

Trends and global collaborations in education research in fragile contexts related to the Middle East and North Africa

Abstract

This study analyzes academic production in education in Africa and the Middle East (MENA) between 1972 and 2025 using bibliometric methods. 1,019 documents obtained from the Web of Science and Scopus databases were evaluated for publication trends, collaboration networks, thematic density, and citation impact. The findings indicate a significant increase in production after 2000 and an accelerated academic interest, particularly in the period after 2011. The most productive countries are the United States, Iran, and the United Kingdom, while countries like Lebanon stand out with their high citation rates. Keyword analyses revealed the prominence of concepts such as “education,” “public health,” “sustainability,” and “migration.” Conceptual cluster and network analyses revealed thematic diversity as well as emerging research areas such as digitalization, inequality, and youth. While the United States and the United Arab Emirates are prominent in international collaborations, the low representation of countries close to the region, such as Turkey, is noteworthy. The study reveals the multidimensional nature of education in the MENA region, intersecting with crises, development and public health, and offers strategic recommendations to guide future research.

Keywords: Middle East and North Africa (MENA), education, sustainability and migration, public health and disasters, migration and crisis

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Introduction

Beyond developing individuals' competencies, education plays a central role in societies achieving social justice, economic growth, and sustainable development goals.^{1,2} However, this function faces serious challenges, particularly in socio-politically fragile regions such as Africa and the Middle East. The first quarter of the 21st century was a period in which the need for structural reforms increased in these regions, while crises (war, migration, pandemics) profoundly disrupted education systems.^{3,4}

For many years, the African continent struggled with post-colonial economic inequalities, infrastructural deficiencies, and political instability, negatively impacting the distribution and quality of education services.^{5,6} Similarly, the Middle East and North Africa (MENA) region has experienced structural disruptions that threaten the continuity of education systems due to factors such as the political turmoil following the Arab Spring, the Syrian civil war, and the crisis in Yemen.^{7,8} A common characteristic of these crises is that they have deepened educational inequalities and exacerbated the digital divide.⁹

The demographic growth experienced in the MENA region over the past decade, the increasing proportion of young people, and the need for digitalization have dramatically increased the demands on education systems.¹⁰ However, many countries lack the infrastructure and teacher resources to meet this growing demand.² Student-teacher ratios exceed 50 in some parts of Africa, and access to higher education remains largely limited in rural areas.¹¹

Despite this, some positive developments in the region are noteworthy. In many countries, education reforms have accelerated, investments in distance education technologies have increased, and more crisis-resistant systems have begun to be built.^{12,13} Funding and technical support provided by international organizations (UNESCO, UNICEF, and the World Bank) have contributed to the reconstruction

of education services, particularly in countries affected by war and migration crises.

In this context, examining the patterns of scholarly production in education literature in Africa and the Middle East is crucial for revealing academic trends, thematic concentrations, and collaborative networks in the region. Bibliometric analysis offers a powerful methodological tool for such exploration. This study aims to assess the evolution, global impact, and future directions of education research by providing a detailed analysis of scholarly production between 1972 and 2025.

Purpose

In regions with intense socio-political vulnerabilities, education systems play a critical role not only for individual development but also for societal resilience and sustainable development.^{3,14} MENA regions have been subjected to multiple crises, including wars, migration, economic turmoil, and pandemics, over the past three decades, leading to significant transformations in education.^{4,7}

To understand the nature, pace, and direction of this transformation, a systematic examination of academic production in education is necessary. The literature demonstrates that during periods of crisis, scholarly production can both increase and thematically shift.^{13,15} However, the extent to which education research has increased in MENA, which themes it focuses on, and which countries/institutions are leading the field have not yet been answered comprehensively. Therefore, the primary objective of this study is to analyze education-themed academic production in MENA between 1972 and 2025 using bibliometric methods. The research encompasses the following sub-objectives:

- To reveal annual publication trends in this field,
- To identify the most productive countries and institutions,

- c) To identify the most cited journals and key themes,
- d) To analyze the structure of international collaboration networks,
- e) To visualize thematic development, trends, and conceptual clusters.

This aims to make the dynamics of education literature in MENA more visible and to establish a strategic reference framework for future studies.

Methodology

This research adopted a bibliometric analysis approach and aimed to evaluate academic production published in the field of education in Africa and the Middle East using qualitative and quantitative criteria. Bibliometric analysis is a scientific method frequently used to understand the structure, development, and knowledge networks of academic literature.¹⁶ Methodologically, this study is based on two main components: performance analysis and science mapping.

