



# Mapping foundational literacy and numeracy research in sub-Saharan Africa

## Kenya country report

## Authors

The writing of this report was led by Laté Lawson and Woulamé Oudjim. Samuel Asare and Pauline Essah provided oversight throughout the process, offering guidance and reviewing the report.

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## List of abbreviations

AJOL	African Journals Online
APHRC	African Population and Health Research Center
CBC	Competency-Based Curriculum
CESA	Continental Education Strategy for Africa
DFID	Department for International Development
ERIC	Education Resources Information Center
ESSA	Education Sub Saharan Africa
FLN	Foundational Literacy and Numeracy
GPE	Global Partnership for Education
ICT	Information and Communication Technology
KICD	Kenya Institute of Curriculum Development
MoE	Ministry of Education
NESSP	National Education Sector Strategic Plan
NGOs	Non-Governmental Organisations
REAL	Research for Equitable Access and Learning
RTI	Research Triangle Institute
SDG	Sustainable Development Goal
SEACMEQ	Southern and Eastern Africa Consortium for Monitoring Educational Quality
SSA	sub-Saharan Africa
UNESCO	United Nations Educational, Scientific and Cultural Organization
USAID	United States Agency for International Development

## Summary

Poor learning outcomes persist in Africa, as African children are found to be at least five times less likely to learn basic skills than children living elsewhere. In Kenya, only two in five Grade 4 learners can read a Grade 3 English text. Therefore, in Kenya, education research increasingly focuses on assessing basic learning outcomes and generating knowledge to help improve children's cognitive development.

This report presents a bibliometric analysis of research available in local databases and repositories on foundational literacy and numeracy (FLN) by Kenya-based researchers. We systematically mapped journal articles (research papers mostly published in local, regional and international non-indexed academic journals), PhD theses, books (chapters) and research reports that were unlikely to appear in international databases. Also, we gathered metadata on the FLN thematic areas including inequality (disability, gender, ethnicity, poverty, religion), funders of FLN research, and authors' gender, among others.

The analysis revealed that FLN research outputs had increased between 2010 and 2023, with journal articles and PhD theses accounting for over 90 percent of the outputs. The FLN studies in Kenya resulted largely (85 percent) from collaborative research projects in country. Research collaboration in Kenya extended beyond the country-level and involved FLN researchers from other sub-Saharan African (SSA) countries (4 percent) and beyond the region (11 percent).

Research topics related to basic literacy received more attention than those related to numeracy. Inequality factors within research outputs were varied, where 20 percent of studies discussed gender-related issues, only 10 percent addressed pupils' disability. Only 11 percent of FLN research outputs were funded, and international organisations accounted for over 80 percent of the funding provided.

Despite the promising trend observed in FLN research, its usefulness for educational policies and practices is not well-established. Research published in local academic journals represents an untapped opportunity and suffers from limited exposure, as it



is largely disregarded by international research databases and ignored in most evidence-based syntheses.

Based on this analysis of FLN research, we identified a series of recommendations that are crucial to support, improve, promote and disseminate education research published in local journals and available in local repositories. These recommendations are as follows:

- Encourage and fund regional research collaboration within SSA.
- Promote under-researched topics and assessments such as research on basic numeracy skills and inclusive and equitable FLN.
- Increase funding for high-quality and large-sample FLN research.
- Researchers should disclose the funding sources of their research outputs.
- Develop, digitalise and regularly update data and research repositories.
- Train FLN researchers on data skills to enable them to use advanced methods of data analytics.

## 1. Introduction

Foundational Literacy and Numeracy (FLN) i.e. a child's ability to read with meaning and perform basic calculations, is the pillar on which future learning and training are grounded, as highlighted in the African Union's 2063 Agenda. Nevertheless, the area is neglected in terms of policy, investment and practice, leading to poor learning outcomes for most children in Africa, who are found to be at least five times less likely to learn the basics than children living elsewhere (UNESCO, 2023). This data reflects the case in most African countries. For example, in Kenya, recent learning assessments suggest that only two in five Grade 4 learners (mostly aged 10 to 13) meet expectations in reading a grade three appropriate English text. Moreover, three in ten children of pre-school age are out of school, and three in ten children enrolled in early childhood education are over-age in Kenya (Uwezo, 2021).

Against this background, a growing interest in strengthening children's cognitive development and their ability to read, write and count correctly is noticeable in most African countries. This interest is gaining momentum in the policy debate, as

emphasised in the Continental Education Strategy for Africa (CESA) 2016-2025 agenda. In Kenya, the National Education Sector Strategic Plan (NESSP) 2018-2022 also underscored the importance of FLN for schooling outcomes. Among others, the NESSP aims to ‘provide education geared towards development of the child’s mental and physical capabilities’, ‘enrich the child’s experience to enable him/her to cope better with primary school life’ and ‘enable the child to enjoy living and learning through play’ (MoE, 2018 p. 141).

Africa-based education researchers have investigated educational attainment and learning outcomes at all phases of education, including at the pre-primary level. However, they face acute challenges in conducting quality research, due to limited access to data and funding (ESSA and Southern Hemisphere, 2024). Also, existing FLN research is fragmented and almost non-visible in most African countries, while learning poverty, known as the incapacity to read and understand a simple text by age 10 (World Bank, 2021), persists. These challenges account for the collaborative effort of ESSA and the REAL Centre to improve the visibility and accessibility of FLN research undertaken by Kenyan 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.

This report as part of the above-mentioned collaboration, examines FLN research produced by researchers in Kenya and as such highlights the relevance of locally published research. It offers a bibliometric analysis using research outputs available in local repositories and academic journals, focusing on various elements including funding, thematic domains, gender distribution of authors, and collaboration.



## 2. Policy context in Kenya

Kenya, like most African countries, recognises quality education as essential to achieving Sustainable Development Goal 4 (SDG-4), ‘inclusive and equitable quality education and lifelong opportunities for all by 2030’ (United Nations, 2015). Also, the country’s Basic Education Act (Parliament of Kenya, 2013) and its Education Sector Strategic Plan 2018-2022 (Ministry of Education, 2018) reflect SDG 4.1, which aims to ‘ensure that all girls and boys complete free, equitable and quality primary and secondary education by 2030’ (United Nations, 2015), as they re-state the country’s commitment to ensuring that no child is left behind in terms of access to education. It is worth noting that Kenya’s policy instruments, from the National Literacy Campaign in 1967 to its current Constitution (National Council for Law Reporting, 2010) and Basic Education Act (Parliament of Kenya, 2013), also emphasise the importance of pre-primary education and the acquisition of FLN skills as essential for successful education at all subsequent stages.

Despite its ambitions and policy instruments, the country is facing a learning crisis, and millions of children remain out of school (Ohba, 2020). Moreover, although access to education has improved over time at all levels, including early childhood education, (as indicated in the country’s net enrolment rates in pre-primary and primary education between 2017-2020), learning outcomes remain low (MoE, 2020). For instance, recent World Bank estimates indicate that 42 percent of Grade 3 students passed the minimum proficiency threshold for numeracy tests, and 53 percent for English (World Bank, 2022). Similar figures are reported in the country’s 2020 Basic Education Statistical Booklet (Ministry of Education, 2020), and various national assessments, which indicate that only 40 percent of fourth-grade learners were able to read a text at the third-grade level (Uwezo, 2021).

