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GUIDANCE NOTE

EXPLORING THE FOUNDATIONAL LEARNING DATA AND KNOWLEDGE ECOSYSTEM IN SUB-SAHARAN AFRICA

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Notes

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Reviewers

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About the Unlocking Data Initiative

The Unlocking Data Initiative is a community of practice that connects African scholars, NGOs, national statistics offices and policymakers to improve access to and use of education data. The "Unlocking Data: Scaling Uses and Users of Education Data" project is a collaborative work led by Zizi Afrique Foundation and supported by Education Sub-Saharan Africa, eBase Africa, University of Malawi's Centre for Education Research and Training (CERT). The latter project, which is being implemented in Cameroon, Kenya and Malawi, aims to scale up uses and users of data to address the knowledge gap of how to adaptively scale up the effective use of existing education data by policymakers and researchers in Africa.

To find out more about us, go to https://unlockingdata.africa/. Our evidence library can be found at https://docs.unlockingdata.africa/lib/.

Contents

Figures, boxes, and tables

Abbreviations and acronyms

CBC	Competency-Based Curriculum
CERT	Centre for Education Research and Training
CSO	Civil society organisations
FL	Foundational learning
IDRC	International Development Research Centre
NGO	Non-governmental organisations

1. Introduction

This document outlines the methodological approach adopted by the '**Unlocking Data: Scaling Uses and Users of Education Data'** project to explore foundational learning (FL) knowledge ecosystems in selected African countries. It builds on existing literature on education data mapping developed by the Unlocking Data Initiative (see ↑Lawson & Heady, 2021; ↑Selwaness et al., 2022). While contributing to existing methodological tools for exploring the FL knowledge ecosystem, it also reviews the technical considerations for identifying FL data and research, as well as analysing the flow of evidence.

1.1. Background

The foundations of a child's future learning are laid in their early years. Hence, FL, the acquisition of basic literacy, numeracy, and socio-emotional skills, is essential for children's long-term educational success. In Africa, recent data indicates that children are "five times less likely to learn the basics than children elsewhere" (↑GEM Report UNESCO, 2023, p. 2). Moreover, existing evidence suggests that 'one in five primary school-age children on the continent is still out of school and a quarter will never complete primary education' (↑GEM Report UNESCO, 2023). Ignoring these challenges in Africa can have a cumulative effect over time, affecting children's chances to achieve their full potential in society.

Tackling issues related to basic education in Africa requires data, evidence, and coordination among the various stakeholders. Here, as well, challenges persist. For instance, in most African countries, existing knowledge on the state of education, including FL, is scarce, mostly invisible and scattered (↑Adam et al., 2020). Moreover, education and FL-related microdata collected by stakeholders for analysis, policy formulation and planning is often not publicly available, while collecting new primary data frequently exceeds the financial capacity of researchers and local policymakers (↑Lawson & Heady, 2021). These challenges are evident in most African countries, although they manifest in relatively different ways.

In Cameroon, for instance, ↑Pambe (2023) likens the education data ecosystem to a broken spider web, abundant in data but lacking coordination and actionable insights. In the same way, despite existing regulatory frameworks for data sharing, enforcement remains weak. As a result, stakeholders like researchers and non-governmental organisations (NGOs) play a crucial role in data collection and evidence generation. However, they often work in silos, reducing their overall impact in promoting evidence use (see ↑Pambe, 2023). Similar challenges are observed in Kenya and Malawi. In Kenya, while the Competency-Based Curriculum (CBC) encourages data integration across different evidence producers, limited grassroots engagement and data sharing

persist (see ↑Gachoki & Arisa, 2025). In Malawi, FL evidence is mainly generated by government agencies, universities, and donors. However, recent consultations indicate limited capacity within national systems to manage and disseminate data effectively and support community-led initiatives aligned with national priorities (see ↑Kadzamira et al., 2025).

1.2. Research questions / objectives

Addressing these challenges, whether related to access to basic education and learning outcomes or data and evidence flow, requires coordinated actions among national and sub-national decision-makers and non-state actors. This includes efforts to increase the availability and use of data to improve educational planning and outcomes, especially at the foundational level. The current '**Unlocking Data: Scaling Uses and Users of Education Data**' multi-country project hypothesises that the first step in doing this is to improve actors' understanding of the data and knowledge ecosystem, as well as the flow of evidence. The project is a collaborative effort involving Cameroon, Kenya, and Malawi to enhance the accessibility, utilisation, and impact of education data in sub-Saharan Africa. Box 1 provides definitions of the concepts used in this report.

