Mapping foundational literacy and numeracy research in sub-Saharan Africa
Ghana country report

Authors

The preparation of this report was led by Stephen Acquah, who conducted the searches for research outputs. Laté Lawson Ayao conducted the analysis. Samuel Asare reviewed the initial draft of the report. Pauline Essah provided oversight throughout the process, offered guidance and reviewed the final report.

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List of abbreviations

AAU	Association of African Universities
AJOL	African Journals Online
ECD	Early Childhood Development
ECE	Early Childhood Education
EGMA	Early Grade Mathematics Assessment
EGRA	Early Grade Reading Assessment
ESP	Education Strategic Plan
ESSA	Education Sub Saharan Africa
FLN	Foundational Literacy and Numeracy
GDP	Gross Domestic Product
GEEDLab	Ghana Education Evidence Data Lab
HEIs	Higher Education Institutions
ICT	Information and Communication Technology
NaCCA	National Council for Curriculum and Assessment
NALAP	National Literacy Acceleration Project
NGOs	Non-Governmental Organisations
ORCID	Open Researcher and Contributor ID
PRB	Population Reference Bureau
REAL	Research for Equitable Access and Learning
SDGs	Sustainable Development Goals
SSA	sub-Saharan Africa
STEM	Science, Technology, Engineering & Mathematics
UNESCO	United Nations Educational, Scientific and Cultural Organization
UNICEF	United Nations Children's Fund
USAID	United States Agency for International Development

Summary

Research from the Global South, for example Ghana, can be useful for innovating solutions to address local education challenges (McLean & Sen, 2019). However, Ghanaian researchers face barriers such as lack of adequate support for their professional development, high journal fees, and insufficient funding, which often lead them to publish in non-indexed journals that may not attract decision-makers' attention. A report on peer-reviewed Foundational Literacy and Numeracy (FLN) publications from sub-Saharan Africa indexed in Dimensions, Scopus, and Web of Science over the period 2015–2023 revealed a limited number of contributions (40) from Ghana (Binesse & Rose, 2024). This highlights the need for greater investment, visibility, and recognition of local research and researchers.

This report presents the findings of a comprehensive mapping exercise of FLN research conducted in Ghana. The research outputs that met the inclusion criteria for the mapping exercise were national and regional journal articles, working paper series, PhD theses, books (chapters), and evaluation and intervention reports produced by Ghanaian researchers affiliated with home-based institutions.

The study revealed a growing interest in FLN research, yet the total number of research outputs identified (121) underscores the need for increased attention in this area of research. Predominantly, the outputs were journal articles focusing largely on literacy skills and/or learning outcomes. However, it was observed that most of the research outputs (90) did not include inequality factors in their analysis. Among the inequality factors examined, ethnicity (18 percent) was prioritised, while gender (10 percent), disability (7 percent), poverty (3 percent), and religion (2 percent) received less attention. A balanced research approach was observed in terms of quantitative, qualitative, and mixed-methods studies. There was however a lack of funding for FLN research in the country, although most of the research outputs were open access (88 percent), eliminating the need for subscription fees.

Collaboration among FLN researchers was evident, accounting for 84 percent (n = 98) of all the research outputs excluding PhD theses (n = 4, 3 percent). Of these studies, 73 percent resulted from within-country collaborations, while 24 percent resulted from collaboration outside SSA and 3 percent from collaboration within SSA.

Gender disparities within the FLN research domain in the country were also evident, with the majority of first authors (70 percent) being male.

The report concludes with recommendations aimed at addressing gaps and challenges in the FLN research domain in Ghana. The recommendations include the following:

- Integrate a broader range of inequality factors, including gender, disability, poverty, and religion, into research agendas.
- Increase FLN visibility in online spaces.
- Increase investment in FLN research initiatives.
- Support the development of effective digital academic repositories in the universities and colleges of education.
- Prioritise the inclusion of female researchers and other minority groups (e.g. early career researchers) in FLN research and projects.
- Foster partnerships and collaboration among FLN researchers.
- Researchers should disclose funding information on their research outputs.
- Prioritise funding of FLN research to address the issue of restricted access and foster the wider dissemination of FLN evidence.

1.   Introduction

In the pursuit of equitable and sustainable educational development, the significance of Foundational Literacy and Numeracy (FLN) cannot be overstated. The United Nations Sustainable Development Goal (SDG) 4 (United Nations, 2015) explicitly recognises the importance of FLN as it lays the crucial groundwork for lifelong learning and serves as the bedrock upon which future educational achievements are built. Research in this area is therefore vital to determine gaps in knowledge, policy, and practice, and provide solutions and recommendations towards shaping the area. For example, in Ghana, while access to primary school education and its completion rate have improved, almost 80 percent of children still do not acquire basic skills in literacy and numeracy by the end of primary school (UNESCO, 2020a; 2022). Addressing these challenges requires local evidence that considers socio-cultural contexts to inform policy and practice.

As identified by McLean and Sen (2019), researchers from the Global South are generally best positioned to help address local development challenges. It can be argued that Ghanaian researchers affiliated with local institutions possess enormous understanding of the local system and its challenges. This is crucial to ensure that evidence informs local investment, policy, and practice. However, locally based research is often underutilised or unrecognised, partly because of the barriers to publishing in high impact journals. These barriers include a lack of support and mentoring of researchers when making journal choices (Chatio et al., 2023), exorbitant journal fees (Moosa, 2018), and insufficient research funding (Lund et al., 2021; Ondari-Okemwa, 2007). Consequently, many researchers either fail to publish or resort to publishing in non-indexed local journals (which often fail to reach decision-makers).

A mapping report focusing on FLN publications in international databases authored between 2015 to 2023 in sub-Saharan Africa (SSA), revealed a limited number of publications (40) from Ghana (Binesse & Rose, 2024). From the 40 publications identified, 25 were authored by SSA-based researchers, including at least one Ghanaian author, and 15 by non-SSA-based researchers. Furthermore, 'half of SSA-based co-authored publications were published in journals with a lower impact factor

or not assessed by Scimago"ⁱⁱⁱ (Binesse & Rose, 2024, p. 13). Similarly, Iddrisu, Adrupio and Rose (2024) observed that only a limited number of publications by Africa-based scholars on education (11 percent) and play (6 percent) were indexed in Scopus, Web of Science, Dimensions, and PubMed during the period 2020–2022. Asubiaro (2023) found that, generally, only seven percent of African journals are represented in Scopus or Web of Science, although representation increased to 31 percent in Crossref and Google Scholar.

This situation underscores the need for stakeholders to support SSA-based researchers, particularly Ghanaian researchers, in producing and disseminating their research to inform FLN policy and practice. This, among other reasons, accounts for the collaborative effort of ESSA and the REAL Centre to improve the visibility and accessibility of FLN research undertaken by Ghanaian researchers affiliated with local institutions. This initiative is part of a broader project funded by the Bill & Melinda Gates Foundation to:

- Improve the visibility and accessibility of FLN research undertaken by researchers based in SSA.
- Establish a community of practice (network) and strengthen the capacity of FLN researchers based in SSA (based on an assessment of their needs).
- Promote the uptake and use of locally produced FLN research in policy and investment decision-making through advocacy, communication, and dissemination of evidence from SSA.

In-country mapping was conducted to identify existing FLN research outputs in Ghana, driven by the recognition that significant research might remain unpublished or be published in local journals that are not indexed in international databases. Therefore, this report presents the findings of a bibliometric analysis of the FLN research outputs identified in the mapping exercise.

2.   Policy context in Ghana

FLN refers to the literacy and numeracy skills that should be acquired during the early years of primary school (Bill & Melinda Gates Foundation, 2020; Evans &

Hares, 2021). In Ghana, primary school consists of six grade levels (i.e. from primary one to six), targeting learners aged six to eleven years. Since attaining political independence, the education system has seen significant structural changes in order to meet the demands of contemporary education standards, such as equipping learners with essential literacy and numeracy skills. These structural changes emanate from policy reviews, including those of the Kwapong Educational Review Committee in 1966, Dzobo Educational Review Committee in 1974, Evans Anfom Educational Review Committee in 1987, and Anamuah-Mensah Educational Review Committee in 2002 (Akyeampong, 2010).

