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Global Education Monitoring Report

Paper prepared for the
Global Education Monitoring Report

2022 GEM Report Fellowship

Learning inequality and the attainment of global education goals: Insight from Ghana's basic school system

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2023

ABSTRACT

The deadline for achieving the Sustainable Development Goal (SDG 4.1 and 4.5) of ensuring access to quality and equitable basic education and learning skills for all children (by 2030) is only seven years away. Yet, it is unclear whether countries like Ghana and many others in the Sub-Saharan Africa (SSA) region will meet this objective, owing to inequalities that still characterise educational opportunities, notably access to learning. In Ghana's context, disparities in educational opportunities and outcomes between the predominantly rural communities in the north and the largely urbanized south, remain one of the main challenges the country must tackle if it is to achieve its education goals. But there is a key research gap at the center of a comprehensive understanding necessary to develop evidence-driven policies to reach the most marginalized. Emphasis on quantitative indicator approaches as the dominant benchmark for measuring access to learning means that the schooling and livelihood experiences that potentially tell us more about factors that shape a child's learning in different geographical settings are often unaccounted for in existing indicators on educational outcomes.

To address this gap, a sequential mixed method design was used, drawing on data from the MICS 6 foundational learning model and qualitative interviews and focus groups in rural Northern Ghana to explore inequalities in access to learning. Additionally, a framework that centers children's local environment in understanding educational equity was used to identify mechanisms that drive the formation of learning inequalities in Ghana's basic school system, focusing on rural northern Ghana. The results show that the majority of learners from Ghana's basic school system, notably lower and upper primary levels, lack access to foundational literacy skills expected at grade 2 level. There is also a deep regional dimension to learning skills access, with learners from the Northern regions having the least access. Subsequently, the study found that in the Northern regions, mechanisms that drive learning inequality are inherently borne out of the schooling and livelihood experiences (MLEs) children face in their local communities. Yet, these experiences are often not captured in the datasets that inform educational policy and strategy, to support effective policies that target the sources of inequality. The study suggests that future household survey datasets and policies to improve learning should prioritize MLEs, not only to improve existing data on educational equity, but also to allow for effective, and evidence-driven policy recommendations to address Ghana's learning challenges.

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1.Introduction

The deadline for achieving the Sustainable Development Goal (SDG 4.1 and 4.5) of ensuring access to quality and equitable basic education and learning skills for all children (by 2030) is only seven years away. Yet, it is unclear whether countries like Ghana and many others in the Sub-Saharan Africa (SSA) region will meet this objective. In Ghana, access to basic education has become more inclusive in the past two decades, as in most SSA countries, with children in remote and at-risk communities benefiting the most from the expansion of schooling opportunities (Darvas and Balwanz, 2013; Yasunaga, 2014; Lopez, Nagashima, and Ackwerh, 2020). Implementation of policies such as free basic education, school feeding programs, and education capitation programs have also led to an increase in both access and completion at unprecedented levels (Gaddah, Munro, and Quartey, 2016). For instance, enrolment in primary school jumped from 58% in 2003 to 91% in 2016 (UNESCO, 2018). Accordingly, Ghana is oftentimes presented as a success story in SSA for having managed to achieved progress in its basic education system (Bashir et al., 2018; UNESCO, 2022b).

However, disparities in educational outcomes between the predominantly rural communities in the north and the largely urbanized south, remain one of the main challenges that Ghana must tackle if the country is to achieve SDG 4 targets, and notably SDG 4.1.1. Ghana's northern/savannah regions, as a geographical area, are historically associated with lower educational outcomes in comparison to regions in the coastal and middle belt respectively (Abdulai and Hickey, 2016). Yet, besides results from basic school certificate exams that show disproportionately low levels of learning outcomes in the northern regions (Ansong etal., 2015), there is little empirical information on learning inequality from the Ghanaian context, evidence from large scale educational assessments is notably lacking.

There are three key research gaps at the center of a comprehensive understanding necessary to develop evidence-based policies to reach the most marginalized in Ghana. First, national education indicators rely on enrolment and completion statistics, and therefore underrepresent the layers of inequality that drive unequal access to learning, as opposed to schooling. Second, there is inadequate emphasis on whether regional disparities in learning have been reduced, or any in-depth understanding of the determinants behind deficits in learning outcomes distributed across regional lines. Finally, emphasis on quantitative indicator approaches as the dominant benchmark for determining educational success means that Micro-level Experiences (MLEs), such as schooling and livelihood experiences of children that shape learning in different geographical settings are unaccounted for in existing indicators on educational outcomes. MLEs and their impact on children's schooling and learning have not received adequate attention due to the limitations of data from many household surveys to account for all the factors in children's environment that underlay learning inequalities. For instance, recent studies by Savolainen (2021) using World Bank SDI data[1] show that only 29% and 36% of the variations in children's literacy skills in Kenya and Tanzania (respectively) were explained by the analytical model, whereas Loye, van Rensburg, and Ouedraogo (2022) explained only 10% of

[1] Service Delivery Indicator (SDI) is a World Bank survey that measures the quality of social sector services. https://www.worldbank.org/en/programs/service-delivery-indicators

the variations in children literacy learning in their study using a dataset from PASEC[2]. The explanatory power in these studies imply that large proportions portions of the factors that explain children's learning skills are unaccounted for in datasets on children's learning.

1.1.Research questions

This study employed a mixed method research design to go beyond national performance indicators by delving into issues pertaining to inequalities of access to learning. Specifically, it sought to address the following questions:

1. What does existing data say about learning inequality in Ghana's basic school system?
2. What factors determine children's access to learning (literacy and numeracy) skills in Ghana's basic school system?

2.Review of literature

2.1.Background and context to educational and structural inequality in Northern Ghana

Educational literature in Ghana points to a long-standing regional disparity in educational opportunities and outcomes which disadvantages regions in the north compared to those in the south (Balwanz & Darvas, 2013; Abdulai and Hickey, 2016; Afoakwah and Koomson, 2021). Educational disadvantages in the north are linked to broader disparities in socioeconomic and infrastructural development, which have both structural and colonial origins as well as partisan political associations (Plange, 1979; Brukum, 2005; Abdulai, Bawole, and Kojo Sakyi, 2018). Extant literature shows that formal education was introduced by Christian missionaries and the British colonial government 100 years later in Northern Ghana[3] than in the south. The colonial government placed less of an emphasis on social and economic development in areas, such as Northern Ghana, that offered little economic profitability in terms of exportable crops and minerals, than in the southern colony (Thomas, 1974; Abdulai, Bawole, and Kojo Sakyi, 2018). Accordingly, by 1912, only 3 schools were operational in the Northern region, then known as the Northern Territories (NT).[4] In 1919, Sir Gordon Guggisberg became the Gold Coast governor and introduced broader educational reforms and a special educational scheme to serve the needs of the NT. However, though the proposed special educational scheme aimed to improve educational standards in the NT, historical records suggest that in practice, the reforms widened the north-south education gap. Based on the new scheme, educational opportunities progressed to the university level in the south whereas education in the north was controlled and maintained at the basic level to produce handymen and clerks (Thomas, 1974). In effect, the NT were controlled to serve as a labour reserve for the colonial administration. By 1922, only five government and 2 missionary schools were operating in the entire area, with a total enrolment of

[2] Program for the Analysis of Confemen Educational Systems (PASEC) is a large-scale educational assessment conducted every 4 years at the beginning and end stages of grades 3 and 6 in French-speaking countries (including SSA) (PASEC, 2014).
[3] Northern Ghana geographically refers to the landmark covering the northern part of the Republic of Ghana.
[4] Present day Northern Ghana was formerly the Northern Territories, which was a protectorate under the British Colony of the Gold Coast between 1902 and 1956 (See Plange, 1979). In 2019, Northern Ghana was reconstituted from 3 to now 5 administrative regions (i.e., Northern region, Savannah region, North East region, Upper East region, and Upper West region), (GoG, 2019).

only 243 pupils (Thomas, 1974). While the education system has obviously greatly expanded and improved in the intervening century, these fundamental disparities have persisted through colonial and several post-colonial regimes, with very few signs of ever bridging the north-south development gap, especially in the education sector, despite several anti-poverty initiatives and programs by successive governments.

From a political perspective, literature on Ghana's political economy highlights political distribution of power among ruling coalitions as a driving factor contributing to the continued north-south development disparity, with education being a prime example. For instance, Abdulai and Hickey (2016) have provided strong evidence to show that the competitiveness of recent democratic elections in Ghana has become an incentive for the political elite to alter the targeting regime of social welfare programs, especially in the education field, to favour political capital approaches. Within this analysis, ruling political elites/parties have tended, over the years, to favour implementing educational programs that cut across wider voter constituencies where they stand to be credited for such interventions and thereby increase the legitimacy of the ruling elite, instead of following pro-equity and pro-poor targeting strategies of redistribution. For instance, while the three northern regions (now 5 regions) were known to be the most disadvantaged along several education indicators and food insecurity problems, the three regions received only 7 percent (GH¢ 3.6 million) of a GH¢ 50 million budgetary expenditures during the implementation of Ghana's School Feeding Program (GSFP) – a protection program designed to increase school enrolment and retention in the most food insecure areas (Abdulai and Hickey, 2016).

In the educational expenditure literature, Abdulai and Hickey (2016) raised issues of political targeting and skewed redistribution of basic education expenditure[5], showing vast inequalities in per-child spending for basic schools which also favors regions in the south than those in the north. In 2008 for example, per pupil spending in primary schools in the more affluent regions like Greater Accra and Eastern was 34 percent higher than the national average. However, compared to poorer Northern regions like Upper East and Upper West in the same period, the difference was more than 100 percent lower compared to the national average.

From a structural perspective, arguments have been advanced by some scholars (Harsch, 2008; Lall, Sandefur, and Wang, 2009) that natural environment conditions such as soil and climate explain the north-south development divide. The combined effect of environmental conditions relating to reduced rainfall patterns, water scarcity, and increased desertification of the area has been associated with declines in subsistence agriculture, which is the main economic activity of the population in Northern Ghana - a key factor that puts regions in the north among the poorest and most food insecure, compared to regions in the south. For instance, reports in 2016 suggest that about 40 percent of Ghana's poor lived in the three northern regions, which has only 17 percent of the national population (Molini and Pierella, 2015), and had the highest rate of people living below the poverty line (Cook, Hague, and McKay, 2016). The combination of these colonial, structural, and political factors structurally position regions in Northern Ghana as

[5] Abdulai and Hickey (2016) graphically showed differences in per child spending in basic education expenditure, which favored the Greater Accra, Ashanti, Eastern, and Central regions, with the three northern regions and the Volta region being significantly underfunded in the period between 2004 and 2008.

the most disadvantaged in both social and economic development, which is also reflected in the lower educational investment, opportunities, and outcomes in the area, compared to most regions in the South.

2.2.Researching educational inequality

The exiting literature shows two possible ways to understanding educational inequality and how they are generated and addressed from a policy perspective: a quantitative approach highlighting macro level indicators, and a qualitative approach highlighting children's micro level experiences.

The first approach uses macro-level quantitative, indicator methods to monitor and understand schooling- and learning-related inequalities, especially in countries of the global South and SSA in particular (Lewin, 2011; Lewin and Sabates, 2012; Spaull and Taylor, 2012, 2015; Iddrisu, Danquah, and & Quartey, 2017: UNICEF, 2022). Datasets from household surveys (e.g., MICS6[6], DHS[7], GLSS[8]) and Educational Assessment Programs (EPAs) are relied upon to explore individual-level characteristics and other dimensions of educational disadvantage that drive inequality in children's schooling and learning. This approach has helped to place a spotlight on situations of limitations in schooling and learning in various sub-national, national, and regional perspectives (UNESCO, 2022a). Since these datasets collect information about individual-level attributes, they also help to identify key markers and dimensions such as gender, language, household resources, etc., that are connected to children's education, providing entry points to understanding inequality. Nevertheless, by applying uniform indicators of learning skills to identify how much learning inequality is associated with certain groups of children or geographical areas, quantitative approaches may attribute the problems of learning to those individuals or areas, rather than structural problems that shape children's learning (Gillborn, 2010). Also, quantitative indicators do not yield the comprehensive understanding needed to generate concrete policy responses to the multiple levels of educational disadvantages faced by children in SSA contexts. This is because, even though existing household surveys and EAP datasets may identify who and where learning disadvantages are prevalent (i.e., rural girls or orphan boys), what to do to reverse such trends is generally less supported by such datasets because of their limited insight into children's experiences. These issues are even more important in global South contexts and SSA specifically, where the factors that account for schooling and learning inequalities are often interlocked in multiple layers of experiences such as poverty, inadequate learning resources etc., (Savolainen, 2021) that do not necessarily make it into indicators relied upon in macro-level quantitative approaches.

The second approach to research into understanding educational inequality employs qualitative methods to explore micro details of children's experiences within the school system and home environment to appreciate the factors that account for inequality (Ananga, 2011; 2012; Dunne, Humphreys, and Szyp, 2021). By design, these qualitative methods make it possible to unpack a more complex picture of background issues such as children's work or linguistic diversity that are crucial to understanding why certain learning disparities prevail in specific sub-national contexts. Importantly,

[6] Multiple Indicator Cluster Survey (MICS 6 data) is implemented by UNICEF. See https://mics.unicef.org/about.
[7] Demographic and Health Survey (DHS) is implemented by the USAID. See https://dhsprogram.com/.
[8] Ghana Living Standard Survey (GLSS) is implemented by the Government of Ghana. See https://www2.statsghana.gov.gh/nada/index.php/catalog/97/study-description.

the in-depth qualitative exploration of these background issues can support the work of constructing indicators that provide a more comprehensive understanding of learning disparities. However, qualitative approaches alone cannot generate the quantified measures and constructs that are necessary to support comparative perspectives at the global or regional scales. In addition, qualitative approaches to understanding educational inequality seldom explore all the different levels of children's environment to generate comprehensive insight into the situation of inequality.

2.3.Towards a comprehensive understanding of educational inequality-why a framework on children's local environment matters

This study is inspired by the idea of cantering children's local environment as a way of gaining a comprehensive understanding of educational and, notably, learning-related inequities in basic education systems. It therefore draws on a framework on children's local environment (ecological model) as developed by Bronfenbrenner (1979), Johnson (1994), Lee (2008), and Michell et al. (2018) to provide a conceptual guide. The ecological model situates the child at the center of multiple levels of interactions within their local environment. It emphasizes the importance of considering context and the dynamic interactions that individual children have with their environment in explaining individual behaviour and outcomes (Johnson, 1994; Foster, Louis, and Winston, 2022). This framework treats children's schooling and learning outcomes, and overall educational opportunities, as a direct consequence of the experiences they have within four critical levels of their local environment. These interactions occur at the *personal/individual level* (micro-environment), the *community or organizational level* (meso-environment), the *policy level* (macro-environment), and the *temporal level* (chrono-environment).

- **Interactions at personal/individual level** – this shows children's relationship with their immediate surroundings such as the family, friends, teachers, school, etc. that influence their schooling and learning ability.
- **Interactions at community/organizational level interaction** – this refers to the space where different personal/individual-level actors interact. For instance, the relationship between a child's family and the school system or between the church and family impacts the child's schooling and learning ability.
- **Interactions at the policy level** – this level captures the broader political environment that shape children's experience with the school system and overall educational opportunities.
- **Interactions at the temporal level** – this level revolves around issues of time (chrono-system), such as major political and livelihood events, personal transitional events, and counter-transitions that define children's livelihood and their educational trajectory (Bronfenbrenner, 1979). Though this dimension of the model is least referenced in recent literature, its temporal and transitional context makes it useful in explaining livelihood patterns in places like rural northern Ghana.

