EXPLORING CLIMATE CHANGE COMMUNICATION APPROACHES IN SELECTED BASIC SCHOOLS IN ACCRA, GHANA.

BY

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DECLARATIONS

STUDENT'S DECLARATION

I hereby declare that this research is a result of my/our own original research and that no part of it has been presented for another degree in this university or any other higher education institute. I further declare that all the sources that I have used or quoted have been indicated and acknowledged by means of complete references.

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CERTIFICATION BY SUPERVISOR

This Dissertation/Thesis has been prepared and presented under my supervision according to the guidelines for supervision and formatting of Dissertation/Thesis laid down by the University of Media, Arts and Communication, UniMAC.

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ABSTRACT

Climate change poses severe threats to Ghana through flooding, heatwaves, and resource degradation, disproportionately affecting vulnerable urban children and hindering Sustainable Development Goals progress in education and environmental resilience. While Ghana's basic school curriculum integrates climate change topics, limited evidence exists on how pupils comprehend them amid teacher-centered pedagogies and resource gaps. This study assessed climate change communication approaches, pupils' understanding, and barriers in selected basic schools in Accra's La-Nkwantanang Madina Municipality, targeting Basic 4-6 pupils (aged 10-15) from one public and one private school.

Guided by Bandura's Social Cognitive Theory, the research examined observational learning, self-efficacy, and classroom interactions shaping climate change literacy. Using a pragmatic convergent parallel mixed-methods design, Data were collected via pupil questionnaires (n=203), semi-structured interviews (n=7) with five teachers and two school heads, and focus group discussions with pupils (n=12). Quantitative analysis employed SPSS descriptives, correlations, and regressions; qualitative data underwent thematic analysis per Braun and Clarke (2006), with interpretive integration.

Results showed school as the dominant information source (86.2%), tied to sporadic curriculum coverage in science and our world, our people, and religious and moral education subjects. Pupils preferred storybooks (72.9%), followed by games (16.3%) and cartoons (10.8%), yet teachers relied on lectures and textbooks, with no link to comprehension (r=.021). Most rated climate change "fairly difficult" (81.8%), influenced by age and class level. Barriers included abstract concepts, material shortages, untrained teachers, and urban pupils limited environmental exposure. Older pupils showed better grasp, but higher classes amplified perceived difficulty.

Findings reveal average climate change literacy hampered by mismatched strategies, highlighting the need for visuals, experiential activities, Indigenous knowledge, and training. Recommendations urge curriculum cross-cutting integration, resource allocation, and public-private comparisons to boost child agency. This highlights urgent gaps in Ghanaian basic education, advocating child-centered reforms for resilient youth.

Keywords: **climate change communication, basic schools, Ghana, communication approaches, teacher strategies, barriers to understanding, pupil comprehension**

DEDICATION

I dedicate this work to Frank Boateng Acheampong. Thank you for your support and encouragement throughout my academic journey.

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LIST OF ABBREVIATIONS

ACERWC	African Committee of Experts on the Rights and Welfare of the Child
DRID	Directorate of Research, Innovation, and Development
EPA	Environmental Protection Agency
FGDs	Focus Group Discussions
GES	Ghana Education Service
ICT	Information and Communication Technology
INEE	Inter-Agency Network for Education in Emergencies
IPCC	Intergovernmental Panel on Climate Change
L.I.	Legislative Instrument
MESTI	Ministry of Environment, Science, Technology and Innovation
OWOP	Our World Our People
RME	Religious and Moral Education
SCT	Social Cognitive Theory
SDGs	Sustainable Development Goals
SPSS	Statistical Package for the Social Sciences
UN CC:Learn	United Nations Climate Change Learning Partnership
UNCRC	United Nations Convention on the Rights of the Child

CHAPTER ONE

INTRODUCTION

1.0 Background to the Study

"I don't like it because the environment will not be beautiful anymore… when they cut down the trees, there's a saying that 'when the last tree dies, the last man dies.' They must arrest them or talk to those destroying the environment." (Pupil, Focus Group Discussion)

"It makes me feel devastated. The more they cut the trees, nature will be gone, and bad things will happen." (Pupil, Focus Group Discussion)

These were not the words of environmental activists or climate change experts, or policymakers. They were the voices of basic school pupils. Children between the ages of 10 and 15, trying to make sense of the changing environment around them. Their concerns were not prompted by textbooks or classroom lessons; they emerged unfiltered, shaped by what they see in their communities, such as disappearing trees, rising heat, flooding, and shifting weather patterns. Their ability to articulate fear, sadness, and moral outrage challenges any assumption that children are passive observers in the climate crisis. In their own way, they are already interpreting environmental change, questioning its causes, and imagining its consequences.

Climate change involves long-term shifts in weather patterns, marked by alterations in average conditions or variability of factors like temperature, rainfall, moisture levels, sunlight exposure, temperature balance, and wind systems, lasting decades or more (Field & Barros, 2014). Research confirms that human actions, such as burning fossil fuels, industrial growth, tree felling, and excessive resource use, drive these recent changes (IPCC, 2014). These human-induced processes have intensified the amount of greenhouse gas in our atmosphere,

accelerating global warming and producing wide-ranging impacts such as sea-level rise, melting ice sheets, extreme weather events, and ecological disruption (IPCC, 2014). These shifts deeply affect people's lives, communities, farming, water supplies, public health, and ecosystems in complex ways (Nelson et al., 2014).

While climate change is a global phenomenon, its impacts are unevenly distributed, with Sub-Saharan Africa among the most vulnerable regions due to limited adaptive capacity, rapid urbanisation, and socio-economic constraints (Nartey & Nyarko, 2020). Ghana is already experiencing erratic rainfall, recurrent flooding, prolonged heatwaves, coastal erosion, and degradation of natural resources. These changes disrupt livelihoods, damage infrastructure, affect agricultural productivity, and alter the everyday experiences of communities (World Bank, 2024). For many children, these impacts are felt directly through flooded routes to school, overheated classrooms, declining vegetation in their neighbourhoods, and unpredictable weather that challenges their sense of normal seasons.

Children, as defined by the United Nations Convention on the Rights of the Child (UNCRC), include all persons below eighteen years old, unless national law sets an earlier age of majority. In Ghanaian basic schools, from basic 4 to 5, children are between the ages of 10 to 15, according to the data from this research. At this age, children occupy a critical developmental stage characterised by emerging abstract reasoning, moral awareness, and increasing ability to interpret environmental and social issues. Their cognitive, emotional, and moral development means they require climate change information that is accurate, accessible, age-appropriate, and aligned with their linguistic realities (ACERWC, 2025). Because children rely heavily on mediated information rather than independent scientific sources, the school system becomes one of the primary spaces where foundational climate change knowledge is shaped.

Recent global developments have highlighted children's growing engagement with climate change issues. Particularly following the youth climate strikes inspired by Greta Thunberg (Wahlström et al., 2019). This strike placed children at the centre of environmental activism and demonstrated the capacity of young people to mobilise global action. Scientific studies have also highlighted how climate change affects children's emotional well-being, with rising levels of worry and anxiety reported worldwide (Hickman et al., 2021). These developments reinforce the urgency of equipping children with clear, supportive, and contextually grounded climate change information.

In Ghana, policy commitments to climate change education have strengthened over the past decade. Through collaborations involving the Ministry of Education (MoE), Environmental Protection Authority (EPA), Ministry of Environment, Science, Technology and Innovation (MESTI), and UN CC:Learn, climate-related content has been integrated into the Standards-Based Curriculum, particularly within subjects like, Science, Our World and Our People (OWOP), and Religious and Moral Education (RME) (UN CC:Learn, 2020). However, curriculum inclusion does not automatically translate into effective learning. Studies show that basic school classrooms often rely on teacher-centred methods such as lecturing, note copying, and textbook reading, with limited use of visual aids, experiments, storytelling, or interactive pedagogies that help children relate climate change concepts to their lived experiences (Asante et al., 2024).

Communication is a transactional process in which people use symbols or messages to create and share meaning (Turner & West, 2018). In the context of climate change education, communication means using tools and strategies that help children decode complex environmental concepts and relate them to their lived experiences. Communication approaches such as storytelling, demonstrations, participatory activities, and Indigenous Knowledge Systems can transform abstract scientific ideas into relatable knowledge that children can

understand and apply (Adom & Harvey-Brown, 2023). In many Ghanaian classrooms, these strategies are not consistently applied. Climate change concepts are sometimes delivered in ways that are too abstract, language-heavy, or disconnected from children's realities (Asante et al., 2024).

Given the increasing climate vulnerabilities faced by Ghanaian children and the central role of basic schools in shaping their environmental knowledge, it is crucial to examine how climate change is communicated in classroom settings. Understanding the communication approaches used by teachers, the pedagogical challenges learners face, and the contextual factors influencing classroom practice provides a foundation for strengthening climate change literacy.

It is within this context that the present study, "Exploring Climate Change Communication Approaches in Selected Basic Schools in Accra, Ghana," seeks to investigate how climate change information is conveyed, interpreted, and understood at the basic school level, and how communication practices can be enhanced to support meaningful learning and engagement among children.

1.1 Problem Statement

Climate change poses complex environmental, social, and developmental challenges; however, the children who will live longest with its consequences are often the least intentionally considered in climate change communication efforts. Although Ghana has integrated climate-related topics into the basic school curriculum (UN CC:Learn, 2020). There is limited understanding of how these concepts are actually communicated to pupils in classroom settings, or whether existing approaches enable meaningful comprehension among younger learners. Despite children's demonstrated awareness of environmental change, reflected in their own observations of deforestation, flooding, and rising heat, there remains a disconnect between the curriculum's intentions and pupils' real learning experiences.

Existing studies on climate change communication in Ghana focus predominantly on adults, community stakeholders, or the general population. Research by Baffour (2022) examined climate change communication in coastal communities but centred on adult perceptions rather than children's learning. Odonkor and Adom (2020) explored climate change knowledge and adaptation among the wider Ghanaian public, providing valuable national insights but overlooking school-aged learners. Studies in formal educational settings tend to emphasise senior high schools, as seen in the work of Keh (2023), which leaves foundational basic school contexts largely unexamined. Even research that incorporates Indigenous Knowledge Systems, such as Adom and Harvey-Brown (2023), focuses on rural communities and cultural practices rather than mainstream basic school instruction. As a result, little empirical evidence exists on how climate change is communicated to children in basic schools or how they make sense of the information they receive.

This disconnect is especially concerning given that basic school pupils encounter climate-related events such as flooding, heat stress, and poor air quality in their daily lives. Yet classroom communication often remains strongly teacher-centred. Studies on climate change education in Ghana report that teachers frequently rely on abstract explanations, technical English terms, and textbook-driven instruction that do not always match the developmental stage of basic school learners (Asante et al., 2024). Child-centred and environmental education research shows that pupils at this age learn complex concepts more effectively through concrete, visual, and participatory strategies, including storytelling, role-play, group activities, and hands-on environmental tasks such as tree planting and clean-up exercises (Ginsburg & Audley, 202). Despite this, these learner-centred approaches are applied inconsistently in many Ghanaian basic schools, limiting pupils' opportunities to actively engage with climate change concepts and connect them to their lived experiences (Amoakwa et al., 2024).

Language further complicates comprehension. Many children communicate primarily in their local language at home, yet climate change content is delivered mainly in English, often without translation or contextual reinforcement. As Adjei-Baffour (2022) notes, language mismatches contribute significantly to the misunderstanding of environmental concepts among adults; these challenges are likely magnified for younger pupils with limited scientific vocabulary. Without deliberate communication strategies that bridge linguistic and conceptual gaps, climate change education risks becoming superficial and disconnected from children's lived realities.

At the systemic level, although the Standards-Based Curriculum includes climate-related themes. Teachers frequently report inadequate training, insufficient teaching materials, and limited flexibility to adapt lessons to child-friendly formats (Keh, 2023). These institutional constraints weaken the intended curriculum reforms and result in uneven implementation across schools. Consequently, pupils' understanding of climate change remains fragmented, with many unable to connect classroom content to real-life environmental issues (Asante et al., 2024).

1.2 Purpose of the Study

The purpose of the study is to examine the approaches used to communicate climate change information to pupils in selected basic schools in Ghana and to explore the factors that enhance or hinder children's comprehension of climate-related concepts. By analysing both school-based strategies and children's experiences, the study seeks to generate insights that contribute to the growing body of knowledge on climate change communication within the Ghanaian basic education context.

1.3 Research Questions and Research Objectives

1.3.1 Research Questions

1. How is climate change information currently communicated to children in selected basic schools in the Greater Accra Region?
2. What communication strategies are used to communicate climate change information in Ghanaian basic schools?
3. What barriers limit children's understanding of climate change information in basic schools?

1.3.2 Research Objectives

1. To examine how climate change information is currently communicated to children in Ghanaian basic schools.
2. To explore the communication strategies teachers use to communicate climate change information.
3. To identify the barriers that hinder children's understanding of climate change information in basic schools.

1.4 Scope of the Study

This study seeks to explore climate change communication approaches in selected basic schools in Accra, Ghana. Specifically, within the La-Nkwantanang Madina Municipality in the Greater Accra Region. The study focuses on pupils in Basic 4 to Basic 6, typically between the ages of 10 and 15, who are developmentally capable of engaging with foundational climate-related concepts. By including pupils from both a public and a private school, the study aims to capture

diverse experiences and obtain a balanced understanding of how classroom context, school resources, and instructional approaches influence climate change literacy.

The study concentrates specifically on school-based climate change communication, how teachers present climate change concepts, the strategies they employ during instruction, and the ways pupils receive, interpret, and respond to climate change information. While issues related to media exposure or community influences may be referenced for contextual understanding, the central emphasis remains on the communication processes occurring within the basic school environment.

Guided by a mixed-methods approach, the study integrates quantitative data from pupil questionnaires with qualitative insights from teacher and school heads' interviews and pupils' focus group discussions. This design enables a detailed exploration of pupils' experiences, teachers' pedagogical practices, and the barriers that shape climate change comprehension in the classroom. Although broader curriculum policies and national climate change education initiatives provide background context, the primary focus of the research is on the school-level factors that affect children's understanding of climate change.