1.3. Report structure

The remainder of this document is organised as follows: Section 2 outlines our approach to knowledge ecosystem mapping, while Section 3 focuses on assessing the data ecosystem. Section 4 examines methods for understanding evidence flows within the FL landscape. Finally, Section 5 presents conclusions.

Box 1. *Definitions of concepts*

1. **Foundational learning**

   Engagements with stakeholders in different countries revealed that foundational learning is known under various terms, and that there is currently no universally accepted definition. In the context of Cameroon, Kenya, and Malawi, the terms 'basic education', 'early childhood education', 'basic literacy', 'early learning', and 'lifelong skills' are mostly used to refer to foundational learning in national policy documents.

   For the mapping exercise, the consortium adopted the definition of the Global Partnership for Education (GPE), which refers to foundational learning as "[...] **basic literacy, numeracy, and transferable skills such as socio-emotional skills"** (↑Global Partnership for Education, 2023). As demonstrated by our different search strings (see Sections 3 and 4), the local terms used to designate foundational learning have also been considered to avoid missing out on important research outputs and data.

2. **Research data**

   This Guidance Note uses 'data' and 'research data' interchangeably. Research data refers to any information or records observed, generated, or created to support or use in research. For mapping foundational learning data, our focus has been on primary or secondary quantitative data — numerical information such as survey results, experimental measurements, and statistical records. Primary data is data collected directly by researchers through experiments, surveys, or fieldwork, while secondary data is data obtained from existing sources, such as government reports, published studies, or databases.

3. **Evidence or knowledge**

   Definitions of evidence vary across disciplines, and there seems to be no widely accepted definition of it in scientific research (↑Yu et al., 2024). In this document, we use the terms 'evidence' and 'knowledge' interchangeably to refer to findings obtained through the systematic search for foundational learning research outputs, which may include journal articles, research reports, books and book chapters, and PhD theses.

4. **Evidence flow**

   This Guidance Note uses the term 'evidence flow' to refer to the process through which evidence — outputs of research findings, data analyses, or empirical insights — is generated, disseminated, and used to inform decision-making and advance knowledge.

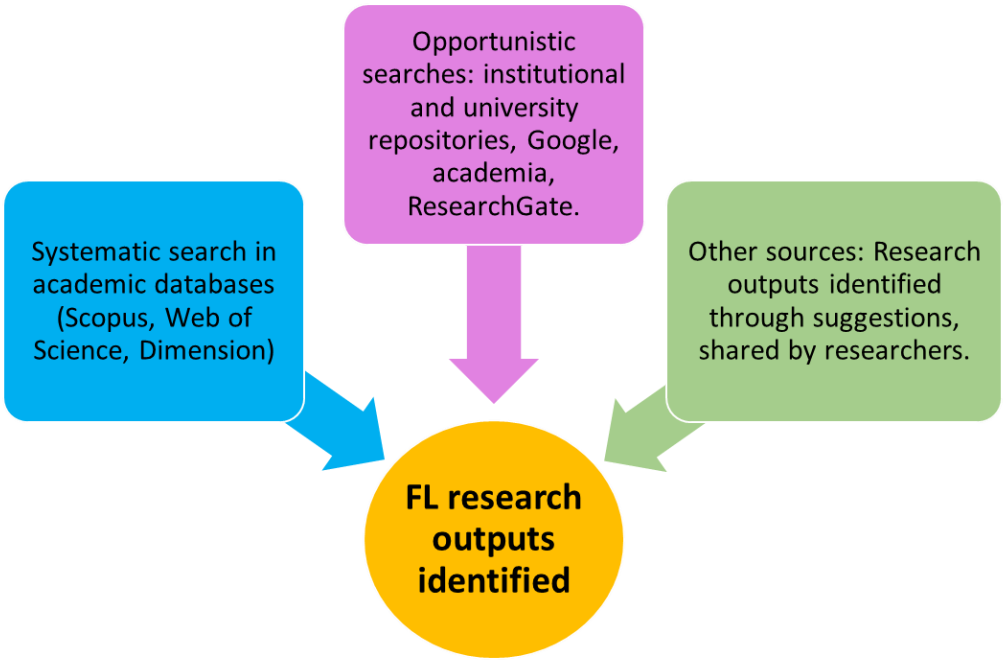
2. Knowledge ecosystem mapping

Understanding the FL knowledge ecosystem requires assessing and conducting a meta-analysis of existing research outputs targeting various characteristics. This section presents the methodological considerations for doing so.