Data source and scope

The bibliometric data for the study was generated from 1019 documents (articles, book chapters, and proceedings) published between 1972 and 2025 in journals indexed by Web of Science and Scopus. These documents, collected from a total of 641 different sources, contained education-themed content and were filtered using keywords such as “Middle East,” “North Africa,” “Education,” and “MENA.” Most of the data was obtained from academic indexes such as Scopus and Web of Science.^{3,17}

Initially, 923 documents were retrieved from Scopus and 566 from Web of Science, yielding a total of 1489 records before processing. However, the dataset underwent a rigorous cleaning process to ensure data integrity and prevent duplication bias. After removing duplicate entries, documents lacking complete bibliographic metadata (e.g., missing author or affiliation information), and documents not directly related to the thematic focus of the study, the final text was narrowed down to 1019 unique and thematically relevant documents.

Scopus and WoS were selected as data sources due to their broad disciplinary coverage, high indexing quality, and compatibility with bibliometric tools such as Bibliometrix/Biblioshiny. Their structured and standardized metadata formats make them suitable for longitudinal and cross-sectional analyses in education, social sciences, and public health. The selected documents provide a reliable and representative dataset for understanding academic trends in education in the Middle East and North Africa.

Analysis tools and process

The following bibliometric software and analysis techniques were used in the data analysis:

- a) Main analyses (publication years, citation counts, journals) were performed using the Bibliometrix R Package.¹⁸
- b) Keyword co-occurrence networks, country collaboration maps, and thematic clusters were visualized using VOSviewer.
- c) Core journals were identified using Bradford’s Law.

Restrictions

- a) Only English publications were included.
- b) Regional restriction was based on the keywords “Middle East” and “Africa.”

- c) Data for 2025 was based on predictive trend analysis.

Ethical considerations

Because no individual data was used in the study, ethics committee approval was not required. All analyses were conducted using content obtained from open-access databases.

Findings

Before moving on to the main findings of the study, the general structure of the data and the scope of the analysis were summarized (Table 1).

Table 1 Scientific production from 1972 to 2025

Main information about data	
Timespan	1972-2025
Sources (Journals, Books, etc.)	641
Documents	1019
Annual Growth Rate %	8,01
Document Average Age	6,82
Average citations per doc	18,63
Document Contents	
Keywords Plus (ID)	7858
Author's Keywords (DE)	109
Authors	
Authors of single-authored docs	130
Single-authored docs	11,7
International co-authorships %	28,46

As seen in Table 1, the annual growth rate of 8.01% is quite remarkable and indicates that the discipline is gaining momentum. This is consistent with the annual production graph, which particularly accelerated the increase in the post-2000 period (Figure 1). The 11.7 co-authors per document demonstrate the prevalence of multicenter and interdisciplinary collaborations in this field. The 28.46% international co-authorship rate demonstrates that research is conducted interactively on a global scale. The presence of 3855 Keywords Plus and 2725 Author’s Keywords demonstrates that the literature is multidimensional and has a wide thematic diversity. This suggests that it offers a structure highly suitable for identifying trending themes through keyword clustering (co-occurrence) analyses. The average document age is 6.82 years, indicating that production is confined to the last 10 years and that the field is dynamic, current, and based on new literature. The average citation counts of 18.63 demonstrates the high scientific impact of publications in the field.

Scientific production

To understand scientific production, basic information on documents, authors, and collaborations is provided by year. Figure 1 shows the number of articles published by year.

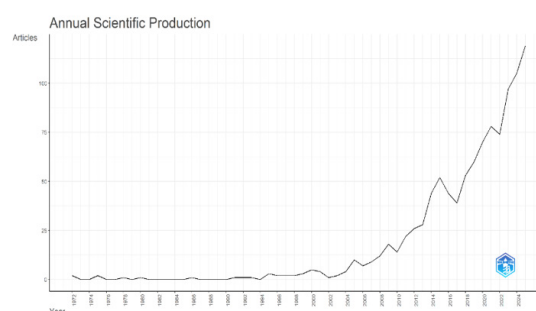


Figure 1 Total Number of Articles per Year (1972-2025).

Figure 1 shows the change in annual publication numbers from the 1970s to 2025. The vertical axis (y-axis) represents the number of articles, while the horizontal axis (x-axis) represents the years. The stagnation between 1970 and 2000 is striking. Annual production is quite low and flat in the first 30 years. During this period, annual production generally averages around 0-5 articles. This can be explained by limited academic interest in the subject, difficulties accessing data in the region, and the lack of adequate educational infrastructure to support academic production.