1.5 Significance of the Study

A careful examination of climate change communication literature in Ghana and beyond reveals that much of the existing scholarship has focused on public awareness, community adaptation, and adult-oriented communication practices (e.g., Baffour, 2022; Odonkor & Adom, 2020). While these studies have contributed to understanding climate change literacy among the general population, research specifically centred on children, particularly basic school pupils, remains limited. Scholars who have investigated climate change communication strategies have largely drawn on quantitative assessments of awareness levels or qualitative analyses of community narratives (e.g., Adom & Harvey-Brown, 2023; Keh, 2023). Employing a mixed-

methods design in this study, therefore, offers an opportunity to generate a more comprehensive and balanced understanding of how climate change information is communicated to younger learners, as the convergence of quantitative and qualitative evidence strengthens interpretation and enhances credibility (Creswell & Plano Clark, 2018).

The mixed-methods approach adopted in this research aligns with calls for methodological pluralism in climate change education, where both numerical trends and lived experiences are necessary for capturing the realities of classroom communication. This pragmatic orientation allows for the use of varied tools, like pupil questionnaires, teacher and school heads' interviews, and pupils' focus group discussions. This together strengthens the pedagogical strategies, constraints, and contextual factors shaping climate change literacy among children. By examining climate change communication approaches within basic schools, the study contributes new insights to an understudied area in Ghanaian climate scholarship and provides a basis for future inquiry into child-centred and school-based climate change education.

Beyond methodological value, the study holds broader academic significance. It highlights the barriers that constrain effective climate change literacy among children, such as limited teaching resources, curriculum-driven constraints, and teacher capacity gaps. These findings are expected to stimulate further research and reflection among scholars, educators, and curriculum developers who seek to strengthen climate change education in Ghana. Additionally, by foregrounding pupils' perspectives and learning experiences, the study supports ongoing discussions on the need for age-appropriate, participatory, and context-sensitive communication approaches that resonate with children's developmental stages and cultural realities. In this way, the research contributes to the wider discourse on climate change literacy and offers a platform for subsequent studies aimed at enhancing climate change communication within the basic education sector

1.6 Definition of Key Terms

Climate Change: Long-term alterations in temperature, rainfall, and weather patterns attributed to natural processes and human activities, particularly greenhouse gas emissions.

Climate Change Communication: Processes through which information about climate change is conveyed, interpreted, and understood, including school-based teaching, media messaging, and community interactions.

Basic School: In Ghana, it refers to primary and junior high school levels; this study focuses on upper primary (Basic 4–6).

Climate Change Literacy: The ability of individuals to understand climate change concepts, recognize environmental changes, and respond appropriately through informed behaviour.

Communication Approaches: Methods teachers use to convey climate change information, including storytelling, discussion, multimedia, demonstrations, and experiential activities.

Barriers to Understanding: Factors that hinder pupils' comprehension of climate change, such as curriculum constraints, limited resources, or conceptual difficulty.

1.7 Organisation of the Study

The research is structured into five chapters. Chapter One introduces the study by presenting the background, problem statement, purpose of the research, questions and research objectives, scope of research, significance, and definitions of key terms. This chapter sets the foundation for understanding the focus and relevance of the inquiry.

Chapter Two provides a review of related literature on climate change communication, child-centred learning approaches, and climate change education within Ghana and comparable contexts. It synthesises theoretical, conceptual, and empirical studies that inform the research and highlights the gaps the study seeks to address.

Chapter Three outlines the methodology employed in the study. It discusses the research philosophy and design, study area, population, sampling procedures, data collection tools, data gathering processes, data analysis methods, and ethical considerations.

Chapter Four presents the findings of the study and discusses them in relation to the research questions. It integrates results from the pupil questionnaires, teacher and school head interviews, and pupils' focus group discussions to provide a comprehensive interpretation of the data.

Chapter Five concludes the study by summarising the key findings, drawing conclusions, highlighting methodological limitations, and offering recommendations for future research.

CHAPTER TWO

LITERATURE REVIEW AND THEORETICAL FRAMEWORK

2.0 Introduction

This chapter reviews existing literature relevant to the study's focus on climate change communication approaches in selected basic schools in Accra, Ghana. The review establishes a conceptual and theoretical foundation for examining how climate change information reaches pupils, the communication strategies teachers employ, and barriers affecting children's understanding.

The chapter begins with a conceptual review clarifying core terms such as climate change, climate change communication, communication approaches, basic school pupils, and child-centred climate change education. It then reviews empirical studies. Discussions in this review are organised around themes aligned with the study's objectives, with a summary of the literature gaps, justifying the need for this study. The chapter presents the theoretical framework anchored in Albert Bandura's Social Cognitive Theory. And finally concludes with a chapter summary.

2.1 Concept Review

This section clarifies key concepts that underpin the study: climate change, climate change communication, communication approaches, basic school pupils as learners, and child-centred climate change education. Defining these concepts is essential for understanding how climate change information is framed, transmitted, and interpreted within basic school classrooms in Accra, Ghana.

2.1.1 Communication

Communication is understood in this study as a process through which people jointly create, share, and interpret meaning rather than simply pass information from a sender to a receiver (Craig, 1999). It involves encoding and decoding messages within particular social, cultural, and institutional contexts, where power relations, language choices, and prior experiences shape how messages are understood (Swan, 2017). In classroom settings, communication functions as a pedagogical tool that teachers use to translate abstract concepts into forms that are comprehensible and relevant for learners.

From this perspective, communication in basic schools is both transactional and interpretive: teachers and pupils exchange information, questions, and feedback, while pupils actively interpret classroom messages through their developmental stage, home background, and everyday experiences (Craig, 1999). In the case of climate change education, this means that how teachers talk about climate change, and the opportunities they create for pupils to respond, directly influence what children understand, remember, and feel able to act upon.

2.1.2 Climate Change

Climate change refers to long-term shifts in average weather patterns, including temperature and precipitation, driven increasingly by human activities such as burning fossil fuels, deforestation, and industrial processes (IPCC, 2021). Recent assessments emphasize that these changes are manifesting through rising global temperatures, more frequent heatwaves, erratic rainfall, flooding, and sea-level rise, with children among the groups most exposed and least able to protect themselves (Hunger et al., 2022). Contemporary scholarship therefore, treats climate change not only as a physical phenomenon but also as a social issue that intersects with vulnerability, justice, and everyday life (Howe et al., 2022).

For basic school pupils, however, climate change is often introduced through technical language and distant examples, making it appear abstract or disconnected from their realities. Research on climate change education shows that children understand and retain climate change concepts far better when these concepts are linked to tangible experiences, such as local flooding, increasing heat in classrooms, or changes in familiar seasons (Monroe et al., 2019). In this study, climate change is therefore conceptualised as both a scientific and experiential reality, which must be communicated in ways that bridge global processes with the lived experiences of pupils in Accra.

2.1.3 Communication Approaches in Climate Change Education

Communication approaches refer to the specific strategies, methods, and media that educators use to convey climate change information to learners. These include more traditional, teacher-centred approaches such as lectures, chalk-and-talk explanations, note-taking, and textbook reading, as well as learner-centred approaches like discussion, storytelling, role-play, experiments, project work, and field visits (Moser, 2016). Scholars argue that climate change communication is most effective when it is tailored to the audience's age, cultural context, and prior knowledge, rather than relying exclusively on one-way transmission of scientific facts (Wibeck, 2014).

Studies of climate change communication emphasise the importance of multimodal and participatory strategies, especially for children. Visual tools such as diagrams, pictures, and videos, together with narrative framing and concrete examples, can help pupils grasp invisible processes like greenhouse effects or long-term climatic trends (O'Neill & Nicholson-Cole, 2009). Yet systematic reviews of climate change education suggest that in many low-resource settings, including parts of sub-Saharan Africa, classroom practice remains dominated by rote learning and textbook recitation, with limited use of experiential methods (Guzmán et al.,

2020). In Ghanaian basic schools, teachers draw on a mix of methods, but quantitative evidence indicates that discussions, lectures, brainstorming, field trips, project-based learning, and role-plays are among the most commonly reported techniques for teaching climate change topics (Amoakwa et al., 2024).

In this study, "communication approaches" is used as an analytic lens to examine how climate change concepts are presented in the classroom, what instructional materials are deployed, and how far these approaches support or constrain pupils' understanding.

2.1.4 Child-Centred Climate Change Education

Child-centred education is grounded in the assumption that teaching should be aligned with children's developmental capacities, interests, and sociocultural realities, rather than treating them as miniature adults (Piaget, 1970). It emphasises active engagement, inquiry, collaboration, and opportunities for learners to construct their own understanding through dialogue and hands-on experience. When applied to climate change, a child-centred orientation involves designing learning experiences that translate complex climate science into accessible, meaningful, and emotionally sensitive forms for children.

Evidence from climate change education shows that children benefit from a combination of visual representations, stories, group work, and practical environmental activities such as gardening, clean-up exercises, or simple experiments (Monroe et al., 2019). These approaches not only support cognitive understanding but also nurture environmental values and a sense of agency. Recent work on young people's emotional responses to climate change further highlights the importance of acknowledging feelings such as worry, fear, or curiosity, and channelling these emotions into constructive discussion and action, rather than ignoring them (Hickman et al., 2021).

Within Ghana's basic curriculum, climate-related content appears across subjects such as Science and Our World Our People and Religious and Moral Education; however, classroom implementation is often predominantly teacher-directed, with limited opportunities for pupils to shape the direction of lessons (Asante et al., 2024). Child-centred climate change education, as used in this study, thus refers to an ideal in which climate change communication is developmentally appropriate, participatory, culturally grounded, and responsive to children's emotional and cognitive needs.

2.1.5 Basic School Pupils as Learners

Basic school pupils in Ghana, particularly those in upper primary (approximately ages 10 to 15), occupy a developmental stage where they begin to move from purely concrete thinking toward more abstract reasoning, while still relying heavily on concrete examples, images, and real-world experiences to make sense of new ideas (UNICEF, 2022). Their climate-related understandings are shaped by cognitive factors such as attention span and vocabulary, as well as by social and linguistic factors including language of instruction, family conversations, media exposure, and opportunities to interact with the natural environment.

Research on children's environmental learning suggests that sustained, meaningful engagement with nature, combined with participatory educational experiences, can foster strong environmental attitudes and habits that persist into adulthood (Chawla, 2015). Conversely, when climate change information is presented in highly technical language, through fast-paced curricula, or without room for questions, misunderstandings and misconceptions are likely to persist (Monroe et al., 2019). In multilingual urban settings such as Accra, the use of English-only instruction can further hinder understanding, especially where pupils are more comfortable in local languages. In this study, basic school pupils are therefore conceptualised as active interpreters of climate change information, whose developmental characteristics, linguistic

resources, and everyday experiences must be considered when evaluating the effectiveness of classroom communication.

2.3 Empirical Review

This section synthesizes relevant empirical studies that align with the study's objectives. Focusing on communication strategies, stakeholder roles, child-centred pedagogies, Indigenous Knowledge integration, barriers to understanding, and curriculum challenges. Drawing from Global, African, and Ghanaian contexts, it highlights evidence on effective practices and persistent gaps, particularly in urban basic schools, to contextualize the current study's focus on Accra's basic school setting.

2.3.1 Contextual Background of Climate Change Education

Climate change education is critical for preparing young learners to address environmental challenges, but its effectiveness depends on context-specific approaches. Globally, Lotz-Sisitka et al. (2022) recommend transformative, participatory, and decolonial pedagogies, pointing to the fact that traditional scientific literacy-focused education often fails to involve learners emotionally or motivate action, particularly in marginalised communities. This disconnects limits Climate Change Education's impact in fostering resilience and agency among children in climate-vulnerable regions.

In Africa, colonial legacies in education systems marginalise Indigenous Knowledge Systems, reducing the cultural relevance of Climate Change Education and hindering locally grounded adaptation strategies (Mbah et al., 2025). Place-based curricula integrating Indigenous Knowledge Systems are recommended to enhance engagement and empowerment, particularly in communities facing climate-induced disruption.

In Ghana, vulnerability to climate change, evidenced by urban flooding, deforestation, erratic rainfall, and rising temperatures, underscores the urgency of effective Climate Change Education in basic schools (Baffour, 2022). In urban Accra, frequent flooding disrupts access to school and infrastructure, heightening educational inequities (Keh, 2023). Fitzpatrick et al. (2024) emphasise the need for climate-resilient systems, including upgrades in infrastructure, curriculum reform, and teacher training. Acharibasam (2022) demonstrates that integrating Indigenous Ecological Knowledge in rural Ghanaian early childhood education enhances understanding of local environmental issues, but urban applications remain underexplored, highlighting a gap this study seeks to address.

The contextual background provides a clear understanding of why this study is important. It connects global ideas about climate change education with Africa's history and Ghana's urgent climate challenges. It shows that including Indigenous Knowledge and focusing on local cultures and urban realities is essential. This foundation supports the study's goal to explore how climate change information is communicated in Ghanaian basic schools in ways that are relevant, understandable, and meaningful to children in these communities.

2.3.2 Stakeholders and Their Roles in Climate Change Education

Multiple stakeholders play crucial roles in shaping the delivery and effectiveness of climate change education. These include pupils, teachers, school administrators, community members, indigenous knowledge holders, curriculum designers, and policymakers. Teachers are central stakeholders in fostering environmental attitudes and facilitating learning experiences; however, they often encounter challenges that limit engagement with complex climate change topics. For instance, Ginsburg and Audley (2020), in a study involving 20 early childhood educators and two administrators in the U.S., found that while teachers are pivotal in nurturing young children's connection to nature, many expressed reluctance to engage children with

deeper or politically charged climate change discussions. This hesitance was largely attributed to concerns about the developmental appropriateness of such content for young children and limited institutional support. These findings highlight the critical need for targeted teacher training and professional development that equips educators with the skills and confidence to employ child-centred and developmentally informed climate change education approaches. School administrators also play a vital yet underexplored role, particularly in allocating resources that can support or constrain climate change education implementation.

Mbah et al. (2021) argue for collaborative curriculum design processes that actively involve teachers, indigenous knowledge holders, and educational policymakers. Such partnerships help ensure that climate change education is culturally relevant, contextually grounded, and more effectively addresses learners' lived realities. This inclusive design strategy encourages the blending of scientific and indigenous knowledge systems, fostering a more holistic educational experience.

In South Africa, Selepe, Ramsaroop, and Carolin (2022) worked with community elders and teachers in rural KwaZulu-Natal to incorporate indigenous weather and climate change knowledge into primary school curricula. This participatory approach allowed local ecological knowledge to inform classroom teaching, thereby making climate change education more meaningful and relatable for students within their community context. The study serves as a valuable model that is adaptable to diverse settings with multi-ethnic or indigenous populations, including many African countries.