2.1. Searches for foundational learning research outputs

FL research in Africa can be identified through various platforms, including specialised academic databases, online archives, and university repositories that host research outputs. To identify relevant FL research outputs, we used a definition stating that FL encompasses literacy, numeracy, and socio-emotional skills among children of primary school age in sub-Saharan Africa. This guided our search, ensuring alignment with a widely accepted understanding of foundational learning in the region.

Figure 1: *Systematic and opportunistic search strategy for mapping FL research in sub-Saharan Africa*



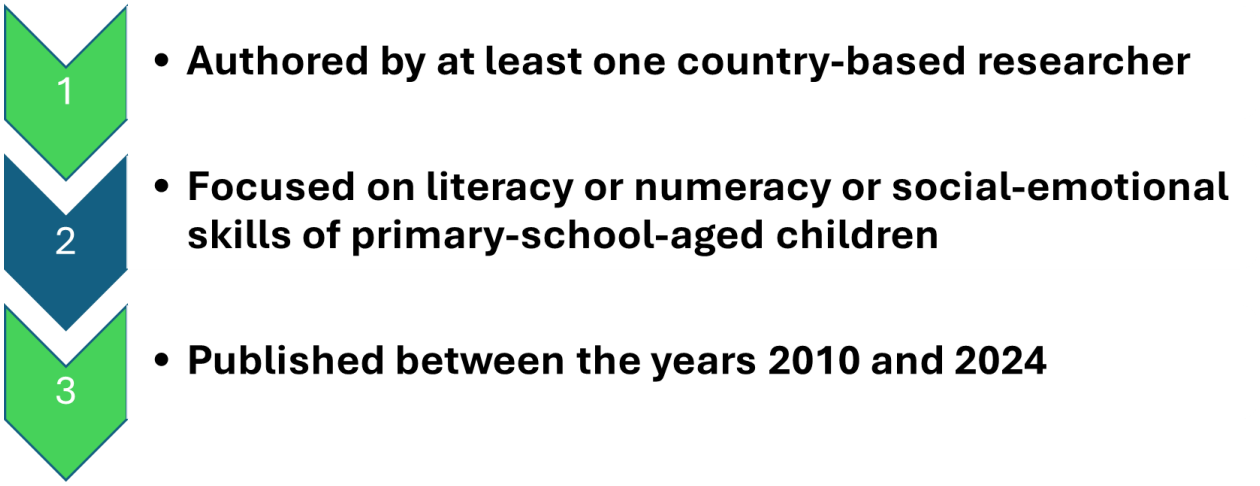
Our approach for mapping FL research in the different sub-Saharan African countries closely follows the search protocols developed by ↑Binesse et al. (2023), which proposed a detailed framework for identifying, mapping, and assessing FL research outputs in Africa. As illustrated below, our search strategy combines a systematic approach with opportunistic searches.

Specifically, to search, we developed and implemented search strings incorporating key terms encountered in the FL literature such as “foundational skills”, “basic skills”, “literacy”, “reading”, and “socio-emotional”, among others. However, while a single search string suffices for queries in international databases, local and institutional repositories require tailoring it. An example of a typical search string used is:

> Country AND (“foundational learning OR early childhood development OR early childhood education OR pre-primary education OR preschool education OR primary education OR kindergarten OR nursery school OR literacy OR numeracy OR cognitive development OR social-emotional learning OR play-based learning”.