The increase in the number of publications was significant between 2000 and 2010. A significant increase is observed from the early 2000s onward. Double-digit production levels are observed, particularly after 2005. This increase may be related to the increase in international funding, the emergence of education reforms targeting the MENA region, and the intensification of disasters and migration.

Rapid growth and academic concentration are observed between 2011 and 2025. There is an almost exponential increase in the number of publications in the post-2011 period. Peak increases are particularly observed in years such as 2015, 2021, and 2023. This period can be explained by the migration crisis following the Syrian civil war, the transformation of education due to the COVID-19 pandemic, and the impact of digitalization in the MENA region.

The projected production for 2025 represents the highest level ever recorded (110+ articles). This suggests that interest in this research area is growing, fueled by political, social, and economic influences.

Publication increases may parallel periods of reform in the education system. Increases after 2010 may be associated with the displacement following the Arab Spring. The post-pandemic publication increase may have highlighted the fragility of education systems. The acceleration of academic investments in the MENA region by local and international institutions may also have been influential. The proliferation of open-access journals may have stimulated production.

Most cited journals

The study provides a detailed analysis of the most cited journals on education in Africa and the Middle East. These journals stand out as valuable resources for researchers to conduct in-depth research on specific topics and access important articles. It also highlights the potential of these journals to provide researchers with in-depth information on a specific topic by demonstrating their specialized and concentrated coverage. The productivity of journals publishing on education in Africa and the Middle East, based on total citations and indexing, is presented in Table 2.

Table 2 Bibliometric metrics of top sources

Source	h-index	g-index	m-index	Total Citations (TC)	Number of Publications (NP)	First Publication Year (PY_start)
Plos One	8	12	0.667	164	18	2014
BMC Public Health	6	12	0.333	147	13	2008
Journal of North African Studies	4	6	0.211	40	8	2007
Eastern Mediterranean Health Journal	5	7	0.333	118	7	2011
International Journal of Environmental Research and Public Health	5	5	0.833	157	5	2020
International journal of Educational Development	4	5	0.138	93	5	1997
BMJ Global Health	4	4	0.571	117	4	2019
Compare - Journal of Comparative and International Education	4	4	0.267	46	4	2011
Reproductive Health Matters	4	4	0.182	233	4	2004

Table 2 shows that Plos One, despite its launch in 2014, has the highest contribution with 18 articles. This journal also boasts both quantitative and qualitative contributions, with 164 citations and a high h-index (8). The m-index value (0.667) also demonstrates this sustained activity. BMC Public Health and the Eastern Mediterranean Health Journal stand out, particularly in health-themed studies in the MENA region. These journals' high total citations (147 and 118) and g-index (12 and 7) indicate interdisciplinary interest. The International Journal of Environmental Research and Public Health (as of 2020) has received 157 citations with only 5 articles, reaching the highest m-index (0.833) in a very short time. This demonstrates the recent rise in environmental and public health themes. Journals such as the International Journal of Educational Development and Compare, despite their long-standing publication history, have lower m-indexes. This suggests that studies on education policy are fewer but more in-depth, or are cited later.

The Journal of North African Studies is among the most productive journals with 8 articles. However, the total number of citations is

relatively low (40). This finding may indicate that the study is cited at a narrower, localized level. Reproductive Health Matters makes a notable impact with 233 total citations for only 4 articles. The high citation level suggests that themes such as gender, reproductive health, and women's studies have strong resonance.

While health and environmental health-themed journals are prominent, educational policy journals offer longer-term and more in-depth contributions. The m-index value is important for demonstrating the timeliness and enduring impact of journals; in this context, journals like IJERPH should be closely monitored. Locally/regionally focused journals can be considered important in thematic analyses due to their geographical distribution and contextualization.

Figure 2 shows the distribution of articles across journals according to Bradford's Law, which defines a small number of journals as "core sources" that contribute to the majority of publications on a given topic. This bibliometric model helps identify which journals play the most important role in disseminating scholarly knowledge within a research field.

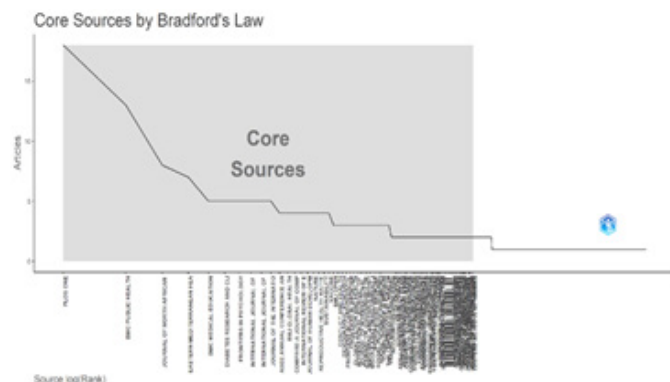


Figure 2 Core journal distribution based on Bradford's Law.