In response to the ongoing learning crisis, as in most African countries, Kenya, in partnership with development partners and regional bodies including the Global Partnership for Education, Education International, UNESCO and the Southern and Eastern Africa Consortium for Monitoring Educational Quality (SEACMEQ), recently introduced a series of reforms to improve teaching and learning. These reforms include the 2012-2014 Tusome Literacy Programme (RTI, 2023) and the 2017 Competency-Based Curriculum (CBC). The CBC aims to shift from an exam-oriented

education to one focused on developing skills and competencies in learners and Teacher Professional Development programme (KICD, 2018). Moreover, the country's Basic Education Curriculum Framework ensures that 'pertinent and contemporary Issues are included in the curriculum' and also that evidence is used in assessing competencies, including at the foundational levels (Republic of Kenya, 2017, p.110).

### 3. Methodology

A bibliometric analysis was conducted of FLN research available in local repositories, databases and academic journals. This involved identifying relevant outputs, collecting required metadata and analysis of the data. We adopted the definition by the Global Education Program of the Bill & Melinda Gates Foundation (2020), where FLN refers to literacy and numeracy skills among children of primary school age in sub-Saharan Africa.

In contrast to international databases (e.g., Scopus and Web of Science), we searched for FLN research outputs in local repositories and databases. These included institutional repositories (e.g. University of Nairobi Research Archive, Kenyatta University Institutional Repository, and the African Population and Health Research Center - APHRC publications) and local databases (e.g., Kenya Education Research Database and African Journal Online (AJOL)). Appendix 1 presents a list of the institutions and platforms where the searches were conducted.

Searching in the different platforms, we exploited search strings containing relevant FLN keywords, such as 'foundational skills', 'basic skills', 'literacy' OR 'reading', among others. Appendix 2 presents all the keywords used to develop search strings. Our methodology is described in the search protocol by Binesse, Rose and Silva (2023), where the criteria for mapping and evaluating literature related to FLN in SSA is described comprehensively. Moreover, in cases where the country-level searches led to outputs that were also identified by the mapping exercise focusing on international databases, and for the 2015-2023 period (Binesse and Rose, 2024), the outputs were removed from our result spreadsheet to avoid duplication. Finally, compared to international databases, where a single string may be sufficient for

searching, depending on the platform, we adapted our strings using different combinations of keywords. A typical example of such a search string is:

("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 "Kenya".

It is worth noting that shorter or longer forms of the latter string were tested to identify FLN research outputs. Following the searches, research outputs meeting the three criteria below were considered in the analysis.

- Authored by at least one Kenya-based author.
- Focusing on literacy or numeracy skills of primary school-aged learners.
- Published between 2010 to 2023.

After searching and identifying relevant FLN research outputs, we downloaded and compiled them in an Excel spreadsheet. The spreadsheet included essential columns for reporting key metadata related to the research outputs (e.g., title, abstract, year), researchers (e.g., institutions, contact details, gender), information on inequality factors (e.g., ethnicity, disability, gender, poverty, religion, and location), related keywords (e.g., literacy, reading, writing, speaking skills), funding information (e.g., funders, funding 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 student learning outcomes and engagement in literacy/numeracy activities.
- *Accessibility*: this examined whether the research output was open access or not.
- *Funding information*: studies were categorised according to whether they disclosed their funding details or not.
- *Funding type*: this identified the sources of research funding (where provided), 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 given by 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 authors was inferred from the biographical data of each study's author list. Data on gender was inferred from researchers' online (institutional) profiles and through other internet searches, where feasible.
- *Collaboration*: The geographical location of the 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 the authors' affiliation data.

## 4. Findings

This section focuses on the trends of FLN research outputs in Kenya 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

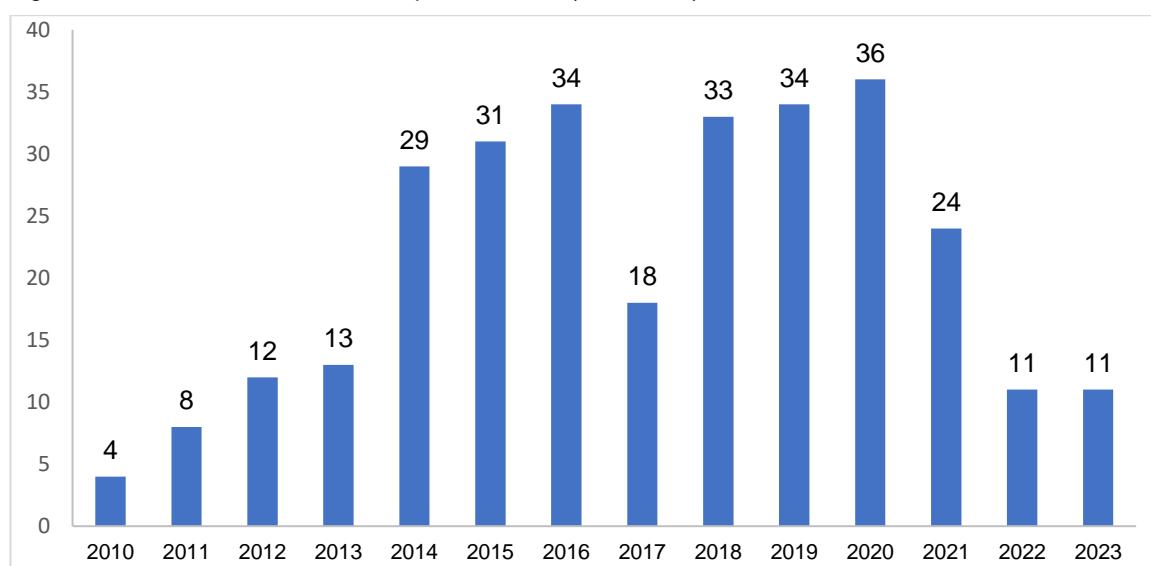
funded and the top funders of FLN research. Additionally, it delves into the thematic areas and design of FLN research, examining existing evidence gaps, poverty and inequality factors, as well as different research settings and methodologies.

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 to 2023)

Analysis was conducted of the research outputs published in local journals and repositories that indicated the number and types of FLN research outputs available in Kenya, but also how the pattern of these evolved over time. Overall, a total of 298 FLN research outputs were identified (Figure 1).

Figure 1: Number of FLN research outputs identified (2010-2023)



Note: Base = Total research outputs identified, 298.

The first three years, from 2010 to 2013, showed a relatively modest but increasing number of FLN research outputs with 2010 as the year in which the fewest research outputs (4) were identified. However, from 2014, when 29 outputs were identified, there was a rapid acceleration in FLN research production. This most likely reflects a growing awareness of the importance of foundational literacy and numeracy for Kenya's educational and socio-economic development and its commitment to the SDGs. This upward trend peaked in 2020 (36 studies) suggesting continued interest and commitment from researchers to improve the quality of basic education in the country, as well as a growing need for data and evidence to guide educational policies and practices. After the year 2020, a decline was observed in the number of

research outputs identified. One possible explanation for this could be the COVID-19 pandemic, which halted data collection and research activities in 2020 and 2021, thereby limiting research outputs in the subsequent years.

Figure 2: Types of research outputs



Note: Base = Total research outputs identified, 298.

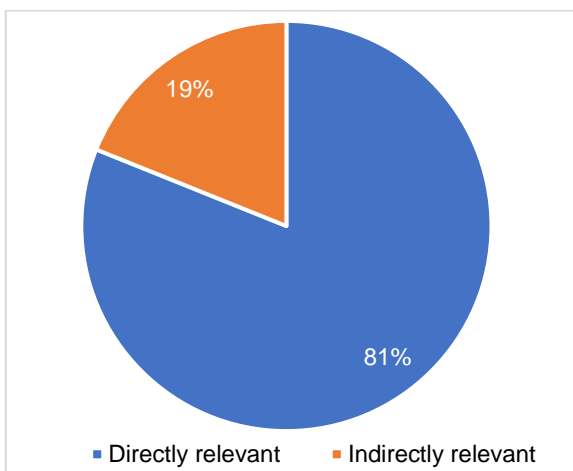
The in-country mapping of FLN research considered PhD theses, academic journal articles, reports and books. We used journal articles to refer to research papers mostly published in local, regional and international non-indexed academic journals.