Shorter forms of the search string above were tested for identifying FL research outputs. Finally, it was observed that the different searches for FL research outputs, independently of the repositories, may deliver results that are not relevant. Therefore, specific relevance criteria were set for selecting useful research outputs. Figure 2 presents the three main selection criteria that we suggested and used in the case of Cameroon, Kenya, and Malawi. Any research outputs identified were relevant if they met the criteria:

Figure 2. *Selection criteria*



Moreover, researchers following this Guidance Note will have to define the types of research outputs that meet the minimum quality criteria to be considered in their ecosystem assessments. Recent mapping exercises of foundational literacy and numeracy research in Ghana and Senegal considered different types of research outputs, including journal articles, PhD theses, books and book chapters (see ↑Acquah et al., 2024; ↑Diallo et al., 2024).

2.2. Metadata collection and review of foundational learning evidence

After identifying relevant FL research outputs and compiling them in a dedicated spreadsheet, the metadata on each output identified is collected. Hence, in addition to the titles and authors' names, a lot of other metadata is worth considering since it is useful for understanding the FL knowledge ecosystem. ↑Lawson et al. (2024) proposed a recent application of this approach to understanding the knowledge ecosystem in four African countries — Ghana, Kenya, Senegal, and Tanzania. Table 1 reports the main metadata needed for the analysis.

Table 1. *Metadata*

Metadata	Specific items to consider
Research outputs	Title, abstract, year of publication, authors.
Authors' data	Institutional affiliations, country, gender.
Inequality indicators considered in the study	Ethnicity, disability, gender, poverty, religion, location.
Foundational learning themes	Literacy, reading, writing, speaking skills, socio-emotional skills.
Funding data	Funded (Yes/No), funder's name, funding types.
Others	Grade levels, type of publication, source of the publication, language of the publication, county of the study, urban vs. rural setting.

Box 2. *Analysing the knowledge ecosystem*

The analysis of the mapping results followed a multistep approach to provide a comprehensive understanding of the data collected on foundational learning. ↑Lawson et al. (2024) propose an insightful analysis of metadata on foundational learning. Here are the main elements to consider:

1. **Classification of research outputs**: The outputs were organised into thematic categories (literacy, numeracy, policy, governance, etc.) to identify where most evidence was concentrated and to uncover any gaps.
2. **Quantitative review of data distribution**: Metrics such as the number of outputs per category were analysed to identify temporal trends and regional disparities in research intensity.
3. **Evaluation of data accessibility and usability**: The accessibility of data was assessed based on criteria such as open access, licensing restrictions, and data quality, with a comparative analysis between government and non-governmental sources.
4. **Stakeholder analysis**: The role of various actors (governments, research institutions, NGOs, international organisations) in generating and utilising foundational learning data was analysed, identifying challenges like lack of collaboration and systemic barriers.
5. **Qualitative contextualisation**: Insights from stakeholder discussions and document reviews explored socio-economic, political, and institutional factors influencing research, such as social inequalities and resource constraints.

3. Data ecosystem mapping

This section focuses on research data and presents our approach to mapping and analysing the FL data ecosystem. It builds on the initial methodological contributions by ↑Lawson & Heady (2021) and ↑Selwaness et al. (2022) and includes innovative strategies adopted in our ongoing FL data ecosystem analyses in Cameroon, Kenya, and Malawi.

3.1. Data stakeholders' consultation

It is crucial to gather insights from national and sub-national actors involved in education data collection and use (both supply and demand sides) to understand the landscape of FL data. This process ensures that diverse perspectives inform the understanding of data ecosystems, gaps, and opportunities.

3.1.1. Identifying key stakeholders

Effective stakeholder consultation begins with systematically identifying actors who play critical roles in the education data ecosystem. This includes entities involved in generating, analysing, disseminating, or utilising data at national and sub-national levels. Below are the key stakeholder groups to prioritise:

Researchers

Besides conducting research and disseminating research outputs, this group of actors also typically collects primary data. Therefore, it is essential to consider researchers when exploring data ecosystems. Reflecting on who the key players are in the education data landscape ensures we identify the individuals or institutions leading research efforts. Section 2 lists the researchers and experts who generate knowledge and can serve as a guide for identifying them in more detail.

Government officials

In most African countries, government officials, namely those working in ministries of education or national bureaus of statistics, are the primary education data collectors and suppliers. Given this and the fact that government officials are often the only actors collecting and sharing nationally representative data, it is essential to include them in data ecosystem assessments.