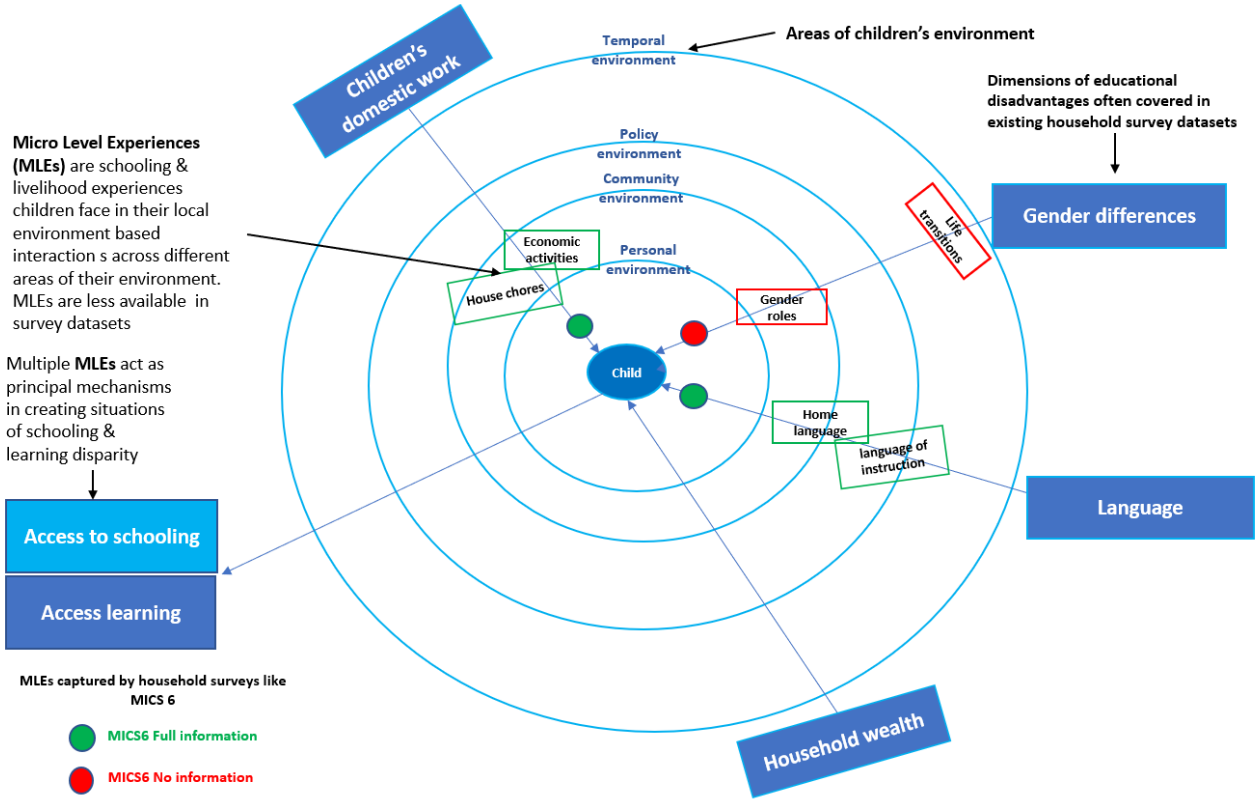
Within this framework, understanding educational inequality begins by acknowledging the diverse, contextual, and interrelated livelihood experiences that children encounter or face at the different levels of their local environment. Interaction around the different levels of the environment exposes children to multiple, interrelated Micro-*level*

Experiences (MLEs)[9]. In many disadvantaged areas in SSA, children may face multiple, and often interrelated MLEs across different areas in their local environment. Cumulatively, these interrelated experiences also define how children experience schooling and learning access. Yet, existing household survey datasets often fail to capture these MLEs, which tend to be presented as broad indicators – and thereby masking the very experiences that serve as mechanisms in driving educational inequality from existing macro-level education indicators. For instance, dataset form international household surveys like MICS 6 usually capture broad dimensions of educational disadvantage related gender differences. But what they do not show is to narrow-in on the dimension of gender to understand the different ways gender differences create disadvantage, or ways through which gender may be shaped by individual life transitions and counter-transitions like pregnancy or loss of primary caregivers. A comprehensive insight into all the factors that shape learning will make these experiences noticeable in children's environment, effectively introducing more dimensions of educational disadvantage and multiple, interrelated MLEs as presented in figure 1.

The conceptualization of children's local environment provides a lens to understand the key markers at different levels of interaction around children's environment and how these interactions, in turn, reproduce distinct micro experiences, which either support or restrain schooling and learning ability. The framework thus draws attention not only to the multiple and interrelated MLEs embedded in children's local environment that impact schooling and learning outcomes, but also the need to incorporate them into critical discourses and debates around schooling and learning access. The application of the framework suggests that a comprehensive understanding of the mechanisms behind the formation and persistence of educational inequality can only be attained through approaches and methods that consider multiple dimensions and data sources. This framework thus underscores the need for a mixed-method design that goes beyond quantitative, indicator approaches to understanding educational inequality from the perspective of what goes on in children's local environments.

[9] The term MLE in this study is used to broadly refer to the combination of layers of livelihood and schooling experiences that occur within children's local environment: in this case, within the social context of rural communities in northern Ghana.

Figure 1: *Pathways to understanding learning inequality through children's local environment.*



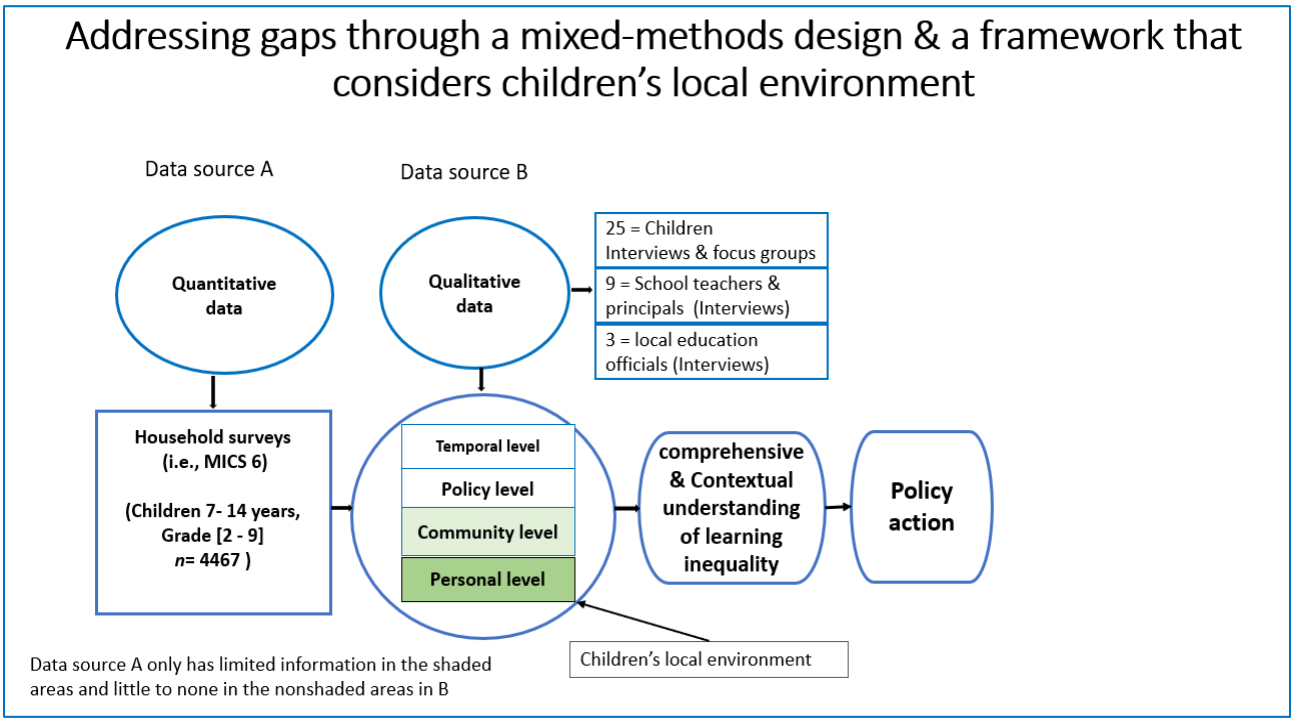
Note: **Figure 1** presents example of the dimensions of educational disadvantage and micro-level experiences (MLEs) often captured in existing international household survey datasets like MICS 6.

3. Methodology

3.1.Research design

To gain a comprehensive understanding of learning inequality in Ghana's basic school system, this study employed a mixed-method (***Quant*** → ***qual***) design, using a qualitatively driven sequential explanatory approach (Schoonenboom and Johnson, 2017) to explore multiple data perspectives to understand the situation of learning inequality. The first sequence used existing household surveys (i.e., MICS 6) to first understand the situation of foundational literacy (FL) skills and the scale of inequities associated with children's access to FL skills along national and regional dimensions, with a particular focus on northern Ghana. To understanding what is known about FL skills, the study utilized regression analysis to predict factors associated with access to FL skills within the Ghanaian basic school context. Since the quantitative exploration provides a limited version of the realities of learning inequality within the school system, the second sequence drew on qualitative tools (interviews and focus-groups) to provide contextual insight, aiming to uncover the layers of inequities at different levels of children's environment that drive unequal access to learning but remain largely under-represented in quantitative datasets. This sequential approach provided an avenue for using quantitative design to understand how much children learn in school, and who and where children are falling behind in learning, while the qualitative design provided the means to probe into MLEs that shape the learning trajectory, especially in rural northern Ghana. The combined strengths of the two methods provide a nuanced understanding of the mechanisms behind the formation of learning inequality as well effective pathways to potential appropriate policy solutions. The methodological process is explained in figure 2.

Figure 2: *Sequential mixed method design employed in the research.*



3.2.Quantitative data, sample selection, and analysis

The quantitative analysis relied on data from the 6th round of the Ghana Multiple Indicator Cluster Survey (MICS 6, 2017/2018) to quantitatively describe children's access to FL skills, drawing on the children (5-17) file. MICS is a large-scale cross-sectional survey implemented in over 100 countries and provides one of the largest global sources of internationally comparable data on women and children. The MICS 6 included, for the first time, a foundational learning assessment model, making it possible to explore learning skills relevant for the monitoring of global education goals (Hattori, Cardoso, and Ledoux, 2017). The quantitative analysis in this study therefore focuses on a sample of children in Primary and Junior High School (JHS)[10] grade cohorts for whom learning assessment data (FL skills) is available.

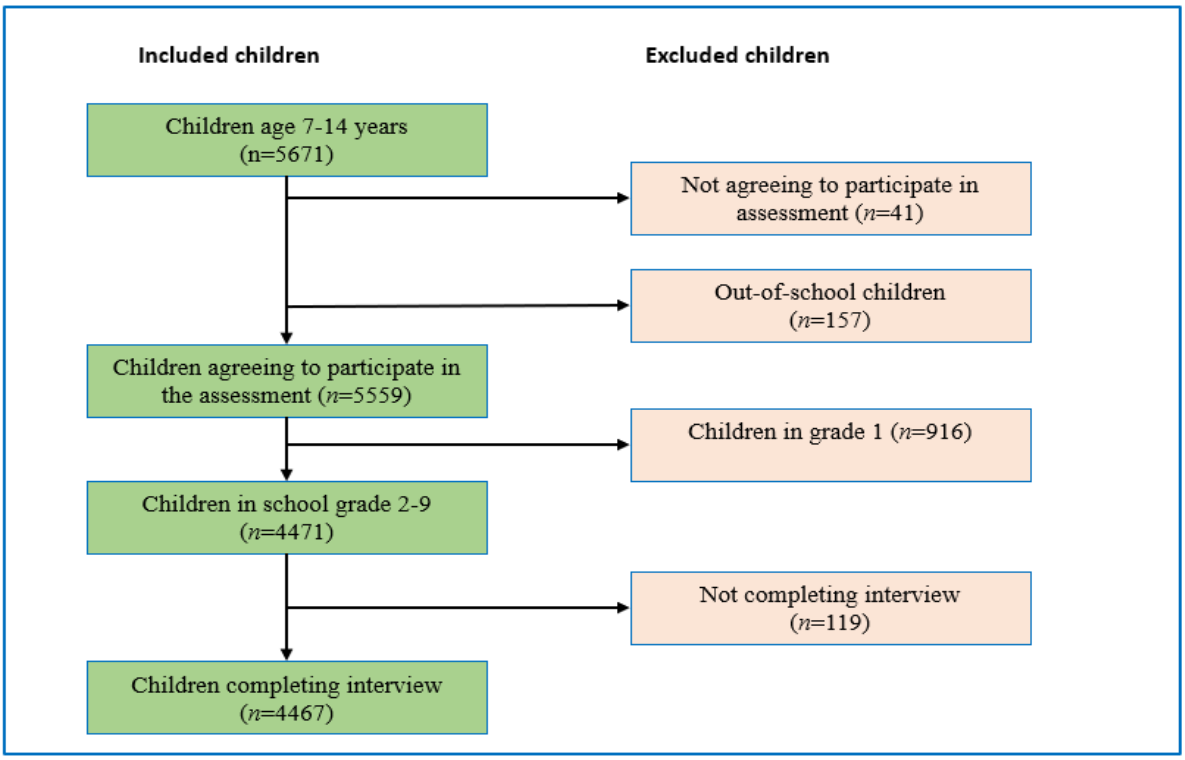
In the MICS 6 foundational learning module, assessment questionnaires comprising reading and numbering tasks were administered to children aged 7-14 years (*n= 5671*). This included an initial practice test administered to children whose parents or care takers had previously agreed to the interview. Children who passed the initial practice/screening test then qualified to be administered a foundational learning module comprising both literacy and numeracy assessments. However, the analysis of this study only focused on the literacy assessment, due to its immense importance and impact on children's overall learning ability in later stages (UNESCO, 2023). To address the objectives of this paper, the sample selection was further scaled down to capture only in-school children 7-14 years who (1) agreed to participate in the assessment (*n*= 5559), (2) fall within school-grade 2-9 (*n*= 4471), and (3) were identified as having completed the interview (*n*= 4467), effectively excluding children in school grade 1. Since the MICS 6 foundational learning assessment is designed to capture reading and numbering skills at grades 2 level (UNICEF, 2019), the assumption remained that children in grade 1 may lack the needed skill level to complete the assessment tasks - hence, the focus on children from grade 2 upwards.

Focusing on cohorts from Grades 2-9 made the MICS 6 foundational learning assessment module the most appropriate and nationally representative learning assessment dataset in the Ghanaian context for this study's analysis, as opposed to other assessment data like EGRA and EGMA[11]. First, the MICS 6 foundational learning data is internationally comparable and represents a relatively new assessment on learning outcomes in the Ghanaian context that is less understood, compared to EGRA and EGMA (Hottori, Cardoso, and Ledoux, 2017; Graham and Sean, 2018). It also provides the most recent and nationally representative data on learning outcomes in Ghana's basic school system at both national and regional levels. This offers a unique opportunity to explore learning skills from a regional perspective other than what EGRA and EGMA datasets have shown. Second, while EGRA and EGMA are grade-specific assessments and focuses only on few grade cohorts in lower and upper primary school, the MICS6 assessment, although designed to capture learning skills at grade 2 level (UNICEF, 2020), also provides learning information for all

[10] JHS refers in the Ghanaian basic school system refers to Grades 7 - 9, which is the last stage of basic education.
[11] Early Grade Reading Assessment (EGRA) and Early Grade Mathematics Assessment (EGMA) are learning assessment models designed to be adaptable in different languages https://www.epdc.org/node/5355.html

school-grade levels in the basic school system (grades 1-9). This allowed for analysis on how gaps in FL skills change as children progress though higher grades.