Over the years, the different types of research outputs contributed to existing FLN research to varying degrees. Journal articles represented more than 81 percent of the total research outputs identified. This was followed by PhD theses (16 percent),

reports (2 percent) and books (1 percent). This high proportion of journal articles indicates that Kenyan FLN researchers preferred to disseminate their work and new findings predominantly through academic publications, as the latter contributes to academic debates.

### Relevance and accessibility of FLN research

Figure 3: Relevance of FLN research identified



Note: Total research outputs identified, 298.

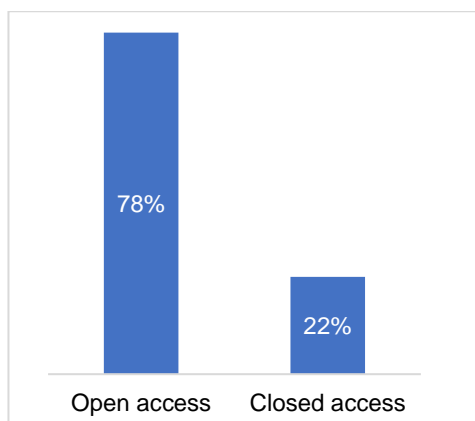
Figure 3 depicts the distribution of FLN studies by relevance. Research outputs were categorised as directly relevant if the study directly reflected literacy or numeracy skills and/or outcomes of primary school level learners. Studies that addressed topics such as teacher training, student attendance, or language of instruction, without direct reference to student learning outcomes or pupils'

engagement in activities related to literacy/numeracy were considered indirectly relevant.

When analysing the research outputs, 242 (81 percent) were classified as directly relevant. This high proportion of relevant research indicates a growing awareness of the current learning crisis, especially considering FLN, as well as collaborative efforts involving researchers, education practitioners and decision-makers to address learning outcomes at the foundational level.

Although we searched for FLN research in local repositories and academic journals, a full paper, book or book chapter was not always accessible. Figure 4 indicates the accessibility of FLN research outputs identified, illustrating whether the research content was freely accessible online or required a payment or subscription.

Figure 4: Access to FLN research outputs



Note: Total outputs identified, 298.

Out of the 298 FLN research outputs identified, 78 percent were accessible, while 22 percent were not freely accessible. This high proportion of open access research outputs is not surprising as the in-country searches focus on institutional repositories and local academic journals, which mostly advocate for open access research outputs. When compared to international databases, fewer open access FLN publications are observed (Binesse and Rose, 2024).

Table 1: Typology of closed access research outputs (in percent)			
Books	Journal articles	PhD theses	Reports
2 (2 percent)	54 (83 percent)	8 (13 percent)	2 (3 percent)

Note: Total closed research outputs = 66.

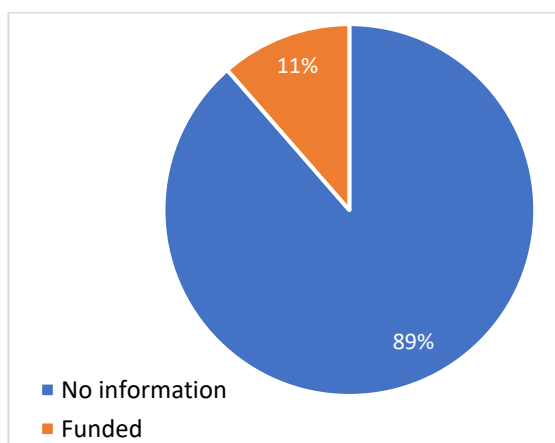
As greater accessibility is associated with dissemination and impact, we investigated further to understand the nature of research we could not access. The data (Table 1) revealed that of the 66 closed studies, 83 percent (55) were journal articles, which may require payment. The inaccessible PhD theses and reports may be because of restrictions to the institutions' repositories.



## FLN research funding

Funding plays a crucial role in quality education research, as it contributes to the development and implementation of innovative research initiatives that help to improve the quality of education and learning outcomes. Unfortunately, in the African context, challenges in accessing research funding, particularly in the field of education, are well-known and documented (ESSA and Southern Hemisphere, 2024). In this section, the funding sources for FLN research in Kenya cover 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 Kenya, highlighting the top funders.

Figure 5: Funding of FLN research



Note: Share of FLN research output that are funded out of a total of 298 outputs identified.

Figure 5 shows the breakdown of identified research according to funding, distinguishing between studies that have secured funding and those for which the authors provided no funding information.

Out of the 298 FLN research outputs identified in Kenya, only 11 percent mentioned receiving funding, indicating that there is a predominance of unfunded studies (89 percent). This data might

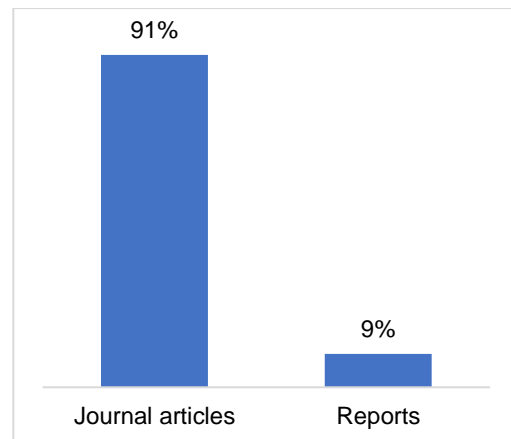
suggest low investment in FLN research in Kenya. However, the lack of information about funding for most research outputs may not correspond to 'no funding'. It could be that researchers did not provide information because it was not requested explicitly at the source. Or it could mean that the high proportion of research outputs not reporting on funding reflected the challenges that researchers faced to secure research funding of all types.

## Types of FLN research funded

Figure 6 illustrates the distribution of FLN research funding in Kenya by type of research outputs considered (PhD theses, journal articles, books and reports).

The analysis revealed that of the 34 research outputs funded in Kenya, journal articles were the most frequently funded, accounting for 91 percent (31) of all outputs funded, despite the FLN researchers' interest in publishing and disseminating the results of their research in specialised journals, as noted previously. Reports account for 9 percent (3) of research funded. The PhD theses and books we identified were not classified as funded.

Figure 6: Types of FLN research funded



Note: Base = Funded research outputs, 34.

Apart from revealing that very few types of studies or research outputs are funded in Kenya, Figure 6 suggests that doctoral theses were rarely funded (both from private and public sources), at least for topics related to FLN, raising questions about what research funding mechanisms support PhD theses in most African countries, as well as in education research.