As seen in Figure 2, publications are concentrated in a specific core group of journals. Journals such as PLOS ONE, BMC Public Health, and the Journal of North African Studies are among the “core sources” of the research field and host the largest number of articles. This core group accounts for the bulk of the literature, while many other journals contribute relatively few publications.

This situation is consistent with the prediction of Bradford's Law: a small number of sources produce the majority of publications, while a large number of sources contribute only limitedly. Specifically, in the analyzed dataset, this suggests that research is clustered around specific journals, and that these publications, located at the center of the field, have high potential impact.

Most productive countries

Scientific production on the subject shows a broad international distribution, encompassing both developed and developing countries. This section evaluates geographical and temporal trends in publication volume, impact (citations), and international collaboration based on bibliometric data.

Country-level output distribution

The global map (Figure 3) shows the distribution of scientific production by country. The US (United States) stands out as the most productive contributor, followed by the UK (United Kingdom), Saudi Arabia, Germany, Lebanon, and other countries in the Middle East and North Africa (MENA) region. In particular, some developing countries in the Global South also show significant participation, indicating an expanding research base.

Country Scientific Production

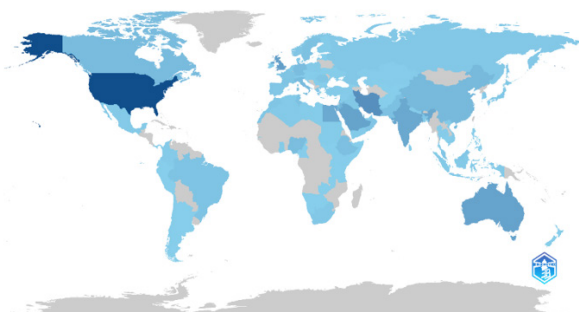


Figure 3 Global Distribution of Scientific Publications.

Temporal evolution of country output

A significant increase in publication activity has been observed over time, particularly after 2015. This increase is most pronounced

in countries such as the US, UK, Saudi Arabia, Iran, and Australia, where research output has increased significantly in recent years (Figure 4). This trend may be linked to:

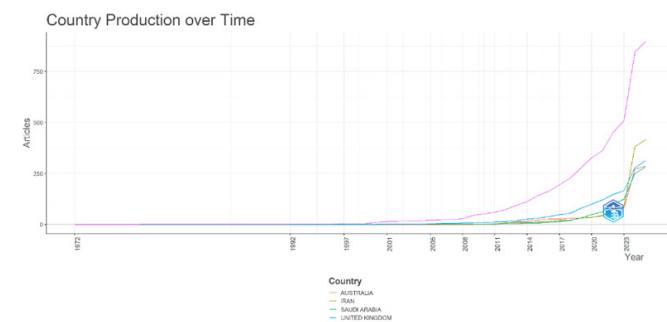


Figure 4 Publication growth by country over time.

- The rise of global crises such as forced migration or pandemics,
- Increased open-access publishing opportunities,
- Regional policy interest in education and healthcare reforms in the Middle East and North Africa.

Most cited countries

While the US leads in both volume and impact, Lebanon, Germany, and the United Arab Emirates, despite having fewer publications, stand out in terms of citation density. For example, Lebanon ranks third with 596 citations, highlighting the high-impact nature of its contributions (Figure 5).

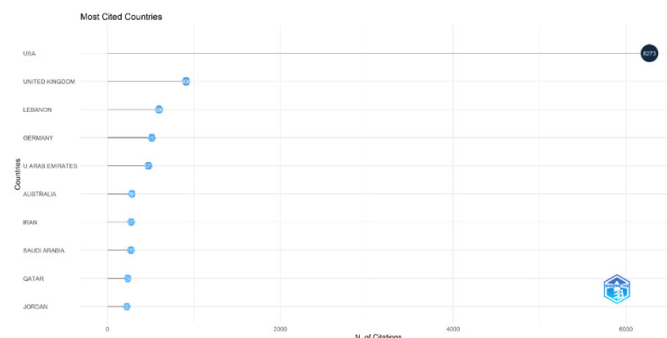


Figure 5 Countries ranked by number of citations.

International collaboration models

The author's country analysis reveals that the US is a leader not only in publication volume but also in multinational collaboration. Countries such as Qatar, Jordan, and the UAE (United Arab Emirates) show a high rate of Multi-Country Publications (MNCP), indicating strong international connections and co-authorship networks (Figure 6).