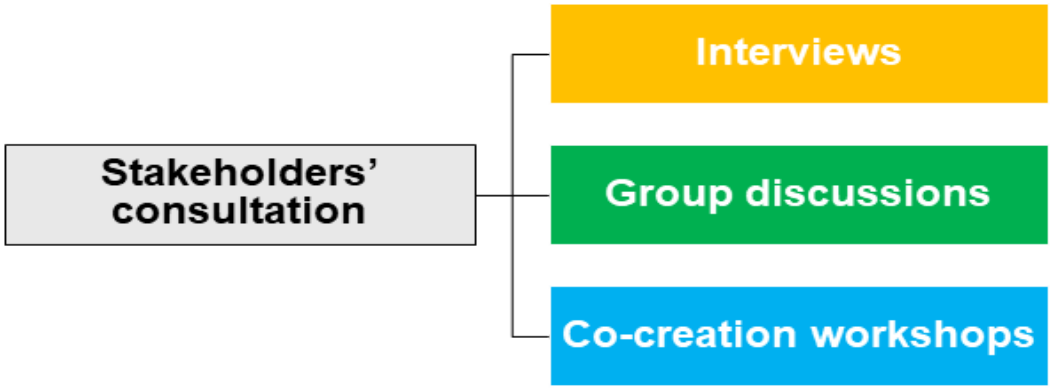
NGOs and civil society organisations

A third group to engage during stakeholder consultations includes NGOs and civil society organisations (CSOs), both local and international, involved in the supply or demand for education data and evidence. It should be noted that in addition to the key actors above, experts from international organisations and donors working in the field of FL research, policy evaluation or financing of local initiatives can also be identified and involved in this exercise.

3.1.2 Engagement strategies

Three main consultation strategies were adopted throughout our different data mapping exercises: interviews, focus group discussions, and workshops.

Figure 2: *Key methods of stakeholders' consultation*



Lessons learnt from applying these strategies in Cameroon, Kenya, and Malawi reveal that all national and sub-national stakeholders can't attend the co-creation workshops (or webinars). Group discussions at the sub-national level (in some regions or counties, for example) may prove to be more convenient engagement formats for some key players to share insights on the types of education data they collect, store, analyse, and share with other stakeholders. Similarly, interviews may be the best approach to engage with some high-level officials (or donors) to understand national data collection and sharing policies.

3.1.3 Critical topics / questions

Overall, the purpose of the engagement, which is to gather insights and perspectives on how FL data is collected, shared, and used to inform policy and practice at the country level, should be clearly explained before any critical questions are asked. Table 2 below presents the main topics to cover, independently of the engagement format.

Table 2. *Topics to cover during data ecosystem assessments*

Topics	Analytical objectives
Foundational learning policy landscape	To know and list the main policy instruments in place in the country, as well as current FL initiatives or programmes.
Data collection	To know the main FL-related indicators that are important to collect data on and how the participant's organisation collects that data. Understand current practices and challenges in collecting FL data.
Data sharing	To understand how, what data, with whom and how often the participant's organisation shares data they collected. To probe what the main barriers that prevent effective data flow / sharing are, and what incentives can help improve the flow of data sharing (e.g., lack of trust, technical limitations, policy restrictions). It is also useful to probe for enablers. To list the different sources of FL data for data tracing.
Data use	To explore participants' awareness of national or subnational policy / strategy / programme informed by data they collected. To understand participants' perspectives on challenges in using data to inform policies and practices, and how to overcome these. One can also probe the steps that could be taken to encourage greater collaboration and sharing between different actors. (e.g., establishing common data standards, creating data-sharing platforms, and building trust through transparency).
Others	Other topics / questions to investigate evidence flow among stakeholders can also be built into the various engagements.

Although these are the main topics covered during the data ecosystem assessments, depending on context, other topics could be considered and explored. For example, if a National Bureau of Statistics and other data suppliers are aware of and understand the usefulness of research outputs produced using the data they shared, this can enhance a

culture of data sharing. The latter idea can be built into the data collection instruments to probe stakeholders' awareness of the importance of sharing data.