## Sources of funding for FLN research

Figure 7: Sources of funding for FLN Research

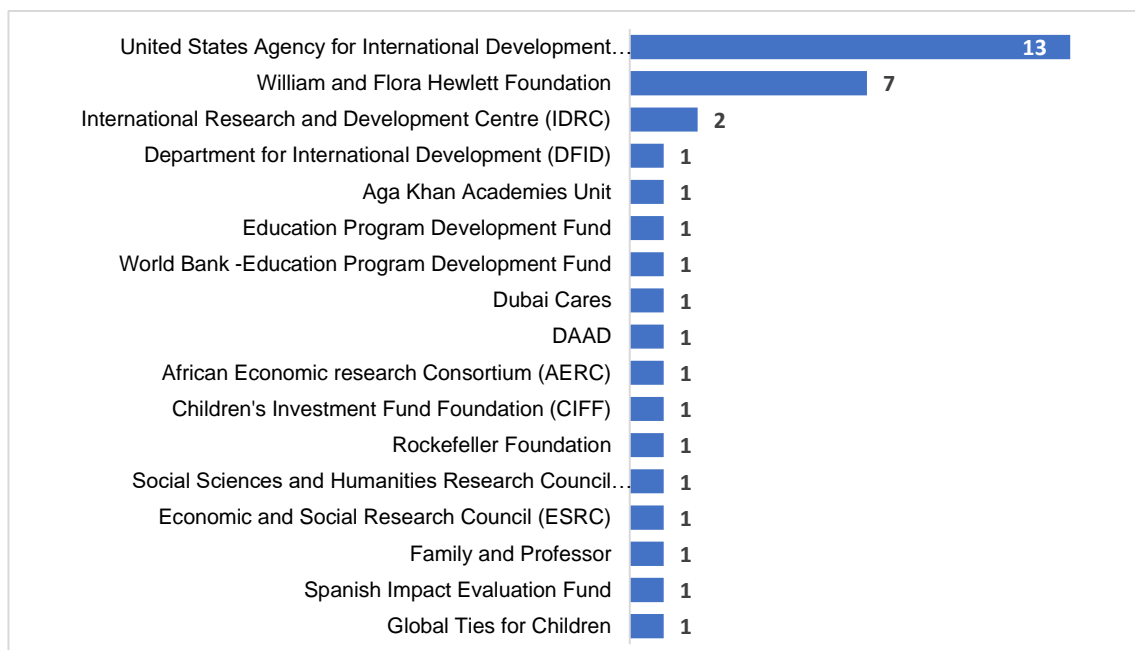


Note: Base = 41 counts of funding sources

Figure 7 provides an overview of the funding sources supporting FLN research in Kenya. Funding from international organisations represented the highest proportion of funding to FLN research (78 percent). This highlights the importance of research collaboration and international organisations in implementing

research initiatives in Kenya. Internal institutions, such as universities and research centres that the researchers were affiliated with, also played a role in providing funding for FLN research (10 percent). The data also indicated that external philanthropies and local organisations financed around 5 percent of FLN research in Kenya.

Figure 8: Top FLN research funders identified



Note: Base = Total research outputs funded 34. Some of these research outputs received funding from multiple sources.

A potential explanation for this high dependency on funding from sources outside of the researchers' internal institutions, is the low resource allocation for research and development typically observed in many African countries (in Kenya this amounted to 0.8 percent of Gross Domestic Product (Statista, 2024)). This probably affects the entire education research sector, including research on FLN, and can also explain the low funding provided by local organisations and government agencies to FLN research in Kenya.

When examining the main organisations supporting FLN research in Kenya from 2010 to 2023, we found that the top funders of FLN research included the United States Agency for International Development (USAID) and the William and Flora Hewlett Foundation (Figure 8).

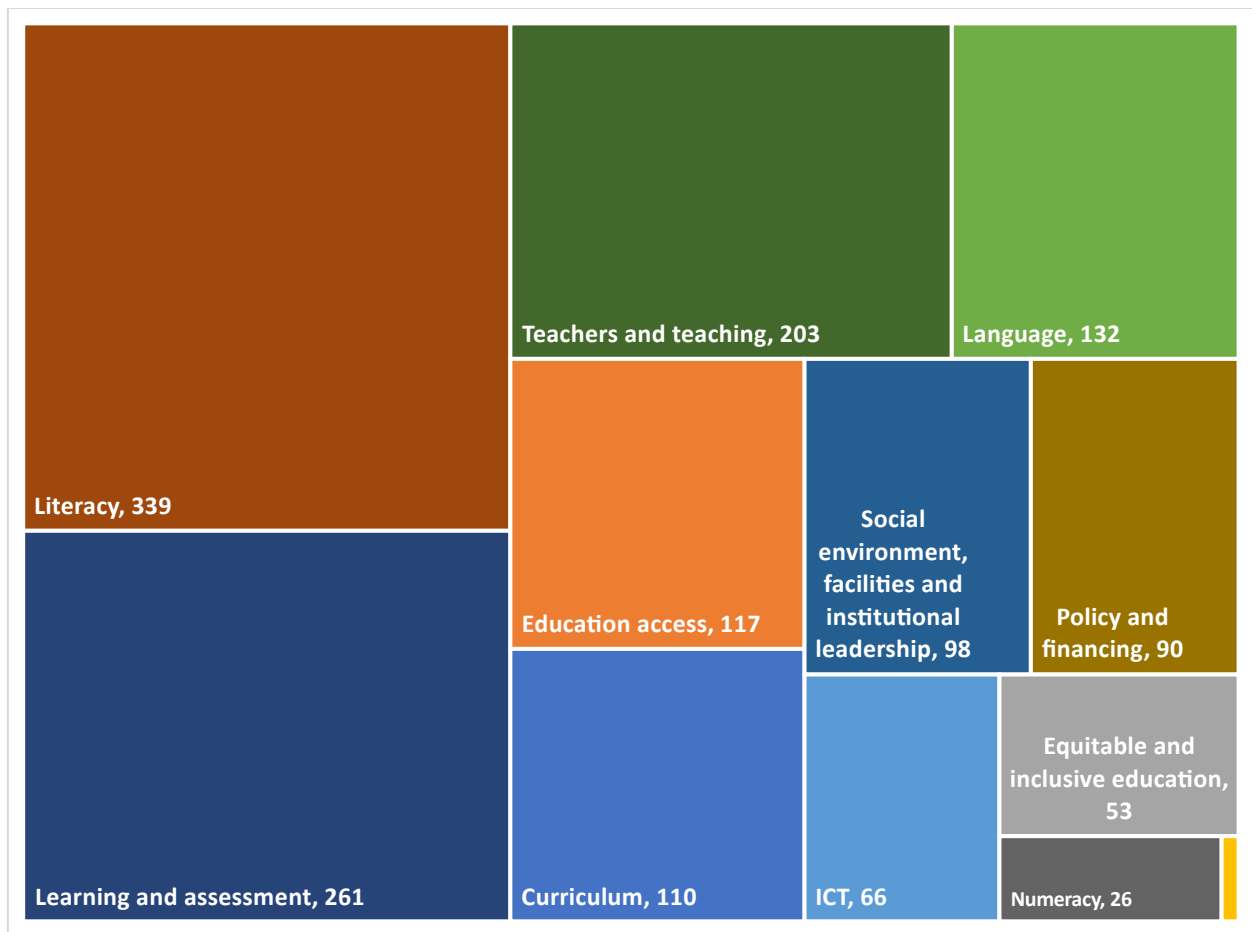
USAID as the top funder of FLN research in Kenya contributed to the funding of 13 research outputs, followed by the Hewlett Foundation which supported seven of the 34 funded outputs we identified. Organisations that financed at least one FLN study included the Aga Khan Academies, the United Kingdom through the Department for International Development (DFID) and the Economic and Social Research Council, and other international organisations.

## Research focus

The FLN studies identified covered several topics and our initial assessment revealed the various education-related keywords which were categorised under thematic areas as indicated in Figure 9. Most studies fit under more than one thematic area, as a research paper about learning outcomes can also investigate how this is linked to social environment or curriculum. Appendix 2 presents the list of keywords and the corresponding thematic areas.

The thematic areas considered included literacy, learning and assessment, teachers and teaching, language, curriculum, education access, information and communication technology (ICT), numeracy, policy and financing, social environment, facilities and institutional leadership, and equitable and inclusive education. Figure 9 presents an overview of the thematic areas covered by researchers working on FLN in Kenya, where the relative importance of each thematic area is displayed. Analysing the data, the top five thematic areas investigated by Kenyan FLN researchers are: literacy, learning and assessment, teachers and teaching, language, and education access. Figure 9 also shows the thematic areas that were least investigated by Kenya FLN researchers. These were ICT, policy and financing, equitable and inclusive education, and numeracy.