***Figure 3**: Quantitative sample selection*

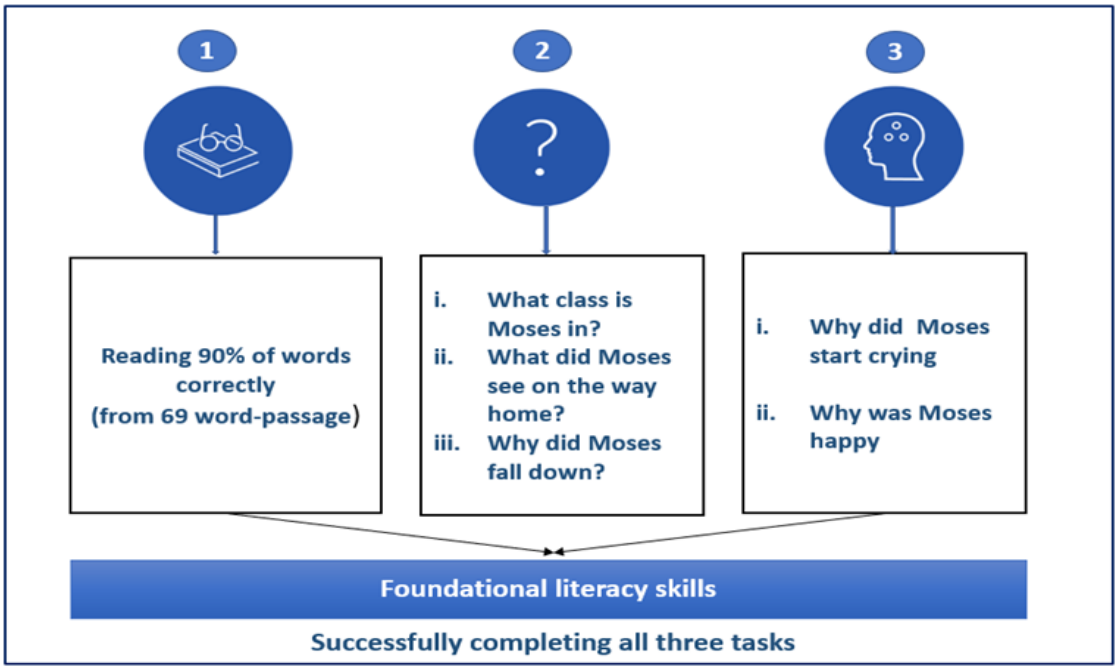


3.3.Variables and measures

Outcome variable: The outcome measure is access to FL skills in Ghana's basic education system. The measurement of FL skills in this study was based on indicators used for the MICS 6 foundational learning assessment (Hattori, Cardoso, and Ledoux, 2017), which is a composite measure of literacy and numeracy skills. However, this study only focused on FL skills as the measurement for foundational learning. It is widely acknowledged that the ability to read for meaning and write in early grades of schooling is a marker for developing improved learning skills and overall educational outcome in later life - making the development of literacy skills a priority for children in the early years of school (UNESCO, 2023).

Foundational literacy skills in this study is a binary outcome (1= correct; 0 = Incorrect), which measures access to FL skills development among basic school pupils in primary and JHS grades (2 - 9). The measurement of FL skills in the MICS 6 foundational learning module required children to complete three tasks: reading aloud a short story comprising 69 words, followed by answering three literal and two inferential comprehension questions. Children are considered to have attained FL skills if they successfully complete all three tasks under the reading assessment. The MICS6 methodology for assessing FL skills is explained in figure 2 below.

Figure 4: *MICS6 indicators for measuring foundational literacy skills.*



Source: Adapted from MICS 6 foundational learning module, UNICEF (2020).

Independent variables: To understand the situation of learning and factors that affect learning in children's local environment, this study considered a combination of variables available within the context of educational literature at the SSA level as well as relevant information from the qualitative data regarding factors that are likely to affect children's learning. Here, socio-demographic factors and background information of children such as household wealth and area of residence were considered based on their statistically significant association with children's learning outcomes, especially within the literature landscape on educational systems in developing economies (Spaull and Taylor, 2012; UNESCO, 2022). Similarly, household and school-level activities such as children's domestic work and parental involvement at home and in school were considered, which are known to be associated with literacy skills development, though most studies in this domain come from non-SSA contexts (Hottori, Cardoso, and Ledoux, 2017). These variables were considered alongside other variables on region/geographical area, school/class disruption, student-teacher language match, and use of translator, to understand how they help explain the situation of FL skills in the Ghanaian context. Outcomes for all variables were compared across four main regional/geographical areas[12] in Ghana. Full description of all the measures and how they were coded are explained in table 1.

[12] the 10 political and administrative regions of Ghana, at the time of the survey was reconstituted into four main geographic zones. The Greater Accra region though is geographically and officially part of the Coastal regions/zone, for this analysis, it was treated as a separate zone on grounds of its status as the capital city and the center of resources allocation.

***Table 1**: List of variables used in the study.*

Description of variables used in quantitative analysis.			
	Variables	**Descriptions**	**Coded**
1.	**Foundational learning skills**	Whether a student has developed literacy skills at grade 2 level as measured	0= Incorrect; 1=Correct
3.	**Area**	Place of residence of	1= Urban; 2=Rural
4.	**Region**	Identifies the regional/geographical zone of students	1= G. Accra; 2=Coastal; 3=M. belt; 4= Northern
6.	**Gender**	Sex of students	1=Male; 2= Female
7.	**Household wealth**	Socio-economic status of student's household	1=poorest; 2=second; 3=Middle; 4=Fourth; 5= Richest
8.	**Parental involvement at home**	Parental participation and support in providing conducive learning environment at home	0=low involvement; 2=high; 3= very high
9.	**Parental involvement at school**	Parental involvement in school-related activities for which parents had indicated their participation	0=low involvement; 1=high; 2=very high
10.	**Hours engaged in household chores**	Measure the number of hours per week that children engaged in house chores	0= No engagement; 1= up to 20hrs; 2= 21+
11.	**Hours engaged in economic activity**	Number of hours per week children performed work that contributes to house economic activity	0= No engagement; 1= up to 20hrs; 2= 21+
12.	**Experience of school disruption**	Inability to attend school or engage in class work due to natural or man-made constraints	0= No; 1= yes
13.	**Use of translator**	Whether or not children used a translator for either parts or whole of the interview	0= No; 1= yes
14.	**Language match**	Whether students and teachers share the same language	0=No match; 1=Match

3.4.Qualitative data in rural Northern Ghana

The qualitative component of this drew on field data collection from rural northern Ghana in spring 2021, using purposive sampling procedures to select five remote communities in three of Ghana's five northern regions[13], based on proximity and remote status. Three districts were first selected in each of the three chosen regions, followed by the selection of five communities aligning with the remote and deprived description by local education officials.

[13] Data collection took place in the Savannah Region, the Northern Region and the North-East Region

3.4.1.Research communities and schools in rural Northern Ghana

Present-day northern Ghana has evolved in its administrative composition since the colonial era. The area presently comprises five administrative regions (Northern, Savannah, North East, Upper East, and Upper West) which cover the northern half of the Republic of Ghana. Compared to the south, regions in the north are sparsely populated, with a larger share of dispersed rural settlements. Across 3 of the 5 regions, 70% -74% of the population lives in rural areas, whereas the Northern and the North East regions have 53% and 67% share (respectively) of their populations living in rural areas, according to the recent 2021 Ghana Population and Housing Census (GSS, 2022). While regions in Northern Ghana are characterized by immense linguistic diversity, they are nonetheless homogeneous along cultural and historical lines, sharing previous experiences of intermittent chieftaincy and tribal conflicts in some parts (Bogner, 2000; Awedoba, 2010; Tonah, 2012).

The five rural communities included in this study were selected from three districts, one each from the Northern, Savannah, and North East regions. The Nanumba north district, which mostly comprises Likpapaln- (Konkomba) and Nanumba-speaking[14] communities, was selected from the Northern region. The East-Gonja district, which was selected from the Savannah region is predominantly Gonja-speaking, with pockets of Likpapaln-speaking communities scattered across the district. In the Yunyoo-Nasuan district (North East Region), the communities are multi-ethnic, with Likpapaln-, Dagani-, Kusasi-, Mamprusi-, and Chokosi-speaking communities among the dominant ones. Children in schools visited in this district spoke different native languages, with English being the common language among most of the pupils. The majority of the population in all the five communities engage in subsistence agriculture. In the Northern and Savannah regions, they grow mostly yam and cereal crops. The rocky landscape surrounding selected communities in the North East region meant that farming activities in the area are restricted, largely to cereal crops such as millet, guinea corn, and maize, as well as animal husbandry. Cash crops such as Shea nut (Vitellaria paradoxa) and Cashew are also grown across all northern regions.

Three of the study communities are situated along a 138Km road network connecting the Northern region (Bimbila and Kpandai) to the Savannah region (Salaga), making these communities readily accessible by vehicle or motor-bicycle. These are mainly untarred roads, bursting with red-earth dust. Most of the schools in these communities are situated along the main road network, making them particularly exposed to the intense thick cloud of red dust which hover around the school grounds and classrooms, whenever a big truck passes through. Schools in the two communities in the North East region are quite remote and only accessible by motorbike on difficult rocky paths. Across the five communities, children who live in surrounding villages with no JHS would often walk between five to fifteen kilometers to attend school. Schools observed in all the communities differed in terms of their physical state and teaching and learning resources, such as availability of textbooks and professional teachers. Two had physical structures that were fairly new, with adequate furniture. The others, however, were in weak structures, some in worse conditions than others. These looked porous, with leaky detached roofs, such that school or learning activities would

[14] Likpapaln is the language spoken by the Konkomba people who are regarded as native in norther Ghana; The Nanumba people speak Nanum, which is classified as a dialect od Dagbani, the official Ghanaian language of the Northern region.

immediately come to a halt or be cancelled anytime it rained or the winds came in strongly. Five schools were visited, representing the five selected communities. Apart from one community, which had two schools, the remaining communities had one each. The teaching staff (both professional and volunteer) in all the schools visited were men, except in the North East Region, where one of the schools had a female teacher. All the communities had electricity, except one in the in the North East Region, even though two of the schools had no access to electricity within their structures. The physical and resource conditions in these schools appear strikingly different from schools in major cities in the northern regions and more so in the South. Generally, within Ghana's basic education setup, schools that are in resource-rich environments also tend to be better resourced in terms of human, infrastructural, budgetary, and teaching and learning resources (TLS) have better physical and teaching and learning resources needed to facilitate learning. Conversely, whereas schools in resource-poor environments also tend to lack these resources to support effective learning.

3.4.2. Qualitative sample selection, data, and analysis

A purposive and snow-ball sampling approaches were followed to select 24 school children and 21 adults as study participants (*n*= 45). Adult participants comprised 9 caregivers, 9 school teachers/principals, and 3 Local Education Officials (DOEs). Unlike in the quantitative data, selection of school children in the qualitative part only focused on students at the JHS level (grades 7-9) as opposed to using both primary and JHS students. Focusing on students at the JHS level was particularly crucial for the qualitative data collection because it enabled the participation of children who are likely to have longer years of schooling and livelihood experiences and are therefore better placed to engage in discussions about experiences that affect their schooling and learning, compared to children at the primary level.

The data collection phase used semi-structured interview, focus group discussions, face-to-face, and key informant interview formats, mostly on themes covering the collective livelihood and schooling experiences of children at their respective local environments. All qualitative data were transcribed, coded, and analyzed using a thematic analysis (Nowel et al., 2017) and with the aid of the MAXQDA (2022) qualitative software program. The coding and analysis were guided by the children's local environment framework (Bronfenbrenner, 1979; Michell et al., 2018). This helped to generate codes based on the experiences children face in the four main areas (personal, community, policy, temporal) of their environment. Emerging themes from the codes were then segregated based on two sets of livelihood experiences: (1) those labelled as broader dimensions of educational disadvantage, which are based on variables used in existing literature and household surveys (i.e., MICS 6) and (2) those labelled as MLEs that trigger educational disadvantages. The interviews and focus groups, and the management of the qualitative data was approved by the McGill University Research Ethics Board (REB 20-09-029). The data collection approach and the themes covered for the different participant groups are illustrated below in table 2 and 3.

Table 2: *Qualitative data collection methods used.*

Data collection method	#No.	Respondents	Data collection tool
• Semi-structured, individual face-to-face interviews (With students)	21	4/5 students in JHS3 per community Children interviewed included 11 females and 10 males aged between 14 and 21years	Semi-structured interview guides
• Semi-structured, individual face-to-face interviews (With school teacher/principals)	9	9 (3 per community) Interviews were conducted with 1 volunteer teacher, 1 trained teacher, and 1 school principal	Semi-structured interview guides
• Semi-structured, individual face-to-face interviews (With key informants)	3	District Education Officials (DEOs) - 1 per district All officials interviewed had over 5 years of experience of service in their district.	Semi-structured interview guides
• Focus groups. (With students)	3	3 (1 per district) Interviews were conducted with officials who had over 5 years of experience of service their district.	Focus group interview guides

Table 3**:** *Thematic areas covered in qualitative data collection.*

Thematic areas covered in qualitative interviews.			
Children's Interview	**Focus Group**	**School Teacher/Principal**	**Education Officials**
1.Demographic information	✓	✓	✓
2. Household & schooling experiences (e.g., account of daily routine before during, and after school)	**2**. Perspectives about childhood & children's work in rural northern communities	**2.** Impressions about education & schooling access in community	**2** Basic Education Access (BEA) – understanding the policy intent
2a. Gendered perceptions and experiences about schooling in rural communities	**2a.** Farming and commercial activities of children	**2a**. Community's role in education/schooling	**2a**. State of access at the local
3. Learning environment at home & in school	**3.** Schooling & learning conditions in community		**3.** Emerging themes from interaction with children
3a. Teaching academic activities in school	**3a.** Availability of teachers & teaching in community	**3a.** Learning environment and conditions in school	**3a.** Professional reaching personnel in rural communities
3b. Awareness and preparations for National Basic Education Exams	**4.** Parental/caregiver Support for education & schooling	School's participation and preparations for national basic education exams (BECE)	**3b**. Supervision in **3c**. Teaching & learning materials
4. Understanding of schooling and		**4.** Knowledge of existing basic education policy interventions in community	**4**. Policy interventions & impact at local levels
4a. The concept of childhood in rural communities – children's perspectives from	**4a**. Insight and experiences of gender roles, gendered work, & schooling & education	**4a** – Policy effectiveness **4b** – Policy challenges	**4a**. Implementation challenges **4b**. Suggested areas for improvement