The latest government led Education Strategic Plan (ESP 2018-2030), initiated in 2018, aims to contribute to the goals of the SDGs. The ESP 2018-2030 includes the development of teacher standards, the introduction of a new curriculum, and an overhaul of pre-service teacher education. Its overall goal is 'to deliver quality education service at all levels that will equip learners in educational institutions with the skills, competencies and awareness that would make them functional citizens who can contribute to the attainment of the national goal' (Ministry of Education, 2018, p. 14). The ESP 2018-2030 outlines three policy objectives for the basic education sector as follows:

- Improved equitable access to and participation in inclusive quality education, which encompasses; increased enrolment in basic schools, particularly in disadvantaged communities, and achieved and sustained gender parity in access to quality basic education, with a focus on reducing regional disparities.
- Improved quality of teaching and learning in Science, Technology, Engineering & Mathematics (STEM).
- Sustainable and efficient management, financing and accountability of education service delivery (Ministry of Education, 2018).

Several interventions have been implemented to improve literacy and numeracy in Ghana e.g. the Free Compulsory Universal Basic Education in 1995, Breakthrough to Literacy/Bridge to English (BTL/BTE) in 2004, National Literacy Acceleration Programme [NALAP] in 2009, Ghana Reads Initiative in 2017, Ghana/USAID Partnership for Education: Learning – FHI 360 from 2014 to 2023. Additionally, the

Ministry of Education launched a campaign, BorntoLearn, which offers a diagnosis of the current state of foundational education in Ghana and identifies policy solutions that are critical for improving educational outcomes (UNESCO, 2020a).

The primary education sector is characterised by some significant achievements as well as challenges within the FLN domain. For example, the Global Education Monitoring Report provided estimates that the primary education completion rate in Ghana increased from 57 percent in 2000 to 69 percent in 2010, and to 77 percent in 2020. When late completers are taken into account, the primary completion rate is higher, having increased from 74 percent in 2000 to 82 percent in 2010, and to 89 percent in 2020 (UNESCO, 2022).

On the other hand, a critical challenge remains in literacy and numeracy learning outcomes. An Early Grade Reading Assessment (EGRA) conducted in 2015 shows that at least half of the Primary Two pupils assessed could not read a single word correctly either when taught in a local language or in the English language. Also for the Early Grade Mathematics Assessment (EGMA) in the same year, the Primary Two pupils' performance lagged in conceptual understanding, particularly in tasks involving subtraction of two-digit numbers, where 73 percent of the pupils could not answer correctly (Republic of Ghana, 2016). Notably, the EGRA and EGMA results for 2017 were not different. However, a significant improvement was seen in the performance of Primary Two learners on the 2022 national standardised test where about 38 percent and 62 percent of these learners achieved mastery in literacy and numeracy, respectively (Republic of Ghana, 2022).

3.   Methodology

Conducting a bibliometric analysis of FLN research identified in local repositories and academic journals involved first identifying relevant research outputs, collecting required bibliographic data and finally, conducting the analysis. To do this, we adopted the definition by the Global Education Programme of Bill & Melinda Gates Foundation, where FLN refers to literacy and numeracy skills among children of primary school age in SSA.

Unlike searching for FLN research in international databases (e.g., Scopus, Dimensions and Web of Science), our search mainly focused on local repositories, including the University of Ghana Digital Collection, University of Cape Coast Institutional Repository, University of Education Winneba Repository, and University of Development Studies' Digital Repository, online academic portals (e.g., Academia, ResearchGate, Semantic Scholar), Google Scholar, as well as in databases such as the African Journals Online (AJOL). Additionally, we explored the websites of both government and non-government organisations working in FLN-related fields. For a complete list of all search platforms, see Appendix 1.

We used search strings containing relevant FLN keywords, such as 'foundational skills', 'basic skills', 'literacy' OR 'reading', 'numeracy', 'mathematics' among others. Appendix 2 shows all the keywords that were used for the searches. This search strategy aligns to the search protocol developed by Binesse, Rose and Silva (2023) where the search criteria for mapping and evaluating literature related to FLN in SSA is described.

Regarding the search strings, different search strings with FLN-related keywords were tested. Contrary to searching in international databases, where a single string may be sufficient for searching depending on the search-platform, we adapted our strings using different combinations of keywords including:

> ("foundation* skills" OR "basic skills" OR "literacy" OR "reading" OR "writing" OR "vocabulary" OR "speech" OR "alphab*" OR "numeracy" OR "math*" OR "arithmetic" OR "calculation" OR "proficiency level*" OR "learning achievement" OR "learning outcome*" OR "learning level*" OR "learning gain*" OR "learning loss*" OR "cognitive skills") AND ("basic education" OR "early grade" OR "elementary school*" OR "primary school*" OR "primary education" OR "second chance" OR "second-chance" OR "alternative education" OR "complementary basic education" OR "complementary education" OR "accelerated learning" OR "non-formal education" OR "primary-age*" OR "community-based education" OR "community education" OR "learning centres") AND "Ghana".

Following the search, the relevant data for our analysis consisted of research outputs that met the following three criteria:

- Authored by at least one Ghana-based author.

- Focusing on literacy or numeracy skills of primary school-aged learners.

- Published between 2010 to 2023.

Finally, to avoid including studies already published in journals indexed in international databases, the list of identified research outputs meeting the inclusion criteria was cross-referenced with a list of FLN publications (2015 to 2023) from Ghana which were indexed in Scopus, Web of Science, and/or Dimensions, as documented in the protocol produced by Binesse and Rose (2024). This step ensured the removal of any duplicate research outputs.

After identifying the relevant FLN research outputs, their bibliographic data were captured in Microsoft Excel spreadsheet including title, abstract, year, type of research output (e.g. journal article, book, review, PhD thesis) researchers (e.g. institutions, contact details, gender), research location (e.g. urban and/or rural), inequality factors (e.g. ethnicity, disability, gender, poverty, religion), keywords (e.g. literacy, reading, writing, numeracy, etc), funding (e.g. funding sources and types), collaboration, and other pertinent data.

We used descriptive analysis with graphic illustrations to visually represent the data patterns and trends. To ensure a thorough analysis, several indicators were used, offering comprehensive understanding of the FLN research ecosystem. These included:

- *Relevance:* research outputs were categorised based on their relevance to learning outcomes and engagement in literacy/numeracy activities.

- *Accessibility*: this examined whether the research output was open access (free of charge) or closed access (subscription-based).

- *Funding information*: studies were categorised as to whether they disclosed their funding details or not.

- *Funding type*: this identified the sources of research funding, such as internal institutions, government bodies, external philanthropy, self-funding, local organisations, and international organisations.

- *Top funders*: funding organisations were ranked based on how frequently they were mentioned in the research outputs.

- *Research method*: the methods used in the studies were classified into qualitative, quantitative, mixed-method, review, and action research.
- *Thematic classification*: thematic areas were developed based on keywords assigned to the studies identified as detailed in Appendix 2. Their relative importance was attributed according to the frequency of the corresponding keywords.
- *Inequality factors*: this involved identifying FLN studies that explicitly addressed or reported data on gender, ethnicity, religion, poverty, and disability.
- *Authors' gender*: information about the gender of the researchers was inferred from the names and available biographical data in each study's author list. Information about the gender, where feasible, was inferred from researchers' online (institutional) profiles.
- *Collaboration:* the geographical location of an author's institutional affiliation was used to analyse collaboration patterns.
- *Top research institutions*: research institutions were ranked by analysing the frequency of studies attributed to each, based on authors' affiliation data.