Sherpa's (2017) research in Nepal similarly emphasises the integration of indigenous and scientific knowledge through active teacher involvement. The study highlights several insights relevant to African multi-ethnic contexts: first, teachers who are familiar with or belong to indigenous communities are more likely to blend local cultural practices and ecological knowledge into climate change education effectively. Second, ongoing teacher training that

sensitizes educators to the value of indigenous worldviews fosters greater curriculum contextualization and student engagement. Third, balancing empirical scientific facts with culturally meaningful narratives enables learners to develop practical climate change resilience skills grounded in their heritage. These insights highlight the importance of culturally responsive pedagogy and teacher empowerment in diverse educational landscapes.

In Ghana, Keh (2023) surveyed 253 senior high school students and 36 teachers in urban Accra, revealing widespread enthusiasm for climate change education despite significant resource limitations in schools. The study further highlighted the necessity for stakeholder-specific strategies that consider the local socio-economic context to optimize climate change education delivery. Complementing this, Adom and Harvey-Brown (2023) engaged 80 elementary learners, 16 teachers, two administrators, and three community elders in a rural Ashanti Region community (Akrofrom). Their research demonstrated that active collaboration between schools and local communities, especially through the inclusion of indigenous knowledge systems, significantly enhances learner engagement and sustainability consciousness. This collaboration promotes culturally relevant learning and fosters community ownership of climate change education initiatives.

The Inter-Agency Network for Education in Emergencies (INEE, 2023) an international consortium dedicated to advancing inclusive education in crisis contexts, emphasises the importance of inclusive climate-sensitive education, particularly for vulnerable populations such as girls and children affected by frequent flooding in urban areas like Accra. Their work advocates for education systems that engage diverse stakeholders in collaborative, child-centred approaches to climate change education. Their guidance aligns closely with this study's focus on upper primary pupils, highlighting the critical need to design climate change communication and learning strategies that are inclusive, participatory, and responsive to the unique challenges facing vulnerable children in flood-prone urban environments.

The above studies on stakeholder roles are relevant to the study because they help identify potential leverage points to overcome barriers related to policy gaps, limited teacher capacity, resource constraints, and cultural differences. As such, the study's exploration of climate change communication in basic schools requires a multi-stakeholder lens to uncover the collaborative dynamics that enable or hinder effective climate change education in Ghana's urban context.

2.3.3 Integrating Indigenous Knowledge and Cultural Relevance in Climate Change Communication Strategies

Effective climate change communication for children involves using diverse, age-appropriate tools and approaches designed to foster engagement, understanding, and motivation toward climate action.

Globally, Hemminki-Reijonen and Logadóttir (2021) highlight the potential of immersive technologies, such as virtual reality and interactive games, to create deep emotional connections between learners and climate change phenomena. Their pilot project within Harvard's Arctic Initiative demonstrated how such experiential learning tools can bridge cognitive understandings with affective engagement, which is critical for motivating learners to internalize and act on climate change issues.

Focusing on linguistic and cultural relevance, Nasrullah et al. (2025) emphasize the importance of delivering climate change information in local languages in Indonesia. They demonstrate that community engagement activities, such as environmental festivals, combined with positively framed communication strategies, effectively improve collective understanding and participation. This local-language approach acknowledges the diversity in audiences and leverages cultural contexts to enhance comprehension and agency.

In Africa, Hebe (2015) documents how South African Grade R teachers harness storytelling to introduce environmental concepts to young children. This method fosters emotional connections with nature, making abstract concepts more relatable and accessible to early learners. Similarly, Selepe et al. (2022) explore integrating Indigenous Knowledge Systems into educational practice by using indigenous weather indicators such as bird migrations and plant behaviours within outdoor learning activities in KwaZulu-Natal. This not only situates learning within learners' cultural realities but also strengthens place-based environmental awareness and stewardship.

In Ghanaian basic schools specifically, Amoakwa et al. (2024) report that Social Studies teachers predominantly use learner-centred methods in teaching climate change, including lively discussions (93.3% of teachers), field trips (70%), and project-based learning (63.3%). These approaches promote active participation, critical thinking, and real-world connections, enabling students to engage deeply with climate change concepts. Such methods align well with contemporary climate change education scholarship, emphasising experiential and dialogic learning.

Taking a culturally embedded pedagogical approach, Adom and Harvey-Brown (2023) illustrate how indigenous songs, proverbs, and community elders as co-instructors in rural Ghanaian schools significantly elevate learners' sustainability competencies. By embedding local cultural practices within climate change education, they achieve higher engagement and foster learners' environmental identity and agency, underscoring the value of culturally resonant communication strategies. More specifically, Adom and Harvey-Brown (2023) implemented an Elementary School-Based Indigenous Knowledge pedagogical model leveraging Akan proverbs, folk songs, and community elders as co-instructors to teach native tree species. This culturally grounded approach significantly enhanced sustainability consciousness, ecological knowledge, and student engagement.

Critiquing formal curricula, Asante et al. (2024) reveal Ghana's science curriculum is heavily Western-centric with limited incorporation of local languages such as Twi and Ga, which are essential for Ghana's linguistically diverse classrooms in urban settings like Accra. They advocate for reforms embedding local languages and cultural contexts to improve climate change literacy. Similarly, Acharibasam (2022) documents the successful inclusion of Indigenous Ecological Knowledge in rural early childhood education in Ghana, improving environmental understanding and adaptive capacity. Parallel findings from Sherpa (2017) in Nepal emphasise that blending indigenous and scientific knowledge in education fosters contextualized climate change resilience, suggesting that such models can be adapted effectively to Ghana's multi-ethnic urban environments

Gebbels et al. (2011) provide another creative dimension by showing how Ghanaian children use poetry and paintings to express environmental messages, creatively communicating their perceptions and concerns about climate change issues. This artistic expression not only empowers children as active agents in climate change discourse but also acts as a participatory communication form that reinforces affective bonds with the environment.

Collectively, these studies enrich this research by directly supporting its objective to understand the nature of climate change information children receive, the communication strategies teachers employ, and the factors that limit children's meaningful understanding in Ghanaian Basic schools.

Collectively, these studies show that including Indigenous Knowledge Systems and cultural elements in climate change communication makes education more relevant and easier for children to understand. This approach not only helps children learn better but also encourages them to feel connected to their local environment and become active learners. These findings are important for this study because they improve how climate change education can be

communicated in Ghanaian basic schools, making it more meaningful, trustworthy, and useful for students.

2.3.4 Child-Centred Pedagogies

Child-centred pedagogies emphasize active participation, experiential learning, and connecting educational content to children's lived experiences to effectively engage young learners in climate change education.

Madden and Liang (2016) conducted a mixed-methods study with children aged 3 to 9 years across three early childhood education settings in the northeastern United States. They found that inquiry-based interventions, which built on children's pre-existing environmental ideas, significantly enhanced their understanding of ecological relationships. Post-intervention, children demonstrated more sophisticated conceptions of ecosystems, articulating interactions between plants, animals, and humans. The study highlights that even very young children can grasp complex ecological concepts when engaged in developmentally appropriate, participatory learning experiences that combine verbal discussions with visual expressive activities like drawing.

Lotz-Sisitka et al. (2022) critically advocate for transgressive pedagogies in climate change education that disrupt dominant Western-centric, knowledge-transmission models. Their work emphasises fostering critical thinking and learner agency through co-engaged, participatory approaches situated in learners' social and ecological contexts. Such pedagogies challenge power imbalances in knowledge production and empower children and youth to become active agents of environmental and social change rather than passive recipients of information. This approach is crucial for marginalised communities disproportionately impacted by climate change, as it nurtures critical consciousness and collective action.

Hebe (2015) studied the implementation of environmental education in Grade R in South Africa, highlighting teachers' use of storytelling as a powerful tool to create emotional connections between children and the natural world. Storytelling enabled children to relate environmental concepts to familiar cultural narratives and experiences, which enhanced engagement and fostered early environmental stewardship. However, the study also noted challenges related to limited teacher training and resources that constrained the breadth and depth of environmental pedagogies in early childhood settings.

Selepe et al. (2022) examined the integration of Indigenous Knowledge Systems in teaching weather and climate change concepts in rural KwaZulu-Natal primary schools. They documented how teachers incorporated culturally relevant weather indicators such as bird migrations (blue cranes and swallows), plant flowering times, and atmospheric phenomena into storytelling and outdoor learning activities. This integration not only activated learners' prior knowledge but also contextualised climate change education within the community's lived realities and cultural heritage. The study found that blending Indigenous Knowledge Systems with scientific knowledge through constructivist pedagogies improved learners' conceptual understanding and increased their interest and engagement in climate change topics.

The Inter-Agency Network for Education in Emergencies (2023) emphasises the importance of hands-on, participatory activities such as gardening and disaster risk reduction exercises in climate-vulnerable settings. These practical engagements build both physical and emotional resilience among young learners and caregivers, fostering agency and adaptive capacities crucial for coping with climate impacts. The guidance notes advocate multi-sectoral collaboration and culturally sensitive pedagogies that prioritise nurturing care and community involvement during crises.

Adom and Harvey-Brown (2023) developed and implemented the Elementary School-Based Indigenous Knowledge pedagogical model in rural Ghana to teach about native tree species and

environmental sustainability. Through place-based learning approaches involving indigenous songs, proverbs, myths, and direct interactions with community elders as co-instructors, learners exhibited a 70% improvement in ecological awareness and sustainability consciousness. The model fostered critical thinking, problem-solving, and environmental stewardship by connecting scientific knowledge with indigenous cultural contexts, cultivating positive attitudes and active participation in conservation practices such as tree planting and care.

Sporre and Osbeck (2022), focusing on urban Accra's flood-prone contexts, highlight participatory pedagogical methods that amplify children's ethical voices in climate change education. Their research illustrates how children can be empowered as moral agents and change actors when curricula and teaching approaches respect their lived experiences and encourage moral authorship. Through fiction-based narrative engagement and dialogical learning, children develop multidimensional ethical competencies encompassing moral judgment, sensitivity, and communicative skills, which underpin sustained environmental engagement and advocacy.

Together, these studies show that child-centred, experiential, culturally relevant, and participatory teaching methods, especially those that include Indigenous knowledge and encourage ethical reflection, help young learners engage better, understand more deeply, and feel empowered in climate change education. They demonstrate that when climate change education connects to children's own knowledge, culture, and values, it builds stronger ecological awareness and encourages active care for the environment. This is important for the current research because child-centred pedagogies give both the theory and practical tools needed to design and deliver climate change education that is easy to understand, interesting, relevant, and empowering for upper primary school pupils in Ghanaian basic schools.

2.3.5 Barriers to Effective Communication

Effective communication of climate change concepts to children is essential for fostering environmental awareness, resilience, and responsible behaviours from a young age. However, various challenges and barriers can impede the successful transmission of climate change education, especially in diverse cultural and educational contexts. Ginsburg and Audley (2020) report that U.S. early childhood educators often show reluctance to teach complex climate change topics due to concerns about developmental appropriateness and competing academic priorities. Specifically, teachers worry that very young children may not have the cognitive or emotional capacity to grasp distressing or abstract issues like climate change, which could cause anxiety or confusion. Furthermore, pressures to meet standardized academic readiness benchmarks limit time and curricular space for in-depth sustainability education, leading educators to prioritize traditional subjects over complex socio-environmental topics. Parental concerns and cultural tendencies toward protecting young children from "scary" topics also contribute to hesitancy in addressing climate change comprehensively at early ages.

Fitzpatrick et al. (2024) identify systemic barriers at the policy and institutional level, noting that less than 40% of countries globally have formal climate change education policies integrated into their curricula. This lack of policy oversight is compounded by acute climate shocks such as flooding and droughts, which disrupt schooling infrastructure, teacher attendance, and consistent delivery of education, undermining the capacity to implement climate change education effectively. Education systems in affected countries often lack resilience mechanisms to maintain learning continuity during climate-related crises.

Mbah et al. (2021) critique the prevalence of Western-centric curricula that marginalize Indigenous Knowledge Systems. They argue that this exclusion reduces the cultural relevance and resonance of climate change education for learners in developing countries, diminishing engagement and limiting adaptive learning grounded in local realities. Such curricula tend to

emphasize technical scientific knowledge detached from the lived experiences, cultural histories, and sustainable practices within Indigenous communities, weakening the effectiveness of climate change education.

Selepe et al. (2022) explore challenges faced by South African primary school teachers in incorporating Indigenous Knowledge into weather and climate change lessons. They found that many teachers struggle with weak content knowledge themselves and rely on outdated or limited teaching materials. This leads to difficulties in blending scientific and Indigenous perspectives meaningfully, and teachers often lack pedagogical confidence to address abstract climate change concepts effectively. These knowledge gaps hinder rich, culturally relevant climate change education.

In Ghana, Keh (2023) highlights several key barriers in the urban context of Accra, including insufficient teaching materials that adequately cover climate change topics and limited curriculum time allocated to climate change education. Teachers also report low confidence and knowledge about local climate impacts and mitigation strategies, which restricts their ability to provide comprehensive instruction. Similarly, Amoakwa et al. (2024) underline funding constraints that limit practical, experiential learning activities such as field trips and project work, leading many teachers to default to lecture-based methods due to lack of training and resources.

Odonkor et al. (2020) report low public climate change literacy in Ghana, with only 43.9% of surveyed adults fully understanding the causes and impacts of climate change. This knowledge gap reflects shortcomings in public education and communication efforts that fail to reach broad segments effectively. Compounding this, Boakye et al. (2023) identify pervasive cultural scepticism and misconceptions, including beliefs attributing climate change to divine punishment or supernatural causes. Such views create challenges for scientific climate change

communication in schools and communities, requiring culturally sensitive, respectful communication strategies to foster understanding and acceptance.

Teacher preparedness equally presents a barrier. Ginsburg and Audley (2020) connect educator reluctance to limited content knowledge and pedagogical skills in addressing complex climate change topics, underscoring the need for professional development. Kwauk (2020) points to systemic deficiencies such as scarce resources, incoherent policies, and lack of institutional support that impair teachers' ability to integrate climate change education effectively. Fitzpatrick et al. (2024) identify chronic absenteeism and insufficient teacher training as further obstacles.

Professional development focusing on Indigenous Knowledge integration is a recommended strategy. Mbah et al. (2021) advocate for training programs that empower educators to respectfully combine Indigenous and scientific knowledge, improving cultural relevance and learner engagement. Sherpa (2017) observes that Nepalese teachers familiar with Indigenous knowledge outperform outsiders in delivering culturally resonant climate change education, emphasizing the benefits of grounded teacher preparation.