4.General findings

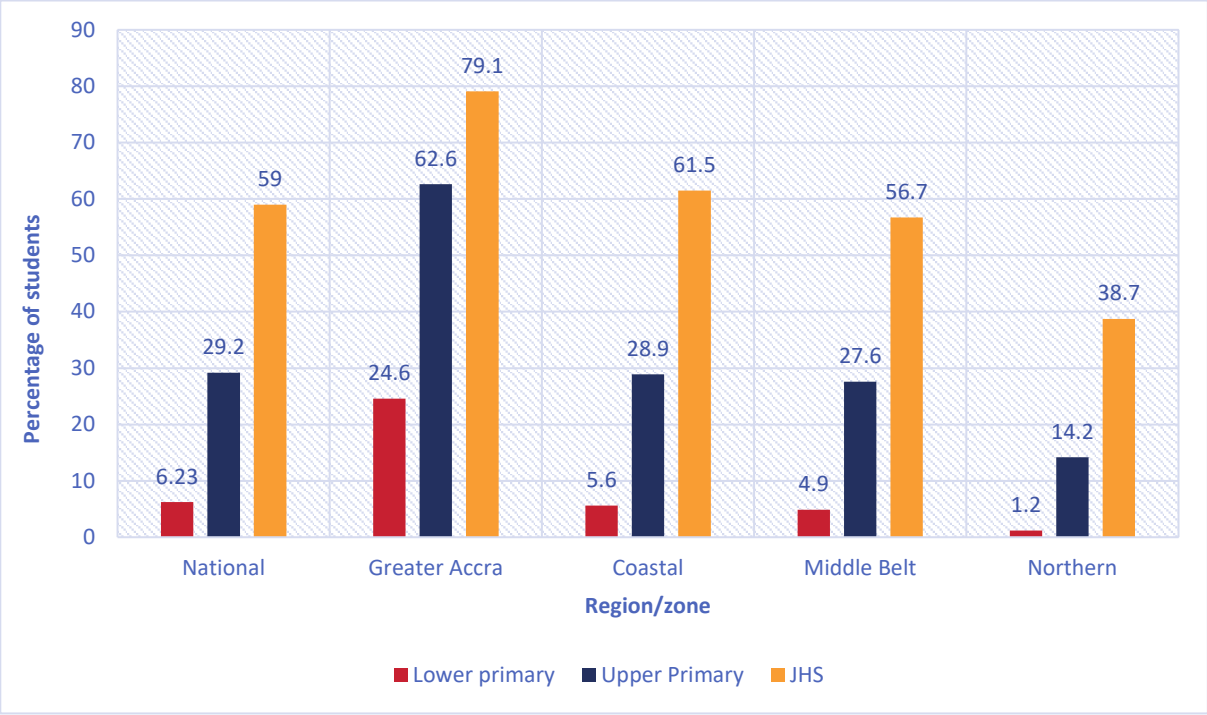
4.1.Descriptive results

The first section of the study, sought to explore what is known about access to foundational learning (i.e., literacy) skills in Ghana's basic school system. This section of the results thus presents descriptive findings on children's access to foundational literacy (FL) skills expected at grade 2 level in Ghana's basic school system, using internationally comparable educational assessment survey data (i.e., MICS6). Determination of literacy skills is based on the MICS6 indicators for foundational reading skills (UNICEF, 2020). Due to the study's focus on Northern Ghana, results in the Northern regions are compared to the national sample and the Greater Accra region, because it is the capital region and the most affluent compared to the other regions/geographical zones. Summary statistics of the main variables used in this analysis is presented in table 4 (Appendix 1).

4.1.1.What is the rate of literacy skills among basic school students

The descriptive results generally show lower levels of learning skills across all samples. On average, only 6% of lower-primary school-going children in the nation and only 29% in the Greater Accra achieved FL skills expected at grade 2 level. At the JHS, only 59% in the national sample and 79% in Greater Accra achieved FL skills expected at grade 2. However, results in the Northern regions were much lower, with merely 1% in lower primary, 14% in upper primary, and 39% in JHS achieving FL skills as shown in figure 5 (grade-specific average results are presented in Annex 2).

***Figure 5**: Proportion of students attaining FL skills across region/zone.*

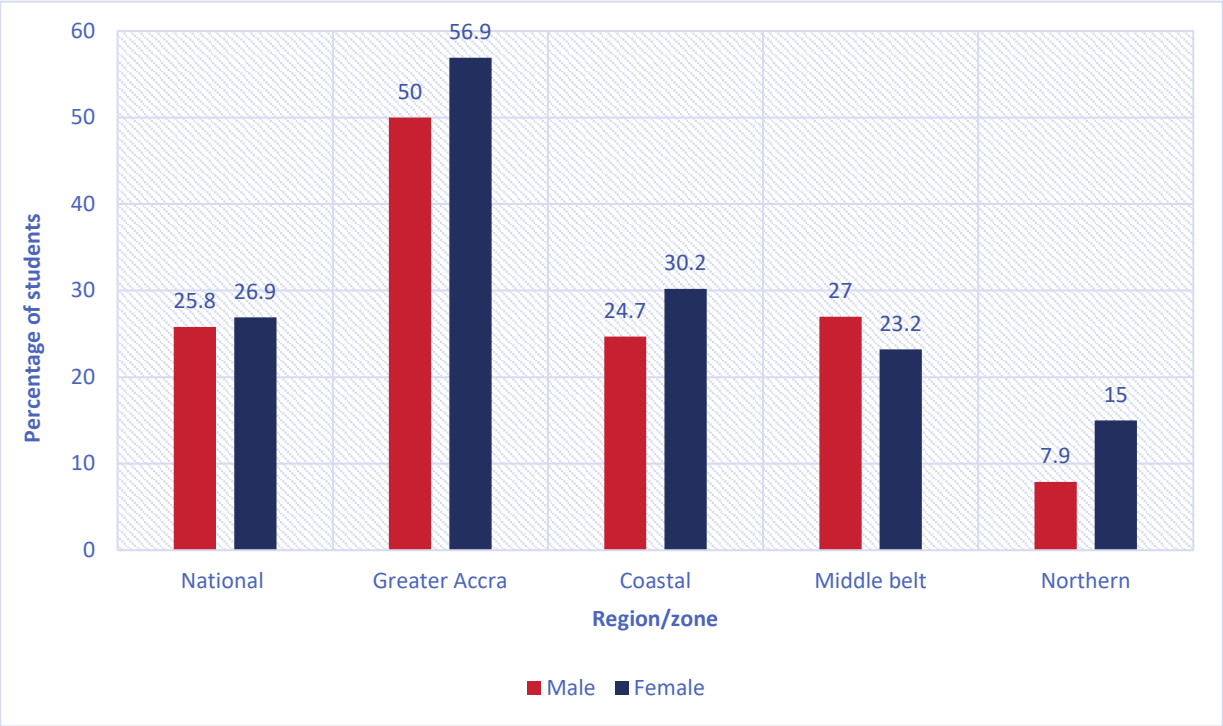


Source: Author's calculation based on MICS 6 data 2017/2018. Children's sampling weight applied.

4.1.2.Gender and rural /urban differences in literacy skills attainment

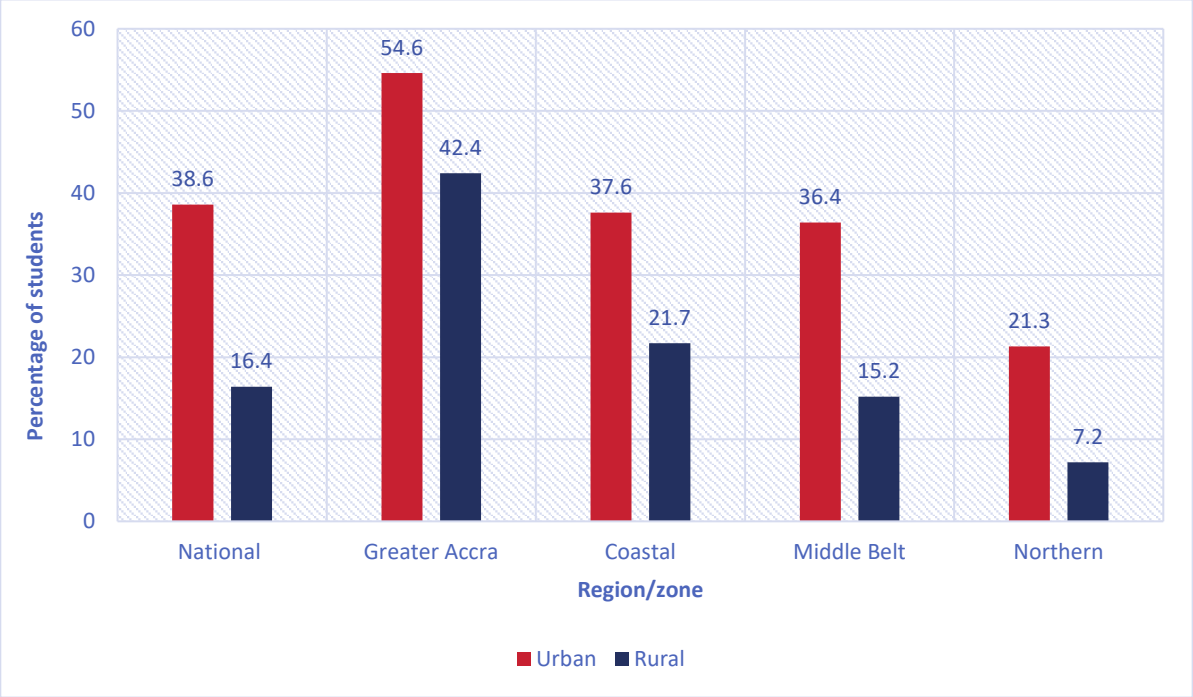
The descriptive results further show that female students were slightly better in attaining FL skills than their male counterparts in all samples, except the Middle belt. Whereas gender differences were minimal in both the national sample and the Greater Accra region, in the Northern regions, about twice more females (15%) than males (7.8%) achieved FL skills. Regarding rural urban differences, literacy skills remained lower in rural than urban areas across all regions, and lowest in the Northern regions. For instance, rural children in the national sample and the Greater Accra region achieved literacy skills at a level two times higher (16.4) and six times higher, respectively, than those in the Northern regions (7.2%). Figures 6 and 7 show the proportion of male and female, and urban and rural children attaining FL skills foundational literacy skills across national and regional samples.

***Figure 6**: Proportion of male and female students attaining FL skills across region/zone.*



Source: Author's calculation based on MICS 6 data 2017/2018. Children's sampling weight applied.

***Figure 7**: Proportion of students in rural and urban areas attaining FL skills across region/zone.*



Source: Author's calculation based on MICS 6 data 2017/2018. Children's sampling weight applied.

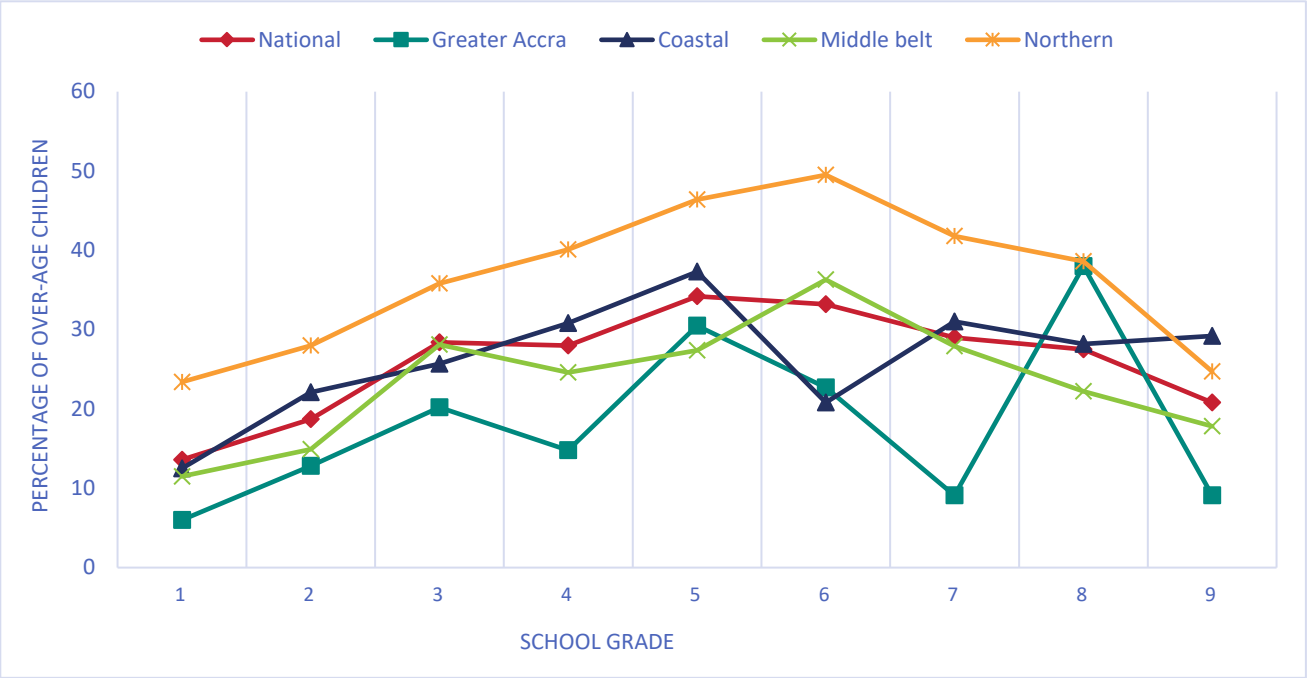
4.1.3.Over-age for grade enrolment and literacy skills

Given the prevalence of over-age enrolment in many SSA settings, and its relevance for monitoring global education goals related to SDG4.1.6 (Lewin and Sabates, 2012; UNESCO, 2022a), a descriptive analysis of over-age students for grade was performed to understand the proportions of children over-age for their school grade in the Ghanaian context, and the corresponding learning skills associated with those over-age for their grade and those with official age-for-grade. Figure 5 compares the proportion of students over-age-for grade[15] across the national level sample and the four regions or geographical zones.

The results highlight a general trend of educational disadvantage relating to age-grade enrolment that characterizes school children in the Norther regions. A higher proportion of children were over-age for their grade in the Northern regions, compared to those in the national sample and in Greater Accra. While the proportion of over-age students in the national sample increased gradually from 18% by grade 2 and peaked at 34% by grade 5, in the Northern regions, over-age students constituted about 28% by grade 2 to as high as half (50%) by grade 5. Also, students within the official age for their grades were better in achieving FL skills, compared to those over-age for their grade. For instance, 62% of children within the official age for grade 2 achieved FL skills compared to only 8% for those over-age in grade 2. Similarly, in grade 6, 29% of children within official age for grade 6 achieved FL skills, compared to 13.3%, for those over-age for 6. Proportions of students over-age for grade and their associates FL skills at the national level are respectively presented in Figures 8 and 9.