Country-level output table

Table 3 summarizes the key figures for the most productive countries based on document count, citation, and collaboration metrics.

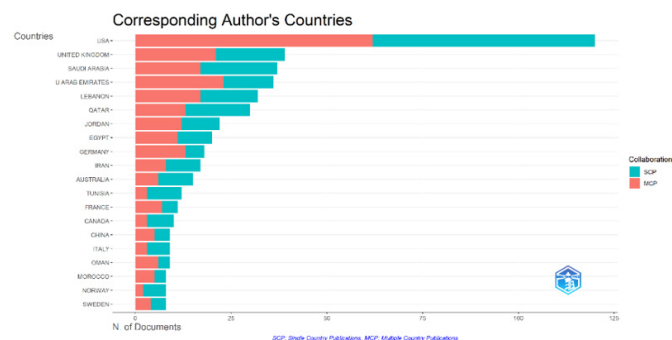


Figure 6 Country of correspondent author, SNCP.

Table 3 Country-level output table with citations

Country	Documents	Total citations (TC)	Avg. article citations
USA	897	6273	52.3
Iran	415	275	16.2
UK	313	—	—
Australia	286	281	18.7
Saudi Arabia	282	270	7.3
India	243	—	—
Egypt	235	—	—
Lebanon	169	596	35.1
Germany	150	513	32.1
Jordan	135	222	16.2
Qatar	125	234	14.6
UAE	123	172	10.1
France	110	—	—
Tunisia	98	—	—
Canada	94	—	—

Table 3 compares the productivity and citation impact of the 15 countries with the most publications. The US leads by far in both the number of publications (897 documents) and the total number of citations (6273 citations). This reflects both its production power and its global academic impact. Lebanon and Germany, despite producing relatively fewer documents (169 and 150), stand out with their high average citation rates (35.1 and 32.1). This suggests targeted publication strategies with high impact. Countries such as Iran, Australia, and Saudi Arabia have high productivity but more limited average citation rates, which can be explained by the limited citation impact of regionally focused publications. MENA countries such as the United Arab Emirates, Qatar, and Jordan exhibit moderate average citation rates combined with high publication numbers, indicating the potential for growing scientific impact. Citation data is not available for some countries, such as the UK, France, and Canada; This may be due to dataset incompleteness and additional checking may be required.

While the top-ranked countries include many expected leaders, such as the US and the UK, it is notable that some non-Middle Eastern and African countries, such as Australia, Germany, and Canada, rank highly in terms of both productivity and citation impact. Conversely, some countries geographically and geopolitically close to the Middle East (notably Turkey) are absent from the top 15 lists. This absence is particularly striking given Turkey's proximity to regional migration crises and its active academic ecosystem. Similarly, some African and Middle Eastern countries appear to contribute less to global research output despite being directly affected by themes such as conflict,

education, and public health. These gaps may reflect inequalities in research infrastructure, publication access, or international collaboration networks, and highlight important avenues for future capacity building in the region.

Most relevant affiliations

A closer look at institutional connections reveals that scientific productivity is concentrated in a few prominent universities, most of which are located in the Middle East. The institution that produced the most articles was the Tehran University of Medical Sciences (Iran), with 93 articles, followed by the American University of Beirut (Lebanon) and the Martyr Beheshti University of Medical Sciences (Iran) (Figure 7). These institutions consistently serve as central nodes in regional academic networks.

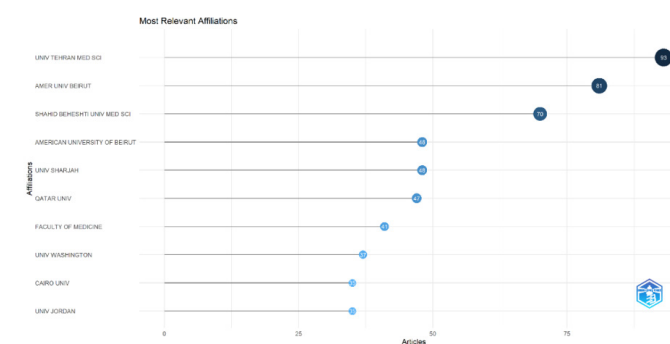


Figure 7 Top Institutions by number of publications.

In addition to Iran and Lebanon, universities from Qatar, Jordan, Egypt, and the UAE also occupy the top positions. In particular, the American University of Beirut and the University of Sharjah have shown rapid increases in their output, indicating an expanding research capacity over time (Figure 8).