Finally, depending on the types of participants, researchers using this Guidance Note can tailor their data collection tools to stakeholders' profiles. For instance, insights from funders of FL research and government officials regarding data collection and sharing may not be the same, since these actors play different roles in the data ecosystem.

3.2. Evidence reviews for data

Section 2 presented our approach to understanding the knowledge landscape, as well as how the evolution and focus of FL research outputs can be assessed using bibliometric analysis. Besides the research element, a review of identified research outputs is crucial to identify data, data sources, and other stakeholders involved in data collection and use, since most FL research outputs use existing data or collect primary data.

Drawing on the approach proposed by ↟Lawson & Heady (2021) and its experimentation in selected sub-Saharan African countries, we suggest reviewing existing research outputs for tracing data uses and users. If doing this, see Table 3 for some examples of items to consider.

Table 3. *Metadata to consider*

Items	Importance
Who collected the data	This informs the ecosystem analysis of the ownership of research data. This can be categorised as researchers, NGOs, CSOs, and government.
Period covered by the data	This is to inform about the timely relevance of the data.
Location / geography	This concerns the geography of the data collection and can be assessed in terms of the county or region where data is collected or the rural versus urban setting of the data collection.
Representativeness	This is to probe the national representativeness of the data and can be recorded as 'Yes 'or 'No'.
Accessibility	This item helps us understand whether the data used in a given research output is in the public domain.
FL-related variables	Which FL variables will be covered?

Besides these items, other items may be considered depending on the priorities of the data ecosystem assessment. For instance, questions related to the funder of the data collection process may be considered where this item is important to the researchers conducting the assessment.

3.3. Data search

A valuable approach to consider in this Guidance Note is an opportunistic search for research data (see ↑Gachoki & Arisa, 2025).

This strategy leverages Google Dataset Search, which, by definition, is a Google search engine that helps researchers and the general public discover publicly available datasets across the web and from various sources, including government agencies and research institutions. Concretely, this involves searching for datasets involving FL-related variables using pre-developed search strings. Applying this, we use different combinations of the following search string: “Kenya” AND (foundational learning OR early childhood development OR early childhood education OR pre-primary education OR preschool education OR primary education OR kindergarten OR nursery school OR literacy OR numeracy OR cognitive development OR social-emotional learning OR play-based learning).

It is important to note that using this data search strategy will lead to a high number of results, most of which may not be relevant. Hence, similar to the case of research outputs, we suggest carefully assessing each dataset identified for relevance. Finally, for all relevant datasets identified, the metadata suggested in Box 3 below should be collected and considered for understanding the data ecosystem.

Box 3. *Analysing the data ecosystem*

1. **Understanding foundational learning policy and national priorities**
   Data from stakeholder interviews, focus group discussions, and co-creation workshops can be used to draw a picture of the foundational learning policy landscape. This should reflect country-level efforts to improve learning outcomes at the basic level, as well as main innovations introduced by policymakers to improve access to basic education. A comprehensive example is provided by ↕Gachoki & Arisa (2025) (see p. 20) on the case of Kenya.

2. **Data systems and data availability**
   Data (and data sources) shared by stakeholders in the various engagements, combined with data retrieved from reviewing research outputs and online dataset searches, can be referenced and listed in the analysis. Moreover, the metadata collected (see Table 1) can be used to report on foundational learning data availability, geographical coverage, foundational learning indicators, and GESI (Gender, equity, and social inclusion) considerations in the data landscape, when the corresponding metadata is collected for each dataset identified / shared.

3. **Data gaps**
   The identification of data gaps derives from the metadata analyses. For instance, the regional coverage observed in existing national data repositories reveals a potential data gap. Similarly, foundational learning indicators present in the datasets identified, namely literacy, numeracy, and socio-emotional skills, can also reveal data gaps. The same rationale applies to data collected in rural versus urban settings.

4. Understanding foundational learning evidence flow

Building the analysis of evidence flow into the data and knowledge ecosystem assessment tools is crucial because understanding the dynamics of education evidence flow may help leverage data and evidence as an asset for informed decision-making in African countries. Given that contexts are different and various groups of stakeholders are involved in the education space, there is no specific blueprint for assessing the FL evidence flow. Nevertheless, we suggest considering the three following items for a comprehensive assessment.