Within Ghana, Amoakwa et al. (2024) report that while about 60% of Social Studies teachers employ learner-centred methods like discussions and field trips, many still default to lecture-based approaches due to knowledge and resource gaps. Keh (2023) corroborates ongoing shortages in instructional materials and narrow curriculum focuses. Similarly, Hebe (2015) documents challenges in South African early childhood education, where inadequate training and scarce resources limit environmental education conditions relevant to upper primary climate change education in Ghana.

Together, these studies show that there are many barriers to effective climate change communication in Ghanaian basic schools. These include concerns about children's developmental readiness and cultural factors at the teacher level, lack of supportive policies and

resources at higher levels, gaps in the curriculum that ignore Indigenous and local knowledge, and social beliefs that affect how people receive climate change information. These findings are important to this research because the study aims to identify the specific barriers that prevent children in Ghanaian basic schools from fully understanding climate change information.

2.3.6 Curriculum Integration

Integrating climate change topics into educational curricula is essential for addressing both local and systemic environmental issues effectively. However, numerous challenges exist in the design and implementation of such curricula, particularly in African contexts.

Mbah et al. (2021) critically observe that many African educational systems continue to rely heavily on Western-centric curricula, which fail to resonate with or adequately serve African learners. These curricula often marginalize Indigenous Knowledge Systems, neglecting culturally relevant perspectives that could enhance climate change education's contextual relevance and impact. To remedy this, they advocate for the integration of Indigenous Knowledge Systems into climate change education as a pathway to foster critical, participatory, place-based, and holistic learning experiences suited to African realities.

Supporting this view, Manteaw et al. (2025) propose interdisciplinary and community-grounded pedagogical approaches that connect climate change education with the lived experiences of learners. Their research in Ghana highlights how place-based curricula that incorporate indigenous knowledge and local adaptation strategies can cultivate sustainability consciousness and critical systems thinking among students.

Addressing curriculum content specifically, Keh (2023) finds that the Social Studies curriculum in Ghana’s senior high schools lacks sufficient depth regarding climate change mitigation strategies and fails to thoroughly address local and national climate impacts. Similarly, Asante et al. (2024) critique Ghana’s science curriculum for its predominant focus on individual

responsibility and technical knowledge. They argue this approach overlooks systemic issues such as global economic forces, colonial legacies, and power dynamics that significantly influence climate vulnerability. This narrow framing limits students' capacity to critically engage with and advocate for structural climate justice.

Low literacy levels among learners further complicate the implementation of climate change curricula, as noted by Odonkor et al. (2020), who emphasize that inadequate foundational knowledge impedes comprehension and application of climate change education concepts. Consequently, systemic educational inequities must be addressed in curricular reforms to ensure accessibility and effectiveness.

Decolonizing curriculum content forms a crucial part of this reform agenda. Acharibasam (2022) documents the success of embedding Indigenous Ecological Knowledge into early childhood environmental education in rural Ghana through Community-Based Participatory Research. This collaborative approach actively involves community elders and pupils, fostering culturally relevant learning that challenges dominant Western paradigms and promotes local adaptation practices, thus enriching climate change education.

The studies above are important to the current research work because it address how climate change education is embedded within formal education systems, shaping the extent to which learners develop the knowledge, skills, and attitudes necessary for climate resilience and action.

2.3.7 Research Gaps

The literature reviewed provides important insights into climate change education globally and regionally, yet reveals notable gaps that this study seeks to address. While many studies emphasize transformative and decolonial pedagogies, a significant shortfall exists in research explicitly focused on urban Ghanaian basic school contexts serving diverse student bodies. Most Ghana-specific work centres on rural or general populations, with little attention to the

nuanced differences between public and private schools. Additionally, there is limited investigation into age-appropriate communication strategies tailored for upper primary pupils, leaving questions about effective messaging and pedagogy within this critical developmental stage.

Furthermore, the literature inadequately explores how communication strategies can be mobilized to overcome barriers such as developmental limitations, resource constraints, and cultural scepticism, particularly in urban, multi-ethnic environments where complexities are heightened. Deficiencies are also apparent in understanding teacher preparedness, the effectiveness of curriculum integration efforts, and mechanisms for stakeholder collaboration within Ghana's basic education settings. These gaps underscore the necessity for empirical, contextually grounded research to inform more responsive and inclusive climate change education for urban Ghanaian pupils across different school types.

2.2 Theoretical Framework

A theoretical framework is essential for analysing how communication approaches in basic schools enable children to encounter, interpret, and respond to climate change information. This study draws on Social Cognitive Theory (SCT) to examine learning as an interplay of social modelling and cognitive processes within classroom interactions.

2.2.1 Social Cognitive Theory

This study is grounded in Social Cognitive Theory, which provides a comprehensive lens for examining how basic school pupils acquire, process, and respond to climate change information through classroom communication (Bandura, 1986). The theory evolved from Bandura's earlier Social Learning Theory, which emphasized observational learning through modelling and reinforcement (Bandura, 1977). Social Cognitive Theory expands this foundation by

incorporating cognitive processes such as self-efficacy, self-regulation, and reciprocal determinism, the dynamic interplay between personal factors, behaviour, and environmental influences (Bandura, 1986, 1991).

In the context of climate change education, Social Cognitive Theory explains how pupils learn environmental concepts primarily through observing teachers, peers, and instructional materials as models. For instance, when a teacher demonstrates tree-planting or discusses local flooding using relatable examples, pupils imitate these behaviours, reinforced by positive feedback or group discussions. This observational learning aligns directly with the study's focus on communication approaches, where transmission-style lectures may limit modelling opportunities, while participatory activities like role-play or group projects enhance them (Zimmerman & Schunk, 2011).

The theory's cognitive dimensions further clarify pupils' agency in climate change comprehension. Self-efficacy, the belief in one's ability to understand and act on climate change issues, determines whether children translate observed models into personal action, such as advocating against deforestation (Bandura, 1997). In Ghanaian basic schools, low self-efficacy may arise from abstract English-only instruction, reducing pupils' confidence to connect lessons to daily floods or heatwaves (Pajares, 2002). Reciprocal determinism captures how teacher strategies (environment) shape pupil attitudes (personal factors), which in turn influence classroom participation (behaviour), creating cycles that either reinforce or hinder climate change literacy (Bandura, 1986).

Social Cognitive Theory suits this research because it bridges teacher-led communication with pupil-centred outcomes. Empirical applications in environmental education confirm its utility: Usher and Pajares (2008) found that students with high science self-efficacy engaged more deeply in sustainability tasks, while Artino (2008) showed reciprocal influences in online learning environments akin to multimedia climate tools.

By grounding the study in Social Cognitive Theory and acknowledging its roots in Social Learning Theory, the research is able to capture both the modelling dimension of classroom communication and the internal processes that shape how pupils respond to climate change information. This framework supports analysis of how teachers' communication approaches, pupils' opportunities to observe and participate, and school environments interact to influence climate change literacy and climate-related behaviour among Basic 4 to Basic 6 pupils in selected schools in Accra.

2.4 Chapter Summary

This chapter reviewed scholarly literature on climate change communication strategies in basic schools, synthesizing global, African, and Ghanaian perspectives to establish conceptual, theoretical, and empirical foundations. Organized around key themes aligned with the study's objectives, communication approaches, child-centered pedagogies, stakeholder roles, Indigenous Knowledge integration, barriers, and curriculum gaps. The review highlights substantial evidence on transformative and decolonial pedagogies that enhance engagement through participatory methods, arts-based tools, and culturally relevant strategies like storytelling and local ecological indicators.

Global and African studies predominantly employed qualitative or mixed-methods designs, demonstrating the efficacy of experiential learning and Indigenous Knowledge Systems in fostering climate change literacy and agency, particularly among vulnerable youth. Ghanaian research underscores urban vulnerabilities like flooding in Accra, yet reveals persistent challenges: teacher-centered instruction, resource shortages, Western-centric curricula, and limited training, which marginalize child perspectives and local contexts.

Notably, while rural and senior high school settings receive attention, few studies target urban basic schools (Basic 4-6), age-appropriate strategies for 10-15-year-olds, or public-private

comparisons in Accra. This gap justifies the current mixed-methods inquiry into classroom communication, pupil comprehension, and barriers. Albert Bandura's Social Cognitive Theory guides the study, framing learning as reciprocal interactions between modelling, self-efficacy, and environments to analyse how pedagogies shape climate action.

CHAPTER THREE

RESEARCH METHODOLOGY

3.0 Introduction

This chapter outlines the methodological framework of this study. It presents the guiding pragmatic research philosophy and the convergent parallel mixed-methods design that combines quantitative and qualitative data to provide a comprehensive understanding of the study. The chapter further describes the study setting, sampling strategies, data collection approaches and tools, including questionnaires, interviews, and focus groups, analytic techniques, and ethical considerations. It establishes the systematic approach for rigorously and contextually addressing the research questions.

3.1 Research Philosophy

This study adopts a pragmatic philosophical paradigm, which emphasizes practical inquiry and embraces methodological pluralism to effectively address complex social realities. Pragmatism positions the research problem at the core of methodological decisions, valuing approaches based on their utility in answering the research questions (Creswell & Plano Clark, 2018). As Feilzer (2010) articulates, pragmatism moves beyond debates on the nature of truth and reality, instead focusing on "what works" in practice to generate meaningful and actionable knowledge.

This philosophical stance explicitly supports the integration of both quantitative and qualitative methods, recognizing that multiple ways of knowing contribute to a fuller understanding of a phenomenon. Rather than adhering rigidly to any single epistemological position, pragmatism prioritizes the research questions and their practical implications to guide the choice of methods (Morgan, 2014).

Within this study's context of climate change communication approaches in Ghanaian basic schools, pragmatic philosophy enables the reconciliation of objective measures such as students' comprehension levels with the subjective experiences and pedagogical practices of teachers and school heads. This pluralistic approach facilitates the collection and integration of quantitative data, capturing observable patterns alongside qualitative insights that reveal underlying meanings and contextual factors (Creswell & Plano Clark, 2018).

By focusing on "what works" in the specific educational and cultural environment of Ghana's basic schools, pragmatism allows for methodological flexibility. It fosters the generation of actionable knowledge that is both empirically grounded and contextually relevant.

3.2 Methodological Framework

The research onion model, originally conceptualized by Saunders et al. (2007) and refined in subsequent editions (Saunders et al., 2019), serves as a visual and conceptual metaphor for research design. It depicts methodological decisions as concentric layers of an onion that researchers "peel" sequentially from the outermost philosophical assumptions inward to the core techniques and procedures. This framework promotes systematic progression, ensuring each layer logically connects to the next while maintaining coherence between the study's aims, worldview, and execution. It encompasses six primary layers: philosophy, approach, methodological choice, strategy, time horizon, and data collection or analysis, facilitating transparent justification and adaptability across diverse research paradigms (Melnikovas, 2018).

In this study, the model structures decisions starting with pragmatism at the outer layer, which prioritizes practical utility and methodological pluralism to blend quantitative pupil surveys with qualitative teacher and school heads' insights. This avoids positivism's rigid empiricism or interpretivism's sole subjectivity (Creswell & Plano Clark, 2018). Inner layers feature an

abductive approach merging deduction and induction; mixed-methods choice for triangulation; convergent parallel strategy across two La-Nkwantanang Madina Municipality schools; cross-sectional horizon; and core procedures including SPSS-based descriptives, regressions, and Braun and Clarke (2006). Thematic analysis of interviews and focus groups, integrated to uncover convergences and contextual nuances (Saunders et al., 2019). This application enhances methodological rigor and yields actionable, evidence-based recommendations for educational practice

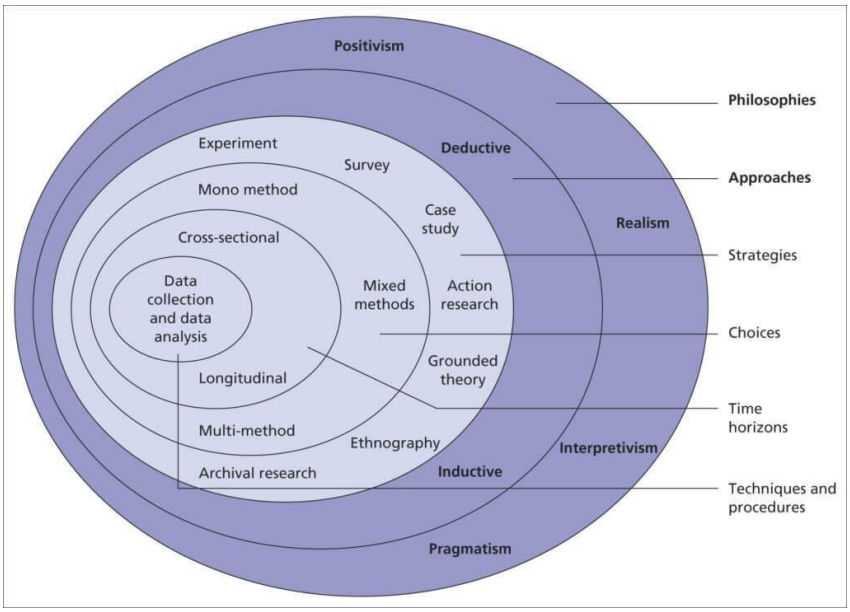

Figure 1 Research Onion

(Source: Saunders et al. 2009)

3.2 Research Approach

This study employs a mixed-methods research design that integrates both qualitative and quantitative techniques to comprehensively investigate climate change communication approaches in Ghanaian basic schools. The quantitative strand collects structured data measuring pupils' knowledge levels and their exposure to various climate change communication strategies. Concurrently, the qualitative strand delves into the experiences, perceptions, and practices of teachers and school heads through interviews and focus group

discussions with pupils. This methodological combination aligns with the pragmatic research philosophy, which endorses methodological flexibility and values approaches that effectively address real-world problems (Creswell & Plano Clark, 2018).

Two foundational perspectives on mixed methods research help clarify its approach. Creswell and Plano Clark (2018) describe mixed methods research as a systematic integration of quantitative and qualitative data collection and analysis within a single study, designed to capitalize on the complementary strengths of each method and provide a more comprehensive understanding of the research problem. Supporting this view, Fetters and Molina-Azorin (2019) further emphasize that this methodology focuses on collecting, analysing, and integrating diverse data types within a single study to yield deeper insights than could be achieved through either quantitative or qualitative methods alone.