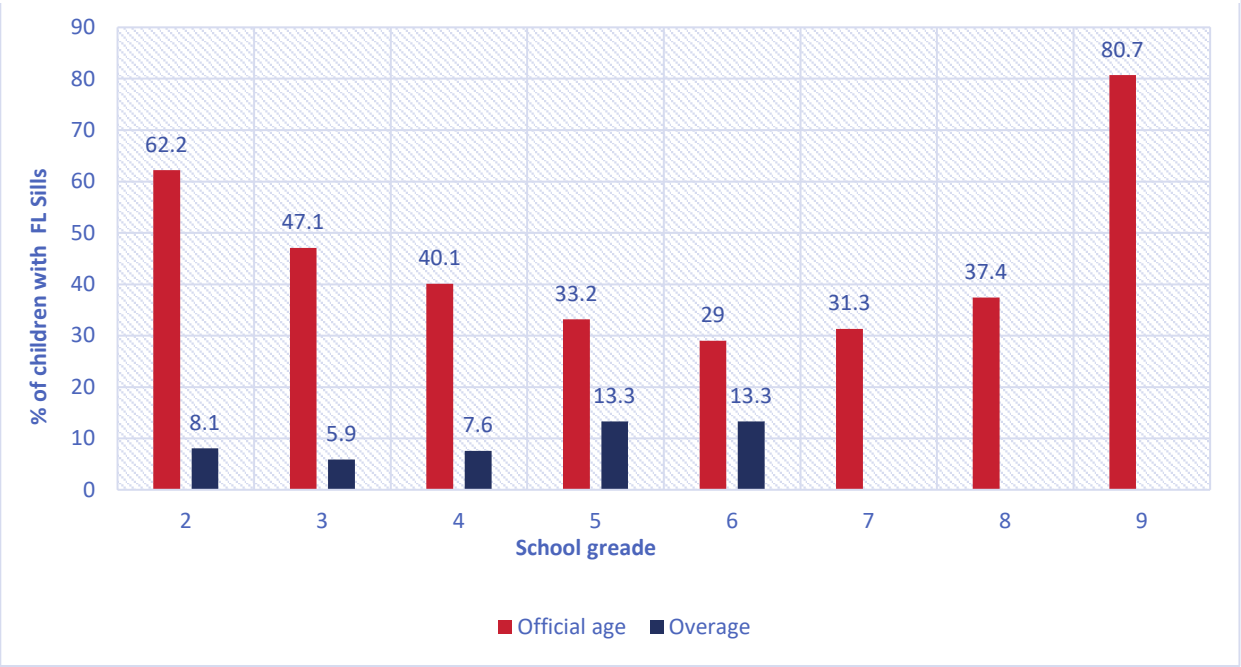
[15] Children over-age for grade is defined as the percentage of students in each grade of a given level of education of education who are at least two years older than the official age expected for that grade (UNICEF, 2020).

***Figure 8**: Proportion of children over-age for grade across region/zone*



*Note: While the sample for this study focused on children within 7–14 years, the proportions for over-age for grade children were calculated based on the sample of children 5-17 years in the children's dataset, to provide a wholistic picture of over-age for grade students within the basic school system.
Source: Author's calculation based on MICS 6 data. Children's sampling weight applied.

***Figure 9**: Proportion of students within official age for grade & over-age for grade attaining FL skills.*



*Note: Given that over-age-for grade is defined as children with at least two or more years above the official age for a grade, it was not possible using the current dataset to calculate for FL skills for over-age students in grade 7, 8, and 9, since the FL assessment questions were only administered to children 7-14 years.
Source: Author's calculation based on MICS 6 data. Children's sampling weight applied.

4.2.Combined quantitative and qualitative results.

The second part of the study sought to gain a comprehensive understanding of the schooling and learning inequities that characterize Ghana's basic school system, using quantitative and qualitative data sources to explore determinants of learning, as well as livelihood experiences in children's local environment that shape learning. The quantitative, multivariate analysis employed binary logistic regression models to predict factors associated with children's learning. Full results of the logistic regression analysis are presented in table10. However, 5 major results are highlighted in this study, which stand out in differentiating the Northern regions from the Greater Accra and the national sample, regarding factors that are important in predicting learning skills. These include gender, household wealth, very high parental involvement at home, doing up 20 hours of economic work, the use of a translator, and having a match between the language children use at home and the language teachers use in school.

Table 4: *Logistic regression results for foundational reading skills (Odds ratio)*

Read	**National**	**Region**			
		Gr. Accra	**Coastal**	**Middle Belt**	**Northern**
Area[1]					
Rural	0.55***	0.79	0.73	0.45***	0.58
	(0.743)	(0.347)	(0.147)	(0.098)	(0.170)
Gender[2]					
Female	0.91	1.39	1.20	0.61**	1.91**
	(0.107)	(0.357)	(0.239)	(0.117)	(0.522)
Household wealth status[3]					
Second	1.93***	12.53	1.74	1.58	1.85
	(0.480)	(18.604)	(0.893)	(0.650)	(0.621)
Middle	2.95***	17.62*	2.60*	2.61**	2.09
	(0.698)	(25.615)	(1.232)	(1.033)	(0.913)
Fourth	3.58***	20.82*	3.51**	3.10***	2.03
	(0.916)	(29.918)	(1.712)	(1.304)	(0.848)
Richest	9.09***	52.83***	8.54***	7.10***	3.92***
	(2.241)	(76.187)	(4.365)	(3.204)	(1.922)
Parental involvement at home[4]					
High	1.05	0.50	1.10	0.96	1.52
	(0.169)	(0.230)	(0.301)	(0.237)	(0.509)
Very high	0.89	0.39*	0.94	0.71	2.26**
	(0.145)	(0.180)	(0.268)	(0.190)	(0.832)
Parental involvement in school[5]					
High	0.94	0.51	0.88	1.16	0.66**
	(0.175)	(0.186)	(0.316)	(0.341)	(0.221)
Very high	1.10	0.46*	1.14	1.11	1.79
	(0.186)	(0.159)	(0.370)	(0.288)	(0.620)
Hours engaged in hh chores[6]					
Up to 20 hours	1.94***	1.48	2.90***	2.31***	1.16
	(0.290)	(0.445)	(0.801)	(0.576)	(0.533)
21 or more hours	1.88**	0.54	1.87	2.47	1.94
	(0.526)	(0.325)	(1.196)	(1.338)	(1.083)

Hours engaged in hh econ activity[7]					
Up to 20 hours	0.82	1.10	0.71	1.06	0.46***
	(0.110)	(0.487)	(0.163)	(0.235)	(0.126)
21 hours or more	0.58	0.06**	1.34	0.17***	0.73
	(0.233)	(0.068)	(0.860)	(0.116)	(0.583)
School disruption[8]					
Experienced at least a disruption	0.61***	0.85	0.41***	0.56*	1.29
	(0.102)	(0.406)	(0.115)	(0.160)	(0.379)
Use of tranlator[9]					
Yes	0.47	0.03***	0.38	0.54	0.69***
	(0.212)	(0.038)	(0.228)	(0.618)	(0.272)
Teacher-student language match[10]					
Match	0.71	3.35**	0.73	0.49*	0.32
	(0.149)	(1.606)	(0.304)	(0.167)	(0.117)
Key statistics					
Observation	4,464	514	1,224	1,476	1,253
Wald Chi2	307.17	43.54	91.92	142.46	99.07
Prob > chi2	0.0000	0.0004	0.0000	0.0000	0.0000
Pseudo R2	0.1336	0.1039	0.1153	0.1332	0.1784

Reference categories defined		
1 – Urban	5 – low involvement	9 – No
2 – Male	6 – low engagement	10 – No match
3 – Poorest	7 – No engagement	
4 – No involvement	8 – No disruption	

Note: Standard errors in parenthesis. ***, **, * are significance levels p<0.01, p<0.05, p<0.1
Source: Author's calculation based on MICS 6 data. Children's sampling weight applied.

In the qualitative aspect, interviews and focus groups were used to unpack livelihood experiences in children's environment which act as mechanisms that drive schooling and learning inequities. The results identified 10 broader *dimensions of educational disadvantages* and exposure to multiple, interrelated *Micro-level Experiences* (MLEs), which, when put together, act as principal mechanisms in explaining situations of learning inequality. A full presentation of these broader dimensions of disadvantages and their associated MLEs are presented in figure 10. For purposes of this paper, 5 of the 10 broader findings are explored in detail alongside the quantitative results. These include gender, children's economic work, linguistic diversity, temporal interactions, and the seasonality of farming.

Whereas a sequential design was followed in the exploration, the results for this study are presented side-by-side (both quantitative and qualitative) to emphasize the different perspectives as well as the complementarity brought to bear by findings from both data sources. This section focuses on 5 key aspects of the results which highlight the different perspectives and the complementarity of the two data sources in appreciating the depth and context of educational inequality. Importantly, these 5 results also stand out in differentiating the Northern regions from the Greater Accra and the national sample, in terms of the context and insight needed to gain a comprehensive understanding of learning inequality in Ghana's school system, and their potential implications for policy and on-going research in reducing schooling and learning inequities in Ghana.

4.3.Understanding learning inequality: What do household surveys and insights from children's local environment reveal?

4.3.1.Gender-specific interactions

This study shows that there is pronounced gender inequality associated with FL skills in the Northern region, but not in Ghana as a whole or Greater Accra. The regression results for gender showed that in the national sample and the Greater Accra, no statistically significant differences were observed between female and male children relative to FL skills acquisition. But in the Northern regions, the odds for female children attaining FL skills were 91% higher compared to their male counterparts; this result was significant at the 5% level.

The qualitative interviews and focus groups revealed instances that suggest why gender differences have statistically significant relationship with learning skills in the Northern regions. Most respondents affirmed the influence of gender-specific roles in the socialization and livelihood experiences of children in rural northern communities in ways that also shape their interaction and relationship with the broader environment. On the one hand, female students engaged in time-intensive household chores like cooking and water fetching that often limited learning time at home for girls. In focus group 2 for instance, female students talked about the multi-task nature of house-chores and its impacts on their learning ability.

> *…let me say this, especially we the girls, we don't have time, like if we just close from school, we have to go and look for water, sweep the yard, and then cook. Again, you have to wash your siblings clothing. So, if you are not a fast person, by the time you complete your tasks and begin to learn, you realize that you will be tired and be feeling sleepy. And it will be a problem to sit down and learn* [Child 6, Focus group 2, 2021].

On the other hand, some teachers also explained that male children tend to be more involved in physical and labour-intensive responsibilities such as farming, which during the raining season, often leads to absence from school for weeks or months to work on the farms. The response from teacher 3 below, illustrates this point.

> *When it rains, you won't find a boy here. At this time, we're even lucky, because they have finished harvesting the yams, so most of them are regular in school. Else, some of them can go and stay on the farms for a week to do harvesting… So it varies. When the raining season starts, which is the time to prepare the yam mounts for planting, most of the boys will be absent [Teacher 3, 2021].*

Some male students also explained what they perceived as additional responsibilities at home, such as engaging in economic work to cater for themselves and their siblings, especially in situations of migration or loss of primary caregiver(s). These care responsibilities put their schooling at a disadvantage compared to their female siblings. Overall, participants noted that female students were vulnerable in terms of general lack of time at home for learning. But they also pointed to temporal patterns of educational disadvantage for males - who sometimes missed school for weeks or months during peak farming seasons to support their parents with farm work. Consequently, these skewed economic engagements contributed to male-specific ender inequities in learning compared tofemale.

When it rains, you won't find a boy here. At this time, we're even lucky, because they have finished harvesting the yams, so most of them are regular in school. Else, some of them can go and stay on the farms for a week to do harvesting… So it varies. When the raining season starts, which is the time to prepare the yam mounts for planting, most of the boys will be absent [Teacher 3, 2021].

4.3.2.Household economic work/activity

Household economic work was a key dimension in differentiating the Northern regions from the national sample and the Greater Accra, regarding factors that determine FL skills acquisition. Economic work in this paper refers to working activities that contributes to the general household economy such as working on parents' farms, selling farm produce or other commercial activities. The regression results showed that in the Northern regions, children who performed *up to 20 hours* of economic work experienced 54% less literacy skills compared to children who did no economic work, which was statistically significant at the 1% level. But in the national sample and the Greater Accra, no statistically significant difference was observed in FL skills acquisition between children who did no economic work and those who performed up to 20 hours per week of work.

There were no qualitative data from the other regions to directly compare the nature of economic activities children engaged in. However, research participants in rural Northern Ghana, especially students and schoolteachers, perceived livelihood conditions in their environment to be a contributing factor to prevailing deficits in schooling and learning outcomes in their area. These qualitative findings align with the regression results. The majority of students in the research communities believed that unlike in urban centers in the South, poverty situations in their communities require them to engage in household economic activities to support their parents, which predispose them to several learning disadvantages. By household economic work, children generally referred to working activities performed on behalf of the household, such as farming or trade that contributes to the household economy. The statements below by child 1 & child 5 during a focus group confirm this perception.

…here in the North our parents don't have money, so we must work, unlike in the South, parents have money so when their children go to school, the only work they do is to focus on their studies. So, if your parents have money, they will allow you to learn without telling you to go to the farm. …But if there is no money and all the livelihood comes from the farm, they will always count on your help even if it affects your study time [Child1 & F5, Focus group 3].

Beyond expectations of performing household economic work, which often leads to school abstention and loss of time for learning, most children underscored other forms of economic activities that potentially constrain available time for learning at home. The majority of children indicated that they engage in *personal commercial activities*[16] such as petty trading, farming, or animal husbandry, where they sell their produce and products for personal income,

[16] Children talked about personal commercial activities as something they have ownership of, and therefore able to make their own decisions concerning the amount of work to be done and how to use income accrued from their engagement.

independent of economic work performed on behalf of parents. Child 3 shed light on his person commercial work and what he uses the money for.

> *I don't have a farm, but I have fowls that I sell if there's the need to do that. So, for example, sometimes if I get five orders, I can sell and get 50 GHC ($ 4 USD), and I will save the money and use it for important things like school fees. You know, I am the class captain[prefect] so I don't wait for teachers to ask me before I pay the fees. If I get money I just pay before our master comes to get me out of the class and disgrace me, because I have not paid* [Child 3, A 16-year male student].

Other students and to some extent, school principals, described the performance of *school work* – which takes several forms but largely comprises general cleaning work of school compound and classrooms - paid labour, where children work for the school to generate income[17], and other forms of in-kind labour work, where children extend help to individual teachers by working on their farms. Collectively, these micro-level experiences suggest the diversity in children's economic work in rural northern communities which when put together, seem to provide a base-level of disruption to learning, such that doing up to 20 hours of economic work per week in the Northern regions can pre-dispose children to learning loss.

4.3.3.Linguistic diversity in literacy skills acquisition

There were linguistic complexities that lie beneath observed literacy skills across the main regions of comparison, but more so in the Norther regions than others. The regression results showed that having a common language (language match) between the language children speak at home and the language teachers use in school is statistically significant predictor of literacy FL skills in the Northern regions and the Greater Accra, but not in the national sample. In the Greater Accra, children who shared the same language with their teachers had 335% increase in FL skills, compared to those who did not share the same language. This is statistically significant at 1% level. Yet, in the Northern regions, literacy skills reduced by 68% for children who shared the same language with their teachers, compared to those who did not (mismatch). This mismatch language advantage in learning skills in the Northern regions remain puzzling and contrary to conventional results, where children who learn in a different language, other than what they speak at home are expected to face learning challenges. The confusion with the language findings in the Northern regions was not necessarily addressed by the qualitative findings. This leaves room for few possibilities in explaining why children with language mismatch in the Northern regions outperform those with language match in literacy skill. These will be explored in the discussion section.

On the contrary, the qualitative findings showed scenarios that support conventional expectations of learning outcomes in situations where there is language mismatch. The interviews and focus groups unpacked several layers of linguistic complexities in the Northern regions that may not be adequately represented by the two categories

[17] Typically, schools use such money to cater for urgent school needs. A principal cited the example of using such proceeds to rent to vehicles (Bus) that transport students to their examination centers, to enable them to participate
in national exams (BECE) for basic school leavers. These exams are often written in urban centers, which remain further away from rural schools.

(language match/mismatch) created in the dataset. This means that it is unlikely for the full complexities of linguistic diversity in the Northern regions to be captured just by

the language match and mismatch categories. For instance, students in some communities (e.g., 2) described scenarios that suggest that not all available local languages were recorded in the MICS dataset. Child 6, a sixteen-year-old male pupil, shared this experience in his school, in the statement below.

