

1. Strengthen Global South Scholarship: Encourage and fund regionally grounded studies, particularly in Latin America, Sub-Saharan Africa, and South Asia, where educational exclusion is most severe. Supporting South-based journals and collaborations can help amplify the voices of underrepresented individuals.

2. Address Structural Asymmetries in Collaboration: Promote equitable co-

authorship arrangements where Global South researchers participate not only in empirical data collection but also in conceptual framing and theoretical debates.

3. Expand the Research Focus: Broaden the agenda to include early primary education, where exclusion often begins, as well as underexplored intersections such as disability, conflict zones, and digital divides.

4. Enhance SDG Integration: Improve the alignment of research with the 2030 Agenda by explicitly framing studies within SDGs 1 (No Poverty), 4 (Quality Education), 5 (Gender Equality), and 10 (Reduced Inequalities). Better tagging and categorization will ensure more comprehensive coverage and policy relevance.

5. Bridge Research and Policy: Foster stronger connections between academia and policymakers to translate bibliometric findings into targeted interventions, such as community-level campaigns against early marriage, gender-responsive curricula, and health-education linkages.

By mapping the structural contours of the field, this study lays the groundwork for a more inclusive, equity-driven, and policy-relevant research agenda on gender and foundational education. Moving forward, addressing the structural imbalances in authorship and expanding attention to early exclusion will be crucial for ensuring that scholarly work not only reflects global realities but also contributes to transformative educational justice for girls worldwide.

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Information about the authors

Malika Temirtayeva – Bachelor, KIMEP University, Almaty, Kazakhstan. Email: malika.temirtayeva@kimep.kz, ORCID ID: https://orcid.org/0009-0008-6642-7433

***Irina V. Kovaleva** – PhD Candidate, Adjunct Lecturer, KIMEP University, Almaty, Kazakhstan. Email: irina.kovaleva@kimep.kz, ORCID ID: https://orcid.org/0000-0002-3636-6093

Alma Kudebayeva – PhD, Associate Professor, KIMEP University, Almaty, Kazakhstan. Email: almak@kimep.kz, ORCID ID: https://orcid.org/0000-0002-1962-3924

Авторлар туралы мәліметтер

Темиртаева М.М. – бакалавр, KIMEP университеті, Алматы, Қазақстан. Email: malika.temirtayeva@kimep.kz, ORCID ID: https://orcid.org/0009-0008-6642-7433

***Ковалева И.В.** – PhD докторанты, adjunct-оқытушы, KIMEP университеті, Алматы, Қазақстан. Email: irina.kovaleva@kimep.kz, ORCID ID: https://orcid.org/0000-0002-3636-6093

Кудебаева А.К. – PhD, қауымдастырылған профессор, KIMEP университеті, Алматы, Қазақстан. Email: almak@kimep.kz, ORCID ID: https://orcid.org/0000-0002-1962-3924

Сведения об авторах

Темиртаева М.М. – бакалавр, Университет КИМЭП, Алматы, Казахстан. Email: malika.temirtayeva@kimep.kz, ORCID ID: https://orcid.org/0009-0008-6642-7433

***Ковалева И.В.** – PhD докторант, преподаватель по совместительству, Университет КИМЭП, Алматы, Казахстан. Email: irina.kovaleva@kimep.kz, ORCID ID: https://orcid.org/0000-0002-3636-6093

Кудебаева А.К. – PhD, ассоциированный профессор, Университет КИМЭП, Алматы, Казахстан. Email: almak@kimep.kz, ORCID ID: https://orcid.org/0000-0002-1962-3924