4.   Findings

This section focuses on the trends of FLN research outputs in Ghana over the period 2010–2023. It also highlights the types of these research outputs, their relevance and accessibility, as well as the funding landscape, including the types of research funded and the top funders of FLN research. Additionally, it delves into the thematic areas and design of FLN research, examining existing evidence gaps, poverty and inequality factors, as well as different research settings and methodologies. Furthermore, it analyses the gender distribution and collaboration patterns of FLN research, as well as highlights the top FLN research institutions.

FLN research outputs, types and trends (2010-2023)

This analysis provides insights into the trends of FLN research outputs in Ghana over a fourteen-year period by examining the yearly distribution of research outputs that met the inclusion criteria (Figure 1). The total number of FLN research outputs

for the period was 121. However, the yearly research outputs fluctuated between 2010 and 2023. The initial years from 2010 to 2014 showed a relatively modest number of research outputs, ranging from one to six. This increased to 13 research outputs in 2015 but declined to 9 in 2016 and 2017. The fluctuating trend continued as the annual research outputs increased to 16 in 2018, sharply decreased to 6 in 2019, increased to 11 in 2020, 16 in 2021, and 14 in 2022, with another significant decrease to four in 2023. Unlike the other years, the decrease in research output in 2023 is due to a halt in the mapping process in the middle of the year to allow for analysis and reporting. Notably, two research outputs did not indicate the year because they were unpublished journal articles.

Figure 1: Number of FLN research outputs identified (2010-2023)
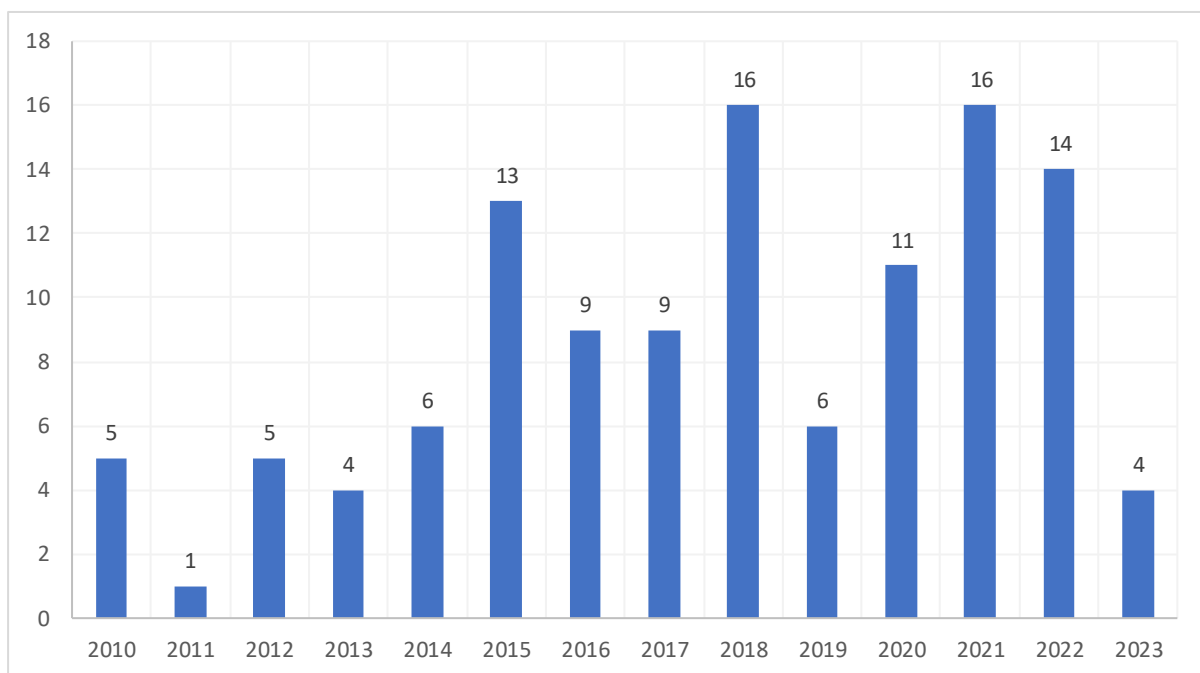
Note: Base = Total research outputs identified: 121, including two unpublished journal articles.

Note: Base = Total research outputs identified: 121

FLN research in Ghana represents various types, including academic theses, journal articles, book chapters, and reports. From the analysis, the majority of the FLN research ouputs were journal articles (110). This emphasises the relevance of journal articles in the dissemination of FLN knowledge and findings within the Ghanaian academic community. It may also increase the chances of academic promotion of faculty in Higher Education Institutions (HEIs) when they publish peer-reviwed articles in academic journals.

PhD theses and book chapters accounted for four research outputs each, while reports accounted for three of the research outputs.

The varying types of FLN research outputs (although fewer numbers were recorded for PhD theses, book chapters and reports) indicated a multi-faceted and holistic approach to understanding and addressing FLN issues in the country. However, the smaller proportion of PhD theses, in particular, raised concerns. Notably, these included the lack of access to PhD theses (i.e. if available), the limited availability of PhD programmes focusing on FLN, as well as the capacity of HEIs in Ghana to graduate doctoral students in this important area.

Relevance and accessibility of FLN research

The relevance of the FLN research outputs identified was assigned to two main categories: directly relevant and indirectly relevant. Relevance in this case refers to the research output in relation to 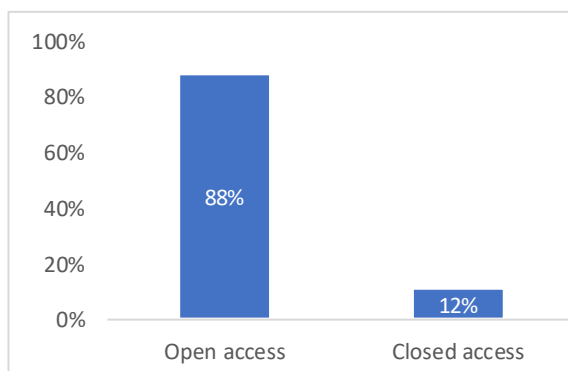literacy and/or numeracy skills and learning outcomes of primary school level learners. Research outputs were categorised as directly relevant if the study directly reflected literacy or numeracy skills and/or outcomes of primary school level learners. Research outputs were categorised as indirectly relevant if it focused on education at the primary level, but not learning skills or competencies related to literacy and/or numeracy outcomes.

Figure 3: Relevance of research identified

Note = Total research outputs identified: 121

The analysis based on the relevance of the identified research outputs revealed that a greater proportion (79 percent) of the research outputs were directly relevant to FLN while 21 percent were indirectly relevant. This high proportion of directly relevant research indicates a growing awareness of the current learning crisis in Ghana, especially FLN, as well as collaborative efforts by researchers, education practitioners, and decision-makers to address learning outcomes at the foundational level.

Figure 4: Access to FLN research outputs

Note: Base = Total research outputs identified: 121.

The accessibility of FLN research was also explored. Out of a total of 121 research outputs, 88 percent were identified as open access, while the remaining 12 percent were closed (i.e. restricted access) (Figure 4). The data further revealed that of the 12 percent (n = 14) closed studies, 79 percent were journal articles (Table 1).