The integration of both data strands enables triangulation, which maximises the validity and credibility of the findings by confirming evidence across diverse data sources (Carter et al., 2014). The mixed-methods design employed here supports both exploratory and descriptive goals: qualitative insights highlight the contextual dynamics of climate change communication approaches, while quantitative data reveal statistical patterns in pupils' understanding and exposure. By synthesizing these perspectives, the study presents a holistic depiction of the climate change communication approaches in Ghanaian basic schools, thereby generating practical and contextually grounded recommendations for educational policy and practice.

3.3 Research Design

Research design refers to the overall strategy and framework that guides how a study is conducted, encompassing the choice of methods, data collection, analysis procedures, and how these components relate to achieving the research objectives (Creswell & Clark, 2018). It ensures the coherence and rigor of the study by linking research questions with applicable

methodologies, and it can take various forms depending on the research purpose, including experimental, descriptive, exploratory, and mixed methods designs (Shorten & Smith, 2017).

Among mixed methods designs, the convergent parallel design is particularly suitable when the goal is to collect qualitative and quantitative data concurrently, analyse them separately, and merge findings at the interpretation stage for validation and comprehensive insight (Curry, & Creswell, 2013).

This study employed the convergent parallel mixed-methods design. This is because the study focuses on both qualitative and quantitative approaches. In the convergent parallel design, quantitative and qualitative components are given equal priority. The quantitative strand in this study gathered structured data via questionnaires administered to pupils, measuring their levels of understanding and exposure to climate change communication approaches. Concurrently, the qualitative strand collected rich, contextual data through semi-structured interviews with teachers and school heads, along with focus-group discussions with pupils, to explore experiences, perceptions, and pedagogical practices.

The rationale for selecting this design lies in its ability to achieve both breadth and depth in addressing the research problem. Quantitative data provide descriptive statistical patterns, while qualitative data offer interpretive insights into how climate change information is communicated and the challenges schools face in doing so. By analysing both strands separately and then integrating them during interpretation, the study can corroborate findings, identify convergences and divergences, and generate a holistic portrayal the study (Wisdom & Creswell, 2013).

3.4 Study Area

The study was conducted in Accra, the capital city of Ghana, located in the Greater Accra Region. The Greater Accra Region is the smallest of Ghana's 16 administrative regions by land

area, covering 3,245 square kilometers, or 1.4% of the country's total landmass. It is bordered by the Eastern Region to the north, the Volta Region to the east, the Gulf of Guinea to the south, and the Central Region to the west (National Regional Spatial Agency, n.d.). Despite its small size, Greater Accra holds the largest population share at 17.7% of Ghana's total 30,832,019 people in the 2021 Population and Housing Census, with the highest population density at 1,681 persons per square kilometer. The region is the most urbanized in Ghana, with 91.7% of its residents in urban areas, underscoring its role as the national economic and administrative hub (Ghana Statistical Service, 2021)

Accra, the capital city of both the Greater Accra Region and Ghana itself, serves as the administrative, political, and economic center. It spans roughly 139.7 square kilometers and constitutes the core of the Accra Metropolitan Area, one of the most urbanized zones in Ghana (Achampong, 2021). The city's strategic location and demographic diversity, marked by a youthful population and a mix of ethnic groups, influence educational practices and schooling realities. Population estimates reaffirm the region's density and heterogeneity, underscoring pressures such as high school enrollment and varied management structures in both public and private institutions (Baafi et al., 2025).

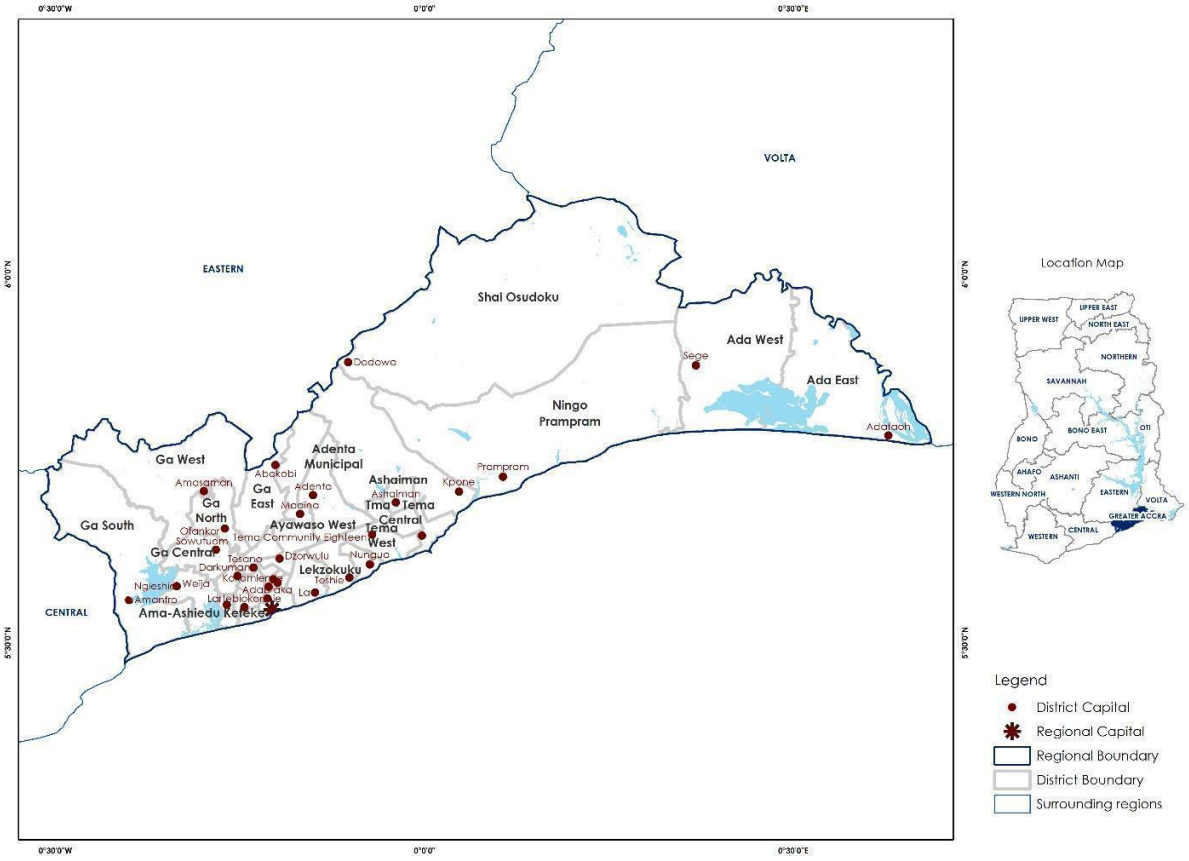

Figure 2 Administrative map of Greater Accra Region

(Source: Ghana Statistics Service, 2021)

The research specifically targeted two schools located in the La-Nkwantanang Madina Municipality, a district in the Greater Accra Region of Ghana. Established in 2012 by Legislative Instrument (L.I.) 2131 and inaugurated on June 28, 2012, the municipality was carved out from the Ga East Municipal Assembly. It encompasses an area of approximately 70.887 square kilometers and shares boundaries with the Ga East Municipal to the west, Adentan Municipal to the east, Accra Metropolitan Assembly to the south, and Akwapim South District to the north, embodying both urban and peri-urban characteristics suitable for capturing diverse schooling contexts (Ghana Districts, n.d.; Ghana Statistical Service, 2021).

Governed by the Madina Municipal Education Directorate, the municipality hosts a mix of public and private basic schools that form a diverse educational ecosystem. According to the 2021 Population and Housing Census, the municipality had a population of 244,676,

comprising 120,846 males and 123,830 females. (Ghana Districts, n.d.; Ghana Statistical Service, 2021).

3.5 Target Population

The study engaged pupils, teachers, and school heads from two basic schools in the La-Nkwantanang Madina Municipality of the Greater Accra Region, chosen to represent the public and private sectors within Ghana's basic education system.

This study targeted basic schools within the Ghanaian education system, focusing specifically on the Basic Education level. Ghana's Basic Education system covers 11 years of compulsory and free education, spanning two years of kindergarten, six years of primary school, and three years of junior high school (Ghana Education Service, 2024).

The pupil participants were drawn from upper primary classes, specifically Basic 4 through to Basic 6, an age range where students have developed the cognitive ability to engage with environmental topics, including climate change. Basic Education curricula include subjects like Science, Our World Our People, and Religious and Moral Education, which have topics relevant to climate change.

Teachers included in the study were those responsible for delivering climate-related topics within these subject areas. School heads were also engaged as key administrative figures overseeing curriculum implementation, school governance, and prioritisation of environmental education.

Collectively, pupils, teachers, and school heads represent the core stakeholders involved in delivering, mediating, and receiving climate change education, thereby providing a comprehensive stakeholder perspective aligned with the study's objectives.

This combination enables the study to address its core objectives: to examine how climate change information is currently communicated to children, to explore the communication strategies teachers employ, and to identify barriers that hinder pupils' understanding of climate change concepts. In the Ghanaian context, these stakeholders collectively shape classroom discourse, instructional design, and policy-practice alignment, making their inclusion essential to a holistic understanding of the study.

3.5.1 Sampling Procedure

Sampling is the process of selecting a subset of individuals from a larger population to obtain information that is representative and relevant for the research objectives (Baran & Jones, 2016). In mixed methods research, carefully chosen sampling strategies ensure the quality, credibility, and applicability of both quantitative and qualitative data (Collins et al., 2007).

The quantitative strand of this study utilised a combination of sampling techniques within a convergent parallel mixed-methods design focusing on two basic schools in the La-Nkwantanang Madina Municipality. The smaller public school employed a census approach for Basic 4 to Basic 6 pupils, involving all eligible students, where n=83, due to its manageable population size. This method ensures complete coverage, minimizes sampling error, and provides precise data for the smaller cohort (EduAcademy, 2024).

In the private school, a census approach was not applied because the population size of 171 pupils across Basic 4 to Basic 6 was substantially larger than that of the public school. Administering questionnaires to such a large number of basic-level pupils posed significant challenges. It required close guidance and step-by-step clarification while completing the questionnaire. This meant that administering the instrument to all 171 pupils would have required extended contact hours, multiple sessions, and additional research assistants to ensure accuracy and comprehension.

These logistical and time constraints made it impractical to manage the entire population. Therefore, a representative sample was selected to maintain the quality of data collection while still ensuring that findings would be generalizable to the larger pupil population. This approach provided a statistically sound and representative sample while maintaining practical feasibility and research efficiency (CloudResearch, 2019).

The Yamane (1967) formula was used to determine the appropriate sample size:

$$n = \frac{N}{1 + N(e)^2}$$

Where:

- n= sample size
- N= population size (171)
- e= margin of error (0.05)

Substituting values:

$$n = \frac{171}{1 + 171(0.05)^2} n = \frac{171}{1 + 171(0.0025)} n = \frac{171}{1 + 0.4275} n = \frac{171}{1.4275} n = 119.8 = 120$$

For qualitative data, purposive sampling was used. Five teachers and two school heads were selected across both schools, based on their involvement in teaching climate-related subjects and their curriculum oversight roles. Additionally, a sample size of (n=12), 6 pupils from each school for a focus group discussion. This was done to obtain learner perspectives and deepen contextual insight into the study objectives. The integration of these sampling techniques across both strands reflects best practices in mixed methods research, strengthening the study's ability to triangulate data, enhance validity, and provide multidimensional insights into the study. (Bazeley, 2018).

3.6 Data Collection Procedure

The data collection process in this study employed a multi-method approach consistent with the convergent parallel mixed-methods design, integrating questionnaires, semi-structured interviews, and focus group discussions (FGDs). This triangulation of data sources aimed to enhance the validity and depth of findings, allowing cross-verification across different types of data (Merriam & Tisdell, 2016).

Prior to data collection, formal permissions were obtained. An introductory letter from my head of department was sent from my institution was sent to the La-Nkwantanang Madina Municipal Education Directorate. The Municipal Directorate then gave me an approval letter to the school heads of the selected schools within the municipality. These permissions facilitated ethical access for data gathering. In the public school, access was relatively straightforward after review and approval by the school heads, while in the private school, additional follow-up and time were needed to review the instruments and align schedules, given the school's administrative requirements.

Three instruments guided the data collection:

3.6.1 Questionnaires

Administered face-to-face to pupils in Basic 4 to Basic 6 to assess their understanding of climate change and how it is communicated in the classroom. These questionnaires were delivered in English with explanations in Twi, which is a local dialect most students understand. This was to ensure comprehension and comfort across varying literacy levels. Each questionnaire session was conducted individually, ensuring pupils received personalized attention and support as needed. To maintain focus and privacy, these sessions were held in designated areas within the schools. Some days a research assistant provided additional support due to the sample size. This one-on-one approach not only accommodated diverse student needs but also minimized

distractions, resulting in more accurate and reliable responses. The personalized administration of the questionnaire aligns with best practices in educational research involving young learners, ensuring data quality and validity (Teixeira et al., 2024)

3.6.2 Semi-structured Interviews

An interview guide was used to conduct interviews with five teachers and two school heads from both schools, exploring their communication strategies, pedagogical approaches, and institutional barriers that influence climate change education. These interviews were audio-recorded with consent and supplemented with field notes capturing nonverbal cues and contextual nuances.

3.6.3 Focus Group Discussions (FGDs)

A focus group discussion guide was used to engage twelve students across both schools. Each comprising six pupils, selected across basic 4 to 6 within each school, to capture diverse learner perspectives on climate change communication. FGDs were held outdoors at the public school and indoors at the private school to accommodate space constraints. They were recorded both digitally and manually and later transcribed for analysis.

Data collection occurred over a three-week period, with questionnaires administered first, followed by focus group discussions and interviews on separate days to mitigate fatigue. The average duration was 5 to 10 minutes for each pupil for the questionnaires. For interviews, the duration was between 25 and 40 minutes for each teacher and management and approximately 45 minutes for focus group discussions for the pupils.

Challenges such as scheduling conflicts and space limitations were addressed through rescheduling and careful planning, ensuring smooth data collection despite logistical hurdles.

Several practical challenges arose during the data collection phase. Coordination with the private school posed scheduling difficulties, as some teachers were occasionally unavailable. The public school faced spatial constraints, necessitating FGDs to be held outdoors under a tree, which led to minor distractions.