Figure 9: Thematic areas covered by FLN researchers



**Note:** Base = Total research outputs identified, 298. The reported figures correspond to the number of times the corresponding keywords were counted in all outputs identified.

Analysing these results in greater depth, it appears that while literacy (which involves the four keywords literacy, reading, writing and speaking skills) was the main thematic area investigated by FLN researchers in Kenya, numeracy was not among the top seven. This reflects the relative importance given to fundamental skills related to reading and writing, compared to numeracy. In addition, the data indicated that Kenyan FLN researchers also prioritised investigating interventions and learning outcomes, as well as the impact of teaching methods and instruction language. Finally, not only does this analysis of thematic areas offer an insight into the diversity of issues investigated by FLN researchers in Kenya, it also highlights existing knowledge gaps. Specifically, this analysis reveals that at the foundational level, topics related to inclusive and equitable education, as well as the use of ICT tools in learning, were researched less. For example, under the literacy theme, researchers such as Otike and Kiruki (2011), Otieno-Omutoko and Omutoko (2013) and Hungi et

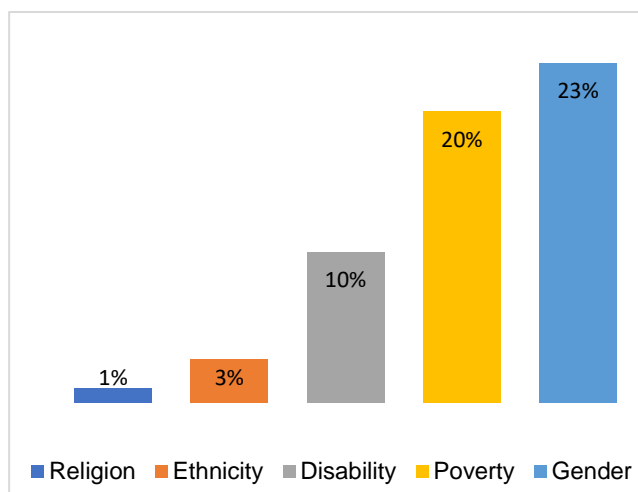
al. (2018) examined the role of ‘free primary education’, ‘technology’ and ‘language of instruction’ on literacy skills, respectively. Others examined the effects of factors such as ‘mothers' education’ and ‘instructional materials’ in numeracy skills (Abuya et al., 2018; Katam, 2019).

## Inequality indicators in FLN research

Our analysis also considered inequality factors such as gender, poverty, disability, ethnicity and religion, and provided an in-depth analysis of the relative importance of socio-economic and demographic factors in existing FLN research in Kenya. We assessed whether identified FLN research outputs addressed these elements or not and Figure 10 provides an overview of the frequency in which they appeared.

23 percent of the FLN studies identified touched on gender. This was followed by poverty, which was included in 20 percent of the research outputs identified. Learning outcomes of pupils living with disability, as well as the instructional strategies to improve their literacy and numeracy skills, were considered in 10 percent of the FLN research outputs identified. Finally, issues related to ethnicity and the religion of primary school learners, and its interconnection with literacy and numeracy were included in only 3 percent and 1 percent of research outputs respectively.

Figure 10: Inequality factors included in FLN research



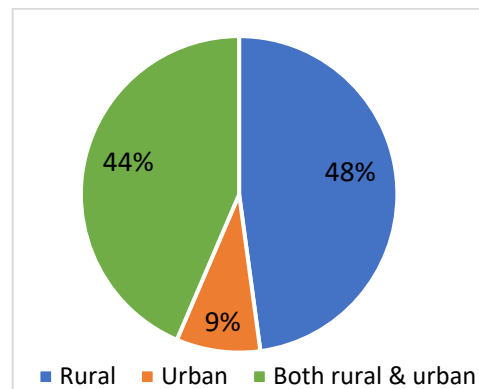
Note: Base = Total research outputs identified, 298.

Overall, this analysis highlighted the relative emphasis placed on inequality factors by Kenyan FLN researchers. It also reflected existing research gaps in children’s acquisition of reading, writing and numeracy skills which could form the basis for future research investigations, investment trends, etc.

## Research location

In addition to inequality factors, we also examined the geographical locations of the FLN research in Kenya. 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. Figure 11 indicates that most FLN studies (48 percent) conducted in Kenya collected data in and covered rural areas. This was followed by studies conducted in both rural and urban areas (44 percent of outputs). Interestingly, and perhaps surprisingly, research covering urban areas in Kenya represented only 9 percent of the FLN studies identified.

Figure 11: Location of FLN research



Note: Base=Studies that mentioned the research location 163.

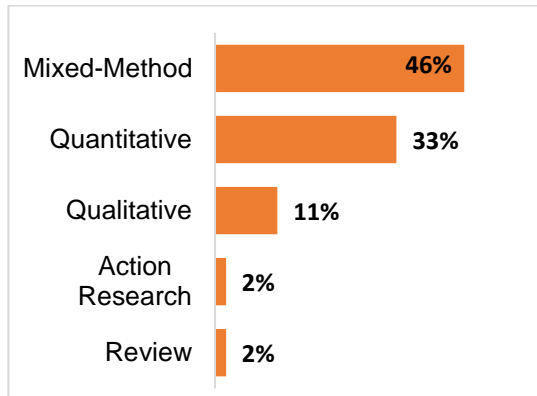
In summary, it is worth noting that Kenyan FLN researchers have not disregarded rural areas in their assessment, among others, of educational outcomes, access and quality, and factors driving this, especially at the pre-primary school level. Rather, as learning crises may be more acute in rural settings, researchers have prioritised these areas to generate FLN evidence that could inform policy and practice.

## 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.



Figure 12: Synopsis of FLN research methods



Note: Base = 298 total research outputs. 6 percent of output were categorised as “unknown” and are therefore not shown here.

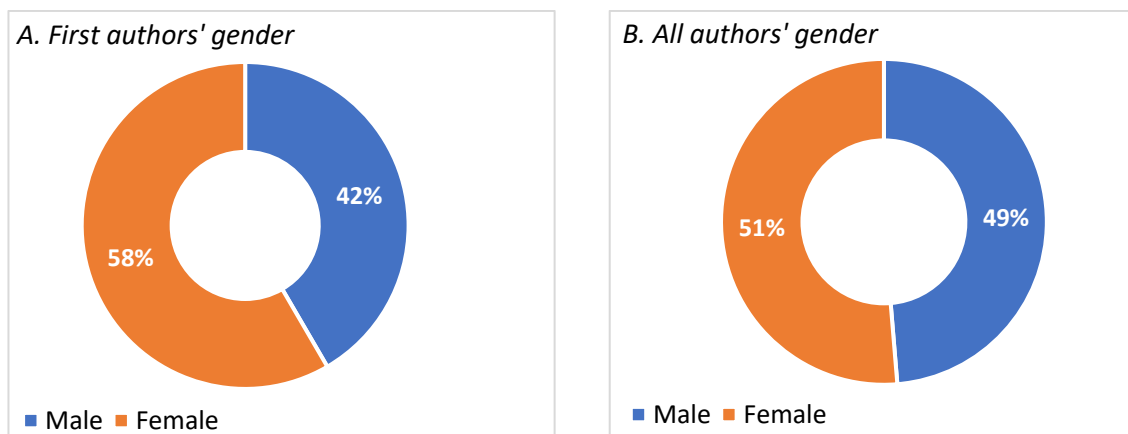
Figure 12 presents the distribution of the methodological approach used in the FLN research outputs identified in Kenya.