> *Our teachers teach in English, but when it is time for Gonja lessons, the Gonja[18] master comes to teach and goes away… There are only three guys that understand Gonja in our class. If the teacher comes, we'll just be laughing and sometimes he gets angry and goes out* [Child 6,].

The experiences shared by child 6 is interesting for several reasons because, his reference to Gonja, which is the official Ghanaian Language of Instruction (LOI)[19] used alongside English, is recorded in the dataset. However, the language spoken at home by child 16 (i.e., Likpapaln)[20] as well as the majority of his school colleagues is not recorded in the dataset. In other communities, participants described situations where some students and teachers did not share any common language, apart from English, which is the official language of instruction. These situations often led to instructional difficulties, especially in areas where students lacked adequate command of English, which was most often the case. In community 5 for instance, some students indicated difficulties in comprehending all instructions in English and the fact that not all teachers speak their home-language - a situation that further complicates their learning experience and hinders the development of literacy skills.

> *They teach us in English… Ahh yes, I'm able to understand what they teach in English. But sometimes too, I don't understand… For teachers who speak our Konkomba language (Likpakaln), they will sometimes switch to Likpapaln if they see that some of us don't understand in English. So, for instance, if three people notify a teacher that they don't understand some parts of the lesson, the teacher is able to explain in Likpapaln, if he understands our language* [Child 1, children's interview, 2021).

These responses suggest multiple levels of linguistic difficulties with potentially negative impact, first, on the ability to identify language commonality between students and their teachers and second, on children's ability to develop expected literacy skills in rural northern communities.

4.3.4.Temporal life, seasonal farming, and tensions with the formal school calendar

The qualitative data showed that the pervasiveness of subsistence farming in most rural communities in Northern Ghana tends to make communities adopt a temporal life pattern based on rainfall seasons – thus making the raining season, perhaps, the most important for livelihood and the welfare of families in these communities. However, this temporal livelihood and rainfall patterns conflict with the formal school calendar, making it difficult for children to

[18] Gonja is the official GLOI in the Savannah region. But in this region are several communities that speak Likpapaln.
[19] Ghanaian Languages of Instruction (GLOI) comprises 11 local languages sponsored as the official Ghanaian (i.e., indigenous) languages to be used alongside English for instructional purposes in basic education. See USAID (2020) https://pdf.usaid.gov/pdf_docs/PA00X9JT.pdf
[20] Likpapaln is a dominant language in Northern Ghana as a whole, but not part of the GLOI.

stay in school, whenever the rains set in and there are family responsibilities to fulfil. Interviews with school teachers and principals explained children's obligation in supporting their families during this period.

> *…It's a farming community, so if it rains and your father has to work on the farms or complete his yam mounds, the child has to automatically go and help the father, no matter what. If a child is grown and can support, he has to go and support. That takes children away from school for a week, two weeks, or three weeks. A child will even go for a month…* [Teacher-Principal 4_Teacher's interview, 2021].

In communities where farming activities revolved around yam cultivation, respondents stressed the intensive nature of physical labour required to prepare hundreds and thousands of *earth mounts*[21] to be used in planting yam tubers, depending on the farm size. The nature of physical work involved in farming makes labour sharing an essential and inherent responsibility of household members, including school children, especially during the peak farming seasons. Because farming responsibilities in the raining season coincide with the basic school calendar, many children essentially prioritized their familial obligations at the expense of schooling – an outcome that predisposed children from many rural northern communities to considerable time loss away from school work. This situation creates learning disparities for children in these geographical zones. In the quantitative data, there was little to no information on temporal activities relating to seasonal farming and rainfall patterns. As a result, no conclusions could be drawn on the statistical effect temporal factors have on learning disparity across the main regions/zones of comparison.

4.3.5.Effect of household wealth on learning skills acquisition

The quantitative model analyzed household wealth effect on literacy skills acquisition across the five main samples. The results showed that household wealth status was a statistically significant predictor of learning skills in the Northern regions at the 1% level, but this was only between the richest (5^{th}) and the poorest quantiles, predicting 292% increase in FL skills for the richest compared to the poorest. Yet in both the national and Greater Accra samples, increase in FL skills was statistically significantly predicted by children in the 3^{rd}, 4^{th}, and 5^{th} quantiles, respectively. Children from the richest quantile were associated with increase in FL skills across all the samples, but the margin of increase was about twice (801%) higher in the national sample and about 17 (5183%) times higher in the Greater Accra than the Northern regions, which was associated with 292% increase. The results therefore suggest that differences in household wealth are more important for improving children's learning skills in the Greater Accra and Ghana as a whole, than they are in the Northern regions.

[21] Also locally referred to as yam mounts, these are specially prepared for planting yam suckers.

5.Discussion of findings

The quantitative and qualitative results presented in this study both highlight key issues with significant implications on how we conceptualize inequality to encompass the broader environment children learn in. This is first an important step in gaining comprehensive understanding of the complexities surrounding learning inequality in Ghana, to provide effective policy response. But this comprehensive understanding is also important for efforts aimed at improving data gathering for effective monitoring of educational/learning inequality in Ghana. These issues are explored in detail in this section.

5.1.Learning skills and learning deficits in Ghana's basic school system

The first part of this study sought to understand access to foundational learning (FL) skills and deficits associated with learning skills in Ghana's basic school system, using the MIC6 data. Specific to the Ghanaian context, there is a dearth of studies that estimate learning skills in the basic school system from the perspective of internationally comparable learning assessment datasets such as MICS 6 foundational learning module.

The descriptive findings confirm the challenging situation of learning documented in many SSA contexts: only a small proportion of school-going children achieve foundational learning skills expected at their grade level (Mizunoya, 2019; Spaul and Lilienstein, 2019; Spaul and Pretorius, 2019; UNICEF, 2022). In Ghana's context, lower levels of learning skills are also associated with immense inequality across regional/geographical lines. Among lower primary grades[22], only 6% of children in the national sample and 24% in the Greater Accra achieved FL skills expected at grade 2 level. In JHS[23] which is the final phase of basic education, only 59% of children in the national sample and 79% in Greater Accra demonstrated FL skills expected at grade 2 level. The results are far worse for children in the Northern regions, where only 1% of lower primary grade cohorts and 39% in JHS had access to FL skills expected at grade 2 level. These results reflect disproportional levels of learning inequality between children in the northern regions and those in Greater Accra.

Educational inequality between Ghana's northern and southern regions have been highlighted by previous studies and reports that looked at differences in infrastructural resources and quality of service delivery (Darvas and Balwanz, 2013; Abdulai and Hulme, 2015; Abdulau and Hickey, 2016), enrolment and completion (Senadza, 2012; Iddrisu, Danquah and Quartey, 2017; UNESCO, 2022b) and adult literacy levels (Abdulai and Hickey, 2016). Results from this study further support these findings of disproportionate levels of educational inequality in the Northern regions, specifically in foundational literacy skills. The consequences of low-quality service delivery and the poor state of educational infrastructure associated with the area, as shown in previous studies, may be one of the key reasons why learning skills in Northern Ghana appear poorer, compared to the other regions/zones.

[22] Lower primary in this study comprised only children in grades 2 and 3.
[23] JHS is the final stage of basic education in Ghana, which comprises grades 7 - 9.

The descriptive results also highlight lower literacy skills among male children and over-age children, especially in the Northern regions as another key area of concern regarding access to learning skills in Ghana's basic school system. Interestingly, the proportion of female children achieving FL skills was higher than their male counterparts, and this gender difference was twice higher for female students in the Northern regions. Descriptive results also showed a trend of increased proportion of over-aged enrolment as one moves through higher grades, and then a much bigger increase in the Northern regions compared to those in the South. Being over-age in school is associated with negative consequences for children's learning ability compared to those with the appropriate age for their grade as observed in the descriptive results (see figure 9). These results also align with existing literature in the SSA and global South context, where over-age enrolment is classified as one of the '*zones*' that lead to educational exclusion, including school completion and the mastering of learning skills (Taylor et al., 2010; Little and Lewin, 2011; Ahmed et al., 2019). This suggests that existing strategies to improve learning should necessarily seek to prevent late entry and repetition or target over-age students in school.

Overall, the learning deficits in Ghana's basic school system shown in the descriptive results align with recent studies that report on lower learning skills in SSA, using different educational assessment datasets (Pritchett, 2013; Mizunoya, 2019; Spaul and Lilienstein, 2019; UNICEF, 2022; UNESCO, 2022). Reports by Spaul and Lilienstein (2019) and UNICEF (2022) for instance, painted a *dire* picture of the learning situation in fellow West African countries like Senegal, the Gambia, Guinea Bissau, and Sierra Loen. MICS results in Sierra Leon for instance, showed only 66% of lower secondary school children[24] achieved FL skills expected at primary school level. Yet, this result in Sierra-Leon is still higher when compared to Ghana, where only 59% of the equivalent school level (JHS) achieved the expected FL skills. Comparing learning skills in Ghana to those in other West African countries show how far Ghana is away from meeting its global education goals particularly in its northern regions, even though Ghana's basic school system is widely acknowledged as a success case in SSA. Disproportionate learning deficits shown in the Northern regions suggest that if Ghana is to make progress towards meeting its global education goals, it will need to re-evaluate its existing strategies to prioritise more on areas in the North, but also, spending time to understand why disparities in educational outcomes and learning skills persist despite seeming successes in recent educational and social protection interventions.

5.2.What local experiences undermine children's learning and what implications are there for equity-based policies?

The second part of the study explored factors that help us to gain comprehensive insight into mechanisms that form learning inequality and determine children's access to learning in Ghana, focusing on rural northern communities. By analyzing quantitative and qualitative data, the study shows five key themes which highlight experiences from children's local environment that drives the formation of inequality. The implication of these experiences in understanding how learning disparities in the basic school system are formed and what this means for Ghana's approach towards equity-centred policies in education, and learning skills in particular, are discussed below.

[24] Lower secondary school in the Sierra Leone is equivalent to the JHS/JSS level in Ghana and between grades 7 and 9, internationally.

The study results showed pronounced gender inequality in access to literacy skills in the Northern regions, but not in Ghana as a whole or Greater Accra. Whereas gender did not have any effect on children's access to literacy skills in both the national sample and Greater Accra, in the Northern regions, they accounted for 91% increase in literacy skills for girls. The observation in the northern regions align with recent studies and international reports, which show that females often outperform males in literacy skills assessment. UNICEF reports (2022) on foundational learning using the MICS 6 assessment show that in most countries, the gap in reading skills tend to be 10 percentage points more for girls. But there are studies from other SSA contexts that show contrary findings. Kye's (2021) study on grade 6 pupils using SACMEQ (III) assessment reported female disadvantage in reading achievement in 15 Southern and Eastern African countries. The specific reasons for boys' underperformance, as shown in the Northern regions, is often less explained by quantitative models. The qualitative interviews and focus groups, however, provided contextual explanations on gender-specific interactions in children's environments that possibly explains learning disadvantages for boys compared to girls in the Northern regions. The strong presence of gender-specific roles in the social and cultural life of rural communities in Northern Ghana meant that on the one hand, female students were likely to engage in time-intensive house activities which often limits girls' learning time at home. On the other hand, the more physical and labour-intensive activities like manual preparation of earth mounds[25] are likely to be performed by boys, which tend to push many of them away from the classroom for weeks or months during raining seasons.

Even though females were more vocal about exhaustion due to longer hours of house chores, the economic activities, such as farming, that male children more often engaged in caused greater disruption in regular school attendance. Some teachers noted that far more male students than females abstain from class to engage in farming activities during the rainy season. This suggests the possibility that being away from school might cause more harm to learning for boys than not having enough time at home to learn, in the case of female students. The qualitative results from rural northern communities provide useful insight in explaining MLEs such as gender roles around household work and farmwork, which further explain gender differences in learning outcomes observed in the quantitative results. Despite this insight, further exploration is still needed to fully appreciate the gender dynamics around children's work and its effect on literacy skills development. However, what these discussions imply is that relying on existing household datasets alone may limit the contextual understanding required to inform what needs to be done to ensure gender parity in children's learning outcomes. This also makes MLEs such as gender roles around children's work an important area to consider in discussions around educational access and learning outcomes. Gender roles relating to longer hours of water fetching by girls or participation of more boys in farmwork may not necessarily be the target of policy. However, a contextual insight into the effect of these activities on children's schooling and learning can provide justifiable grounds to explore policy avenues that improve water accessibility in rural communities or realigning the school calendar to accommodate children's farmwork in the raining seasons.

[25] Manually prepared mounds usually refer to aspects of the physical work associated with yam cultivation. See https://www.intechopen.com/chapters/83160.

What this study also shows is that children's economic work has a detrimental effect on access to foundational literacy skills, especially in rural and disadvantaged areas. The quantitative model showed that doing up to 20 hours of economic per week did not have any effect on access to learning skills for children in the Greater Accra and Ghana as a whole. However, doing up to 20 hours of economic work predicted 54% reduction in literacy skills for children in the Northern regions. The predominantly rural nature of regions in Northern Ghana and the dominance of subsistence agriculture imply that economic work performed by children tend to be more physical and labour intensive, such as farmwork. More importantly, interviews and focus groups with participants also attribute poorer schooling and learning outcomes in the area to the resource-poor nature of the Northern regions. This means that children's interaction with their local environment often expose them to multiple, interrelated MLEs such as lack of trained teachers, learning resources, and access to water, which cumulatively provide a base-level of disruption to learning. It is possible, therefore, that performing up to 20 hours of economic work per week on top of already multiple disadvantages, pushes many children in Northern Ghana above the threshold they can bear – thus limiting access to literacy skills.

Although the dataset did not specify different dimensions of the economic work at the household, the interviews and focus groups suggest that the economic work children do has multiple dimensions that are not adequately represented in major household surveys. Household surveys like MICS capture and distinguish between household chores and household economic work. Qualitative findings from this study, however, suggest that children distinguish between different types of economic work - including not only economic activities on behalf of caregivers, but also *personal/commercial work* and *school-work* that may not be fully captured in quantitative data sets. In contrast with economic activities performed on behalf of caregivers, which they feel culturally and morally obligated to do, children talked about their personal/commercial work as something they have total ownership of, including the agency to make their own decisions on the amount of work to be done and how to use the income generated from such engagements. School work also relates to the work children engaged in either on behalf of the school or as in-kind labor support to teachers or principals, which is also seem different form activities classified under household economic work in the MICS dataset. Engagement in these forms of economic work can inherently compound the schooling and learning challenges children face in rural Northern Ghana. However, it is also worth noting here that children's engagement in economic activities like personal/commercial work or school-work are often in direct response to systemic gaps created by existing policies, which make rural schools largely resource-poor, compared to urban ones. Children therefore bear the burden of having to work on their own or for the school, to raise money for teaching and learning resources required to facilitate schooling and learning activities.