3.7 Data Analysis Method

Data analysis followed a two-branch approach consistent with the convergent parallel mixed-methods design: quantitative analysis of pupil responses and qualitative analysis of teachers, school heads, and pupil focus group discussions, conducted separately before an integrated interpretation.

3.7.1 Quantitative Data Analysis

The quantitative strand of the study was based on data obtained from structured questionnaires administered to pupils in Basic 4, Basic 5, and Basic 6. Completed questionnaires were first examined manually to ensure accuracy and completeness before being coded in Microsoft Excel. The cleaned and coded dataset was subsequently imported into IBM SPSS Statistics Version 27 for analysis. This systematic preparation ensured that the data were suitable for statistical procedures and reduced the likelihood of entry errors.

The analysis began with the computation of descriptive statistics, including frequencies, percentages, means, and standard deviations. These measures were used to summarise pupils' awareness, knowledge levels, communication experiences, and learning preferences regarding climate change. Descriptive statistics were particularly useful in providing an overview of how pupils understood climate change concepts and the forms of communication they were most exposed to. Measures of dispersion, such as standard deviation, were interpreted to explain how

widely pupils' responses varied around the mean, thereby offering insight into the consistency or diversity of their views.

Beyond descriptive statistics, the study employed inferential techniques to explore patterns and relationships within the data. Pearson correlation analysis was used to examine the strength and direction of associations between key variables, such as pupils' understanding of climate change, their knowledge levels, and their learning sources. This approach enabled the study to identify whether increases or decreases in one variable corresponded with similar changes in another.

To further investigate predictive relationships, multiple regression analyses were conducted. The first regression model assessed whether demographic characteristics, specifically age and class, predicted pupils' perceptions of climate change as a difficult topic. The analysis showed that both variables were significant predictors, with age reducing perceived difficulty and class level increasing it, highlighting the interplay between cognitive maturity and curriculum complexity. The second regression explored whether pupils' knowledge of environmentally friendly actions predicted their conceptual understanding of climate change. Although the model indicated a weak but statistically significant effect, it demonstrated that behaviour-oriented knowledge does not automatically translate into deeper scientific understanding.

3.7.2 Qualitative Data Analysis

A thematic approach was used to analyse the qualitative dataset because thematic analysis is well-suited for organising, interpreting, and identifying patterns within qualitative data (Braun & Clarke, 2006). The study adopted a deductive thematic analysis, drawing on the study's theoretical framework and research questions to guide the coding and interpretation of the data.

The analysis followed Braun and Clarke's (2006) six-phase framework. All interview and FGDs transcripts were read several times to ensure familiarity with the content. During this

stage, initial notes were taken on recurring phrases, expressions, and ideas that appeared relevant to the research questions. Open codes were generated through line-by-line manual coding, marking segments of text that captured meaningful ideas or patterns. These open codes were then examined through axial coding, where related codes were grouped, and connections between them were identified. The resulting clusters were organised into categories, which provided the basis for developing subthemes. The subthemes were further refined into the final overarching themes, ensuring each theme captured a clear and analytically meaningful pattern.

Table 1: Summary of themes

To strengthen rigour, the manual coding process was later supported using QDA Miner. The software assisted in organising codes, collapsing overlapping ideas, and confirming the consistency of the thematic structure. The coding process involved iterative movements between the raw data, the codes, and the analytical framework until a final set of six themes was established.

The interview dataset and the FGD dataset were analysed separately. This allowed the analysis to capture the distinct experiences, communication practices, and challenges expressed by each group while still aligning with the overall research objectives.

Throughout the analysis, verbatim quotations were retained to support credibility and ensure that the findings were grounded in participants' lived experiences. The final themes are presented and discussed in detail in the results chapter.

3.7.3 Data Integration

Integration of the quantitative and qualitative datasets was undertaken during the interpretive phase of the analysis to generate a comprehensive and coherent understanding of how climate change is communicated within basic schools. This process involved systematically comparing,

merging, and interpreting evidence across the survey data, interviews, and focus-group discussions.

Areas of convergence emerged where different datasets reinforced one another. For instance, the survey finding that pupils primarily learn about climate change at school aligned closely with teachers' accounts of curriculum-driven instruction and their role as children's main source of environmental knowledge. Such cross-validation strengthened the credibility of the interpretation.

Complementarity was also evident, as the qualitative data added depth and explanatory power to patterns observed quantitatively. While the questionnaire indicated that pupils preferred learning climate change topics through storybooks, videos, and animations, the interview and FGD narratives clarified why, highlighting children's need for visualisation, simplified language, and engaging formats to grasp abstract concepts. These qualitative insights provided contextual grounding for the statistical trends.

Divergences across the datasets were examined critically to highlight hidden dynamics. Notably, questionnaire results showed overwhelmingly high pupil interest in learning more about climate change, yet both teachers and pupils reported minimal climate-related discussion at home. This inconsistency pointed to broader socio-cultural and communicative gaps beyond the school environment, suggesting areas that require targeted educational interventions.

By drawing on the strengths of multiple forms of evidence and integrating them through a deliberate interpretive strategy, the study enhanced the validity, richness, and explanatory power of its findings. The integrated analysis thus presents a multidimensional picture of climate change communication approaches in Ghanaian basic schools, aligning with best practice in mixed-methods research (Fetters et al., 2013; Creswell & Plano Clark, 2018).

3.8 Ethical Considerations

This study was founded on the principles outlined by Israel and Hay (2006), emphasizing that social science research must uphold the highest ethical standards, including voluntary participation, informed consent, confidentiality, and minimization of harm. According to their framework, ethical research is not just about compliance with regulations, but about acting responsibly and conscientiously, with researchers taking active responsibility for addressing potential ethical issues that arise during the research process

Prior to data collection, all necessary institutional approvals were obtained. These included ethical clearance from the University's Directorate of Research, Innovation, and Development (DRID), as well as authorization from the Ghana Education Service (GES) through the La-Nkwantanang Madina Municipal Education Directorate to conduct the study in the selected basic schools within the Municipality. Informed consent was further secured from school management on behalf of the institution.

For pupils, parental or guardian consent was obtained through the school management, who act *in loco parentis* during school hours, or directly from parents or guardians when required. Participation was entirely voluntary, and pupils were informed that they could withdraw at any stage without any consequences.

To ensure privacy and confidentiality, personal identifiers such as names were not included in the data. All data, including audio recordings, transcripts, and field notes, were securely stored in password-protected files accessible only to authorized personnel.

Throughout the research process, ethical conduct was maintained by engaging participants respectfully and sensitively. Participants were treated with fairness and transparency, and their comfort was prioritized at all times. The study complied with both university ethics guidelines

and the Ghana Education Service's research protocols, ensuring that rights, privacy, and well-being were safeguarded from data collection through reporting and dissemination.

3.10 Chapter Summary

This study, grounded in a pragmatic paradigm, adopted a convergent parallel (concurrent triangulation) mixed-methods design, with a total sample of 203 pupils, 5 teachers, and 2 school heads drawn from selected basic schools in the La-Nkwantanang Madina Municipality. Quantitative data were collected using structured questionnaires administered to pupils, while qualitative data were obtained through semi-structured interviews with teachers and school heads, and focus group discussions with pupils.

In addition to the primary data, secondary information on school demographics and educational resources was also reviewed to provide contextual insights. Quantitative data were analysed using descriptive statistics, including frequencies and percentages, to summarize pupils' awareness, knowledge, and engagement with climate change. Qualitative data were analysed thematically, following the protocol of Braun and Clarke (2006, 2016), which involved familiarization, coding, theme development, and narrative synthesis.

Despite the progress made, the researcher encountered some challenges during data collection. Getting the approval from one school took longer than expected, which delayed the date collection process. One school did not have a conducive space for the focus group study to be conducted, but this was carefully managed to ensure pupils were comfortable and understood the questions, and their responses were accurately recorded and interpreted, given their varying levels of comprehension and expression.

The chapter also looked at the data analysis method, which comprised the quantitative and qualitative strands of the data and how they were analysed and integrated.

CHAPTER FOUR

DATA ANALYSIS, PRESENTATION OF FINDINGS AND DISCUSSIONS

4.0 Introduction

The chapter presents and discusses the findings emanating from the empirical investigation as explained in the previous chapter. The findings draw on quantitative data from pupil questionnaires and qualitative insights from semi-structured interviews with teachers and school heads, and focus group discussions with pupils. Together, these datasets provide a comprehensive understanding of pupils' awareness levels, strategies used to communicate climate change information, and the barriers that shape climate change communication in the school environment. The chapter begins with an overview of the socio-demographic characteristics of the participants and proceeds to a detailed analysis of the quantitative and qualitative findings, organised according to the three research questions underpinning the study.

4.1 Socio-Demographic Characteristics of Participants

A total of 222 individuals took part in the research across the two sampled basic schools. These comprised 203 pupils, 5 teachers, 2 school heads, and 12 pupils who participated in the focus group discussions. The pupil sample consisted of 120 learners from the private school and 83 from the public school, all of whom were from Basic 4 to Basic 6. This corresponds to the upper primary stage in Ghana's basic education structure, with participating pupils aged 8 to 15 years (Ghana Education Service, 2019) an age range considered developmentally capable of engaging with foundational environmental and climate change concepts

Sex distribution among the pupils showed a slight female majority (53.7%), compared to males (46.3%), a pattern broadly consistent with enrollment trends documented in many urban basic schools in Ghana (UNESCO, 2021). The teaching staff comprised four males representing (80%) and one female representing (20%), all professionally trained and with more than five years of teaching experience. The two school heads, one male from the public school and one female from the private school, each had over a decade of school leadership experience, offering informed administrative perspectives on school curriculum and academic overview.

The diversity represented across school type, sex, age, and professional experience enriched the dataset by capturing multiple viewpoints from learners, teachers, and school leaders. Such heterogeneity aligns with the pragmatic mixed-methods orientation of the study, which emphasises incorporating varied perspectives to better understand complex educational and social phenomena (Morgan, 2014).

Category	**Sub-category**	**Frequency (n)**	**Percentage (%)**	**Remarks**
School Type	Public	1	50	Public School
	Private	1	50	Private School
Pupil Level	Basic 4	68	33.5	Both schools combined
	Basic 5	70	34.5	
	Basic 6	65	32.0	
Sex (Pupils)	Male	94	46.3	
	Female	109	53.7	Slightly higher female participation
Teachers	Male	1	20.0	
	Female	3	80.0	
School heads	Male	1	50.0	Public school
	Female	1	50.0	Private school
Total Participants	—	205	100.0	

Table 1 Socio-Demographic Characteristics of Participants

(Source: Fieldwork, 2025)

4.2 Findings and Discussions

The research sought to explore how climate change information is communicated to children in selected basic schools, the strategies teachers and schools employ to facilitate this communication, and the barriers that influence pupils' ability to understand climate-related concepts. Guided by the three research questions, the study aimed to establish the extent and nature of climate change communication within the basic school environment, examining not only what information pupils receive, but how it is delivered and what structural or learner-level challenges shape their comprehension.

4.2.1 Source of climate change information to children in selected basic schools in the Greater Accra Region.

The study investigated where pupils first heard about climate change, to identify the source of their information. During the survey, a vast majority of pupils mentioned school as their initial point of exposure, making it the dominant source of information in the dataset. A total of 175 out of 203, representing (86.2%) of the total sample, reported that they first learned about climate change at school. This strong association is supported by a high correlation coefficient ($r = .871$, $p < .001$), indicating that school-based exposure is closely linked to pupils' awareness. This pattern mirrors findings from Amoakwa et al. (2024), who similarly reported that in Ghanaian basic schools, formal classroom instruction, shaped strictly by curriculum requirements, is the dominant channel through which climate change content reaches pupils. Again Rousell and Cutter-Mackenzie-Knowles (2020) in their systematic review of 50 studies concluded that schools remain the most influential institutional source for children aged 8–14.

The mean response score for this variable was (1.33) with a standard deviation of (0.89), reflecting that the majority clustered at the school option, while smaller numbers cited other

sources, such as family (3.0%), media (2.5%), or none (8.4%). This low spread suggests considerable consensus around schooling as the main conduit of climate change literacy.

In line with the findings in the survey, teachers explained in the interviews that they introduce climate-related topics only when these appear in the national curriculum. A teacher in the public school, when asked if there are topics on climate change in the subjects they teach, stated that *"there's a topic on the environment and the world".* Another teacher from the public school said, *in OWOP we talk about ecosystems and the effects of climate change on humans,* illustrating that curriculum dictates when climate change issues are discussed. These accounts directly reflect critiques by Asante et al., (2024), who argue that Ghana's standards-based curriculum continues to position climate change as an add-on rather than a cross-cutting, inquiry-led theme.

Pupils' accounts in the focus groups aligned strongly with these findings. All twelve participants mentioned school as their primary source of climate change information, with some specifically mentioning the teacher and subject they learnt it from. One student said, *I heard it from my Religious and Moral Education teacher.* Another said, *I heard it from Sir Emma.* Children's accounts in the focus groups aligned strongly with these findings.

The school heads reaffirm that climate change information reaches pupils primarily through formal classroom instruction, embedded within the GES curriculum. Both school heads indicated that teachers only teach climate-related topics when they appear in the approved curriculum. The school head of the private school explained;

Basically, the teachers draw their forecast. So ours is to compare it with the syllabus. Now, we don't say syllabus again, we say curriculum. So we make sure that whatever they are teaching has been sanctioned by GES. So if there are things on climate change, it is the teachers who will be submitting that information.

Similarly, the public school head noted that climate change topics are taught only when they are in the subjects that are being taught. *It's just based on the subject. If a subject in the curriculum has a topic that is related to that, then yes, they learn it.*

Source	Frequency (n)	Percentage (%)	Mean Score	Standard Deviation
School	175	86.2		
Family	6	3.0		
Media	5	2.5		
None (N/A)	17	8.4		
Total	**203**	**100.0**	1.33	0.888

Table 2 SPSS Analysis

(Source: Fieldwork, 2025)

4.2.2 Communication strategies used to communicate climate change information in Ghanaian schools.

The study examined pupils' preferred methods for learning about climate change, revealing a strong preference for interactive and visual learning approaches. Specifically, 148 out of 203 pupils, (72.9%) preferred reading storybooks, followed by 33 pupils (16.3%) who preferred playing games, and 22 pupils (10.8%) who liked watching cartoons. This preference pattern is summarized by a mean score of (2.62) on the preference scale with a standard deviation of (0.67), indicating that most pupils consistently preferred storybooks over other methods.