Firstly, 46 percent of the studies used a mixed-method approach, combining quantitative and qualitative approaches for a more comprehensive analysis. This method has the advantage of offering rich and diverse perspectives to inform educational policy and practice in Kenya.

Secondly, FLN studies using only a quantitative (or qualitative) research method represented 33 percent (11 percent) of the total research outputs identified. This was followed by review and action research, both accounting for two percent of the research outputs. The latter 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: Gender distribution in FLN research



Base = Total research output identified, 298.

Recent data on gender distribution in education research revealed a large imbalance, with female researchers underrepresented (ESSA and Southern Hemisphere, 2024). For our FLN research, Figure 13 presents the distribution of male and female FLN researchers in Kenya considering data of both the first authors and all the authors' gender. Based on the first authors' data, female FLN researchers

dominate the field, showing a female-to-male ratio of 58 percent to 42 percent (Figure 13-A).

When considering the data of all authors, a more gender balanced picture emerged. In Figure 13-B, female researchers accounted for 51 percent of all authors identified, compared to 49 percent of males. This analysis indicates that there is a good gender balance in FLN research. This could reflect the importance that both females and males attach to children’s acquisition of basic numeracy and literacy skills. Moreover, as key members of communities and families, female FLN researchers have a unique perspective on issues surrounding foundational skills, which may explain their engagement in this area of research. The findings also potentially reflect equal access to opportunities for both genders to conduct relevant research.

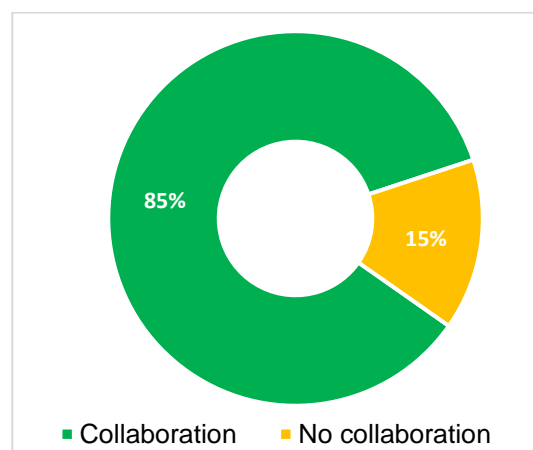
### Collaboration in FLN research

Collaboration is crucial for research, as it fosters an environment in which researchers combine efforts, expertise and perspectives to address complex social issues. Our analysis therefore explored the geography of FLN research collaborations in Kenya whereby a research paper written by more than one author was identified as a collaborative research work, independently of the authors’ affiliation and country.

Figure 14 highlights FLN research collaboration in Kenya. We excluded PhD theses as they were single authored research outputs, which did not involve collaboration.

Of the remaining research outputs (books, reports, journal articles), 264, 15 percent were single authored, and 85 percent were the results of collaborative research projects. Although this high proportion of collaborative research did not identify the different types of collaboration, it did demonstrate the Kenyan FLN researchers’ openness and interest in conducting research with other research partners.

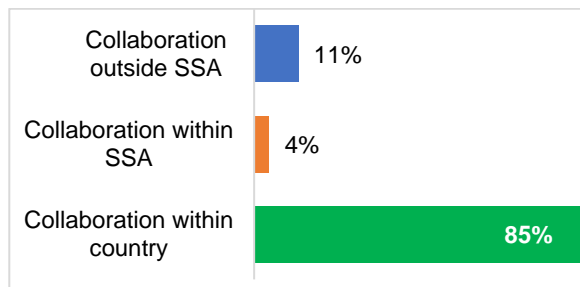
Figure 14: Research collaboration



Note: Base = 264 out of the 298 total research outputs identified. PhD theses were excluded.

When analysing studies that were the results of collaborative research, we examined their geographical distribution, to answer the question of who Kenyan FLN researchers collaborated with. This analysis shed light on the national, regional and international partnerships in FLN research.

Figure 15: Collaboration in FLN research by geographical area



Note: Base = Research outputs involving collaboration, 224. PhD theses excluded.

Figure 15 indicates that within-country collaboration dominated FLN research in Kenya, accounting for 85 percent of studies involving a collaboration. Collaboration with researchers affiliated with institutions in and outside SSA represented 4 percent and 11 percent respectively. Finally, although this openness to international research collaboration may promote greater dissemination, best practices, and sharing of expertise, the figures also raise a question about why Kenyan FLN researchers collaborated more with those based outside SSA, than those within SSA.

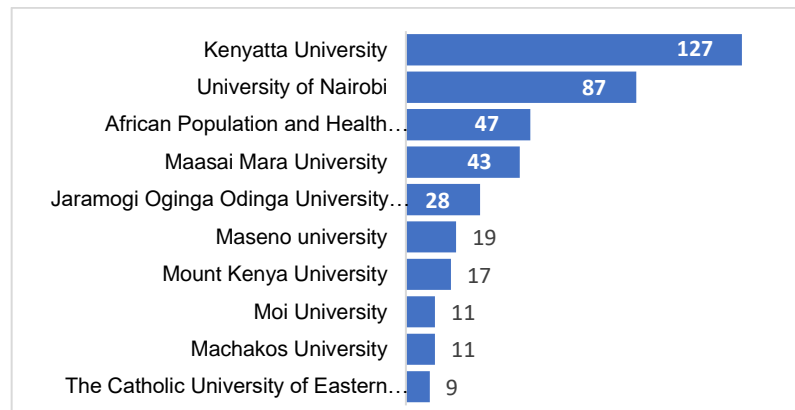
### Top FLN research institutions

Figure 16 lists the top ten institutions, based on data about the institutional affiliations of the authors of the studies we identified.

The top institutions generating FLN research in Kenya included Kenyatta University, University of Nairobi, the APHRC, Maasai Mara University, Jaramogi Oginga Odinga University, Maseno University, Mount Kenya University, Moi University and Machakos University.

Interestingly, the figures indicated that FLN knowledge production in Kenya is not only by universities, but also by non-governmental institutions, reflecting the commitment and contribution of civil society organisations to address issues related to basic literacy and numeracy skills.

Figure 16: Top 10 research institutions focusing on FLN



*Note: The total institution count exceeds total research outputs (i.e. 298). In instances where a single author contributes to multiple research outputs, the institutional affiliation of the author is counted separately for each output.*

## 5. Challenges and limitations

Mapping research published in local repositories and academic journals, and collecting the relevant metadata for this analysis, we encountered a series of challenges and some limitations that affected the analysis. Identifying the relevant literature in this study was challenging, as it involved several time-consuming steps. With no central repository where different institutions and local journals store their research outputs, we first identified and listed dozens of data sources (repositories) for the search using snowballing techniques and consulting with local researchers (see Appendix 1 for a list of sources we consulted). Then we adapted our search strategy to the capability of the institutional platforms and assessed each search result for relevant research outputs.

After identifying a relevant study, metadata such as the title, abstract, author's name, e-mail address and institutional affiliations were reported in a dedicated spreadsheet. This data collection was very time-consuming as the required data may not always be easy to find. For instance, considering papers with three or four co-authors, data on gender and e-mail addresses of the Africa-based authors were not always easy to find. Moreover, there were some rare cases where studies mentioned only surnames followed by the abbreviations of the other names of authors, which did not allow us to trace these authors' identities and gender.

Collecting data about keywords and the inequality indicators was also very demanding, as this involved reading through the papers and picking the right information. We also listed some items needed for the bibliometric analysis including funding type, the corresponding keywords, and thematic areas of the study.

One of the key limitations related to funding, where the data only considered funding sources as mentioned by researchers. Studies not mentioning any source of funding were considered non-funded. This could be misleading when interpreting data about the share of research outputs funded, since the non-provision of funding information was not a correlation for non-funded research.