Table 1: Typology of closed access research outputs

Books	Journal articles
3 (21 percent)	11 (79 percent)

Note: Total closed research outputs = 14

The prevalence of open access publications means that a substantial portion of the research findings, insights, and data in this field can be easily accessed and utilised by a wide audience, including those who may not have institutional access or financial resources to pay for such outputs.
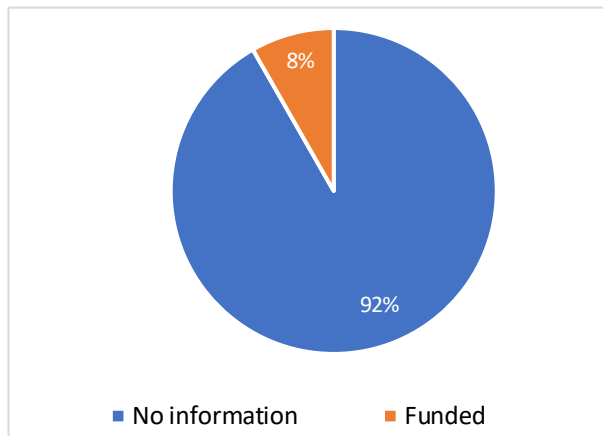
Funding of FLN research

In this section, the funding sources for FLN research in Ghana are explored. It concentrates on the status of funding for FLN research, the types of FLN research funded, the categories of FLN funding sources, and the funders of FLN research in Ghana, highlighting the top funders.

Analysis of the funding sources for the FLN research outputs highlighted that most did not provide information about funding. As shown in Figure 5, 92 percent of the total research outputs did not provide that information, while only eight percent indicated that they received funding.

Although 'no information' may not correspond to 'no funding', the high proportion of research outputs not reporting on funding could reflect the challenges researchers face to secure funding for their research. The lack of information could also suggest that such research was self-funded, rather than funded by an external source. Therefore, data is needed to provide clarity about the source of funding used to conduct the FLN research.

92% · **8%**

■ No information ■ Funded

Note: Share of FLN research outputs that are funded, out of a total of 121 research outputs identified.

produced.

The findings from this analysis could be used to advocate for more funding for FLN researchers, since the (un)availability of funding could affect the quality of research outputs. Some repercussions of lack of funding for research include not conducting in-depth research, not being able to access needed resources, and not publishing in higher-impact journals, all of which can adversely affect the quality or depth of knowledge

Types of FLN research funded

Figure 6 shows the types of research outputs that were funded. Only journal articles and reports were funded, with most of these being journal articles. The research outputs that received funding were very few (n = 10). Moreover, although the identified PhD theses and book chapters were a handful, the lack of funding for these types of FLN research clearly indicated a funding gap.

Figure 6: Types of FLN research funded
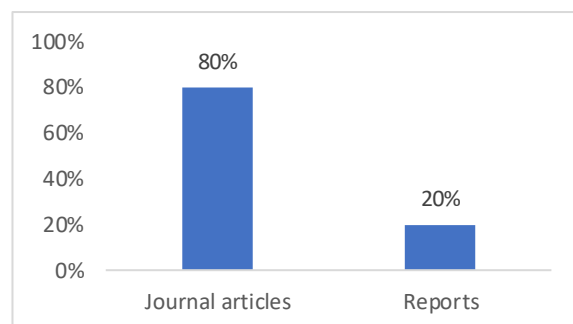
Note: Base = Funded studies: 10. 8 journal articles and 2 reports reported funding.

Sources of funding for FLN research

We explored the sources of funding of the funded research outputs, as indicated in Figure 7. International organisations (e.g. multilateral organisations and international development agencies) accounted for 44 percent. External philanthropy accounted for 38 percent, government funding was 13 percent and internal institutions accounted for 6 percent.

Figure 7: Sources of funding for FLN research
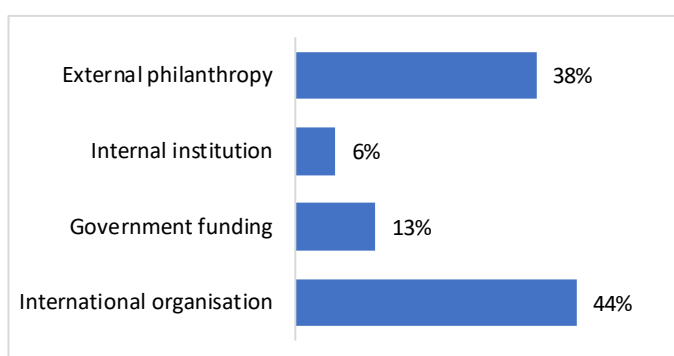
*Note: Base = 16 counts of funding sources. A single research output is likely to report multiple funding sources.*

These results emphasise the important role of external funders (i.e., organisations, and philanthropy) in supporting FLN research in Ghana. The minimal direct governmental investment in FLN research initiatives reflects the limited funding provided for the entirety of research and development in the country, which stands at 0.38 percent of GDP (R&D World, 2022; World Bank, 2023).

Figure 8 shows the analysis of the top five funders for FLN research in Ghana, based on the criteria for identifying FLN research outputs. The Jacobs Foundation ranked as the top funder, funding three of the FLN research outputs. The UK Research and Innovations - Newton Fund, US Department of Education, Institute of Education Sciences, Cambridge Commonwealth European and International Trust, and the Lego Foundation, also funded two research outputs each. The remaining include the British Academy's Early Childhood Development Programme, Spencer Foundation, UBS Optimus Foundation, UNICEF, USAID, Office of Research, Innovation, and Development (ORID) – University of Ghana, NYU Abu Dhabi Research Institute, World Bank Strategic Impact Evaluation Fund, and Global Innovation Fund (GIF), all of whom funded one research output each.

Figure 8: Top funders identified
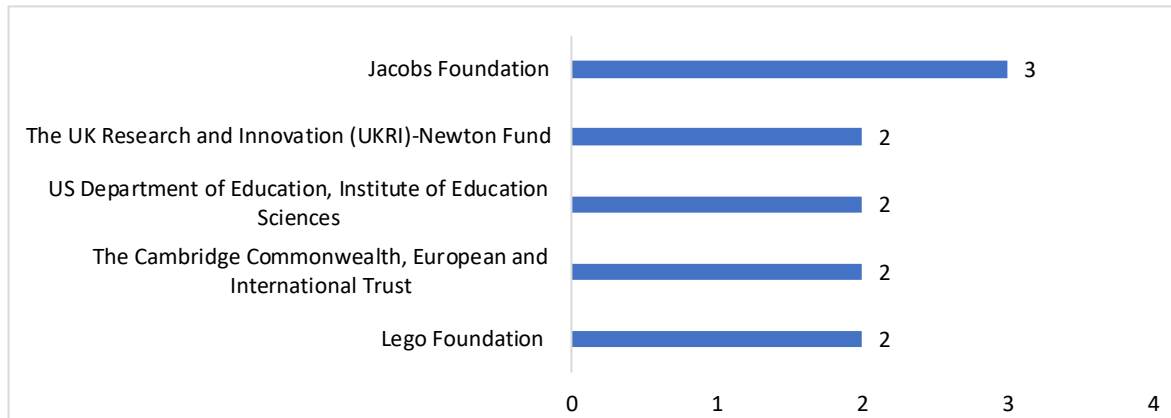
Note: Base = Total research outputs funded: 10. Some of these research outputs received funding from multiple sources.

Research focus

Figure 9 presents evidence of the thematic areas identified in the FLN research. To collect metadata on the thematic areas of the research outputs, we adapted the thematic areas and keywords used in the African Education Research Database (Mitchell & Rose, 2018). The results show*ed* that literacy was the predominant keyword identified in the research outputs, accounting for 94 out of a total of 384 keyword counts. This encompasses reading, writing, speaking and related terms.

The other thematic areas in decreasing order were curriculum (87), language (59), numeracy (41), teachers and teaching (41), equitable and inclusive education (31), learning and assessment (18), policy and financing (7), social environment, facilities and institutions (5), and information and communication technology (1). It is important to note that most of the themes and related keywords were not mutually exclusive. The results highlighted that literacy and numeracy did not receive equal attention in FLN research, despite their equal importance to the development of primary school learners. This underscores the need for increased research and investment in numeracy.