The mean score reflects the average choice among pupils, showing that storybooks were the dominant learning tool, while the relatively low standard deviation means there was general

agreement on this preference across the group. This information helps to quantify how strong and widespread the preference is, making it easier to understand the common learning inclinations of the pupils.

However, despite these clear preferences, the study found almost no link between preferred learning methods and actual understanding of climate change concepts. A near-zero correlation of ($r = .021$, $p = .769$) indicates that a child's preference for storybooks, games, or cartoons does not meaningfully predict how well they understand climate change concepts. This suggests that pupils are not being taught using the tools they find most engaging, which may reduce the effectiveness of climate change communication in the classroom. This weak correlation supports Ginsburg and Audley's (2020) observation that when teaching strategies mismatch children's developmental preferences, comprehension and motivation suffer. The stark mismatch between pupils' strong preference for storybooks, games, and cartoons and the actual delivery methods supports Ginsburg and Audley's (2020) U.S.-based study and Madden and Liang's (2016) Australian research, both of which demonstrated that young children learn environmental concepts best through narrative, play, and visual media rather than abstract exposition.

Preferred Learning Method	**Frequency (n)**	**Percentage (%)**	**Mean Score**	**Standard Deviation**
Read a storybook	148	72.9		
Play games	33	16.3		
Watch cartoons	22	10.8		
Total	**203**	**100.0**	2.62	0.67

Table 3 SPSS Analysis

(Source: Fieldwork, 2025)

Teachers further corroborated this by describing that they rely mainly on traditional, teacher-centered methods such as textbook reading and class explanations, especially in the public school, where teaching materials were scarce. One teacher from the private school said; *I use pictures from the textbook and drawings*, when asked what methods do you use to teach pupils about climate change?"

Some teachers supplemented lessons with multimedia with their personal resources. For instance, a teacher said *I bring my laptop, I show them videos, and they will talk about what they are seeing*. This reflects the teacher's personal initiative rather than the availability of school-provided resources, indicating unequal access to multimedia across classrooms. This mirrors Kwauk (2020) research across sub-Saharan Africa, where resource constraints force reliance on traditional pedagogy.

Experiential learning was limited and reported mainly in the public school. But teachers, pupils and school heads all emphasised its importance. In the public school, the school head recalled past instances where external organisations facilitated practical environmental activities, mentioning that *some time ago, I think the All-African University students came to plant trees here.* The fact that such activities occur only sporadically through external NGOs reinforces Fitzpatrick et al.'s (2024) findings that climate change education in vulnerable regions remains donor-dependent rather than institutionally embedded.

Teachers described activities such as tree planting or school clean-up exercises, noting that these practical experiences help pupils grasp environmental concepts more concretely.

The schools should be encouraged to engage in tree planting activities, because we always tell them when the last tree dies, but we do not practice it. During these exercise the you can have the opportunity to explain to them the benefits of tree planting and that what the western world know that we do not know, they are thought the importance of these things like when

they burn causing a lot of heat in the system but in this part of our world we don't know these things and so we are always destroying the environment.

Pupils expressed strong interest in such activities, commenting on the value of engaging in clean-up exercises to learn how to protect the environment and requesting more opportunities for outdoor or community-based engagement. One student stated, *We should be doing exercises and practicals to learn how to protect the environment and go outside to plant.*

These findings align closely with Social Cognitive Theory (Bandura, 1986), which underpins this study. The theory highlights the influential role of social models, such as teachers and peers, in shaping children's knowledge and behaviour. The emphasis on observational learning and self-efficacy provides a theoretical explanation for why pupils predominantly rely on school-based channels for climate change information, and it underscores the critical role of classroom interactions in facilitating learning through social engagement.

4.2.3 Barriers to children's understanding of climate change information in Ghanaian schools.

The findings identified several interlocking barriers that affect children's comprehension of climate change. These barriers include curriculum constraints, resource limitations, teacher capacity gaps, child-level conceptual difficulties, and environmental exposure limitations.

The survey revealed that a majority of pupils found climate change challenging to understand. Specifically, 166 out of 203 pupils representing (81.8%) described it as 'fairly difficult,' while only 20 pupils, representing (9.9%) reported that it was 'very easy' to understand. The average difficulty score was 2.26 on a scale where higher numbers indicate greater difficulty. This means that, on average, pupils rated climate change as slightly more difficult than easy, suggesting that most children found the topic challenging, but not overwhelmingly so. The

standard deviation of 0.64 shows there was some variation, with a few pupils finding it easier or harder than the majority

Further analysis using regression showed that both a pupil's age and class level significantly influenced how difficult they perceived climate change to be ($R^2 = .065$, $F = 6.94$, $p < .001$). Older pupils generally found climate change easier to understand ($B = -0.28$, $p < .001$), possibly because they have more experience and background knowledge. In contrast, pupils in higher class levels reported slightly greater difficulty ($B = 0.19$, $p = .004$), likely reflecting the increasing complexity of the curriculum content as they progress academically. These results suggest that while age may help pupils make sense of climate change, the structure and depth of the curriculum at higher levels can make the topic more challenging.

These findings align with Bandura's Social Cognitive Theory (Bandura, 1986), which emphasizes learning through observation, experience, and cognitive development influenced by environmental contexts. Older pupils' better understanding can be attributed to their more developed cognitive capabilities and potentially richer social learning experiences. Conversely, the curriculum's escalating complexity without adequate scaffolding may overwhelm pupils' evolving capacities, undermining effective learning.

Difficulty Level	**Frequency (n)**	**Percentage (%)**	**Mean Score**	**Standard Deviation**
Very difficult	2	1.0		
Fairly difficult	166	81.8		
Fairly easy	15	7.4		
Very easy	20	9.9		
Total	**203**	**100.0**	2.26	0.64

Table 4 SPSS Analysis

(Source: Fieldwork, 2025)

Predictor	B	Std. Error	Beta	t	Sig. (p-value)
Age	-0.282	0.080	-0.287	-3.54	0.000
Class Level	0.186	0.064	0.234	2.89	0.004
Model Summary	$R^2 = 0.065$	F = 6.94	p < .001		

Table 5 SPSS Analysis

(Source: Fieldwork, 2025)

Teachers repeatedly described climate change as abstract for younger learners. Pupils confirmed this confusion. In the focus group discussion, a pupil from basic 4 who is between the age range of 10-12 commented; *It is difficult… I don't understand it well.* As noted by Ginsburg and Audley (2020), children under 14 benefits most from concrete, relational, and emotionally resonant pedagogies that render abstract notions meaningful. Reflecting on these insights, it became clear to me that the technical nature of climate change poses a significant barrier to meaningful engagement for young pupils within the existing curriculum frameworks. This realisation highlights the urgent need for pedagogical adaptations that translate complex scientific ideas into accessible, relatable formats. This can foster not only comprehension but also enthusiasm and empowerment among learners. As a researcher, I perceive this gap as a critical leverage point for intervention, indicating that without tailored teaching strategies, the potential of climate change education to inspire agency in young children remains severely constrained.

Resource limitations were another prominent barrier. The public-school teacher reported inadequate textbooks, which are central to guiding instruction and providing the basic

illustrations and explanations needed for effective learning. A teacher in the public school stated that *we do not have any tools, for instance, we do not have any textbooks for OWOP, so I use my own book to teach the subject,* highlighting the extent of inadequate teaching material. When further asked about the availability of additional facilities that could support teaching, such as a library or ICT laboratory, she confirmed that the school lacked both, stating, *No, we do not have a library or ICT lab* emphasising the absence of supportive learning resources. These findings reflect Keh (2023), who documented how the absence of basic infrastructure and teaching materials in urban Accra impedes effective climate change communication in Ghanaian schools.

Bandura's Social Cognitive Theory (1986) explains this challenge clearly: the theory posits that learning occurs through observing models and receiving environmental reinforcement, but without resources like textbooks or visual aids, these modelling pathways break down. Pupils cannot effectively imitate demonstrated behaviours or concepts when teachers lack tools to make abstract ideas concrete and observable. Thus, resource gaps directly undermine the observational learning process critical for climate change comprehension.

Both school heads emphasised that the lack of teaching and learning materials significantly impedes communication. The private school lacks projectors, screens, maps, and digital tools. The school head stressed that pupils depend solely on textbook pictures. He explained,

> *It's only the books. But we are not fortunate to take the children through videos for them to watch. If we have reached that level, you just pick videos, clips, you put them in the lab, put it in the system, then you project it, then you watch it. But over here, they only depend on pictures of the text and explanation, which is abstract, and they cannot really comprehend it very well.*

Teachers also highlighted inadequate training as a major barrier. They admitted receiving no specialised climate education training from the Ghana Education Service. Without these trainings, teachers struggle to simplify scientific concepts for children. This is consistent with

global findings from Puttick et al. (2024) and Ghana-specific insights from Amoakwa et al. (2024), both of which show that climate change modules are rarely included in teacher education programs. Without adequate pedagogical preparation, teachers struggle to deliver age-appropriate and comprehensible climate education.

There are general trainings from GES, so there is money allocated for training for teachers, like workshops, but those are general trainings. There have not been specific trainings on climate change education.

Learner-related barriers further complicate the communication process. Some students lack direct environmental experiences, such as deforestation, which makes it harder to connect lessons to real-world situations. Amponsah's (2012) findings that rural Ghanaian students have greater awareness of climate change than their urban peers, largely because of their closer contact with environmental phenomena, support this idea.

One thing is, because of where they are living, most of the effects of climate change is not seen. And even if you are talking about how maybe deforestation will affect climate change, since they are not within that area, it becomes something they can't relate to

Pupils acknowledged that they had limited access to climate-related learning tools and materials like cartoons, books, or games outside school, reducing opportunities for reinforcement. When asked if they remembered any book or game that taught about climate change, 8 out of the 12 respondents said, "No."

4.3 Chapter Summary

This chapter presented the results of the mixed-methods analysis by organizing and interpreting the quantitative and qualitative data in accordance with the study's research questions. The chapter began with the socio-demographic profile of participants before presenting the

quantitative findings through descriptive statistics, correlations, and regression analyses. It then included a thematic analysis of qualitative data from interviews with teachers and school heads and focus groups with students, supporting each research question. The chapter systematically explored how climate change information is communicated, the strategies used within school settings, and the barriers influencing children's understanding.

CHAPTER FIVE

SUMMARY, CONCLUSION, AND RECOMMENDATIONS

5.1 Introduction

This chapter synthesises the major findings of the study by drawing together insights from both the quantitative and qualitative strands of the study. It presents a consolidated summary of the key results in relation to the study's research questions. Offers conclusions derived from the integrated analysis, outlines limitations encountered during the research, and offers recommendations for future studies.

5.1.1 Source of climate change information to children in selected basic schools in the Greater Accra Region.

The study revealed that school is the dominant and most influential source of climate change information for pupils. Approximately 86% of pupils reported that they first learned about climate change in the classroom. Interviews and focus group discussions reinforced this observation, indicating that climate-related topics are taught only when they appear in the national curriculum. Teachers and school heads emphasised that instruction is strictly guided by curriculum prescriptions, with limited opportunities to introduce supplementary climate change content. Other potential sources, family, media, and community, played minimal roles.

5.1.2 Communication strategies used to communicate climate change information in Ghanaian schools.

The study showed that pupils strongly preferred storybooks, games, and cartoons, as interactive forms of learning, yet these were rarely used by teachers due to resource constraints. Instead, communication relied heavily on traditional, teacher-centered methods, particularly textbook

reading and verbal explanation. In a few cases, teachers used their personal laptops to show videos, but these efforts were sporadic and dependent on individual initiative rather than institutional provision.

Both teachers and pupils expressed appreciation for experiential learning, such as tree planting or clean-up exercises, though these occurred irregularly and were often facilitated by external organisations rather than embedded within school structures.

5.1.3 Barriers to children's understanding of climate change information in Ghanaian schools.

The study revealed a series of interconnected barriers that influence how children understand climate change in at the basic school level. These included limitations within the curriculum, which present climate change only within specific subjects and do not integrate it across learning areas, thereby restricting consistent reinforcement of concepts. Resource constraints were also evident, as both schools, particularly the public school, lacked adequate textbooks, visual aids, ICT facilities, and multimedia tools that could help simplify abstract scientific ideas for young learners. Teachers further reported receiving no specialised training in climate change education, leaving them without the pedagogical support needed to tailor instruction to children's developmental levels. At the learner level, many pupils experienced difficulty grasping the abstract nature of climate change, a challenge compounded by their limited exposure to tangible environmental changes within their urban context. Together, these barriers created a learning environment where pupils' genuine interest in climate-related issues was not matched by the instructional or structural conditions necessary to support deep understanding.

5.2 Conclusion

The findings of this study indicate that the way climate change is communicated in Ghanaian basic schools is heavily influenced by the curriculum and limited by the teaching resources available. This makes children's comprehension highly dependent on the instructional strategies teachers are able to use.

The dominance of the curriculum as the main driver of classroom instruction means pupils' learning is often fragmented, occurring only when topics appear in specific subjects. Although pupils demonstrated strong interest and expressed clear preferences for visual and interactive learning tools, these preferences do not translate into improved understanding because the classroom environment does not provide the pedagogical or material support required.

The mixed-methods integration shows that children's conceptual difficulties stem not from lack of interest but from an absence of engaging, age-appropriate, and contextually meaningful instructional approaches. Teachers' limited training, inadequate teaching materials, and the abstract nature of climate change concepts further compound this gap. The study, therefore, highlights a critical need to rethink how climate change education is embedded and delivered in basic schools, particularly in urban contexts where environmental experiences may be less visible.

5.3 Limitations

- Some interviews and focus group discussions were conducted in Twi and subsequently translated into English by the researcher. Because the researcher is not a linguistics expert and did not have a specialist present during translation, subtle meanings, expressions, and contextual nuances may not have been fully captured. Although efforts were made to translate as accurately as possible, the translated data may not reflect participants' expressions with complete fidelity.

- Although participation was voluntary, it is possible that some pupils did not feel entirely free to withdraw. In Ghanaian school settings, pupils often comply with teachers' directives, and the presence or instruction of teachers may have inadvertently influenced their decision to participate. This potential power dynamic represents a methodological constraint, as it may have affected the openness or autonomy of some responses.
- The study conceptualised climate change communication primarily through the lens of the school curriculum. This operational definition constrained the scope of inquiry and may have limited the extent to which non-school environments like home, community, and media were explored. While appropriate for the research questions, this narrow conceptual focus represents a limitation because it frames climate change communication strictly within formal schooling.
- The study relied predominantly on participants' self-reported experiences, especially those of pupils who completed questionnaires and participated in focus group discussions. Self-reported data are inherently subjective and can be affected by recall bias, as younger pupils may struggle to accurately remember when or how they first encountered climate change information or the specific details of classroom learning experiences. Their responses may therefore reflect partial recollections or assumptions rather than precise accounts. Although triangulation across methods was used, the subjective nature of self-reporting remains a methodological constraint.