4.1 Identifying relevant groups of stakeholders

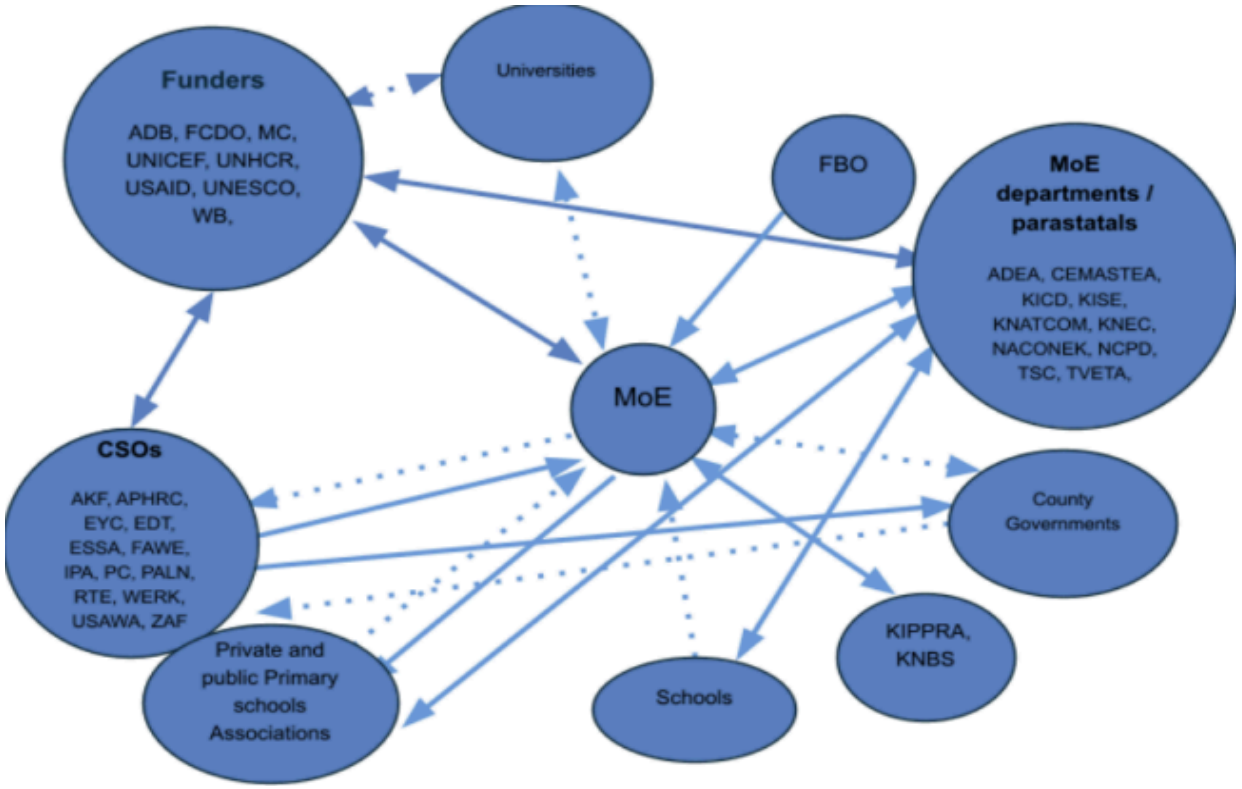
The previous steps of mapping research and data (see Sections 2 and 3) helped identify the various groups of stakeholders involved in the landscape of knowledge generation and their level of involvement. Among others, this includes users of data (researchers, CSOs, development partners), and data suppliers (national bureaus of statistics, ministries of education, researchers, and CSOs). Similarly, the exercise also identified users of research evidence (ministries of education, education institutions, and decision-makers) and suppliers of evidence (researchers, ministries of education, etc).

4.2 Flow of evidence

Insights collected during the different stakeholders' engagements and the co-creation workshop help visualise the flow of evidence among key stakeholders in the FL ecosystem. Depending on the level of interactions reported during the stakeholders' engagements, the flow of evidence between two different groups of stakeholders, for example, a ministry of education and a national bureau of statistics, may be described as a *strong link* or *weak link* (a three-point scaling system with *very strong*, *strong*, and *weak links*, is also feasible). Figure 3 below presents a graphical illustration of the flow of evidence in the FL space in Kenya, where weak and strong links have been differentiated.