Figure 9: Thematic areas covered by FLN researchers
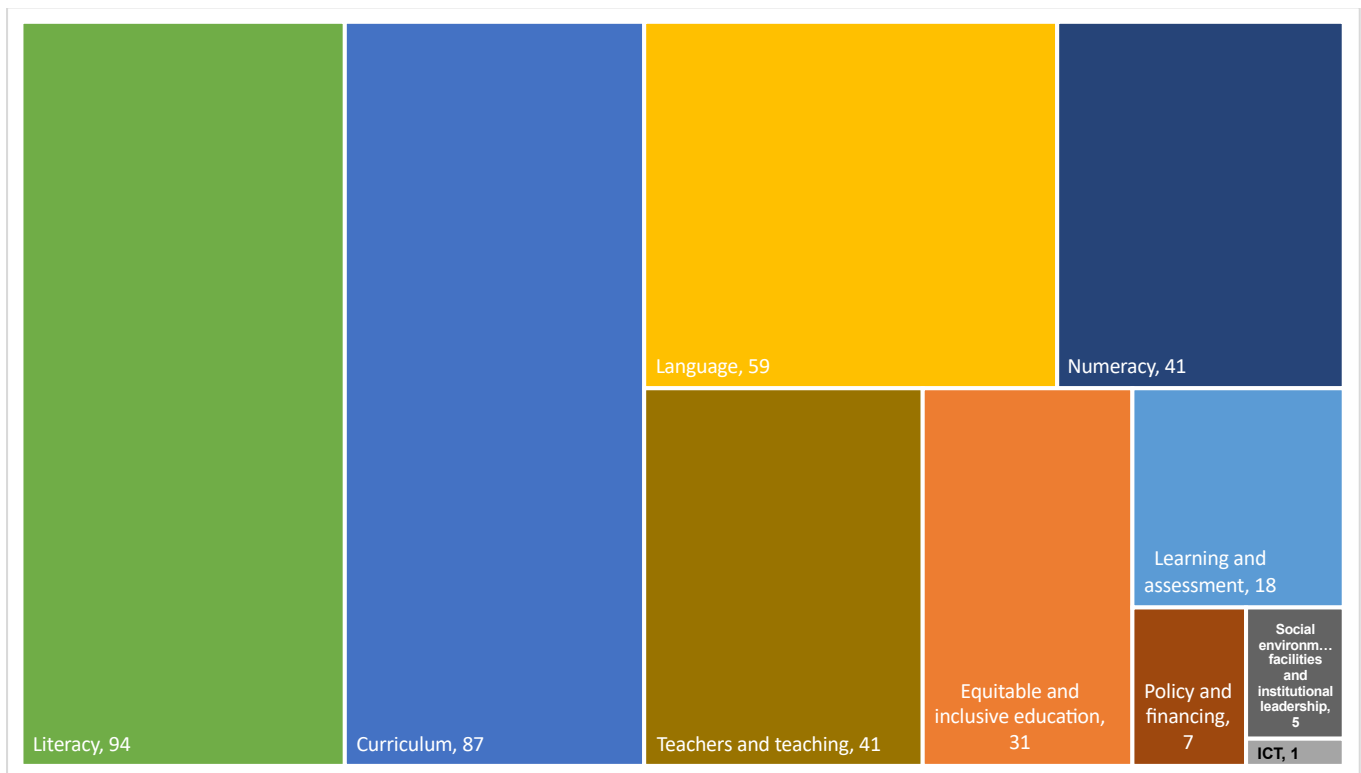
Note: Base = Total research outputs identified: 121. Thematic areas result from the keyword counts of each research output. Total number of keyword counts: 384.

Inequality indicators in FLN research

Out of the 121 research outputs, only 30 included at least one inequality factor. Figure 10 indicates the prevalence of inequality factors such as religion, poverty, disability, gender and ethnicity. Ethnicity was the factor addressed the most, accounting for 18 percent of the research outputs. This could be because a significant

Figure 10: Inequality factors included in FLN research
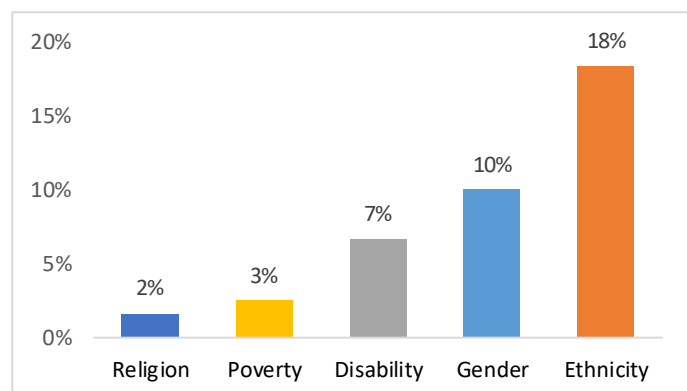
Note: Base = Total research outputs identified: 121.

number of the FLN studies involved language (Figure *9*), including use of mother tongue as a medium of instruction at the lower primary (1-3) level of education, reflecting the National Literacy Acceleration Project (NALAP)[iii] policy. Gender and

disability accounted for 10 percent and 7 percent, respectively, which shows that these indicators do not consistently feature in FLN research in Ghana. This is despite a deliberate attempt by the government, through the Ministry of Education, to prioritise gender and disability issues in the delivery of quality and equitable education (Ministry of Education, 2018). Similarly, poverty (3 percent) and religion (2 percent) were clearly not the focus of most FLN studies.

Research location

The location of the research is important when interpreting results, as urban or rural areas may present different circumstances that could affect education opportunities, with rural areas often facing greater deprivation. As shown in Figure 11, the analysis of research settings revealed a relatively balanced distribution across urban, rural, and combined settings, with 37 percent of studies conducted in urban areas, 30 percent in rural areas, and 33 percent in both.

Figure 11: Location of FLN research
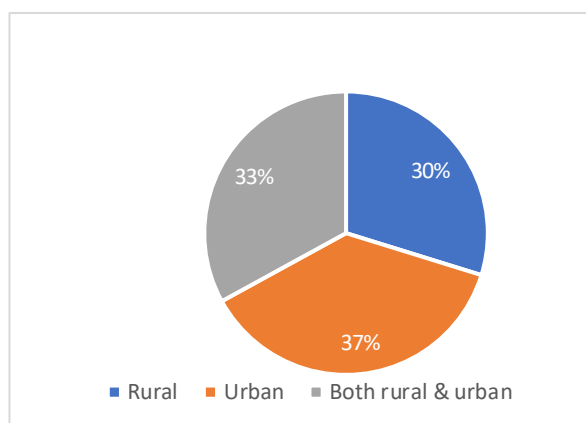
Note: Base = Research outputs that mentioned the setting of the study: 94 (i.e. 78 percent of the total research outputs).

This distribution reflects a comprehensive approach to examining and understanding unique FLN challenges and needs across diverse geographic contexts within the country. By deliberately considering FLN within urban and rural settings, Ghanaian researchers and policymakers could be better placed to develop targeted interventions to promote literacy and numeracy skills among Ghanaian children, irrespective of their location.

FLN research methods

The research outputs that collected primary data were grouped into quantitative, qualitative, mixed-methods and action research, while those that used only secondary data were categorised as *reviews*, which included meta-analysis, systematic literature reviews and research syntheses.

The results in Figure 12 show that out of 114 research outputs, qualitative research methods were employed in 32 percent of the studies, while quantitative research methods were utilised in 30 percent of the studies. Mixed-methods research accounted for 25 percent of the research outputs, demonstrating a growing

Figure 12: Synopsis of FLN research methods

Note: Base = 114 out of 121 research outputs. This is because 7 (6 percent) research outputs were categorised as 'unknown' and were therefore excluded from this analysis.

trend towards holistic research designs. This was followed by review, accounting for eight percent of the research outputs. Lastly, action research only constituted five percent of the studies, which is regrettable given that action research allows educators to address specific problems in their practice and fosters continuous professional development.