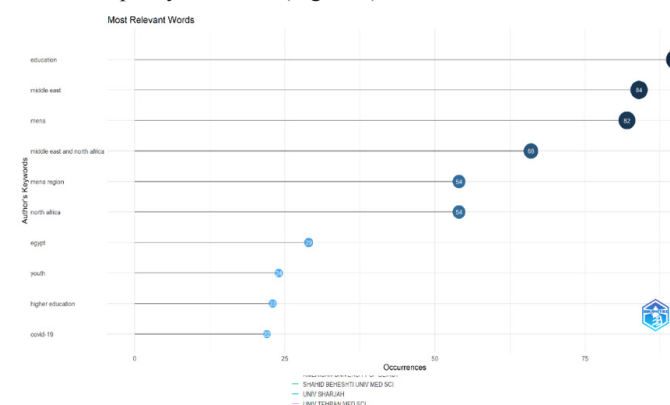


Figure 8 Evolution of institutional productivity over time.

Interestingly, despite their geopolitical and academic presence, no Turkish university is among the top connections. This aligns with previous country-level observations and suggests a research gap or underrepresentation in this particular thematic area. Similarly, leading universities in North Africa (e.g., Morocco, Algeria) are also not included in the list; this may reflect differences in funding, publication language preference, or indexing visibility.

Overall, the dominance of medical schools and health sciences universities among the top institutions also reflects the thematic weight of the analyzed literature, which extensively addresses public health, migration, and crisis-related issues.

Citation: Karacaoğlu OC, Güner B. Trends and global collaborations in education research in fragile contexts related to the Middle East and North Africa. *Soc Int J*. 2026;10(4):105–114. DOI: 10.15406/sij.2026.10.00467

the middle, indicating increasing importance across both dimensions. Isolated clusters like accounting education and oncology are highly consistent (100% confidence) within themselves but do not interact much with broader themes, indicating niche but emerging research groups.

Keywords	Centrality	Impact
middle east - conf 97.6% north Africa - conf 100% education - conf 14.8% mena - conf 8.5% Africa - conf 85.7% Egypt - conf 45.5% development - conf 100% islam - conf 57.1% middle east and - conf 80% and north Africa (mena) - conf 100%	0.452	2.082
mena - conf 89% education - conf 14.8% middle east and north Africa - conf 14.3% oncology - conf 100% health - conf 44.4% sustainability - conf 44.4% youth - conf 30.8% accounting education - conf 100% Egypt - conf 27.3% globalization - conf 75%	0.4	2.372
education - conf 70.5% middle east and north Africa - conf 85.7% mena region - conf 100% gender - conf 66.7% covid-19 - conf 60% Jordan - conf 66.7% youth - conf 46.2% e-learning - conf 100% higher education - conf 50% inequality - conf 83.3%	0.347	2.682

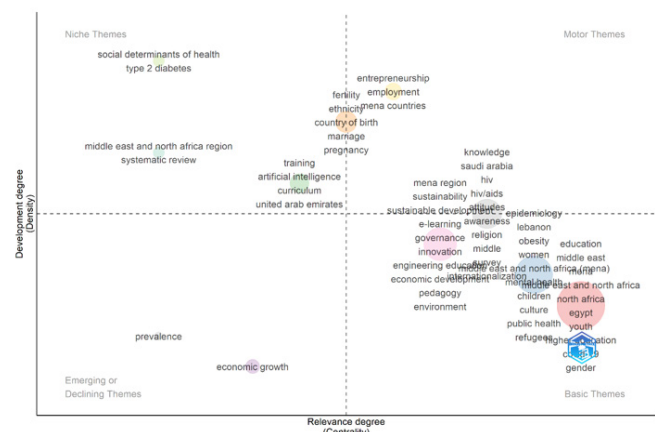


Figure 13 Clusters by documents coupling – interpretation.

In contrast, the upper left quadrant (Niche Themes) includes more specialized or isolated topics such as social determinants of health and type 2 diabetes. These topics are showing internal development but have limited integration with the broader research field. Finally, the lower left quadrant, labeled Emerging or Declining Themes, includes prevalence and economic growth, indicating either nascent or declining relevance in the existing literature. This structure highlights the centrality of education and regional identity (Middle East and North Africa) within the field, while also signaling a shift toward health and sustainability concerns. It also reveals opportunities for further development of emerging topics and deeper integration of niche themes into the core research dialogue.

International scientific collaborations

Understanding the geography and dynamics of international collaborations is essential for interpreting the global structure of knowledge production. This section examines cross-country co-authorship networks and international partnerships within research corporuses using visual and bibliometric data.