5.4 Recommendations for Future Research

- This study did not explicitly compare communication approaches, resources, or learner experiences across public and private schools. Future research could adopt a comparative design to examine how school type influences climate change communication, availability of teaching resources, pedagogical strategies, and learner outcomes.

- Given the translation limitations encountered, future studies may investigate climate change communication using Ghanaian languages as the primary medium. Doing so could reveal cultural interpretations and conceptual understandings that are often obscured in English-only approaches.
- Expanding the research to rural and peri-urban contexts would provide insight into how environmental exposure and community practices shape climate change literacy.
- Further research could explore how teachers' pedagogical orientations, training backgrounds, and experiences influence their approach to teaching climate change and related environmental concepts.
- Future studies can be done to track pupils across several academic years to ascertain how their climate change knowledge evolves over time and the long-term impact of different communication strategies.
- Future studies could examine the roles of parents, media, religious institutions, and peer networks in shaping children's environmental knowledge to provide a more holistic understanding of climate change communication pathways.

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APPENDICES

APPENDIX A: QUESTIONNAIRE

QUESTIONNAIRE FOR BASIC PUPILS (BASIC 4 - 6)

Dear Participant, my name is Hilda Aku Asiedu, a final-year Master's student at the School of Graduate Studies at the University of Media, Arts and Communication. I am carrying out a study on how climate change is communicated to children in basic schools in Accra, Ghana. We want to know what you already know, how you learn about climate change, and what makes learning easy and fun for you. The questionnaire will take about 10 –15 minutes.

Your participation is voluntary. All responses will be treated with strict confidentiality. There are no right or wrong answers; we just want your honest views. Your responses will remain confidential and will be used only for this research.

By answering, you are also agreeing that you are happy to be part of this study.

Section A: Background

1. Age?
    1. 8-10 – 115
    2. 11-12 - 70
    3. 13-15 18
2. Gender?
    1. Boy - 84
    2. Girl - 119
3. What class are you in?

1. Basic 4 - 51
2. Basic 5 - 64
3. Basic 6 - 88

Section B: Knowledge of Climate Change

4. Have you heard about "climate change" before?
    1. Yes - 186
    2. No - 15
    3. I don’t remember - 2
5. Where did you first hear about climate change?
    1. School - 175
    2. Media (TV/Radio) - 5
    3. Family - 6
    4. N/A (none of the above) - 17
6. What do you think climate change means?
    1. Complete Scientific understanding (A change in weather pattern over a long period of time) - 48
    2. Partial Scientific Understanding (A rise in the temperature of the earth/Change in the weather/The change in the environment) - 118
    3. No Understanding (I don’t know) - 37

Section C: Climate Actions

7. Which of these things do you think can help protect the environment from climate change?

    1. Tree planting - 74
    2. Waste management (Segregating waste & Cleaning the environment) - 88
    3. Climate Advocacy (Talking to others about climate change) - 0
    4. Avoid harmful practices (Avoid bush burning/Avoid illegal mining/Avoid deforestation/Avoid sand winning) - 41

Section D: Communication Preferences

8. Which of these do you prefer to use when learning about climate change?

    1. Watch cartoons - 22
    2. Play games - 33
    3. Read a storybook - 148

9. Would you like to learn more about climate change using these fun ways?

    1. Yes - 203
    2. No - 0
    3. Maybe - 0

Section E: Understanding & Social Interaction

10. Do you think climate change is a difficult topic to understand?

    1. Very difficult - 2
    2. Fairly difficult - 166

3. Fairly easy - 15

4. Very easy - 20

11. Do you talk about climate change with your family or friends?

1. Yes - 15

2. No - 188

12. Would you like to learn more about climate change?

1. Yes - 202

2. No - 1

3. Maybe - 0

APPENDIX B: INTERVIEW GUIDE

INTERVIEW GUIDE FOR TEACHERS (BASIC 4 - 6)

Dear Participant, my name is Hilda Aku Asiedu, a final-year Master's student at the School of Graduate Studies at the University of Media, Arts and Communication. I am carrying out a study on how climate change is communicated to children in basic schools in Accra, Ghana. The purpose of this interview is to learn about the methods, tools, and strategies you use to teach climate change, as well as the challenges and barriers in delivering climate education. The interview will last about 30–40 minutes.

Participation is voluntary. You may skip questions or withdraw at any time. All responses will be treated with strict confidentiality and will not be linked to your name. By continuing, you are kindly giving your consent to participate. Thank you for sharing your experience.

1. Interview Guide for Teachers

A. Background

- What subject are you teaching?
- How long have you been teaching?
- Which of the topics within the science syllabus talk about climate change?
- Aside from those topics, are there instances where you are teaching and maybe you come across something, and then you chip in on the topic of climate or the environment?

B. Understanding and Perception

- How do you define climate change?
- How important is it to teach children about climate change, and why?

C. Teaching Practices and Tools

- What teaching methods do you use to explain climate change to your students
- What tools or materials do you use? (e.g., books, cartoons, games)
- Are there tools or methods you wish you had access to?

D. Challenges and Student Response

- What challenges do you face when teaching climate or environment-related topics?
- How do children usually respond or engage with climate lessons?

E. Recommendations

- What could improve climate education for your pupils?
- Do you receive any support or training related to climate education?

INTERVIEW GUIDE FOR SCHOOL HEADS

Dear Participant, my name is Hilda Aku Asiedu, a final-year Master's student at the School of Graduate Studies at the University of Media, Arts and Communication. I am conducting a study on how climate change is communicated to children in basic schools in Accra, Ghana. This interview will explore school policies, curriculum support, teacher training, and ways schools involve children in learning about climate change. It will take about 25 – 30 minutes.

Your participation is voluntary. You are free to stop at any point or skip any question. Information you provide will remain confidential and will be used only for research. The names of schools or individuals will not appear in the report. By agreeing to continue, you are providing your consent to participate. Thank you for your time.

3. Interview Guide for School Management

A. Background and Roles

- How long have you worked in school management?
- Could you give some of your roles and responsibilities as a school manager?

B. Policy and Curriculum Support

- Does the school include climate education in its curriculum or activities?
- Are there school policies promoting climate change education or sustainability?

C. Institutional Support and Training

- What support do teachers receive regarding climate education?
- Are there training sessions or resources provided for climate topics?

D. Barriers and Opportunities

- What are the key challenges the school faces in delivering climate education?

- What opportunities exist to improve climate education?

E. Community Engagement

- How does the school involve parents or the wider community in environmental education?

APPENDIX C: FOCUS GROUP DISCUSSION GUIDE

FOCUS GROUP DISCUSSIONS FOR BASIC PUPILS (BASIC 4 - 6)

Dear Participant, my name is Hilda Aku Asiedu, a final-year Master's student at the School of Graduate Studies at the University of Media, Arts and Communication. I am carrying out a study on how climate change is communicated to children in basic schools in Accra, Ghana. We are here to talk together in a group about what you know, how you learn, and what makes learning fun or difficult. The discussion will take about 30–40 minutes.

Taking part is voluntary. You can choose not to answer any question or stop at any time. What you say will remain private, and we will not use your name in the report. By staying in the discussion, you are showing you are happy to take part. Thank you for helping with this study.

4. Focus Group Discussion (FGD) Guide for pupils.

Opening Activity

- What is your favourite cartoon, game, or story?

A. Awareness and Understanding

- Have you heard about climate change?
- What do you know about it?

B. Perceptions and Feelings

- How do you feel when you hear about floods or trees being cut down?

C. Communication Preferences

- What do you like best for learning: cartoons, stories, drawings, or games?
- Can you remember a story or cartoon that taught you about the environment?

D. Actions and Habits

- What do you do to help protect the environment?

E. Suggestions for Improvement

- What should your teachers do to make learning about climate change more fun or easier to understand?

- Is there anything else you want to say about learning climate change?

APPENDIX D: QUANTITATIVE ANALYSIS RESULTS

Which of these do you prefer to use when learning about climate change?							
		Frequency	Percent	Valid Percent	Cumulative Percent	Mean	Std. Deviation
Valid	Watch cartoons	22	10.8	10.8	10.8		
	Play games	33	16.3	16.3	27.1		
	Read a storybook	148	72.9	72.9	100.0		
	Total	203	100.0	100.0		2.62	0.674

Knowledge of Climate Change

Have you heard about "climate change" before?							
		Frequency	Percent	Valid Percent	Cumulative Percent	Mean	Std. Deviation
Valid	Yes	186	91.6	91.6	91.6		
	No	15	7.4	7.4	99.0		
	I don't remember	2	1.0	1.0	100.0		
	Total	203	100.0	100.0		1.09	0.324
Where did you first hear about climate change?							
		Frequency	Percent	Valid Percent	Cumulative Percent	Mean	Std. Deviation
Valid	School	175	86.2	86.2	86.2		
	Media	5	2.5	2.5	88.7		
	Family	6	3.0	3.0	91.6		
	N/A (none of the above)	17	8.4	8.4	100.0		
	Total	203	100.0	100.0		1.33	0.888
What do you think Climate Change means?							
		Frequency	Percent	Valid Percent	Cumulative Percent	Mean	Std. Deviation
Valid	Complete Scientific understanding (A change in weather patterns over a long period of time)	48	23.6	23.6	23.6		
	Partial Scientific Understanding (rise in temperature of the earth/Change in the weather/change in the environment)	118	58.1	58.1	81.8		
	No Understanding (I don't know)	37	18.2	18.2	100.0		
	Total	203	100.0	100.0		1.95	0.646

Which of these things do you think can help the environment?							
		Frequency	Percent	Valid Percent	Cumulative Percent	Mean	Std. Deviation
Valid	Tree planting	74	36.5	36.5	36.5		
	Waste management (Segregating waste & Cleaning the environment)	88	43.3	43.3	79.8		
	Avoid harmful practices (Avoid bush burning/Avoid illegal mining/Avoid deforestation/Avoid sand winning)	41	20.2	20.2	100.0		
	Total	203	100.0	100.0		2.04	1.085

Knowledge of Climate Change

Understanding & Social Interaction

Do you think climate change is a difficult topic to understand?							
		Frequency	Percent	Valid Percent	Cumulative Percent	Mean	Std. Deviation
Valid	Very difficult	2	1.0	1.0	1.0		
	Fairly difficult	166	81.8	81.8	82.8		
	Fairly easy	15	7.4	7.4	90.1		
	Very easy	20	9.9	9.9	100.0		
	Total	203	100.0	100.0		2.26	0.642
Do you talk about climate change with your friends and family?							
		Frequency	Percent	Valid Percent	Cumulative Percent	Mean	Std. Deviation
Valid	Yes	15	7.4	7.4	7.4		
	No	188	92.6	92.6	100.0		
	Total	203	100.0	100.0		1.93	0.262
Would you like to learn more about climate change?							
		Frequency	Percent	Valid Percent	Cumulative Percent	Mean	Std. Deviation
Valid	Yes	202	99.5	99.5	99.5		
	No	1	0.5	0.5	100.0		
	Total	203	100.0	100.0		1.00	0.070

Correlations

		1	2	3	4	5	6	7	8	9
Which school do you attend	Pearson Correlation	1								
	Sig. (2-tailed)									
Have you heard about "climate change" before?	Pearson Correlation	-.224**	1							
	Sig. (2-tailed)	0.001								
5. Where did you first hear about climate change?	Pearson Correlation	-.195**	.871**	1						
	Sig. (2-tailed)	0.005	0.000							
What do you think Climate Change means?	Pearson Correlation	-.552**	.473**	.437**	1					
	Sig. (2-tailed)	0.000	0.000	0.000						
Which of these things do you think can help the environment ?	Pearson Correlation	.197**	-0.053	-0.034	-.159*	1				
	Sig. (2-tailed)	0.005	0.455	0.627	0.023					
Which of these do you prefer to use when learning about about climate change?	Pearson Correlation	-0.097	0.027	0.015	0.021	-.149*	1			
	Sig. (2-tailed)	0.170	0.699	0.834	0.769	0.034				
Do you think climate change is a difficult topic to understand?	Pearson Correlation	.355**	-0.094	-0.050	-.383**	-0.050	0.047	1		
	Sig. (2-tailed)	0.000	0.181	0.479	0.000	0.475	0.506			
Do you talk about climate change with your friends and family?	Pearson Correlation	-.235**	0.024	0.043	0.122	0.045	-0.047	-.150*	1	
	Sig. (2-tailed)	0.001	0.739	0.542	0.082	0.523	0.503	0.033		
Would you like to learn more about climate change?	Pearson Correlation	0.059	-0.020	-0.027	0.006	-0.003	-.170*	-0.029	0.020	1
	Sig. (2-tailed)	0.407	0.773	0.706	0.933	0.971	0.016	0.684	0.778	

**. Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).

Regression Analysis

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.255[a]	0.065	0.056	0.624	1.561

a. Predictors: (Constant), Which Class are you?, How old are you?
b. Dependent Variable: Do you think climate change is a difficult topic to understand?

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	5.400	2	2.700	6.944	.001[b]
	Residual	77.763	200	0.389		
	Total	83.163	202			

a. Dependent Variable: Do you think climate change is a difficult topic to understand?
b. Predictors: (Constant), Which Class are you?, How old are you?

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	2.284	0.134		17.037	0.000
	How old are you?	-0.282	0.080	-0.287	-3.540	0.000
	Which Class are you?	0.186	0.064	0.234	2.887	0.004

a. Dependent Variable: Do you think climate change is a difficult topic to understand?

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.159[a]	0.025	0.021	0.640	1.162

a. Predictors: (Constant), Which of these things do you think can help the environment?
b. Dependent Variable: What do you think Climate Change means?

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	2.143	1	2.143	5.235	.023[b]
	Residual	82.261	201	0.409		
	Total	84.404	202			

a. Dependent Variable: What do you think Climate Change means?
b. Predictors: (Constant), Which of these things do you think can help the environment?

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	2.139	0.096		22.332	0.000
	Which of these things do you think can help the environment ?	-0.095	0.041	-0.159	-2.288	0.023

a. Dependent Variable: What do you think Climate Change means?