There is sufficient evidence in Ghana (Ananga, 2011; Casely-Hayford et al., 2013; Dunne, Humphreys, and Szyp, 2021) and other SSA contexts like Tanzania (Levison, DeGraff, and Dungumaro 2017) regarding the performance of various forms of school-work by children in rural communities, but not so much on children's personal/commercial activities. Both forms of economic work widely resonate with views expressed by majority of the participants in this study as evidenced in the qualitative interviews and focus groups. However, it is unlikely for these areas of economic work to

be considered in the current construction and measurement of household economic work by MICS, since most children do not necessarily refer to such activities as part of their household economic work experience. Even though the quantitative model identified children's economic work as a determinant of literacy skills in Northern Ghana, it is only through the interviews and focus groups that unpack the context surrounding children's economic work and how it affects learning time in school. Such context specific understanding of MLEs relating to personal work and school-work helps to directly connect these experiences to broader conversations about educational and learning access in resource-poor schools. What this means is that effective policy strategies to improve learning skills do not necessarily target children's economic work, but rather improve resource-poor schools in rural communities to acceptable minimum standards. This in essence, can prevent children from having to work to afford their schooling needs.

The study also found linguistic problems to be an important factor in understanding learning disparity in Ghana's basic school system. Linguistic challenges associated with children's learning have received widespread attention in the education literature in SSA, partly because it remains the only sub-continent where children often start school in a language they are unfamiliar with and their teachers may not have adequate command of (Brock-Utne, 2010; Ouane and Glanz, 205, 2011; Mkandawire, 2017; Lyytinen et al., 2019). This assumption resonates with findings from this study, though there were other complexities about the role of language in learning unexplained by this study, especially in the Northern regions. For instance, the quantitative findings in the Northern regions showed situations where learning skills increased for children whose home language was different from the language teachers use to teach. That is, mismatch language advantage in learning skills compared to those with language match. Though unconventional, similar findings were also observed in recent analysis using the MICS 6 dataset, where there was evidence of mismatch language advantage in literacy skills, but mostly in SSA the context (UNICEF, 2022). These results are confusing and remain counter-productive to expected conventional findings. But this is neither well explained in the qualitative insight nor in the existing literature.

One possible explanation offered for this confusion in the existing literature has been one of second language advantage in educational systems. The peculiar situation in many SSA countries like Ghana, where students learn in a language (i.e., English) that is different from their mother tongue creates a natural outcome of language mismatch in the classroom (van Pinxteren, 2022). And because many of these students experience access to teaching and instructional materials in English than are likely to experience in their home language – this naturally leads to better performance, regardless of conditions of language mismatch (UNICEF, 2022, van Pinxteren, 2022). Yet, this explanation does not entirely reflect the results highlighted in this study, given that the mismatch-language advantage in learning skills was not observed in Ghana as a whole but particularly in the Northern regions.

The second possible explanation comes from the qualitative findings highlighted in this study. The complexity of language as observed in the Northern regions may not be adequately represented by the language categories (match/mismatch) available in the dataset, given the fact that only the Ghanaian Languages of Instruction (GLOI) were captured in the dataset, as observed in Community 3. The language diversity in the Northern regions is such that there

are several communities where the dominant language spoken in those communities remain different from the official language (GLOI) of the region they are geographically located. This may often increase the language disparity between students and teacher in many rural northern communities than it is likely to occur in the south (USAID, 2018). In research community 3, which is in a *Gonja-speaking* region and where the official (GLOI) is Gonja, yet the children in this community mostly speak the *Likpapaln language*, which is not part of the GLOI policy and neither represented in the Dataset. Though there are opportunities to identify whether teachers and children share a similar language, yet the intricate details seen in the example from community 3 is difficult to observe from the existing dataset. These explanations notwithstanding, also do not sufficiently address the central confusion observed in the quantitative findings in Northern Ghana - pointing to the fact that more research is needed to fully unpack the language dynamics and how it affects children's learning outcomes, especially in areas where languages are diverse and complex.

The qualitative findings further showed that livelihood and welfare in rural communities in Northern Ghana are closely tied to seasonal farming and rainfall patterns, which makes communal life to be structured along temporal patterns. But in doing so, children are often drawn away from school to help their families, which predispose them to time loss and learning challenges. Such situations of tension between traditional life patterns and the formal school system that create educational disadvantages have also been reported in pastoral communities in Kenya and East Africa in general (Siele, Swift, and Krätli, 2013). Paying close attention to the temporal patterns and interactions surrounding children's local environment can thus help us to observe and understand more about schooling and learning disparities that occur in the Ghanaian context and how best to address them through policy. However, since existing household surveys like the MICS6 contain little to no information on MLEs surrounding children's temporal environment, we miss the contextual insight they bring to bare in understanding learning-related inequalities and how to address them. For instance, insight from children's temporal environment in this study reveal how subsistence farming and rainfall patterns are central to livelihood and welfare of families, to the extent that key social activities, including schooling, are dictated by the temporal patterns of farming and rainfall and not vice versa. Whereas majority of children focus on schooling during the off-peak farming season, and only participate in farmwork during after-school-hours and on weekends, this pattern reverses during peak-farming seasons, where the weight of children's responsibilities shifts away from schooling to helping their parents on the farms. This tension between seasonal farming and the formal school calendar means that spending weeks away from school is likely to remain a perennial learning challenge for many school children in rural northern communities. A clearer understanding of this context is important for any policy solution seeking to mitigate farming related effects on children's learning, and where policy needs to target.

Unfortunately, the inability of household survey datasets like MICS to gather information on children's temporal environment means that there is a lesser likelihood of observing *educational disadvantages* and the various interrelated MLEs associated with this important area of children's environment. This is where the application of a model framework on children's local environment becomes essential. First, because it provides the first step towards conceptually understanding learning inequality beyond just what happens in the classroom. That is, moving beyond the measurement of cognitive assessment on learning to embracing critical interactions in children's local

environment that shape their learning. Secondly, it also shows the value of accounting for other factors that shape learning in household surveys, when determining the extent of inequality and its distribution across national and reginal dimensions. This shows that the more information future household surveys can gather on key areas of children's temporal environment, the easier it is to observe their effect on learning, and the more effective it is to target specific mechanisms/MLEs that create learning disparity from policy perspective. Recent studies have reported on countries such as Ethiopia and Tanzania, which have designed flexible curricula to serve the educational needs of pastoral communities (Alemu and Solomon, 2019; Ochieng and Waiswa, 2019). This is a policy strategy Ghana can learn from in effort to reduce disproportional learning disparities in its Northern regions, to gain any chance of ever achieving its development goals related to SDG 4.1 and 4.5

Finally, the study results highlight wealth status of households as an important predictor of children's learning outcome (i.e., literacy skills) in Ghana's basic school system. This is reflected in studies from SSA and other global South contexts, where children from poorer backgrounds are identified to be more predisposed to schooling and learning disadvantages than those in wealthier households (Darko and Vasilakos, 2020; Savoleinen, 2021). But again, there are regional differences in the Ghanaian context. Household wealth differences are far more important for improving learning skills in the national sample and the Greater Accra than they are in the Northern regions. For instance, being in the top 20% of the richest households in the Greater Accra was 17 times (5183%) more likely to improve literacy skills than the top 20% of the richest households in the Northern regions (292%). This suggests that other factors may be far more important in predicting children's literacy skills in the Northern regions than the wealth status of households. Knowledge of these factors and how they improve children's learning skills are therefore important for achieving learning equity in Ghana. Some of these factors entail those highlighted in the qualitative results and discussions.

What this result also suggest is the importance of situating the use of household wealth measurements in surveys like MICS and how they apply to urbanized regions like Greater Accra and the predominantly rural regions in the North into proper perspective, especially in terms of their impact on children's schooling. Whereas individual assets such as access to farmlands or ownership of motorcycles may be more associated with wealth in rural northern communities than household appliances such as fridge or computers, household income may also offer a more meaningful assessment of wealth in urbanized areas like Accra. This implies that developing a standardized measure of wealth to apply to both rural and urban livelihood standards as is often the case in household surveys may be problematic in determining their real effect on learning. This is because not all the items factored into the calculation have the same cultural/local connection to wealth, and as a result, the same relevance for schooling and learning activities in rural and urban settings (Mtapuri, 2011).

The qualitative interviews and focus groups did not explore specific items rural communities associated with wealth status, therefore not much insight was gained regarding what items or assets had meaningful connection to children's schooling and learning. Yet, there were indications from some parents who identified themselves as non-natives in

their settled communities regarding challenges in accessing farmlands for farming purposes. While information from care-givers were excluded in the analysis, this provides some insight into culturally appropriate assets that tends to matter most to households in rural northern communities, especially if one considers the fact that care-givers who have access to farmlands, are also able to assign sections of their land to their children, for their own private commercial activities to support schooling needs. This shows that gathering separate information on assets and income may be useful in gaining better understanding of their respective effects on learning skills. From a policy perspective, this can help to better identify what rural and urban households need most to improve learning skills.

5.3.Centering on MLE's broadens how we conceptualize inequality to address existing gaps

The results from interviews and focus groups provide two critical areas that we can focus on to advance how we understand learning inequalities in Ghana's basic school system and how we can effectively monitor where inequalities are most prevalent, which demographic groups are most affected, and who and where should be the target of policies that aim to reduce disparities.

The first area of focus this study brings attention to is the ability to trace the mechanisms that give rise to inequality. By using a framework that centers children's experiences in their local environment to understand learning inequality, this study is able to put a spotlight on the key areas of children's interaction in their environment that shape their schooling and learning trajectory. The responses from participants point to experiences around gender roles, children's economic work, and tensions between the farming season and educational calendar. These experiences can be labelled as broader *dimensions of educational disadvantage* because they reinforce conditions that create educational inequality and exclusion.

However, each dimension of educational disadvantage children face is the outcome of exposure to multiple and interrelated MLEs at different levels (i.e., personal community, policy, and temporal) of their environment – making these MLEs principal mechanisms in the formation of educational inequality. Therefore, knowledge of the individual *dimensions of educational disadvantages* may still not be enough to fully appreciate the context and dynamics behind the forms of inequality children face unless the various interrelated MLEs are put into perspective. For instance, even though the regression results showed gender as a dimension associated with learning disadvantage for boys in the Northern regions, there was little context regarding how gender differences become a source of disadvantage for boys than girls, especially when many studies point to engagement in longer hours of house chores as limiting learning time for females than males (Dunne, Humphreys and Szyp, 2021). In this study, however, the exploration of MLEs around gender roles in children's environment revealed more male involvement in farmwork, which often led to abstention from school. While these two areas (dimensions of educational disadvantages + MLEs) remain essential for a comprehensive understanding of existing learning inequalities in the Ghanaian context, it is practically difficult to gain this comprehensive insight form existing household surveys due to inadequacies in capturing all the possible information on both key areas.

The second area of focus this study brings our attention to is the potential for improving datasets from household surveys with the necessary information on children's experiences that provide detailed and better insight into educational inequalities in the Ghanaian school system. As shown in the quantitative findings, current household surveys (i.e., MICS6) have limited information on all the important areas (i.e., personal, community, policy, and temporal) of children' local environment to allow for a comprehensive insight into prevailing schooling and learning inequalities. This data/information gap can be bridged by centering children's experiences in their environment as priority areas for data gathering, especially, in areas where little to no information exit in existing datasets. The findings and discussions, for instance, showed that in areas such as the personal and community environments, some, but not all of the core areas of experiences (dimensions of educational disadvantages and MLEs) that emerged in the qualitative findings are captured in the MICS 6 dataset. In other areas such as the policy and temporal environments, little to no information exist at all - limiting our ability to fully understand mechanisms that drive the formation of inequality in existing household surveys that inform educational policy.

The assumptions presented above are supported and explained by both quantitative and qualitative findings in three main ways. The first is that the findings of the study show situations where existing household surveys (MICS 6) only capture information on the broader dimensions associated with educational disadvantages but do not identify the mechanisms (as expressed through MLEs) that drive the formation of inequality. This can be observed in the findings on gender, where though gender differences are identified as a broader dimension associated with learning disparities, yet the context of how gender interacts with the environment (through MLEs) to enable disparity were unaccounted for in the quantitative model. Consequently, this creates a situation where we can know more about the dimensions associated with learning disparity, but not know much about the mechanisms through which these dimensions affect children's ability to learn.

Second, the findings also help us to observe situations where existing household surveys capture information on some aspects of the dimensions of educational disadvantages and some information on the mechanisms (MLEs) that drive inequality, but not all of the mechanisms are accounted for. This can be observed in the findings on children's economic work. The quantitative model showed children domestic work as a dimension associated learning disparity, whereas MLEs such as household chores and household economic activities as possible mechanism that limits children's learning opportunities.

Finally, the study's findings also help us to observe situations where little or no information at all is captured by existing household surveys, neither on the dimensions of educational disadvantage nor the MLEs that drive inequality, as observed in the findings on temporal life and its tensions with the school calendar. Here, experiences concerning the seasonality of rainfall and subsistence farming, which were seen as crucial aspects of livelihood and wellbeing in rural communities also created tension with the basic school calendar and longer periods of abstention from school. The transitional nature of these experiences is such that it often occurs at the temporal environment.

The common theme that runs through all the three situations presented above relates to the broader limitations of existing international household surveys to fully unpack educational inequalities prevailing in different areas in the Ghanaian context, especially in rural northern communities. The findings and discussions thus suggest that centering the experiences children face in their local environment in debates around equity in educational access can provide the needed framework to deal with the diverse equity challenges facing Ghana's basic school system, including addressing the following gaps:

- Conceptual gaps in how we understand educational inequality to embrace disadvantages in livelihood experiences in one's local environment.
- Data gaps in terms of improving existing survey datasets with locally relevant information that shape children's educational trajectory and opportunities.
- Monitoring gaps in terms of presenting accurate picture of educational indicators at both national and sub-national levels.
- Policy gaps that ensure that national policy options and strategies to address inequalities are effectively targeted at people who need it.