The gender analysis disregarded cases where we were unable to trace the identity of certain co-authors (classified as unknown). However, to ensure robustness, we also considered data for the first authors of all the research outputs in the analysis of gender distribution. This approach delivered results supporting the gender distribution analysis considering all authors.

The data presented in this report was sourced from local databases and institutional repositories in Kenya, as well as websites, and academic portals available online. However, we recognise that some research outputs identified from African Journals Online (AJOL) and elsewhere may also be indexed in international databases such as Scopus, Web of Science, and Dimensions. Therefore, we searched for duplicates from our country-level searches (focusing on 2010-2023) and our international database searches (2015-2023, presented in a separate report) and removed duplicates from our list of outputs. Our results may not be entirely free of duplication, but we expect the number to be relatively small (for the 2010-2014 period) which should not affect our results significantly.

Finally, it is important to mention that the online search and the data collection carried out in 2023 did not account for relevant research outputs that were not available in digital formats.

## 6. Conclusion and recommendations

This report has outlined the systematic mapping of research on FLN contained in journal articles, PhD theses, books and research reports. The focus was specifically on Kenyan FLN studies published in local journals and repositories, which provided an untapped source of context-relevant knowledge not captured in most international research databases and could therefore be absent from most systematic reviews and/or evidence syntheses.

The results of analysing 298 FLN research outputs and related metadata suggested a promising landscape in Kenya, where researchers increasingly contributed to FLN knowledge production. The analysis revealed that FLN research outputs had increased between 2010 and 2023, with journal articles and PhD theses accounting for over 90 percent of the outputs. The FLN studies in Kenya resulted largely (85 percent) from collaborative research projects in country. Research collaboration in Kenya extended beyond the country-level and involved FLN researchers from other sub-Saharan African (SSA) countries (4 percent) and beyond the region (11 percent).

When assessing the thematic areas studied by FLN researchers, research topics related to basic literacy received more attention than those related to numeracy. Inequality factors within research outputs were varied, where 20 percent of studies discussed gender-related issues, but only 10 percent addressed pupils' disability. Only 11 percent of FLN research outputs were funded, and international organisations accounted for over 80 percent of the funding provided.

### Recommendations

Based on the findings from our analysis, we recommend the following for consideration by the Kenyan government, FLN researchers, national and international funders/organisations:

- **Encourage and fund regional collaboration within SSA.** Although their counterparts in SSA face similar realities at the pre-primary level, the collaborations of Kenyan FLN researchers outside of SSA are three times higher than within SSA. Promoting regional research collaboration would enable FLN-related issues at country and regional levels to be addressed, as well as

fostering regional communities of learning. A strategy to do this would be to provide research grants and develop proposals involving regional collaborations.

- **Promote under-researched topics and assessments such as basic numeracy skills and inclusive and equitable FLN.** While increasing research outputs were observed in Kenya over the period examined, some thematic areas were overlooked. Therefore, there is an urgent need to encourage research and assessments on basic numeracy skills, as they are less investigated than literacy. Similarly, knowledge gaps persist regarding research topics related to inclusive and equitable FLN, which deserve further investigation. Funders should target these areas in their efforts to generate broad and inclusive FLN research in Africa.
- **Increase funding for high-quality and large-sample FLN research.** Given that our analysis identified that just 11 percent of FLN research outputs in Kenya were funded, the government of Kenya and other multi-/bi-lateral donors need to address the current lack of local funding for FLN research. This would ensure that the research process is locally led, and addresses themes and challenges that match local agendas and priorities.
- **Researchers should disclose the funding sources of their research outputs.** Our analysis suggests that researchers should disclose their funding sources when applicable, or explicitly state no funding received, in cases where their studies are not funded. This would give FLN stakeholders a better idea of the funding situation, and how to address any challenges that may exist.
- **Develop, digitalise and regularly update data and research repositories.** There is an urgent need for university decision-makers and knowledge management officers to digitalise and regularly update knowledge repositories at the level of their institutions, as online institutional repositories are crucial in making local research outputs free and accessible.
- **Train FLN researchers on data skills to enable them to use advanced methods of data analytics.** The process of classifying the research methodologies has revealed that most quantitative research used limited samples and mainly relied on descriptive analysis. Hence, training for data skills development could enable FLN researchers to use advanced methods of data analytics in FLN knowledge production. This would also help to develop



evidence-based planning tools for use by decision-makers, to address FLN challenges in Kenya.

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## Appendices

### Appendix 1: List of organisations/institutions where searches were conducted

1. Academia	<a href="https://www.academia.edu/">https://www.academia.edu/</a>
2. African Evaluation Database (AfrED)	<a href="https://db.crest.sun.ac.za/afred/">https://db.crest.sun.ac.za/afred/</a>
3. African Journals Online (AJOL)	<a href="https://www.ajol.info/index.php/ajol">https://www.ajol.info/index.php/ajol</a>
4. African Population and Health Research Center (APHRC)	<a href="https://aphrc.org/who-we-are/">https://aphrc.org/who-we-are/</a>
5. CARI Journals	<a href="https://carijournals.org/">https://carijournals.org/</a>
6. CORE	<a href="https://core.ac.uk/">https://core.ac.uk/</a>
7. Daystar University Repository	<a href="https://repository.daystar.ac.ke/home">https://repository.daystar.ac.ke/home</a>
8. De Gruyter	<a href="https://www.degruyter.com/">https://www.degruyter.com/</a>
9. Department of Publishing and Web Development	<a href="http://publications.uew.edu.gh">http://publications.uew.edu.gh</a>
10. DSpace Repository	<a href="http://repository.dkut.ac.ke:8080/xmlui/">http://repository.dkut.ac.ke:8080/xmlui/</a>
11. East African Nature and Science Organization Journal	<a href="https://journals.eanso.org/">https://journals.eanso.org/</a>
12. Education Resources Information Center (ERIC)	<a href="https://eric.ed.gov/">https://eric.ed.gov/</a>
13. Faculty Digital Archive (FDA)	<a href="https://archive.nyu.edu/">https://archive.nyu.edu/</a>
14. Google	<a href="http://www.google.com">www.google.com</a>
15. Google scholar	<a href="https://scholar.google.com/">https://scholar.google.com/</a>
16. HeinOnline	<a href="https://home.heinonline.org/">https://home.heinonline.org/</a>
17. IATED Digital Library	<a href="https://library.iated.org/">https://library.iated.org/</a>
18. IDRC Digital Library	<a href="https://idl-bnc-idrc.dspacedirect.org">https://idl-bnc-idrc.dspacedirect.org</a>
19. Ijcab Publications Group	<a href="https://journals.ijcab.org/journals/index.php">https://journals.ijcab.org/journals/index.php</a>
20. International Institute for Science, Technology and Education (IISTE)	<a href="https://iiste.org/Journals/index.php/">https://iiste.org/Journals/index.php/</a>
21. International Journal Corner	<a href="https://www.internationaljournalcorner.com/">https://www.internationaljournalcorner.com/</a>
22. International Journal of Computer Applications	<a href="https://www.ijcaonline.org/">https://www.ijcaonline.org/</a>
23. International Journal of Education and Research	<a href="http://www.ijern.com/">http://www.ijern.com/</a>
24. International Journal of Innovative Research and Advanced Studies (IJIRAS)	<a href="https://www.ijiras.com/">https://www.ijiras.com/</a>
25. International Journal of Law, Humanities & Social Science	<a href="https://ijlhss.com/">https://ijlhss.com/</a>
26. International Journal of Research in Humanities and Social Studies	<a href="http://www.ijrhss.org/">http://www.ijrhss.org/</a>
27. International Journal of Scientific and Research Publications	<a href="https://www.ijsrp.org/">https://www.ijsrp.org/</a>
28. International Journal of Social Sciences and Information Technology	<a href="https://www.ijssit.com/main/">https://www.ijssit.com/main/</a>
29. International Knowledge Sharing Platform (IISTE)	<a href="https://www.iiste.org/book/">https://www.iiste.org/book/</a>
30. International Literacy Association	<a href="https://ila.onlinelibrary.wiley.com/">https://ila.onlinelibrary.wiley.com/</a>
31. International Peer Reviewed Journals and Books	<a href="https://www.iprjb.org/">https://www.iprjb.org/</a>
32. International Research Journals	<a href="https://www.interestjournals.org/">https://www.interestjournals.org/</a>
33. Jaramogi Oginga Odinga University of Science and Technology (JOOUST)	<a href="http://ir.jooust.ac.ke/">http://ir.jooust.ac.ke/</a>
34. Journal Issue	<a href="https://journalissues.org/">https://journalissues.org/</a>
35. Journal of Popular Education in Africa (JOPEA)	<a href="https://www.jopea.org/">https://www.jopea.org/</a>
36. Karatina University Institutional Repository	<a href="https://karuspace.karu.ac.ke/">https://karuspace.karu.ac.ke/</a>