Citation: Karacaoğlu OC, Güner B. Trends and global collaborations in education research in fragile contexts related to the Middle East and North Africa. *Soc Int J*. 2026;10(4):105–114. DOI: 10.15406/sij.2026.10.00467

Europe, the Middle East, Asia, and Africa. The UK also emerges as a significant collaboration partner, particularly with Middle Eastern and North African countries such as Saudi Arabia, Lebanon, Egypt, and Jordan.

Country Collaboration Map



Figure 15 Country collaboration map.

Some regional hubs, such as Saudi Arabia, Iran, and Qatar, exhibit intense patterns of international connections, suggesting strategic efforts to internationalize research through global networks. Countries with lower scientific output, such as Jordan and Lebanon, exhibit strong international interactions, likely leveraging diaspora networks or international funding frameworks.

Figure 16 further illustrates the collaboration structure through a network graph. Node size represents the number of publications, while edge thickness indicates the density of collaboration between countries. The red cluster depicts a dense and intertwined regional network (comprised mostly of MENA countries, the US, and the UK). The US, positioned as the most prominent node, forms a central axis connecting both regional (e.g., Saudi Arabia, Egypt, and the UAE) and non-regional partners. The presence of well-integrated nodes like Lebanon and Qatar within this network highlights the role of institutional and national policies in fostering collaborative research.

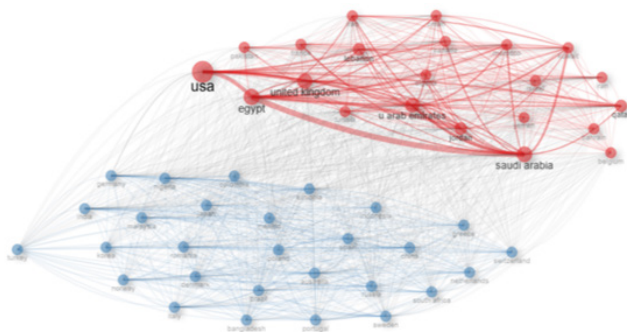


Figure 16 Country collaboration network graph.

Interestingly, countries like Turkey, despite their geographical and cultural proximity to the MENA region, appear more peripheral to this structure. This suggests that regional collaboration opportunities are potentially under-exploited or are not aligned with alternative research networks. Similarly, Sub-Saharan African countries are minimally represented, suggesting limited integration into these academic discussions.

Discussion

Educational research in Africa and the Middle East has accelerated significantly, particularly in the post-2000 period. This increase, as seen in our study, is supported by an annual growth rate of 8.01%. Similarly, the literature highlights that academic production in

the MENA region has increased significantly, particularly in post-crisis periods (e.g., after the Arab Spring or during the COVID-19 pandemic).^{19,20} This demonstrates that the impact of regional uncertainties on education systems has become a significant focus at both the research and policy levels.

The period between 2011 and 2025, when scholarly production intensified, coincides with a period of increased research, defined in the literature as “disruption-induced research”.¹⁵ Factors such as the impact of the Syrian refugee crisis on education, the pandemic’s forced transition to digital education, and the growth of the youth population have led to an increase in both quantitative and qualitative research.²¹

The international collaboration rate in the reviewed publications was found to be 28.46%, which is above the global average (approximately 23%).²⁷ This is consistent with the growing international interest in the MENA region. The intensity of collaborations, particularly with countries such as the US, UK, Qatar, and Lebanon, highlights the influence of diasporas and the role of international funding mechanisms.

According to the findings, the high impact factors of health-themed journals indicate that education is increasingly intersecting with public health. Studies that integrate education and health issues have become prominent in the post-COVID-19 era.^{22,23} The high citation numbers of a small number of articles published in journals such as *Reproductive Health Matters* demonstrate academic interest in gender, reproductive health, and women’s education. This aligns with Nussbaum’s²⁴ capabilities approach: education is viewed not only as the acquisition of knowledge but also as a process of developing an individual’s freedoms and competencies.

The geographic distribution of publication numbers indicates that the US and UK continue to dominate, but that regional players are also increasing their influence. The increasing presence of countries such as Iran, Lebanon, and Qatar in the literature suggests the effectiveness of regional research policies.²⁵ Lebanon’s high average citation count (35.1) in particular can be explained by high-quality and effective publication strategies.