Empirical applications of this approach to assess FL evidence flow to enhance uses and users of FL data in Cameroon, Kenya, and Malawi have been reported by ↑Pambe et al. (2025), ↑Gachoki & Arisa (2025), and ↑Kadzamira et al. (2025), respectively. In addition to highlighting the complexity of interactions between stakeholders in the evidence space, these case studies also highlight some of the barriers and factors enabling effective evidence flows.

Figure 3. *Graphical illustration of the evidence flow in the FL space in Kenya*



Notes: Flow of evidence between different groups of stakeholders, including universities, Faith-based organisations (FBOs), Ministry of Education (MoE), Kenya National Bureau of Statistics (KNBS), Kenya Institute of Public Policy and Research Authority (KIPPRA), CSOs and funders.

Source: ↑Gachoki & Arisa (2025)

4.3 Enablers and barriers of evidence flow

Data collected during the stakeholders' engagements is also useful to comprehend the barriers to data collection and sharing. Country-specific examples of barriers and enablers are provided in the different country reports by ↑Pambe et al. (2025), ↑Gachoki & Arisa (2025), and ↑Kadzamira et al. (2025).

The main barriers include:

- **Limited awareness and know-how —** Some data suppliers may not be aware of the importance of data sharing, while their capacity to effectively do so likely affects data sharing.
- **Cultural barriers** — Some organisations and individuals may be reluctant to share data due to competition, lack of trust, or concerns about misuse.

Some also demonstrate a data-holding culture, considering the data they collected as private.

- **Technical challenges and funding —** Poor online infrastructure and limited funding for research and data collection are among challenges identified.
- **Lack of standardisation** — Inconsistent data formats, taxonomies, and metadata structures make it difficult to integrate and share data across systems.

Enablers include:

- **Policy frameworks —** Data and knowledge-sharing-friendly policy frameworks and initiatives have been identified in selected countries. This enables education evidence flows between stakeholders in the selected countries.
- **Stakeholders' commitment and call for co-creation —** Significant sharing of knowledge generation or research outputs is the result of in-country research collaboration.

5. Concluding remarks

This document proposes a methodological guide to assess the education evidence space in sub-Saharan Africa. It draws on lessons learnt by conducting three case studies in Cameroon, Kenya, and Malawi and considering the field of FL. While it complements previous works of the Unlocking Data Initiative on education data mapping (see ↑Lawson & Heady, 2021; ↑Selwaness et al., 2022), it contributes to existing methodological tools to explore the evidence ecosystem. Concretely, the added value of this note to existing knowledge lies in two key areas. First, it combines strategies to map education evidence (outputs of research findings) and data, treating these items as two sides of the same coin. Second, it highlights the importance of understanding the flow of evidence in the education space, as this helps understand the interconnection between data, knowledge production, and evidence flow.

While the building blocks of exploring the education evidence and data landscapes are laid down in this Guidance Note, their application in the three countries considered revealed that a few challenges are worth mentioning here. First, when searching for research outputs to assess the state of knowledge in FL, we observed fragmented literature in African countries. Because of the absence of a unique repository for education research, the literature is scattered across various sources and is not consolidated; hence, it is not easily accessible. Second, in the different engagements with data stakeholders (e.g., government officials, researchers, or CSOs), some resistance to sharing data may be observed. For instance, researchers may be unwilling to share data they collected, while ministry of education stakeholders may hold crucial country-representative datasets, arguing that these are not digitised or contain politically sensitive variables. This culture of ‘holding onto data’ and the ‘fear of losing control’ of the data should be factored in and anticipated during the different engagements with the demand and supply sides of data and evidence.

Finally, since the process outlined in this Guidance Note involves identifying research, datasets, and their producers, as well as engaging with them, we recommend using these key elements to generate public goods and foster learning communities at both local and national levels. The main public goods include:

- Addressing some existing knowledge gaps identified while reviewing and conducting a bibliometric analysis of available literature.
- Sharing datasets and research outputs identified to improve new knowledge generation and evidence flow.
- Building or strengthening the existing communities of demand and supply of evidence by using data from stakeholders’ engagements.

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