- |  |   |
|--|---|
| 37. Kenya Methodist University                               | <a href="http://repository.kemu.ac.ke/">http://repository.kemu.ac.ke/</a>   |
| 38. Kenyatta University                                      | <a href="https://www.ku.ac.ke/">https://www.ku.ac.ke/</a>   |
| 39. LearnTechLib   | <a href="https://www.learntechlib.org/">https://www.learntechlib.org/</a>   |
| 40. Macrothink Institute                                     | <a href="https://en.macrothink.org/">https://en.macrothink.org/</a>   |
| 41. Maseno Institutional Repository (IR)                     | <a href="https://repository.maseno.ac.ke/">https://repository.maseno.ac.ke/</a>   |
| 42. MMARAU Institutional Repository                          | <a href="http://ir-library.mmarau.ac.ke:8080/handle/123456789/1">http://ir-library.mmarau.ac.ke:8080/handle/123456789/1</a> |
| 43. Moi University Journals                                  | <a href="https://journals.mu.ac.ke/">https://journals.mu.ac.ke/</a>   |
| 44. Novelty Journals   | <a href="https://www.noveltyjournals.com/">https://www.noveltyjournals.com/</a>   |
| 45. Open Academic Journals Index                             | <a href="https://oaji.net/">https://oaji.net/</a>   |
| 46. OpenUCT  | <a href="https://open.uct.ac.za/home">https://open.uct.ac.za/home</a>   |
| 47. Pan Africa Christian university institutional repository | <a href="https://lib.pacuniversity.ac.ke/">https://lib.pacuniversity.ac.ke/</a>   |
| 48. Paper Publications                                       | <a href="https://www.paperpublications.org/">https://www.paperpublications.org/</a>   |
| 49. peDOCS   | <a href="https://www.pedocs.de/">https://www.pedocs.de/</a>   |
| 50. Pwani University Research Repository                     | <a href="https://elibrary.pu.ac.ke/">https://elibrary.pu.ac.ke/</a>   |
| 51. Redfame  | <a href="https://home.redfame.com/">https://home.redfame.com/</a>   |
| 52. Research and Scientific Innovation Society               | <a href="https://www.rsisinternational.org/">https://www.rsisinternational.org/</a>   |
| 53. Research Square  | <a href="https://www.researchsquare.com/">https://www.researchsquare.com/</a>   |
| 54. ResearchGate   | <a href="https://www.researchgate.net/">https://www.researchgate.net/</a>   |
| 55. Researchjournali   | <a href="https://researchjournali.com/">https://researchjournali.com/</a>   |
| 56. Rongo University Digital Repository                      | <a href="https://rongovarsity.ac.ke/ru-repository/">https://rongovarsity.ac.ke/ru-repository/</a>                           |
| 57. Sabinet African Journals                                 | <a href="https://journals.co.za/">https://journals.co.za/</a>   |
| 58. Sage Journals  | <a href="https://journals.sagepub.com/">https://journals.sagepub.com/</a>   |
| 59. Scilit   | <a href="https://www.scilit.net/">https://www.scilit.net/</a>   |
| 60. Semantic Scholar   | <a href="https://www.semanticscholar.org/">https://www.semanticscholar.org/</a>   |
| 61. Springer Link  | <a href="https://link.springer.com/">https://link.springer.com/</a>   |
| 62. SSRN   | <a href="https://papers.ssrn.com/sol3/DisplayAbstractSearch.cfm">https://papers.ssrn.com/sol3/DisplayAbstractSearch.cfm</a> |
| 63. Taylor & Francis   | <a href="https://www.tandfonline.com/">https://www.tandfonline.com/</a>   |
| 64. The British Academy                                      | <a href="https://www.thebritishacademy.ac.uk/publishing/">https://www.thebritishacademy.ac.uk/publishing/</a>               |
| 65. The Catholic University of Eastern Africa Library        | <a href="http://ir.cuea.edu/">http://ir.cuea.edu/</a>   |
| 66. The Open University of Tanzania Institutional Repository | <a href="http://repository.out.ac.tz/">http://repository.out.ac.tz/</a>   |
| 67. University of Cape Coast Institutional Repository        | <a href="https://ir.ucc.edu.gh/xmlui/">https://ir.ucc.edu.gh/xmlui/</a>   |
| 68. University of Chicago Press                              | <a href="https://www.journals.uchicago.edu/">https://www.journals.uchicago.edu/</a>   |
| 69. University of Dar es Salaam Journals                     | <a href="http://www.journals.udsm.ac.tz/">http://www.journals.udsm.ac.tz/</a>   |
| 70. University of Nairobi                                    | <a href="https://www.uonbi.ac.ke/">https://www.uonbi.ac.ke/</a>   |
| 71. University of Nairobi Research Archive                   | <a href="http://erepository.uonbi.ac.ke/">http://erepository.uonbi.ac.ke/</a>   |
| 72. Wiley Online Library                                     | <a href="https://onlinelibrary.wiley.com/">https://onlinelibrary.wiley.com/</a>   |

## Appendix 2: Keywords and corresponding thematic areas

Thematic areas	Keywords
<b>Literacy</b>	Literacy; Reading; Writing; Speaking skills.
<b>Numeracy</b>	Numeracy; Maths, Mathematics, Mathematics Education
<b>Learning and assessment</b>	Assessment; Intervention evaluation; Household factors associated with student learning; Standards of attainment; Student motivation; Learning outcomes.
<b>Curriculum</b>	Textbooks; Curriculum reform; Curriculum relevance; Socio-emotional skills; Health education; Science education; Peace education; Value education; Environmental education; Mathematics Education.
<b>Teachers and teaching</b>	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.
<b>Social environment, facilities and institutional leadership</b>	Community participation; Local knowledge and practices; Library; Violence; Wellbeing; Home-school relations; Parental engagement; Nutrition; Infrastructure; Student voice; Leadership and management.
<b>Education access</b>	Drop-out; Progression, repetition; Enrolment; Access to education; Distance education; Alternative provision; Out-of-school children; Completion; Emergency education provision; Student attendance; Widening participation.
<b>Language</b>	Language of instruction; African languages; French language; English language; Portuguese language.
<b>Equitable and inclusive education</b>	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.
<b>ICT</b>	Learning using mobile phones; ICT in education; E-learning
<b>Policy and financing</b>	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.
<b>Other</b>	Covid-19; Intervention evaluation.

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