Gender of researchers

Figure 13 shows the gender distribution of first authors and all authors of the FLN research outputs. Among the first authors, 70 percent were male, and 30 percent were female. Looking at all authors, a total of 210 gender counts were recorded for the 121 total research outputs, with male and female authors representing 69 percent and 31 percent, respectively.

This male majority in FLN researcher roles is also seen across academia in both Ghana and SSA generally, where male faculty significantly outnumber female faculty. According to a study conducted by Association of African Universities (AAU), ESSA and the Population Reference Bureau (PRB) (2018) focusing on faculty in Ghana's public universities, only 8 percent of full professors were female. Additionally, females constituted only 24 percent of the academic staff of tertiary education institutions in SSA (UNESCO, 2020b).

Figure 13: Gender distribution in FLN research

A. First authors' gender

30%

70%

■ Male   ■ Female

B. All authors' gender

31%

69%

■ Male   ■ Female
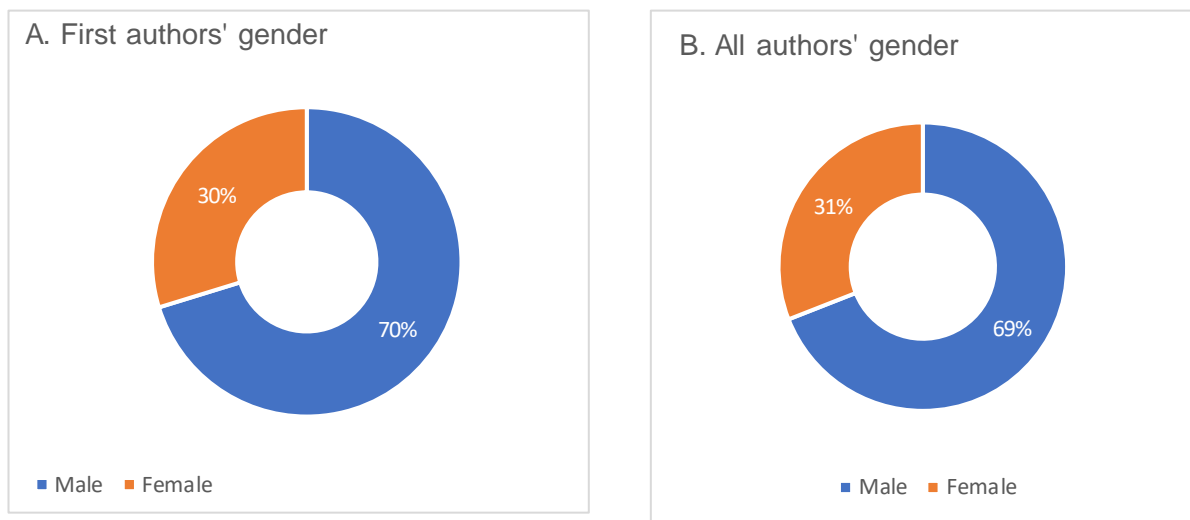
Base = Total research outputs identified: 121

The gender gap in academia, particularly in Ghana, and generally in SSA, can be attributed to several factors, including traditional gender norms, which position women primarily as caregivers and mothers rather than as professionals seeking careers (Ayentimi & Abadi, 2023). In addition, there is a lack of female role models in traditionally male-dominated positions (Kaziboni & Uys, 2015; Mulwa, 2021).

Collaboration in FLN research

To understand the extent to which there is potential networking and learning among researchers, collaboration dynamics between the FLN researchers were explored.

With the exception of PhD theses (n = 4, 3 percent) which were largely monographs, 84 percent (n = 98) of the research outputs resulted from collaborations, while only a few research outputs (n = 19, 16 percent) did not involve collaboration (Figure 14).

Figure 15 illustrates the collaborative research efforts in Ghana categorised

Figure 14: Research collaboration

16%

84%

■ Collaboration   ■ No collaboration
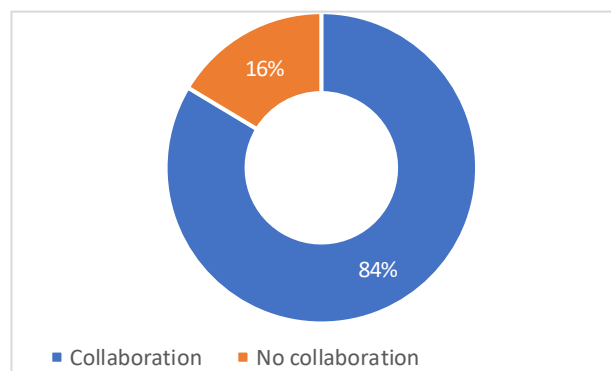
Note: Base = 117 research outputs, PhD theses were excluded.

into collaboration within Ghana, collaboration within sub-Saharan Africa, and collaboration outside of sub-Saharan Africa.

The majority of the research outputs (73 percent) reflected collaborative efforts within the country (i.e., among Ghanaian researchers affiliated with an instit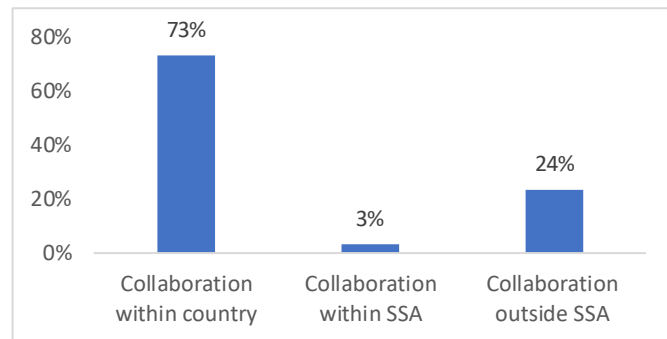ution in Ghana). Only 3 percent showed collaborations within SSA (i.e., among home-based Ghanaian researchers and collaborators within SSA), and 24 percent involved

Figure 15: Collaboration in FLN research by geographical area

Note: Base = Research outputs involving collaboration: 98. PhD theses excluded.

collaborations outside SSA (i.e., among home-based Ghanaian researchers and collaborators outside SSA).

The results highlight a robust network of collaboration among local researchers. There is also reasonable collaboration with researchers outside SSA, although that could be improved. However, there is limited regional research collaboration. This could suggest a lack of FLN researchers' network(s) and/or networking opportunities within the sub-region. Also the lack of funding to facilitate such collaboration, and potential language barriers (e.g., for engaging with Francophone and Lusophone researchers), amongst others, could also be important factors that need further investigation.

FLN research institutions

The institutional affiliation of FLN researchers in Ghana spans pre-tertiary, tertiary, government, and non-government institutions. Figure 16 shows the top 10 institutions of the FLN researchers resulting from the frequency of mentions of each institution per research output.

Nine out of the top 10 institutions were HEIs, including universities (n = 5), colleges (n = 3) and polytechnic (n = 1), while one represented a charity organisation (i.e. Innovations for Poverty Action).

Figure 16: Top 10 research institutions focusing on FLN

Institution	Count
University of Cape Coast	50
University of Education, Winneba	35
University of Ghana	18
Kwame Nkrumah University of Science & Technology	15
Bolgatanga Polytechnic	10
Regentropfen College of Applied Sciences	8
University for Development Studies	7
Presbyterian College of Education	7
Bagabaga College of Education	5
Innovations for Poverty Action	4

Note: The total institution count exceeds total research outputs (i.e. 121). In instances where a single author contributes to multiple research outputs, the institutional affiliation of the author is counted separately for each output.

The University of Cape Coast was the most prolific single institution, followed by the University of Education Winneba. These two institutions are also the leading education-oriented universities with the mandate of training teachers in the country. The other institutions in descending order were the University of Ghana, Kwame Nkrumah University of Science and Technology, Bolgatanga Polytechnic, Regentropfen College of Applied Sciences, University for Development Studies, Presbyterian College of Education, Bagabaga College of Education and Innovations for Poverty Action.