However, the low visibility of a regional actor like Turkey is noteworthy. This may be due to differences in focus of research orientations, publication language preferences, or deficiencies in indexing in bibliometric databases. While Turkey is known to be active in education-related migration research in the literature, its low visibility in this particular study is a significant finding regarding the diversity and balance of regional knowledge production.²⁶

Keyword analysis also reveals the thematic evolution of education studies. The prominence of terms such as “mental health,” “sustainability,” and “e-learning” demonstrates the prioritization of digital transformation, mental health in times of crisis, and sustainability approaches.^{28,29} These trends also align with U.N.E.S.C.O.’s²⁷ Sustainable Development Goals (SDGs), particularly with regard to Goal 4 (Quality Education) and Goal 3 (Health and Well-being).

All these findings demonstrate that the literature is evolving into a more integrated, interdisciplinary structure, and responsive to global trends. Education is no longer merely a pedagogical issue; it intersects with broader issues such as public health, migration, digital inequalities, and gender. This once again highlights the importance of holistic and contextual approaches for future research.

Conclusion

This bibliometric analysis provides a comprehensive overview of scholarly production in education, health, and development in the Middle East and North Africa (MENA) region from 1972 to 2025. The findings reflect a field that is not only expanding quantitatively (with an annual growth rate of over 8%), but also maturing qualitatively, as indicated by a rising average citation rate (18.63%) and a growing emphasis on international collaboration (28.46%).

The temporal analysis reveals three distinct phases in the field's evolution: a period of stagnation before 2000, a steady rise in the early 2000s, and an exponential growth phase after 2011. This recent acceleration is closely linked to geopolitical and public health crises such as the Arab Spring, the Syrian refugee crisis, and the COVID-19 pandemic, as well as regional policy reforms and increased open-access publishing opportunities. At the journal level, publications concentrated around a small number of primary sources confirm Bradford's Law. Interdisciplinary journals such as PLOS ONE and BMC Public Health are leaders in both productivity and impact. The presence of specialized publications such as the Journal of North African Studies and Reproductive Health Topics reflects the field's thematic diversity, encompassing gender, health, inequality, and public policy.

At the country level, the US stands out in both volume and citation impact, while countries like Lebanon and Germany punch above their weight in terms of average citation counts. Some Middle Eastern and North African countries, such as Iran, Saudi Arabia, and Qatar, are showing increasing productivity and participation in international collaborations, reflecting the emergence of new regional research centers. However, the underrepresentation of geographically significant countries, such as Turkey and many Sub-Saharan African countries, highlights persistent inequalities in research capacity and visibility. Institutional productivity is largely driven by public universities and medical schools in Iran, Lebanon, and the Gulf States. While consistent outcomes suggest a stable infrastructure for region-focused research, the dominance of health sciences reveals a thematic bias toward public health and crisis management.

Keyword association and network analyses confirm that the field's conceptual structure is deeply rooted in themes of education, public health, and regional identity. While some themes, such as "education," "gender," and "inequality," have a strong impact, their connectivity remains underdeveloped, suggesting the need for deeper theoretical integration. In contrast, emerging themes such as "e-learning," "sustainability," and "mental health" suggest a forward-looking trajectory aligned with global research agendas.

International collaboration networks emphasize the central role of the US and the UK as global intermediaries, connecting with both high-output and developing countries. The tight clustering of MENA countries around these centers demonstrates regional dependence on external partnerships, while the absence or marginalization of some culturally similar countries, such as Turkey, points to missed opportunities for regional integration.

In conclusion, the scientific landscape in education and development in the MENA region is characterized by rapid growth, thematic diversity, and increasing internationalization. However, the field is unevenly distributed both geographically and thematically. Future research should aim to increase regional inclusiveness, support underrepresented institutions, and develop deeper theoretical frameworks that connect dominant themes. Strengthening intra-

regional collaboration and expanding engagement with emerging topics will be vital to building a more cohesive and effective body of knowledge in the coming decade.

Policy and research recommendations

Education policies in the MENA region should be restructured to specifically address inequality, gender, and youth; access to e-learning and higher education should be increased. Community-based public health research should be encouraged, and interdisciplinary programs addressing the impact of crises such as COVID-19 and chronic diseases on education should be supported. Given the region's fragile infrastructure, models should be developed to ensure disaster preparedness and education continuity during crises. Research addressing forced migration and displacement should be expanded, and practices for the educational integration of refugee children should be strengthened. Countries experiencing migration should be supported both economically and educationally. Regional inequalities should be reduced by developing inclusive development policies that integrate education, health, and gender equality, and research infrastructure should be strengthened.

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Author contributions

ÖCK: Conceptualization, data curation, investigation, project administration resources, validation, formal analysis, data curation, methodology, visualization, supervision, writing – original draft. BG, project administration, validation, visualization, writing – review and editing.

Conflict of interest

The authors declares that there are no conflict of interest.

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