6.Conclusions and policy recommendations

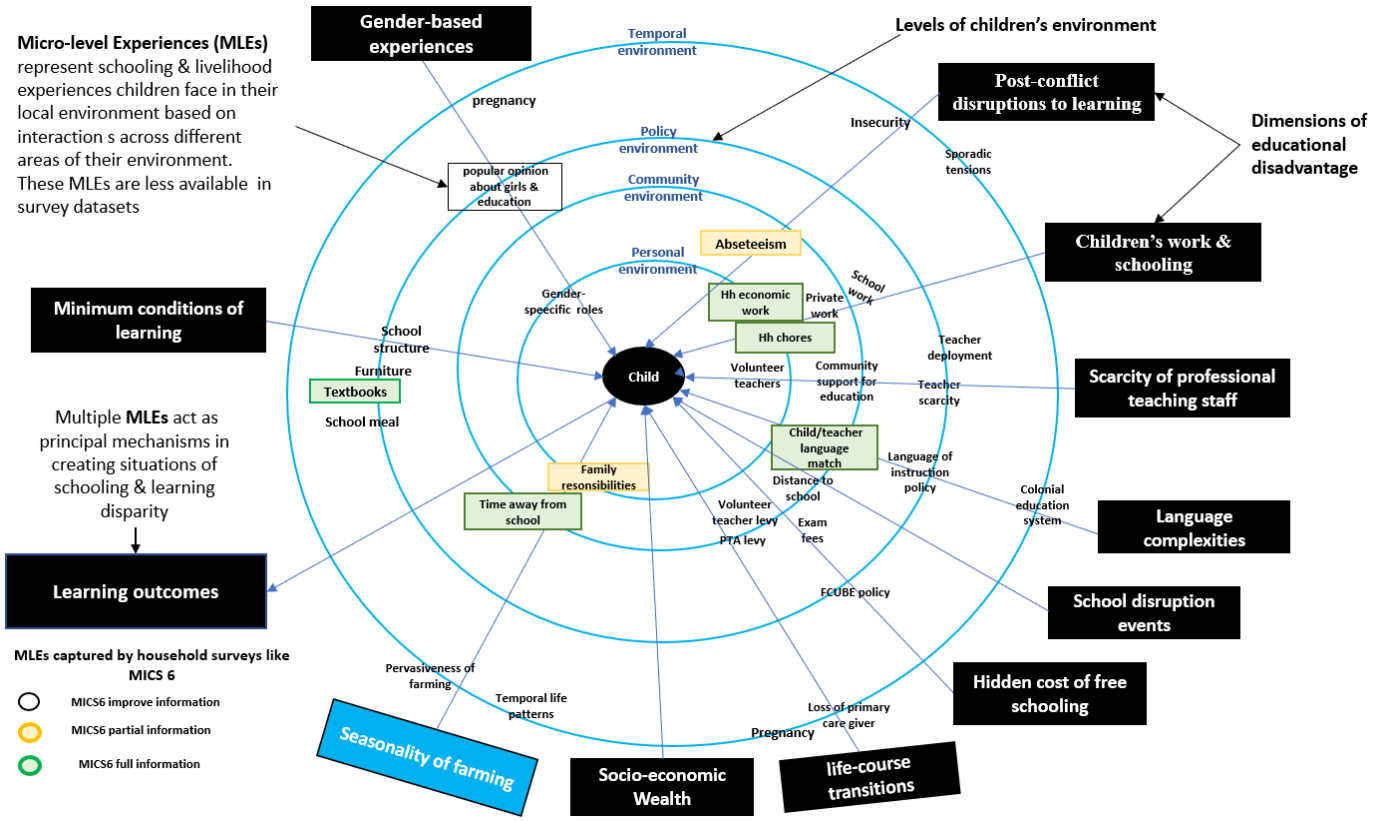
This study has shown that there are far reaching benefits when we combine quantitative indicator methods with qualitative insight from children's local environment to study inequalities in children's learning outcomes. Not only do we observe dimensions of educational disadvantages that emerge from children's environment, but we also understand how multiple, interrelated MLEs act as mechanisms in creating situations that lead to learning disparities. The quantitative indicator approach, using information from household surveys only help to identify limited dimensions of disadvantages and a few MLEs that leads to inequality, as observed earlier in the first framework (see figure 1a, pg. 7). What they do not address is going beyond the dimensions to unpack all the possible mechanisms through which these dimensions affect children's learning abilities. This is observed in the later version of the framework (see figure 1b below), where the main areas of children's local environment were populated with different dimensions of disadvantages and multiple, interrelated MLEs, after taking into consideration qualitative insight.

The implications are that relying solely on existing household surveys and educational assessment datasets can limit what we know about schooling and learning inequalities and how to address them. This assumption is explained in part, by the regression analysis, where only 13% of the variations in children's access to literacy skills was explained by the quantitative model in the national sample and only 18% in the Northern regions – suggesting that a fuller understanding of factors that explain learning skills and how they are formed lie elsewhere. By combining household survey datasets with qualitative insights from children's local environment, this study maximised the opportunity of arriving at a comprehensive understanding of the dynamics surrounding educational inequalities in Ghana's basic school system. The findings on gender for instance, highlight these benefits of drawing on quantitative and qualitative data sources for studies of this nature. The regression model, though identified gender as a key dimension of educational disadvantage in the Northern regions, the context and mechanisms through which gender interacts with various MLEs to disadvantage males, as compared to females in literacy skills acquisition, was only accounted for the qualitative insight. Similar explanations are also seen in findings on linguistic diversity as discussed in section 7.2.4.

As far as monitoring for global education goals are concerned, combining the two approaches can help to fulfil two key tasks. First, the task of improving existing datasets that measure learning outcomes with locally relevant information on the key areas of children's local environment that hinders the learning process, as emphasized by the framework. And second, the ability to identify all possible risk factors and challenges to children's learning, as well as the knowledge and context of how these disadvantages emerge. These are both essential for developing a comprehensive understanding of learning inequality in the Ghanaian situation. Deeper knowledge of this context comes with the potentially for developing locally appropriate measures of educational risks and disadvantages, which also come with several benefits, including the ability to effectively monitor and report on incidence of educational and learning inequality at both national and sub-national contexts.

Overall, this study shows that majority of the learning problems children face can be traced back to basic schooling and livelihood experiences they face in their own local environment. These micro-level livelihood experiences, especially in disadvantaged regions, thus have more to do with educational access in general, than may be envisaged by policy makers. Given that there is only seven years to account for national strategies on the attainment of global education goals as outlined in SDG 4.1 and 4.5, Ghana needs to consciously address the most basic and unequal livelihood conditions in its poorest regions, notably in rural Northern Ghana, to have any chance of achieving SDG 4.

***Figure 10**: Understanding learning inequality through children's local environment framework.*



Note: Figure 10 highlights example of the dimensions of educational disadvantage and micro-level experiences (MLEs) that prevail in children's local environments but remain unavailable in the existing datasets on – indicating the depth of information that is not considered in conceptualizing/measuring equity in learning outcomes.

POLICY RECOMMENDATIONS

Based on the findings provided in this study, two key areas of recommendations are highlighted for future research, policy, and practice, both from the perspective of Ghana's basic school system and data gathering during international household surveys.

Ghana specific recommendations

1. This study has shown that Ghana's basic school system is associated with stark inequalities in learning outcomes that makes it even more difficult for learners in the Norther regions to acquire learning skills expected by SDG 4.1 and 4.5. Ghana should therefore pay particular attention to learners in the Northern regions, especially regarding educational and learning resources, if it is to achieve its global education goals (SDGs 4.1 and 4.5). However, improvements in educational access and learning outcomes in the region need to also prioritize on programs and strategies that seek to reduce social inequalities, especially in basic livelihood conditions such as access to water, power, and improved farming practices to reduce food insecurity.
2. Subsistence farming was identified as a seasonal economic activity and the main source of Livelihood in most rural northern communities. However, the seasonal nature of farming responsibilities during the rainfall period conflicts with the basic school calendar - creating tensions for many children between either staying in school or abstaining from school to support families on the farm – a choice that mostly ends up in favor of the latter and predisposes many children away from school. The perennial nature of this problem, especially in the Northern regions, creates a challenge for education authorities to consider aligning the basic school calendar in the area to match the temporal patterns of life in rural communities. This can reduce the time children spend away from school during peak farming seasons.
3. Linguistic diversity in many rural northern communities, especially between teachers and learners in the classroom was identified as a source of learning challenge for some students, especially those who neither had good command of English nor the local language of the teacher. A clear strategy moving forward is to insist on language considerations in the deployment of teachers by the Ghana Education Service (GES). Ensuring that teachers are posted to communities where they share a common language can reduce language challenges which limit effective teaching and learning.
4. The study also showed that most schools in rural northern communities are resource-poor – lacking the basic learning resources to facilitate effective teaching and learning activities. To mitigate this effect, most children engage in personal commercial activities and other

labor-intensive work on behalf of the school, often to raise income for basic learning resources either for their own use or the school. The cumulative effect of these activities, together with household responsibilities, effectively reduces children's learning time at home. This calls for the education ministry through the Ghana Education Service (GES) to improve resource-poor schools in rural communities, especially those in the Northern regions to acceptable minimum standards. This will prevent children from having to work to provide their own basic schooling needs at the expense of the state.

Improving existing data gathering in international and national household surveys

1. The framework on children's local environment shows that children usually interact with five key areas (i.e., personal, community, policy, temporal) of their local environment as shown in section 5.0. Interactions at each of these areas reproduce distinct schooling and livelihood experiences that shape their educational trajectory and for that matter schooling and learning opportunities. The importance of these experiences to children's education suggests that future household surveys will benefit from improved information to explore educational outcomes and related inequalities. Future MICS surveys should therefore consider gathering information on the key experiences children face at each level/area of their local environment to improve future datasets.
2. Even though there are internationally established indicators for identifying disparities in learning outcomes through datasets from household surveys and EAPs, yet there is no clear framework for measuring and monitoring the inequities that give rise to those learning disparities. This is an emerging concern highlighted in recent international education literature (Montjourides, 2022), especially when one considers that in many places like SSA, factors that account for schooling- and learning-inequality are largely linked to experiences in ones' own local environment, which are diverse, and interconnected as shown in the results section. This paper therefore suggests that children's experiences in their environment can be considered as a framework to develop locally relevant indicators of educational/learning inequality. This can help to integrate children's broader learning environment into the conceptualization of inequality, beyond the measurement of cognitive assessment of learning within the classroom.

ACKNOWLEDGEMENTS

This report has been made possible through the support of the UNESCO GEM Report Fellowship. I am grateful to the Director, Manos Antoninis and Priyadasharni Joshi, the lead coordinator of the fellows' program, for selecting this project as part of the fellowship. Special appreciation goes to my mentor, Patrick Montjourides, for his insight and intellectual direction throughout the fellowship process. He has been vital in shaping this report to be what it is now. To the GEM Report team and my colleague fellows, I say thank you for your regular feedback and the opportunity for this knowledge exchange. It has been a rich learning that has shaped and will continue to shape my academic endeavor.

I extend my appreciation to my academic supervisors - Vandna Sinha of the University of Colorado, Boulder, and Jill Hanley of McGill University, for their critical insight and perspectives which have immensely shaped the broader body of work that resulted in this report. To my colleagues, Anthony Musiwa - McGill University, Dr. Moasun - University of Regina, and Dr. Mohammed N. Kahn – University of Manitoba, thank you all for your pieces of advice. My final appreciation goes to my Ghanaian partners - District Education Officials, school principals, community elders, and Enoch Kumah and Shadrach Yipiin, for supported the fieldwork in Northern Ghana. I appreciate our collaboration.

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APPENDICES

Appendix 1: Descriptive results

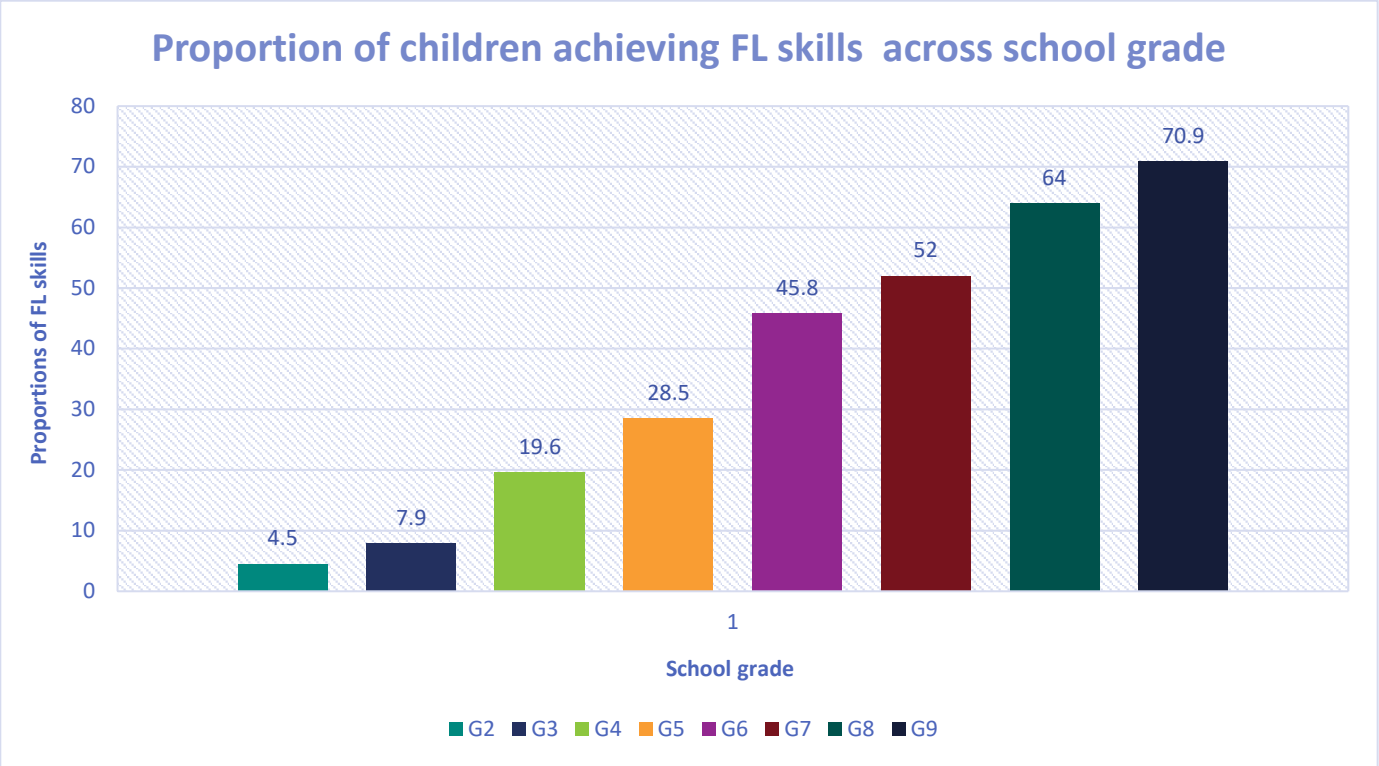
Table 3: Presents summary statistics for the main variables used in this analysis

Variables		Regions/geographical zones				
		National	**Greater Accra**	**Coastal**	**Middle belt**	**Northern**
	N	*Proportions*				
Area	***10980***					
Urban	*4937*	45.0	87.5	36.5	46.5	29.4
Rural	*6943*	55.0	12.5	63.5	53.5	20.6
Gender	*10980*					
Male		50.1	55.3	48.4	49.7	51.1
Household wealth status	*10980*					
Poorest	1999	18.2	1.5	11.5	15.2	49.8
Second	2391	21.8	7.5	27.6	20.2	24.7
Middle	2234	20.4	14.7	24.4	22.0	11.6
Fourth	2295	20.9	27.2	20.9	24.0	7.9
Richest	2061	18.7	49.1	15.6	18.6	6.0
Parental involvement at home	*10980*					
Low involvement	2519	22.9	9.5	18.4	23.6	37.7
High involvement	5072	46.2	42.3	50.7	45.1	43.5
Very high involvement	3389	30.9	48.3	30.9	31.3	18.8
Parental involvement at school	*10980*					
Low involvement	2688	24.5	19.1	19.6	23.9	38.6
High involvement	3166	28.8	29.6	28.2	25.6	39.1
Very high involvement	50126	46.7	51.4	52.2	50.5	22.3
Hours engaged in household chores	*10979*					
No engagement	1695	15.4	26.7	12.2	16.1	12.2
Up to 20 hrs	8680	79.1	69.9	84.1	80.7	70.5
21 hours or more	605	5.5	3.4	3.7	3.1	17.3
Hours engaged in household economic activity	***10980***					
No engagement	7040	64.1	89.0	62.2	67.4	42.4
Up to 20 hrs	3720	33.9	10.5	36.2	31.2	52.2
21 hours or more	219	2.0	0.5	1.6	1.4	5.5
Experience of school/class disruption	***10980***					
Experienced no disruption	9122	83.1	89.7	85.1	82.9	75.7
Experienced at least a disruption	1858	16.9	10.3	14.9	17.1	24.3
Teacher/student language match	***10980***					
No match	9625	87.7	90.6	86.2	89.0	84.5
Language match	1355	12.3	9.4	13.8	11.0	15.5

Source: Author's calculation based on MICS 6 data. *Children's sampling weight applied.

Appendix 2: Descriptive results

Figure 10: Proportion of children across basic school grades achieving FL skills expected at grade 2 level



Source: Author's calculation based on MICS 6 data 2017/2018. Children's sampling weight applied.