5.   Challenges and limitations

Mapping FLN research in Ghana was characterised by searching and screening processes that involved sifting through an extensive number and type of documents. The mapping was largely limited to online searches with no systematic search tools that enabled details of search items to be downloaded in bulk. This led to manual data extraction for each publication, thereby intensifying the resource and time investment required. Additionally, the progress of mapping the authors of the

identified research was impeded by their limited presence on platforms such as Google Scholar, AJOL, and local institutional repositories. Additionally, challenges arose in identifying contact or social media information for most of the researchers, which slowed down the mapping process.

While the search yielded a substantial volume of research outputs, there is a chance that some important ones, such as research reports or book chapters that were not accessible through institutional repositories or online portals, were not included. For example, certain HEIs, such as the colleges of education that offer courses relevant to foundational learning, lacked online research repositories or systems to enable access to publications.

Furthermore, a few research outputs did not indicate key information needed for our analysis, including research settings, research methods, institutional affiliations, funding information, and authors' gender. Specifically for funding information, the analysis only considered funding sources as mentioned by researchers. Studies that did not include funding information could be funded by individual researchers or other external sources. This is a limitation in the data and the analysis, as no funding information is not a proxy for non-funded research. Additionally, identifying authors' gender was challenging when only surnames and initials were provided in some research outputs, despite efforts to trace identities using online resources like Google, Google Scholar, and authors' institutional affiliation profiles. All cases where explicit information was not provided in the identified studies or clearly identified through the authors' online profiles were designated as 'unknown', which limited the number of cases for the analysis where such variables were included, although the number was not significant.

Lastly, we acknowledge that some of the research outputs identified from AJOL, institutional repositories, websites, or online academic portals may also be indexed in international databases, including Scopus, Web of Science, and Dimensions. As such, the research presented in this report as sourced from local journals, institutional repositories, websites, and databases may not be entirely exclusive of international journal articles. However, we expect this to be a relatively small number, and so do not anticipate it would affect the results significantly.

6.   Conclusion and recommendations

The results from mapping locally produced FLN research in Ghana revealed a growing interest in research in the field, although the total number of research outputs that met the inclusion criteria over the 14-year period was relatively small, considering the critical nature of FLN in Ghana. This study, however, highlighted research on FLN that was unlikely to be visible in international spaces and therefore excluded when developing local, regional, and international FLN research agendas and policies.

Our findings highlighted that inequality factors were not the focus of most of the research outputs. This highlights the need to align with the global movement towards more inclusive educational frameworks that recognise the diverse needs of learners.

Only a few research outputs were identified as funded (8 percent), with international organisations as the dominant source of funding. Notably, local government funding was minimal, based on the data available. This points to a potential policy gap that needs urgent attention.

Furthermore, the analysis revealed that FLN researchers, predominantly males, were mostly engaged in in-country collaborations. Greater local, regional, and international research collaborations could enhance the visibility and impact of Ghanaian FLN research on all relevant education platforms, ensuring that local insights contribute to shaping broader educational agendas.

Recommendations

The following recommendations aim to address the identified gaps and challenges in the FLN research domain in Ghana. These recommendations are targeted towards FLN researchers, the Ghanaian government, NGOs, and bilateral/multilateral funders.

- **Integrate a broader range of inequality factors, including gender, disability, poverty, and religion into research agendas** This will ensure more inclusive and equitable educational outcomes. Additionally, consider conducting research that explores the intersectionality of various inequality

factors to develop targeted interventions that address the unique needs of diverse learner populations.

- **Increase FLN visibility in online spaces.** FLN researchers in Ghana could do this by actively managing (creating and/or updating) their authorship information, including their contact details (e.g. email addresses, LinkedIn, Facebook, X, etc.) on professional platforms such as Google Scholar, Open Researcher and Contributor ID (ORCID) and LinkedIn, as well as on their local institutional websites, where possible.

- **Increase investment in FLN research initiatives.** The government of Ghana needs to address the current lack of local funding for FLN research. The purpose of the Ghana Education Evidence Data Lab (GEEDLab) which utilises data to enhance educational outcomes, highlights the need for greater funding. A reasonable portion of the country's research and development budget could be allocated to FLN research initiatives, especially those targeting marginalised and vulnerable groups.

- **Support the development of effective digital academic repositories in the universities and colleges of education.** The government of Ghana could help facilitate the visibility and accessibility of FLN research from pre-service teachers and their tutors to inform FLN decision-making. The GEEDLab, which exists at the ministry level, could be mirrored in universities and colleges of education.

- **Prioritise the inclusion of female researchers and other minority groups (e.g. early career researchers) in FLN research and projects.** The government of Ghana, NGOs, and other funding bodies can achieve this by offering female researchers and minority groups targeted grants, scholarships, mentorships, and fellowships. This could include the provision of funding for organising networking events, conferences, and workshops specifically designed to showcase the achievements of female researchers as well as early career researchers in the FLN domain. This could help build a strong and collaborative research community.

- **Foster partnerships and collaboration among FLN researchers.** This is critical among home-based researchers and those across the region and the globe, by creating networking platforms or systems to bolster collaboration.

- **Researchers should disclose funding information on their research outputs.** This should be the case even if the funding is personal. This transparency would provide valuable insights into the sources of research funding, help to identify potential gaps, and provide evidence to strengthen advocacy efforts to seek greater investment and support for Ghanaian FLN researchers.

- **Prioritise funding of FLN research to address the issue of restricted access and foster the wider dissemination of FLN evidence.** For example, stakeholders (bilateral and multilateral funders) could support local and regional journals by creating an online system of local journals using an easy-to-access platform. With effective publicity, this could raise the quality and visibility of such journals and the online system, as researchers are keen to publish in open access journals.

References

Akyeampong, K. (2010). 50 years of educational progress and challenge in Ghana. *Research Monograph, No. 33*. https://eric.ed.gov/?id=ED510903

Association of African Universities (AAU), Education Sub-Saharan Africa (ESSA), & Population Reference Bureau (PRB). (2018). *Demographics of African faculty: A pioneering pilot in Ghana. https://essa-africa.org/sites/default/files/inline-files/Demographics%20of%20African%20Faculty%20Ghana%20Pilot%20Study.pdf*

Asubiaro, T. V. (2023). (Under) Representation of research journals from Africa in Web of Science, and Scopus. *Information Matters, 3*(3). https://informationmatters.org/2023/03/underrepresentation-of-research-journals-from-africa-in-web-of-science-and-scopus/

Ayentimi, D. T., & Abadi, H. A. (2023). Why are women opting out of academic careers in higher education in Ghana? Implication for policy and practice. *Higher Education Research & Development, 42*(1), 18–32. https://doi.org/10.1080/07294360.2022.2048636

Bill & Melinda Gates Foundation (2020). *Global Education Program.* https://www.gatesfoundation.org/our-work/programs/global-growth-and-opportunity/global-education-program

Binesse, H., & Rose, P. (2024). *Mapping foundational literacy and numeracy research in sub-Saharan Africa: Peer-reviewed publications report*. REAL Centre, University of Cambridge. https://www.educ.cam.ac.uk/centres/real/researchprojects/ongoing/mapping-education-sub-saharan-africa/Mapping_FLN_in_international_databases.pdf

Binesse, H., Rose, P., & Silva, R. (2023) Literature search protocol: Mapping African-led foundational literacy and numeracy publications in English, French and Portuguese. REAL Centre, University of Cambridge. https://www.educ.cam.ac.uk/centres/real/researchprojects/ongoing/mapping-education-sub-saharan-africa/Literature-search-protocol-mapping-FLN-research-in-languages.pdf

Chatio, T. S., Tindana, P., Akweongo, P., & Mills, D. (2023). Publish and still perish? Learning to make the 'right' publishing choices in the Ghanaian academy. *Higher Education Research & Development, Volume 43, 2024 - Issue 2* *https://doi.org/10.1080/07294360.2023.2246396*

Evans, D., & Hares, S. (2021). *Should governments and donors prioritise investments in foundational literacy and numeracy? CGD Working Paper 579.* Centre for Global Development. https://www.cgdev.org/publication/should-governments-and-donors-prioritize-investments-foundational-literacy-and-numeracy

Iddrisu, D. H., Adrupio, S., & Rose, P. (2024). *Mapping early childhood development publications in sub-Saharan Africa: Report on analysis from international databases.* REAL Centre, University of Cambridge and ESSA https://essa-africa.org/sites/default/files/inline-files/ESSA_REAL%20Centre_ECD_Int_Databases_Mapping_2024.pdf

Kaziboni, A., & Uys, T. (2015). The selection of academic role models by first year University students. *Journal of Sociology and Social Anthropology, 6*(1), 77-86.

Lund, B. D., Wang, T., Shamsi, A., Yusuf, A. O., Abdullahi, J., … & Awojobi, A. E. (2021). Barriers to scholarly publishing among library and information science researchers: International perspectives. *Information Development, 39*(19). https://doi.org/10.1177/02666669211052522

McLean, R., & Sen, K. (2019). Making a difference in the real world? A meta-analysis of research for development. *Research Evaluation, 28*(2), 123 – 135. https://doi.org/10.1093/reseval/rvy026

Ministry of Education. (2018). *Education Strategic Plan, 2018–2030.* Accra, Ministry of Education. www.globalpartnership.org/sites/default/files/2019-05-education-strategic-plan-2018-2030.pdf.

Mitchell, R., & Rose, P. (2018). *Literature search protocol for the African Education Research Database*. REAL Centre Methodological Note. https://doi.org/10.5281/ZENODO.1245521

Moosa, I. A. (2018). *Publish or perish: Perceived benefits versus unintended consequences.* Edward Elgar Publishing. https://www.elgaronline.com/monobook/9781786434920/9781786434920.xml

Mulwa, M. (2021). *The gender gap in universities and colleges in sub-Saharan Africa*. Education Sub Saharan Africa (ESSA). https://essa-africa.org/node/1421

Ondari-Okemwa, E. (2007). Scholarly publishing in sub-Saharan Africa in the twenty-first century: Challenges and opportunities. *First Monday, 12*(10). https://doi.org/10.5210/fm.v12i10.1966

R&D World. (2022). *Gross domestic expenditure on research and development (GERD) as a share of GDP in Ghana from 2020 to 2022*. Statista. https://www.statista.com/statistics/1345417/gross-domestic-expenditure-on-randd-as-percentage-of-gdp-in-ghana/

Republic of Ghana. (2016). *Ghana 2015 early grade reading assessment and early grade mathematics assessment report of findings.* Accra, Republic of Ghana. https://ierc-publicfiles.s3.amazonaws.com/public/resources/Ghana%202015%20EGRA-EGMA_22Nov2016_FINAL.pdf

Republic of Ghana. (2022). *2022 National standardised test for English language, mathematics and 21st century skills: Report findings*. National Council for Curriculum and Assessment. https://nacca.gov.gh/wp-content/uploads/2024/04/2022-P2-NST-REPORT.pdf

UNESCO. (2020a) *Ministry of Education commits to prioritising five key policy areas to improve children's learning in Ghana*. https://www.unesco.org/gem-report/en/articles/ministry-education-commits-prioritising-five-key-policy-areas-improve-childrens-learning-ghana

UNESCO. (2020b). *A new generation: 25 years of efforts for gender equality in education*. Global Education Monitoring Report. Paris: UNESCO.

UNESCO. (2022). *Spotlight on basic education completion and foundational learning in Ghana 2022*. https://unesdoc.unesco.org/ark:/48223/pf0000383113

United Nations. (2015). *Transforming our world: The 2030 agenda for sustainable development*. https://sdgs.un.org/sites/Agenda for Sustainable Development

World Bank. (2023*). Research and development expenditure (percent of GDP) - Ghana.* https://databank.worldbank.org/reports.aspx?source=2&series=GB.XPD.RSDV.GD.ZS&country=GHA

Appendices

1. African Journals Online (AJOL) — https://www.ajol.info/index.php/ajol

2. University of Cape Coast Institutional Repository — https://ir.ucc.edu.gh/

3. University of Ghana Digital Collections — https://ugspace.ug.edu.gh/

4. University of Education, Winneba Institutional Repository — https://www.uew.edu.gh/uewlibrary/tutorials-research-guides/institutional-repository

5. University of Development Studies' Digital Repository — http://www.udsspace.uds.edu.gh/

6. Google — www.google.com

7. Google Scholar — https://scholar.google.com/

8. ResearchGate — https://www.researchgate.net/

9. Sabinet African Journals — https://journals.co.za/

10. Semantic Scholar — https://www.semanticscholar.org/

11. Academia — https://www.academia.edu/

12. Ghana Journal of Education (GJE) — https://journal.ucc.edu.gh/index.php/gje/

13. Centre for Learning and Childhood development — https://www.clcdghana.org/eccd

14. Early Childhood Network Ghana — https://www.ecnghana.org/index.php

15. Ghana Education Service ECE Unit — https://ges.gov.gh/early-childhood/

16. GEEDLab — https://geedlab.com/

17. Innovations for Poverty Action's Public Data — https://poverty-action.org/our-studies-with-public-data

18. Kwame Nkrumah University of Science and Technology Repository — https://ir.knust.edu.gh/home

19. Right to Play — https://righttoplay.com/en/

20. Sabre Education — https://sabre.education/

21. UNESCO Ghana	https://unescoghana.gov.gh/
22. UNICEF Ghana	https://www.unicef.org/ghana/research-and-reports

Appendix 2: Keywords and corresponding thematic areas

Thematic areas	Keywords
Literacy	Literacy; Reading; Writing; Speaking skills.
Numeracy	Numeracy, Maths, Mathematics.
Learning and assessment	Assessment; Intervention evaluation; Household factors associated with student learning; Standards of attainment; Student motivation; Learning outcomes.
Curriculum	Textbooks; Curriculum reform; Curriculum relevance; Socio-emotional skills; Health education; Science education; Peace education; Value education; Environmental education; Mathematics Education.
Teachers and teaching	Peer learning; Teacher-student relations; Teacher education; Teacher capacity; Teacher motivation; Teacher deployment; Indigenous pedagogies; Problem-based learning; Time for learning; Class size; Teacher supervision; Teaching methods.
Social environment, facilities and institutional leadership	Community participation; Local knowledge and practices; Library; Violence; Wellbeing; Home-school relations; Parental engagement; Nutrition; Infrastructure; Student voice; Leadership and management.
Education access	Drop-out; Progression, repetition; Enrolment; Access to education; Distance education; Alternative provision; Out-of-school children; Completion; Emergency education provision; Student attendance; Widening participation.
Language	Language of instruction; African languages; French language; English language; Portuguese language.
Equitable and inclusive education	Special education; Child labour; Psychosocial support; Regional disparities in access and learning; Mental health; Emotional and behavioural difficulties; Low attaining students; Remedial education; Early pregnancy/marriage; Disability; Gender; Ethnicity; Poverty; Religion.

ICT	Learning using mobile phones; ICT in education; E-learning.
Policy and financing	Education policy; Government spending; Household spending; Private schools; Public private partnership; Cost-effectiveness; Expansion of provision; National development; Regional disparities in resourcing; Donors and NGOs; Benefits of education; Student financial support; School feeding.
Other	Covid-19; Intervention evaluation.

Endnotes

[i] https://www.scimagojr.com/

[ii] Binesse and Rose (2024) identified 536 publications from 48 SSA countries between 2015 and 2023, of which 381 included at least one SSA-based author.

[iii] NALAP is a bilingual transitional "early exit" model that emphasises the use of Ghanaian language to improve the reading ability of children.

Research for Equitable Access and Learning

Education Sub Saharan Africa